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NSWC CRANE
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Resource Conservation and Recovery Act Facility Investigation (RFI) Report

for

SWMUs 4 (McComish Gorge), 5 (Old Burn Pit), 9 (Pesticide Control/R-150 Tank Area), and 10 (Rockeye)

Naval Surface Warfare Center Crane Division

Crane, Indiana

Volume IV of IV - Appendices C-H

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4-11 Organic and Inorganic Detections in Surface Water, SWMU 4 - McComish Gorge
4-12 Organic and Inorganic Detections in Sediment, SWMU 4 - McComish Gorge
4-13 Human Health Conceptual Site Model, SWMU 4 - McComish Gorge
4-14 Ecological Conceptual Site Model, SWMU 4 - McComish Gorge
5-1 Site Features and Sample Location Map, SWMU 5 - Old Burn Pit
5-2 Cross Section Location Map, SWMU 5 - Old Burn Pit
5-3 Geologic Cross Section A-A', SWMU 5 - Old Burn Pit
5-4 Geologic Cross Section B-B', SWMU 5 - Old Burn Pit
5-5 Potentiometric Surface Contour Map (1-16-01), SWMU 5 - Old Burn Pit
5-6 Organic Detections in Surface Soil, SWMU 5 - Old Burn Pit
5-7 Inorganic Detections in Surface Soil, SWMU 5 - Old Burn Pit
5-8 Organic Detections in Subsurface Soil, SWMU 5 - Old Burn Pit
5-9 Inorganic Detections in Subsurface Soil, SWMU 5 - Old Burn Pit
5-10 Inorganic and Organic Detections in Ground Water, SWMU 5 - Old Burn Pit
5-11 Inorganic and Organic Detections in Surface Water, SWMU 5 - Old Burn Pit
5-12 Inorganic and Organic Detections in Sediment, SWMU 5 - Old Burn Pit
5-13 Human Health Conceptual Site Model, SWMU 5 - Old Burn Pit
5-14 Ecological Conceptual Site Model, SWMU 5 - Old Burn Pit

FIGURES (Continued)

NUMBER

6-1 Site Features and Sample Location Map, SWMU 9 - Pesticide Control/R-150 Tank Area
6-2 Cross Section Location Map, SWMU 9 - Pesticide Control/R-150 Tank Area
6-3 Geologic Cross Section A-A', SWMU 9 - Pesticide Control/R-150 Tank Area
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6-6 Potentiometric Surface Map (1-10-01), SWMU 9 - Pesticide Control/R-150 Tank Area
6-7 Organic Detections in Surface Soil, SWMU 9 - Pesticide Control/R-150 Tank Area
6-8 Inorganic Detections in Surface Soil, SWMU 9 - Pesticide Control/R-150 Tank Area
6-9 Organic Detections in Subsurface Soil, SWMU 9 - Pesticide Control/R-150 Tank Area
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6-15 Ecological Conceptual Model, SWMU 9 (Pesticide Control/R-150 Tank Area)
7-1 Site Features and Sample Location Map, SWMU 10 - Rockeye
7-2 Generalized Hydrogeologic Cross Section, SWMU 10 - Rockeye
7-3 Isopach of Sandstone Units A, B, & C, SWMU 10 - Rockeye
7-4 Upper Surface of the Intermediate Pennsylvanian Shale Contour Map, SWMU 10 - Rockeye
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7-6 Upper Surface of the Pennsylvanian Basal Shale Contour Map, SWMU 10 - Rockeye
7-7 Potentiometric Surface Contour Map Upper Pennsylvanian Wells, SWMU 10 - Rockeye
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7-10 Organic Detections in Surface Soil, SWMU 10 - Rockeye
7-11 Inorganic Detections in Surface Soil, SWMU 10 - Rockeye
7-12 Organic Detections in Subsurface Soil, SWMU 10 - Rockeye
7-13 Inorganic Detections in Subsurface Soil, SWMU 10 - Rockeye
7-14 Inorganic and Organic Detections in Ground Water, SWMU 10 - Rockeye
7-15 Inorganic and Organic Detections in Surface Water, SWMU 10 - Rockeye
7-16 Inorganic and Organic Detections in Sediment, SWMU 10 - Rockeye
7-17 Human Health Conceptual Site Model, SWMU 10 - Rockeye
7-18 Ecological Conceptual Site Model, SWMU 10 - Rockeye

ACRONYM LIST

2,4-D	2,4-Dichlorophenoxyacetic acid
2-ADNT	2-Amino-4,6-dinitrotoluene
4-ADNT	4-Amino-2,6-dinitrotoluene
AET	Apparent Effects Threshold
Ah	Aryl hydrocarbon
AMSL	Above Mean Sea Level
ANOVA	Analysis of Variance
ARCS	Assessment and Remediation of Contaminated Sediment
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	Ambient Water Quality Criteria
BAF	Bioaccumulation Factor
BCF	Bioconcentration Factor
BERA	Baseline Ecological Risk Assessment
bgs	Below Ground Surface
BSAF	Biota-Sediment Accumulation Factor
CAAA	Crane Army Ammunition Activity
CASCO	Central Ammunition Supply Control Office
CCME	Canadian Council of Ministers of the Environment
CDD	Chlorinated dibenzo-p-dioxins
CDF	Chlorinated dibenzofurans
CDI	Chronic Daily Intake
CEC	Cation Exchange Capacity
CLP	Contract Laboratory Program
CMS	Corrective Measures Study
COC	Chain of Custody Form
COCs	Chemical of Concern
COPC	Chemical of Potential Concern
CRAVE	Carcinogenic Risk Assessment Verification Endeavor
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
CTO	Contract Task Order
DAF	Dilution and Attenuation Factor

DI	Deionized
DO	Dissolved Oxygen
DPT	Direct-Push Technology
DQI	Data Quality Indicators
DQO	Data Quality Objectives
EC	Effects Concentration or Environment Canada
Eco-SSL	Ecological Soil Screening Level
EDQL	Ecological Data Quality Level
EEQ	Ecological Effects Quotient
EMR	Environmental Monitoring Report
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ESL	Ecological Screening Level
ESV	Ecological Screening Value
FCM	Food Chain Model
FID	Flame Ionization Detector
FOD	Frequency of Detection
FOL	Field Operations Leader
FSP	Field Sampling Plan
g	gram
GIS	Geographic Information System
gpm	Gallons Per Minute
HASP	Health and Safety Plan
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HSA	Hollow-Stem Auger
HSWA	Hazardous and Solid Waste Amendments
IA	Installation Assessment
IAS	Initial Assessment Study
ICP	Inductively Coupled Plasma
ICR	Incremental Cancer Risk
IDEM	Indiana Department of Environmental Management

IDW	Investigation Derived Waste
IEUBIK	Integrated Exposure Uptake Biokinetic
ILCR	Incremental Lifetime Cancer Risk
IRIS	Integrated Risk Information System
kg	kilograms
L	liter
LC	Lethal Concentration
LCS	Laboratory Control Sample
LEL	Lowest-Effect Level
LOAELs	Lowest-Observed-Adverse-Effects Levels
LOEC	Lowest Observed Effect Concentration
LOGC	Lowest Observed Effects Concentration
µg	micrograms
MATC	Maximum Acceptable Toxicant Concentration
MCL	Maximum Contaminant Levels
MENVIQ	Ministere de l'Environnement du Quebec
MEQ	milliequivalence
MET	Minimal Effect Threshold
mg	milligrams
MI	Mobility Index
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NACIP	Navy Assessment and Control of Installation Pollutants
NAD	Naval Ammunition Depot
NAD	North American Datum
NCEA	National Center for Environmental Assessment
NEC	No Effect Concentration
NECC	Nutrient and Energy Cycling Check
NEESA	Naval Energy and Environmental Support Agency
NEL	No-Effect Level
ng	nanograms
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NOAELs	No-Observed-Adverse-Effects Levels
NOEC	No Observed Effect Concentration
NSWC	Naval Surface Warfare Center

NTUs	Nephelometric Turbidity Units
OESA	Ordnance Environmental Support Agency
OMOE	Ontario Ministry of Environment and Energy
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
ORNL	Oak Ridge National Laboratory
ORP	Oxidation Reduction Potential
OSWER	Office of Solid Waste and Emergency Response
PAET	Probable Apparent Effects Threshold
PAHs	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PEC	Probable-Effects Concentration
PEL	Probable-Effects Level
PID	Photoionization Detector
POC	Particulate Organic Carbon
PPE	Personal Protective Equipment
ppm	parts per million
PRG	Preliminary Remedial Goal
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RFI	RCRA Facility Investigation
RME	Reasonable Maximum Exposure
RPD	Relative Percent Difference
RQD	Rock Quality Designation
SCS	Soil Conservation Service
SCV	Secondary Chronic Value
SD	Sediment
SdSL	Sediment Screening Level
SEL	Severe-Effect Level
SERA	Screening-Level Ecological Risk Assessment
SMCL	Secondary Maximum Contaminant Level
SOP	Standard Operating Procedure

SQAL	Sediment Quality Advisory Level
SQB	Sediment Quality Benchmark
SQG	Soil Quality Guideline
SSL	Soil Screening Level
SSSL	Surface Soil Screening Level
SVOC	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
SWSL	Surface Water Screening Level
TAL	Target Analyte List
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	Tetrachlorodibenzofuran
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TEC	Threshold-Effects Concentration
TEF	Toxic Equivalence Factors
TEL	Threshold-Effects Level
TEQ	Toxicity Equivalent
TET	Toxic Effect Threshold
TIC	Tentatively Identified Compound
TNT	2,4,6-Trinitrotoluene
TOC	Total Organic Carbon
TOM	Task Order Manager
TPH	Total Petroleum Hydrocarbons
TRV	Toxicity Reference Value
TRW	Technical Review Workgroup
TSD	Treatment, storage or disposal
TtNUS	Tetra Tech NUS, Inc.
U.S. ACE	U.S. Army Corps of Engineers
U.S. EPA	U.S. Environmental Protection Agency
UCL	Upper Confidence Limit
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
UTL	Upper Tolerance Level
VOC	Volatile Organic Compound
WES	Waterways Experiment Station
WP	Work Plan

WQC	Water Quality Criteria
WQS	Water Quality Standards

APPENDIX C.1

SWMUs 4, 5, 9, AND 10
SITE LOGBOOK 1330

TITLE NSWC CRANE

PROJECT NO. N7141

BOOK NO. 1330

MONDAY 11.13.00

Work continued from Page WEATHER: ON SITE OVERCAST 45-60°F

0800 KEITH SIMPSON & BOB BALKOVEC @ PGH AIRPORT TERRY ROJAHN'S MOTHER IS ILL AND HIS CANCELED HIS TRAVEL PLANS THIS SHIFT.

1400 ON SITE TALK WITH TOM BRENT & CHRIS FREEMAN ABOUT UXO CLEARANCE FOR SITE 4 & 10, CHRIS IS STILL TRYING TO TRACK DOWN "ON BASE" CLEARANCE BUT WE MAY NEED OUR OWN UXO PERSON ON SITE WHEN WE DRILL/DPT.

SITE TOUR WITH BOB B. & DRILLERS, TIM SANDERS & TED KEEN. TO SWMU 4, 5 & 9. RETURN TO BLD 3245 RALPH B. CALLED WE WILL NOT NEED A UXO PERSON ON SITE FOR SWMU 4 & 10 A SECTION WILL BE ADDED TO THE H&S/WP

TALKED, WITH BILL GATES ABOUT WORK SCHEDULE KS & BB UNPACKING EQUIPMENT CLEANING UP WORK SPACE @ BLD 3245

1920 DEPART SITE TO STORE FOR SUPPLIES WATER

SIGNATURE [signature] DATE 11.13.00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

— DAILY SUMMARY —

ON SITE; T+NUS: KEITH SIMPSON
BOB BAKROVEC

BOWSER-MORNER: TIM S.
TED R.
TIM BOEHMER

- HEALTH & SAFETY TRAINING & DOCUMENTATION FOR ALL OF THE ABOVE PERSONNAL (5)
- 4 WELL @ SWMU 9 REDEVELOPED
- ALL MW & SBs LAYED-OUT @ SWMU 5 & 9

ALSO SEE LOG BOOK #2494 AND FIELD FORMS

TITLE NSWC CRANE

PROJECT NO. N 7141

BOOK NO. 1330

TUES 11.14.00

Work continued from Page WEATHER: OVERCAST 28-37°F

0625 KEITH S. & BOB B. DEPART HOTEL FOR BASE TO BLD 41 TRACK DOWN FED EX SHIPPMENT FROM US ENVIRONMENTAL. TO BLD 3245 CAL/CHECK EQUIP. PREP. FOR BOWSER-MORNER HEALTH & SAFETY

0745 CALL MARK ZINDER CRANE P.W. TO CHECK ON UTILITY CLEARANCES. MARK SAID THE ARE MOVING ALONG THE GAS CO. HAS BEEN OUT. THEY NEED TINUS TO LAY-OUT LOCATIONS THEN WE CAN COMPLETE CLEARANCE.

0825 KS TO SWMU 9 TO START LAY-OUT

1030 TIM BOEHMER (BOWSER-MORNER) QUICK SITE TOUR SWMU 9, 4 & 5.

1100 TO BLD 3245 FOR HEALTH & SAFTY TRAINING R. SIMPSON CONDUCTED TRAINING & COLLECTED COPIES OF TRAINING/MED. CERTS. FROM ALL PERSONNAL (5) (KS, BB, TK, TS, TK)

1230 RETURN TO SITE 9 FOR LAY-OUT BOB B. CONTINUE WITH DEVELOPMENT.

1415 COMPLETE LAY-OUT @ SWMU 9 TO SWMU 5

1630 COMPLETE LAY-OUT @ SWMU 5 TO BLD 3245 PAPER WORK & CLEAN EQUIP.
TALK WITH TOM BRENT MEETING ON WED @ 0800 IN BLD 3260

1850 DEPART SITE TO HOTEL

Work continued to Page

SIGNATURE [signature] DATE 11.14.00

DISCLOSED AND UNDERSTOOD BY DATE WITNESS DATE

WED 11.15.00

Work continued from Page WEATHER: SUNNY 27-45°F

0620 KS & BB DEPART HOTEL TO BLD 3245 ON BASE

0710 BOWSER-MORNER ARRIVES TED K, TIM B & TIM S.

0720 BOB B. TO SWMU 9 & MW DEVELOPMENT
KS & TIM B. TO SWMU 10 TO LOOK AT ACCESS FOR DPT WORK

0800 KS TO BLD 3260 MEETING WITH: BILL GATES, TOM BRENT, BASE SECURITY, BASE SAFETY & ARMY UXO (FOR ROCKEYE ACCESS ON WEEKENDS)

ACTION ITEMS T+MWS:

- NEED TO CALL BASE FIRE DEPT. FOR ALL HOT WORK PERMIT, GEN, WELDING, POWER WASHERS ETC
  THE PERMIT ARE SITE BY SITE
  FIRE DEPT 812 854 1235

- ALL GAS CANS NEED TO STAY ON TRUCK & BE TAKEN OFF SITE OR PLACED IN FLAMMABLE LOCKER BEHIND BLD 3260, NEED KEY FROM TOM B.

✓ - BASE PASSES WILL WORK WITH TOM B. FOR NEW/RENEWED PASSES

✓ - KS NEEDS TO SHOW TOM B. DRILL/DPT LOCATIONS WHERE DOZER WORK WILL BE REQUIRED

OTHER ITEMS: BILL G./TOM B. WILL WORK WITH RALPH ON WELL TAGS, HOW MANY & HOW TO BILL (BY EXISTING CTO OR NEW CTO)
ALSO GIS QUESTIONS

END OF MEETING @0920

0950 KS, TOM B. & PETER C. TOL TEST TO ROCKEYE AND CHECKED LOCATION 10SB03 ~~to~~ TEST IS WORKING IN AREA AND WE WILL NEED TO CALL PETE FOR ACCESS

1050 KS TO SWMU 4 TO LAY OUT LOCATIONS

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 11.15.00

DISCLOSED TO AND UNDERST D BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS BOB BALKOVEC
KEITH SIMPSON

BOWSER-MORNER TIM S.
TED K.
TIM B. DEPARTED @ 11:00

- CTO 10 JOB START-UP MEETING @ BLD 3260
  SEE PG 5
- COMPLETE LAY-OUT OF ALL MW/SBs
- 7 MWs REDEVELOPED

SEE ALSO LOG BOOK # 2494 AND FIELD NOTES

Work continued from Page

1330 COMPLETE LAY OUT OF SWMU 4 TO BLD 3245
PHONE MESSAGES @ BLD 3245
- LINDA KARSONOVICH LAB SHIPPED BOTTLES ON THE 9TH OF NOV S/B HERE THUR.
- MATT S. TALKED WITH JAMES MAY WILL MEET ON SITE ON 11/29/00 & DRILL AT ANY SWMU (4,5,9) ON 11/30/00 MOST LIKELY START AT SWMU 5

1415 RS TO ROCK-EYE TO START LAY-OUT
1600 COMPLETE LAY-OUT OF ROCKEYE RETURN TO BLD 3245. BOC GASES DROPPED OFF 1 CYL. OF HYDROGEN FOR THE FID.
BOB & DRILLERS RETURN TO BLD 3245
CLEAN EQ, PAPER WORK
1733 CALLED LAUCKS LAB TALKED WITH HUGH PRENTICE OUR BOTTLE ORDER IS NOT ON SITE IT WAS ORDERED ON 11-1-00 FOR ~~DELE~~ DELIVERY ON 11-9-00. THIS DID NOT EFFECT THE JOB BUT HAS HAPPENED ONCE OR TWICE BEFORE ON CTO 38/48. I EXPLAINED TO HUGH THAT WE CAN NOT HAVE THIS HAPPEN AGAIN.
1805 DEPART BASE TO LOWE'S FOR SUPPLIES TO HOTEL

— DAILY SUMMARY —

ON SITE; T + NUS: KEITH SIMPSON
BOB BALKOVEC

BOWSER-MORNER TED K.
TIM S.

- RECEIVED PA BOTTLE ORDER FROM LAUCKS
- 6 MWS DEVELOPED

SEE ALSO LOG BOOK #2494 & FIELD NOTES

TITLE NSWC CRANE
THUR. 11.16.00

PROJECT NO. N7141
BOOK NO. 1330

Work continued from Page WEATHER: OVERCAST 40-45°F

0620 DEPART HOTEL TO SITE KS BB
0700 MEET DRILLERS TIM S. & TED R. PREP. FOR DEVELOPMENT
0720 KS CALLED MARK ZINDER CRANE PW BLD 56
TO DISCUSS THE UTILITY CLEARANCE AT THE 4 SWMU
I TOLD MARK THAT ALL LOCATIONS ARE LAYED-OUT.
HE SAID ALL LOCATIONS WILL BE CLEARED BY NOV 27, 00
AND SIGN FOR/PICK-UP PERMITS ON THAT DAY.
MARK ASK THAT I CALL FRIDAY TO SEE IF THEY
HAVE ANY QUESTIONS
0820 KS TO SWMU 9 ADJUST 09T05 MW
TO SWMU 5 AND WORK WITH BOB & MW DEV.
0915 SHOWED RICH FROM PW AROUND SITES 4 & 5
AND DISCUSSED CLEARANCE AT 9 & 10. RICH IS CLEARING
WATER & SEWAGE HE WILL SIGN OFF ON SITES
4, 5 & 9 TODAY
1045 PHONE CALLS SHARON CURRIE, RALPH B., TIM B.
BOWSER-MORNER
TO BLOOMINGTON FOR KEY TO BLD 3245 (OUR DOOR)
& SOME OFFICE SUPPLIES
1425 RETURN TO BLD 3245 ~~SORT~~ RC SORT BOTTLE ORDER
FROM LAUCKS
1615 BOB & DRILLERS RETURN FROM MW DEVELOPMENT
PAPER WORK & CLEAN EQUIP. AND WORK ROOM
1800 KS & BB TO BQ TO SEE IF ANY ROOMS
OPENED UP FOR NEXT SHIFT
OFF SITE TO HOTEL

SIGNATURE [signature] DATE 11.16.00
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS; BOB B.
KEITH S.

BOWSER-MORNER TIM S.
TED K.

RS ACCESS/TOUR WITH TOM B & TRENT OSMON

3 MW's DEVELOPED

TRENT CALLED 11-22-00 @ 1500 STEVE GAVE US OK TO REMOVE A FEW TREES LARGER THAN 3". ALSO, IF WE RUTT-UP/TEAR-UP THE GROUND APPLY STRAW TO COVER DAMAGE AREA

TITLE NSWC CRANE **PROJECT NO.** N7141 **11**

FRIDAY 11.17.00 **BOOK NO.** 1330

Work continued from Page WEATHER OVERCAST & SNOW 25-30°F

0620 KS & BB CHECK OUT OF HOLIDAY INN TO BASE

0700 KS, BB, TIM S. & TED K. @ BID 3245
BB & DRILLERS TO SITE 4 & MW DEVELOPMENT

0810 K.S., TOM BRENT AND TRENT OSMON (FORESTER FROM CRANE NATURAL RESOURCES DEPT.) TO SWMU 4, 5 & 9.

OUT COME OF TOUR:

- WE CAN CUT ANY TREE ≤3" Ø @ 4.5' HIGH
- DAVE POYNTER (ALSO OF CRANE NAT'L RES.) GAVE US A OK TO USE THE DOZER AS LONG AS WE DON'T "DIG UP" THE SOIL. PUSH WITH THE BLADE UP ≈ 3-6".
- AT 09TO2 & THE 3 WELLS @ SWMU 4 TRENT WILL NEED TO TAKE HIS BOSS STEVE TO THE LOCATIONS NEXT WEEK FOR THE OK TO CUT A FEW TREES UPTO 6" Ø @ 4.5'
I WILL CALL TRENT NEXT WED. TO CHECK ON RESULTS OF STEVE'S SITE TOUR

1045 RETURN TO BID 3245 PAPER WORK PREP FOR END OF SHIFT
BOB & DRILLERS RETURN TO BID 3245 3 MWs DEVELOPED.

1210 DRILLERS DEPART FOR HOME

1235 KS & BB TO AIRPORT / HOME

END OF SHIFT

Work continued to Page

SIGNATURE [signature] DATE 11.17.00

DISCLOSED T AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

TRAVEL

ON SITE: T+NUS KEITH S., BOB B.
TERRY R.

BOWSER-MORNER TED K
TIM S.
TIM B.

PREP EQUIPMENT, PAPER WORK

SEE ALSO: LOG BOOK #2494
COC & SAMPLE LOG SHEETS

MONDAY 11.27.00

Work continued from Page WEATHER: ON SITE, OVERCAST 29-36°F
KEITH SIMPSON, TERRY ROJAHN & BOB BALKOVEC @
PGH AIRPORT TO BLOOMINGTON HOLIDAY INN
1400 @ BASE PASS & ID PICK-UP "NEW" PHOTO IDS GOOD
THRU END OF 2001.
1430 TO BLD 3245 PREP FOR TUES SAMPLING.
CALLED PW, MARK ZINDER FOR DIG PERMITS
HE STILL NEEDS THE BASE PHONE CLEARANCE
MARK TOLD ME HE WOULD HAVE THE PHONE
CO. REP. ON SITE @ 0700 TUE TO CLEAR
SITE AND HE WILL SIGN OFF ON PERMIT AT
THAT TIME.
1440 CALLED ON BASE FIRE DEPT. FOR HOT WORK
PERMITS TALKED WITH LARRY WEBB, FOR
SWMU 4, 5 & 9 WE DO NOT NEED A PERMIT
UNLESS WE HAVE A OPEN FLAME. GENERATOR IS
OK WITHOUT A PERMIT. @ ROCKEYE WE NEED
PERMIT FOR GEN. & OPEN FLAME
WE ALSO NEED FIRE EXTINGUISHERS
20 LB. ABC 2A 8BC RATING
ALSO METAL GAS CANS
1600 RS TO SWMU 4 MET TED K. TO
DISCUSS ACCESS TO MW LOCATIONS
WE WILL NEED TO CUT A RAMP DOWN HILL
TO 04 TO 3 RS TO CALL NAT'L RESOURCES
FOR OK TO GRADE RAMP.
1720 RETURN TO BLD 3260
1850 DEPART BASE FOR SAM'S CLUB FOR NEEDED SUPPLIES
2000 TO HOTEL

— DAILY SUMMARY —

ON SITE: T+ NUS; KEITH S.
BOB B.
TERRY S.

BOWSER-MORNER TED K.
TIM S.
TIM B.
DENNIS SINK
ON SITE @ 1200

6 SBs COMPLETED @ SWMU 4

SHIPPED 2 COOLERS TO LAUCKS LAB

SEE ALSO: LOG BOOKS 2494 & 2493
SAMPLE LOG SHEETS, COCs

TITLE NSWC CRANE **PROJECT NO.** N7141 **15**

BOOK NO. 1330

TUESDAY 11.28.00

Work continued from Page WEATHER: 27 - 38°F NO RAIN

0700 KS, TR & BB @ BLD 3245 PREP FOR SAMPLING
DRILLERS TIM S. & TED K. ON SITE LOAD TRUCK
FOR SAMPLING @ SWMU 4
0735 KS TO BLD 56 FOR DIG PERMITS
PICKED UP PERMIT FOR SWMU 4 TO SWMU 4
BOB & TERRY SET-UP ON 04SB05
DPT HAMMER IS LEAKING HYD. FLUID USING
BLOTTERS TO CATCH DRIPS TALKED WITH TED &
TIM THEY WILL REPAIR/REPLACE HAMMER BY WED.
1000 KS TO NATURAL SOURCES TALKED WITH STEVE
ANDREWS ABOUT SWMU 4 & 9 HE SAID THE
TREES ARE NOT A PROBLEM @ THE 2 SITES
1015 TO BLD 2516 TALKED WITH DAVE POYNTER
AND HE GAVE ME A OK TO CONSTRUCT A
RAMP FOR 04TO3
1050 CALLED FIRE HOUSE # 1235 TALKED WITH STEVE
AND ASK IF WE COULD USE BASE FIRE EXTINGUISHER
TO SAVE ≈ $250 (COST OF 2) STEVE CHECKED
WITH LARRY WEBB AND WE GOT A OK TO USE
A 10LB EXTINGUISHER IS OK
1105 RETURN TO SWMU 4
LUNCH
1215 @ SWMU 4 CONTINUE ON SBs
KS TO PW CHECK ON DIG PERMIT FOR
SWMU 5, TO GAS STATION ICE/GAS
1425 TO BLD 3245 RB112800 01 BATCH ON PLASTIC TRAVELL
@ 1520
1635 TERRY & BOB @ BLD 3245 PACKING SAMPLES, PAPER WORK
PREP FOR WED. SAMPLING
1820 TO FED EX

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 11.28.00

DISCLOSED T AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS TERRY R., BOB B.
KEITH S. MATT C. @ 1420
ACE JAMES MAY @ 1425
BOWSER-MORNER TIM S.
TIM B.
TED K.
DENNIS S.

COMPLETED SBs & SS LOCATIONS @ SUMU 4
2 OF EACH

4 SBs COMPLETE @ SUMU 5

SHIPPED 3 COOLERS TO LAUCKS LAB
DIOXINS HELD ON ICE (30 DAY HOLD)

SEE ALSO: LOG BOOK # 2494 &
SAMPLE LOG SHEETS + COCs

TITLE NSWC CRANE **PROJECT NO.** N7141 **17**

BOOK NO. 1330

WED 11.29.00

Work continued from Page WEATHER: OVERCAST LT. RAIN PM 28-38°F

0700 ON SITE KS TR & BB WITH BOWSER - MORNER (4) CAL. FID PREP. EQUIPMENT

0745 TO SWMU 4 KS SAMPLING 045S02

0935 TO 045S01

1010 SB, & SS COMPLETE @ SWMU 4

1015 TO SWMU 5 & SET-UP KS TO PW FOR SWMU 5 DIG PERMIT, NO LUCK SHOULD BE COMPLETE @ 1130 TO SWMU 5. LOAD EQ.

1045 TO BLD 3245 SAMPLES ON ICE & PAPER WORK TO LUNCH TO PW PICKED-UP PERMITS FOR SWMU 5 & 9.

1220 TO SWMU 5 SAMPLING 05SB01 & 07 KS TO BLD 3245 PAPER WORK + RB11290001 ON A OPT 4' LINER (PLASTIC) @ 1510

1605 TR & BB RETURN TO BLD 3245 PAPER WORK CLEAN EQUIPMENT

1745 MC & BB TO WALMART FOR NEED SUPPLIES

1750 KS & TR TO FEDEX TO HOTEL

— DAILY SUMMARY —

ON SITE: TTNUS; KEITH S.
BOB B.
TERRY R.
MATT C.

BOWSER MORNER; TIM B.
TIM S.
TED R.
DENNIS S.

A.C.E. JAMES MAY DEPARTED @ 16[illegible]

6 TOTAL SBs COMPLETED SUMM 5 & 9

MW 04T03 INSTALLED

SHIPPED: 1 COOLER TO TRIANGLE
2 COOLERS TO LAUCKS

ALSO SEE LOG BOOKS 2494, 2447 & 2493
+ SAMPLE LOG SHEETS,
BORING LOGS + COCs

THURSDAY 11-30-00

Work continued from Page WEATHER:

0730 KS, TR, BB & MC @ BLD 3245 WITH DRILLERS (4)
TR GIVING SITE H&S TRAINING (SEE LOG BOOK #2493)
KS & BB EQ. CAL PREP FOR SAMPLING.

0815 BOB, KEITH & TERRY TO SWMU 5 FOR SB-DPT SAMPLIN

0815 JAMES & MATT TO SWMU 4 FOR HSA DRILLING
KS SAMPLING 05SB030002 ALSO COLLECTED DUP &
MS/MSD.
COMPLETE SBs @ SWMU 5 WE WILL COME BACK NEXT
SHIFT AND COMPLETE 05SB04 & 08 USING HAND TOOLS
(JACK-HAMMER) TUFF ACCESS.

1040 TO SWMU 9 START @ 09SB01

1100 KS TO BLD 3245 CALLED PGH WAREHOUSE FOR
SUPPLY ORDER, CALLED US ENVIRONMENTAL FOR TIPS
ON COLD START OF FID

1140 RETURN TO SWMU 9
LUNCH

1210 RETURN TO SWMU 9 KS SAMPLING 09SB03002 ALSO
COLLECTED DUP & MS/MSD @ 09SB030002

1407 KS TO BLD 3245 (PICK-UP ICE ON THE WAY) CALLED
LAUCKS ORDERED COOLERS 20.

1435 CALLED US ENVIRONMENTAL & ORDERED A 3RD FID
ONE OF OUR UNITS IS "ACTING-UP".
COLLECTING RB113000 01 DPT STEEL CUTTING
SHOE @ 1515

1600 TR & BB @ BLD 3245 PAPER WORK, PACK SAMPLES
FOR SHIPPMENT, CLEAN EQ. RESTOCK SUV.

1720 MATT C. @ BLD 3245

1730 TOM-RALPH CALLED THE LAB, LAUCKS, CAN NOT
TAKE ANY MORE SOIL SAMPLES. WE WILL SWITCH
TO MW DEVELOPMENT FRI, SAT & SUN.

— DAILY SUMMARY —

ON SITE: T+NUS BOB B.
KEITH S.
TERRY R.
MATT C.

BOWSER-MORNER TIM B. DEPARTS @ 1200
TIM S.
TED R.
DENNIS S.

5 EXISTING MW DEVELOPED
1 MW INSTALLED 04TO2

SEE ALSO: LOG BOOK #2447 & 2494
& SAMPLE LOG SHEETS

FRIDAY

Work continued from Page WEATHER: 30-37°F OVERCAST

0710 KS, TR, BB & MC AT BLD 3245 PREP. FOR MW DEVELOPMENT MATT TO SWMU 4 FOR DRILLING

0805 TR & BB TO SWMU 4 & 5 FOR EXISTING MW DEVELOPME
KS ORDERED FIRE EX. FROM LAB SAFETY
TO BLD 41 CHECK ON SHIPPMENTS FROM LAUCKS
NO LUCK, NEED TRACKING # FROM LAUCKS
TO PW CHECK ON DIG PERMIT FOR ROCKEYE
NOT COMPLETE MARK SAID I SHOULD HAVE IT
MON/TUE.

0905 TO BQ MADE RESERVATIONS FOR TR, BB & KS FOR
SHIFT 1.2 → 10.01 CONF. #s 102690, 91 & 92
TO BLD 3173 DEB HUPP PHONE 812 854 5214 DEB CAN
HAVE OUR FED EX 90 DIRECT TO US @ 3245, SHE IS
OFF TODAY I WILL CALL MONDAY.
TO SWMU 9 CHECK ON DRILL LOCATIONS ACCESS/
UTILITIES.

1010 TO SWMU 4 BOB & TERRY W/TED K. DEVELOPING LAST
EXISTING WELL
LUNCH

1210 TO BLD 3245 UNPACK SUPPLIES, PGH WAREHOUSE, US ENVIR., EXPLOSIVES
TEST KITS & LAB SAFETY.
TO NATURAL RESOURCES CHECK ON SUNDAY HUNTING AREAS
WE WILL BE OR AT ALL SWMU BUT 4

1445 CALLED RALPH B. @ ROCKEYE IF WE SEE CRYSTALS
OR FOREIGN MATERIAL STOP SAMPLING AND RUN THE
FIELD TEST FOR EXPLOSIVES

1535 CALLED LAUCKS LAB ASK HUGH P. TO FEDEX
TRIP BLANKS TO THE HOTEL FOR SAT.
TR, BB & MC RETURN TO BLD 3245
CLEAN EQ. & PAPERWORK

1815 DEPART SITE

SI NATURE [signature] DATE 12-1-00
DISCL SED T AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T + NUS, BOB B.
KEITH S.
MATT C.
TERRY R.
TIM S.
TED K.
DENNIS S.

BOWSER-MORNER,
ALAN WOLFE
JARED ROGERS } ON SITE @ 1700

DEVELOPED 8 MW WELLS @ ROCKEYE

2 MWs INSTALLED 04T01 & 05T03

ALSO SEE: LOG BOOKS 2494, 2447 & 2493
AND SAMPLE LOG SHEETS/BORING LOGS
DEV. LOG SHEETS + COCs

TERRY R. H&S TRAINING TO JARED & ALAN
@ 1715

TITLE NSWC CRANE

PROJECT NO.

BOOK NO.

SATURDAY 12.2.00

Work continued from Page WEATHER: SNOW AM 29-35°F

0725 KS BB, TR & KS ON SITE w/DRILLERS

0800 MATT TO SWMU 4 FOR DRILLING

0810 TR, BB & KS TO SWMU 10 FOR WELL DEVELOPMENT (2 CREWS)

SET-UP & DEVELOP @ 10C26P3 TR @ 10C26

1010 COMPLETE 10C26P3 KS & BB TO 10-02

COMPLETE 10-2 TO LUNCH

1230 GAS UP SUV TO 1043P3 COMPLETE ~~1043P3~~ 10C41P3 KS

1330 TO 10C37P3 COMPLETE 10C37P3

1435 TO BLD 3245 CALLED SECURITY FOR ACCESS TO

1500 SWMU 10

1505 ACCESS TO SWMU 10 SET-UP ON 10C35P2

COMPLETE 10C35P2

RETURN TO BLD 3245 CLEAN EQUIPMENT, CHARGE EQUIPMENT PAPER WORK

1715 T.R. GIVING H&S SITE TRAINING TO JARED & ALAN

1825 DEPART SITE TO HOTEL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] **DATE** 12-2-00

DISCLOSED TO AND UNDERSTOOD BY **DATE** **WITNESS** **DATE**

— DAILY SUMMARY —

ON SITE: TTNUS; KEITH S.
TERRY R.
MATT C.
BOB B.

BOWSER-MORNER TED K.
TIM S.
DENNIS S.
ALAN W.
JARED R.

DEVELOPED 4 EXISTING
INSTALLED 1 MW 0ST02

SEE ALSO LOG BOOK # 2494, 2447 & 2493
AND DEVELOPMENT LOGS, BORING LOGS

SUNDAY 12-3-00

Work continued from Page WEATHER: 25-37°F SUNNY

0725 KS, TR, BB & MC @ BLD 3245 PREP. FOR DRILLING HSA & BEDROCK, BOB & MATT. KS & TR PREP. FOR MW DEVELOPMENT

0800 KS & TR WITH TED K. CHK SECURITY FOR ACCESS TO SWMU 10 TO SWMU 10 SET-UP & DEVELOP @ 10C52 & 1003 COMPLETE 10C52 @ 1034

1120 COMPLETE 10.03 TO BLD 3245 DECON RESTOCK SUV

1145 TO SECURITY AND CHECK IF WE CAN DRILL @ OST01 TALKED WITH THE HUNT MASTER NO WORK TODAY (RUSTY HUNT MASTER) NEXT SUNDAY IS THE LAST SUNDAY FOR RIFLE HUNTING

1215 KS & TR TO LUNCH @ BLD 3245 DECON EQ.

1240 TO SWMU 10 SET-UP @ 10C35 COMPLETE 10C35

1440 TO 10C31 SET-UP & DEVELOP COMPLETE RETURN TO BLD 3245 PAPER WORK & PREP.

1545 FOR OPT ON MONDAY

1650 DEPART SITE

— DAILY SUMMARY —

ON SITE: T+ NUS KEITH S.
MATT C.
TERRY R.
BOB B.

BOWSER-MORNER TIM B. ARRIVED @ 1030
TIM S.
TED K.
DENNIS S.
ALAN W.
JARED R.

6 SBs COMPLETE @ SWMU 9
1 MW INSTALLED @ SWMU 5
2 MWs INSTALLED @ SWMU 9

SHIPPED 2 COOLERS TO LAUCKS

SEE ALSO: COCs, SAMPLE LOG SHEETS,
BORING LOGS
LOG BOOKS 2494, 2447

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

MONDAY 12.4.00

Work continued from Page WEATHER: 26-37°F FOG, OVERCAST LT SNOW

0703 KS, MC, TR & BB ON SITE w/DRILLERS
CAL EQ. PREP FOR SAMPLING & DRILLING

0750 BOB TO SWMU 5 05T01
MATT TO SWMU 9 MW BEDROCK DRILLING
KS & TR TO SWMU 9 DPT
COMPLETE 3 BORINGS 09SB07, 09 & 11
MS/MSD @ 09SB09 0810
FD @ 09SB04 0002

1100 RETURN TO BLD 3245 RESTOCK SUPPLIES, PAPERWORK
TO LUNCH

1200 TO SWMU 9 09SB07, 06 & 05

1530 PICK-UP BAGGED ICE TO BLD 3245 PACK, PAPER WORK
CHARGE EQ. CLEAN SUV

1750 BOB & TERRY TO FEDEX

1850 KS & MC OFF SITE TO HOTEL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 12.4.00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+ NYS; KEITH S.
BOB B.
MATT C.
TERRY R.

BOWSER-MORNER TIM B.
TED K.
ALAN W.
JARED R.
DENNIS S. > DEPART @ 1100
TIM S.

1 MW INSTALLED @ SWMU 9

7 SBs COMPLETE 1 @ SWMU 9
6 @ SWMU 10

2 COOLERS SHIPPED TO LANCIS

SEE ALSO: 109 BOOKS 2494 & 2447
AND SAMPLE 109 SHEETS + COCs

TUESDAY 12.5.00

Work continued from Page WEATHER: 38 DWN TO 22°F SUNNY

0700 KS, TR, BB & MC @ BLD 3245 CAL. EQ., LOAD TRUCKS
DRILLERS ON SITE.
0740 MATT TO SWMU 9 FOR MW DRILLING
↓ TR & BB TO SWMU 9 TO COMPLETE SBs
KS TO SWMU 10 FOR UTILITY CLEARANCE
0825 KS TO BLD 3245 ROCKEYE IS CLEARED I NEED TO
GO TO PW & PICK-UP PAPER WORK.
PICK-UP DIG PERMIT FOR ROCK-EYE
KS, BB & TR w/ TED K. TO SWMU 10 FOR DPT
1200 SAMPLED 4 SB LOCATIONS, TO LUNCH
1250 TO BLD 3245 RESTOCK TO SWMU 10
1510 COMPLETE 3 SBs @ SWMU 10
TO BLD 3245 RB120500 01 @ 153 ON DPT CUTTING
SHOE. PAPER WORK, CLEAN-UP
1610 KS TO SWMU 4, 5 & 9 INSPECTION OF INSTALLED
MWs 9 TOTAL 3@ SWMU 4, 3@ SWMU 5 &
3 @ SWMU 9.
— LOOSE ENDS —

☑ 09T02 LOCK + CLEAN-UP: 4X4 & CONCRETE
☑ 09T05 LOCK
☑ SWMU 4 EMPTY DRUMS & CLEAN-UP DECON
PAD
ALL OTHER LOCATIONS LOOK GOOD
1735 DISCUSS THESE WITH TED B. & MATT C.
WILL BE TAKEN CARE OF BY WED PM.
1810 OFF SITE TO HOTEL

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

WED 12.6.00

Work continued from Page WEATHER: 25 - 32°F

0630 CHECK OUT OF HOLIDAY INN TO SITE

0710 @ BLD 3245 KS, BB, MC & TR + DRILLERS DISCUSSING SITE RESTORATION WITH BOWSER-MORNER WE NEED TO SEED & COVER w/ STRAW A NUMBER OF ACCESS/WELL AREAS NEXT SHIFT.

COPING NOTES TO RETURN TO OFFICE

CLEANING WORK SPACE.

KS, BB, TR & MC TO AIRPORT HOME

END OF SHIFT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-6-00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS MATT C.
TERRY R.
KEITH S.
BOB B.

ARMY CORE. ENG. JAMES MAY

— TRAVEL DAY —

MONDAY 12.11.00

Work continued from Page WEATHER: RAIN ALL DAY, HEAVY @ TIMES, 33-38°F

KS, MC, TR & BB TO POH AIRPORT FOR FCT. TO
1400 INDY PICK-UP RENTAL SUVS TO CRANE BLD 3245
FAX MACHINE ARRIVED
1445 JAMES MAY ACE @ BLD 3245
CALLED FARM BUREAU CO-OP 812 683 2809
OR 1800 253 7431 - FROM BASE TAKE 45 S
TO 231 S. INTO HUNTINGBURG IN ≈45 MIN.
WINTER WHEAT $4.50 FOR 50 LBS. USE 2 100 LBS/
ACRE. CALLED DENNY FOR STRAW WE WANT
100 BALLS DELIVERED 2$2.50 + DELIVERY PHONE
295-6911 (CEL)
CALLED TRENT @ NATURAL RESOURCES AND ASK
WHAT SEED TO USE ON ACCESS ROADS. TRENT
ASK US TO USE WINTER WHEAT OR ANNUAL RYE
FAX MACHINE ARRIVED W/A PAPER JAM. CALLED
ARRON OFFICE EQ. 703 750 0787 AND TALKED
WITH JOHN NYE IF WE CAN NOT UNJAM MACHINE
THEY WILL SEND NEW FAX MACHINE ALSO WE WILL
NOT BE CHARGED FOR THIS ONE.
1720 TO BLD 3260 TALKED WITH PHIL KEITH ABOUT
DISPOSAL OF USED CR^{+6} REAGENTS BASED ON
MSDS REAGENTS CAN BE DILUTED WITH TAP
WATER AND DUMP DOWN DRAIN @ BLD 3245
PHILL GAVE US THE OK TO DISPSOSE OF REAGENTS
BOB B. DUMP REAGENTS
FAX REPAIRED TERRY & MATT REPAIRED & SET-UP
1810 TO BQ

— DAILY SUMMARY —

ON SITE: T+NUS; KEITH SIMPSON
MATT COCHRAN
BOB BAKOVEC
TERRY ROJAHN

BOWSER-MORNER; TED R.
TIM B. TIM S.
ON SITE ≈1500
ALAN W.
JARED R.

USACE WES; JAMES MAY
OFF SITE ≈ 12:00

INSTALLED MW 09T03

3 DPT SBs @ SWMU 10

SEE ALSO LOG BOOKS # 2494 & 2447
AND SAMPLE LOG SHEETS/BORING LOGS
+ COCs

TUESDAY 12-12-00

Work continued from Page WEATHER: SUNNY COLD 10 - 22°F

0700 MC, BB, TR & KS @ BLD 3245 PREP. FOR DRILLING @ SWMU 9 & OPT @ SWMU 10

0725 DRILLERS ON SITE (4)

0900 TO SWMU 10, KS, TR & BB
MC. TO SWMU 9
KS, BB & TR COMPLETE TRUCK ACCESS OPT LOCATION

1030 SET-UP FOR OPT LOCATIONS WITH ELECTRIC JACK-HAMMER. @ 105B03 0 TO 2' BY HAND WITH SHOVEL ALSO COLLECTED DUP & MS/MSD @ 105B030002
THIS LOCATION IS NEXT TO A BLAST WALL (FILL) AND ≈12' HAS BEEN EXCAVATED BY TOOL TEST
→ ≈12' OF SOIL COVER HAS BEEN REMOVED FROM BLAST WALL SOIL COVER.

1135 JACK HAMMER IS FROZEN TO BLD 3245
PLACE IN FRONT OF HEATER TO LUNCH

1220 RETURN TO SWMU 10 105B03
TR & BB CONTINUE @ SWMU 10 TOM BRENT @ SWMU 10

1355 KS TO PASS & ID TO TURN IN SCOTT NEILS PASS THEN TO HUNTINGBURG, IN TO PICK-UP SEED FOR ACCESS ROADS 200 LB'S ALSO STOPPED @ WAL-MART FOR FIELD SUPPLIES

1715 RETURN TO BLD 3245 PAPER WORK

1810 TO BQ

SI NATURE [signature] DATE 12-12-00
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE T+NUS: BOB B.
MATT C.
TERRY R.
KEITH S.

T+EMI: RAYE LAHTI
ERIC RUSCH

BOWSER-MORNER TED K.
TIM S
ALAN W.
JARED R.

INSTALLED MW 09T04
2 DPT LOCATIONS COMPLETE @ SWMU 5
ALL MWs & DPT LOCATIONS COMPLETE
DEVELOPED 2 "NEW" WELLS
2 SW/SD LOCATIONS SAMPLED 09-03 & 04

SEE ALSO LOG BOOKS 2494, 2447 & 2493
AND SAMPLE LOG SHEETS + COCs

SHIPPED 5 COOLERS TO LAUCKS

WED 12.13.00

Work continued from Page WEATHER: 15-26°F SNOW 6" ENDING @ 1700

0648 ON SITE @ BLD 3245 BOB B., KEITH S. PAPER WORK CAL. EQUIPMENT PREP FOR LAST 2 DPT LOCATIONS @ SWMU 5

0720 MATT C. TO SWMU 9 FOR DRILLING, LAST MW.

0740 TR & BB TO SWMU 5 LAST 2 DPT SB

0740 RAYE LAHTI & ERIC RUSCH TETRA TECH EMI ON SITE, COMPLETE H&S TRAINING
KS, RAYE & ERIC TO SWMU 4 & START GEO. PHY. SURVEY

0830 RETURNED JACK TO TRENT @ NATURAL RESOURCES TO SWMU 9 TALK WITH MATT C. ABOUT JOB PROGRESS LAST WELL, PADS, DEVELOPMENT ETC.

0900 TO NEX STATION GAS & ICE
TO BLD 3245 PREP FOR SW/SD SAMPLING
RECEIVED: COOLERS FROM LAUCKS W/TB & TEMP BLANKS, 10 - 5 GAL CUBES OF DI, HORIBA U 10.

1130 RB 121300 01 COLLECTED ON DPT CUTTING SHOE

1345 KS & BB TO SWMU 9 TO START SW/SD
TR TO SWMU 4 FOR MW DEVELOPMENT

1715 RETURN TO BLD 3245 FILTER DIS. METALS FOR SW LOCATIONS. PACK FOR FEDEX, PAPERWORK

1825 BB & MC TO FEDEX
KS & TR PAPER WORK CLEAN OFFICE
CHARGE EQ.

1920 KS TR TO BQ

SIGNATURE [signature] DATE 12.13.00
DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE: T + NUS; KEITH S.
BOB B.
TERRY R.
MATT C. DEPARTS @ 1045

T + EMI RAY L.
ERIC R. DEPART @ 1830

BOWSER-MORNER TIM S.
TED K.
ALAN W.
JARED R.

5 MW's DEVELOPED
2 SW/SD @ SWMU 9 SAMPLED

4 COOLERS TO LAUCKS

SEE ALSO LOG BOOKS 2447 & 2493
AND SAMPLE LOG SHEETS + COCs

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

Work continued from Page WEATHER: 23-33°F OVERCAST

0700 KS, BB, TR & MC @ BLD 3245 MATT & TERRY PREP. FOR MW DEVELOPMENT.
KS & BB PREP FOR SW/SED SAMPLING
1010 TO BLD 3245 PAPER WORK & SAMPLES TO FRIDGE 09 SW/SD05 + MS/MSD
1210 LUNCH ICE & GAS @ NEX STATION TO BLD 3245 PREP. FOR SW/SD @ SWMU 9
1300 TO SWMU 9
1430 BOB B. TO BLD 3245 TO PACK SAMPLES FOR FEDEX, K.S. TO SWMU 5 TO LAY-OUT SW/SDs.
1645 KS @ BLD 3245 PAPER WORK
1750 BOB TO FEDEX 4 COOLERS
TR & KS PAPER WORK & CLEANING EQUIPMENT
1855 KS & TR TO BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE

DATE 12.14.00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE: T+ NUS, KEITH S.
BOB B.
TERRY R.

BOWSER-MORNER TED K.
TIM S.
ALAN W.
JARED R.

PADS & BALLARDS CONSTRUCTED @ NEW MWs

4 SW/SDs COLLECTED @ SWMU 4 & 9

3 COOLERS SHIPPED TO LAUCKS

GEO. PHY. EQUIPMENT RETURNED, FEDEX

SEE ALSO LOG BOOK #2494 AND SAMPLE LOG SHEETS + COCs

FIRE ON BASE COULD NOT RETURN TO BQ
STAYED IN BLOOMINGTON

FRIDAY 12.15.00

Work continued from Page WEATHER: 28-34°F OVERCAST FOG LT. RAIN

0700 KS, BB & TR @ BLD 3245 PREP FOR SW/SD SAMPLING

0810 BOB & TERRY TO SWMU 9 TO COMPLETE SW/SD

KS @ BLD 3245 PAPER WORK & BOTTLE PREP. FOR SW/SD SWMU 4

ALL 4 DRILLERS WORKING ON MW PADS TODAY, WE HAVE ABOVE FREEZING WEATHER THRU SUN. AND WILL TRY TO GET ALL CONCRETE WORK COMPLETE ALL POURED PADS WILL BE COVERED WITH PLASTIC

CALLED FEDEX FOR A PICK-UP @ BLD 3245 5 PACKAGES FOR RAYLAHTT & 1 FID TO US ENVIRONMENTAL PICK UP # 8

1030 CALLED CAUCKS LAB TALKED WITH H. P. ASK HIM TO ADD FE TO COC # 00352 FOR DIS. METALS AND TO EXPECT 4 COOLERS TODAY & ALSO A SHIPMENT ON SAT.

1115 TR & BB RETURN TO BLD 3245 2 SW/SDs COMPLETE SAMPLES ON ICE, TO LUNCH

1200 KS TO NEX STATION FOR ICE, TR & BB TO SWMU 4 SW/SD SAMPLING

1220 KS @ BLD 3245 PACKING SAMPLES

1340 KS TO SWMU 10 TO LAY-OUT SW/SDs

KS COMPLETES LAY-OUT OF SWMU 10 SW/SDs

1710 RETURN TO BLD 3245 PAPER WORK

1745 DEPART SITE TO FEDEX KS, BB & TR

CALLED DENNY HE WILL MEET ME @ OLD BURN PIT ≈ 7:00 AM MONDAY WITH STRAW

RETURNED FROM FEDEX ≈ 2100 (9:00PM) FIRE ON BASE COULD NOT RETURN TO BQ, HAD TO STAY IN BLOOMINGTON - FAIRFIELD INN FOR ONE NITE.

— DAILY SUMMARY —

ON SITE: T+NUS; KEITH S.
TERRY R.
BOB B.

BOWSER-MORNER;

ALAN W. } DEPART SITE @ 0830
JARED R. } PICK-UP EQ. ONLY, AND DEPARTED FOR HOME

TED K. 0700 — 1430 TO HOTEL

TIM S. 0700 - 1430 DEPARTED FOR HOME

ALL WELL PADS & BALLARDS COMPLETE (11 TOTAL)

8 SW/SD SAMPLES COLLECTED @ SWMU 10
10SW/SD01, 02, 03, 04, 05, 06 WITH DUP + MS/MSD,
07 & 08

SEE ALSO LOG BOOK #2494, SAMPLE LOG
SHEETS & COCs

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

SATURDAY 12-16-00

Work continued from Page WEATHER: RAIN OVERNITE, 38-44°F FOG LT. RAIN

0630 CHECK-OUT OF FAIRFIELD IN TO BASE
PREP FOR SW/SD @ SWMU 10

0720 CALL SECURITY IT IS OK TO RETURN TO BQ
AND WORK PASS 1ST LIGHT, THIS WAS BLOCKED
OFF LAST NIGHT, DRIVERS TED K. & TIM S.
TO SWMU 4 WORKING ON PADS.
I ALSO LET SECURITY KNOW WE WOULD BE
WORKING IN THE ROCKEYE AREA.

0805 BOB & TERRY TO 10 SW/SD 06 TO START
SAMPLING ALSO COLLECTING DUP + MS/MSD
AT THIS LOCATION

0900 KS TO SWMU 10 FOR SW/SD SAMPLING
SAMPLED 4 SW/SD LOCATIONS @ SWMU 10
12-16-00 RAIN OVERNITE, LT RAIN (MIST) 12-16-00
WITH SOME SNOW MELT. THEREFORE SW POINT
HAD IN-CREASED FLOW RATES.

1200 LUNCH, BOB @ BLD 3245 TAGGING & PACKING
SAMPLES.
KS & TR TO SWMU 10 TO CONTINUE SW/SD
SAMPLING

1500 KS & TR RETURN TO BLD 3245 4 SW/SD
COLLECTED @ SWMU 10
BOB, TERRY & KEITH TAGGING BOTTLES & PAPER WORK
& CLEAN EQUIPMENT
COLLECTED RB FOR EXPLOSIVES ONLY ON DISPOSABLE
PLASTIC TROWEL (BATCH BLANK) ALL OTHER PARAMETERS
WERE COLLECTED WITH RB112800 01 SEE COC 02320
DATED 11-28-00 @ 1520

1655 DEPART BLD 3245 TO BQ.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 12-16-00

DISCLOSED T AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE: T+N4S; TERRY R
KEITH S.
BOB B.

BOWSER-MORNER TED K.
0740 → 1330

SAMPLED 4 SW/SDs @ SWM4 10
10 SW/SD09, 10, 11 & 12 DUP @ 12

SEEDED ALL DRILLING LOCATIONS

SEE ALSO COCs & FIELD LOGS

SUNDAY 12.17.00

Work continued from Page WEATHER: TURNING COOLER OVERNITE, BLOWING SNOW -30 WIND CHILL, ~~14-25°F~~ KS 6-12°F BASE ACTIVITES RESTRICED

0650 @ BQ MADE RESERVATIONS FOR 1.15-24.01

0705 @ BLD 3245 PREP. FOR SW/SD SAMPLING @ SWMU 10

0740 TED K. ON SITE DRILLING WEEP HOLES IN PROTECTIVE CASING & SAND INSIDE PROTECTIVE TO CENTER 2" RISER PIPE

0900 SAMPLED 10 SW/SD 10 SECURITY ASK US TO STOP WORK, KS TO BLD 1 FOR OK TO CONTINUE

0910 WORKING FOR DAY. TALKED WITH LT. CALVES HEAD OF NSWC SECURITY AND GOT THE OK TO SAMPLE SW/SD TODAY.

0930 RETURN TO SWMU 10 SAMPLED 2 SW/SDs

1035 TO BLD 3245 FILTER DIS. METALS TAG BOTTLES

1240 BOB & TERRY TO SWMU 10 TO COMPLETE SAMPLING KS PAPERWORK & CLEANING WORK SPACE KS, BB & TERRY SPREAD SEED, KENTUCKY WHEAT VARIETY CLARK, AT ALL WELL LOCATIONS IN GRASS OR WOODED AREAS 10 LOCATION (09T01) IN CONCRETE. USED 150 LBS OF SEED SALED A 50 LB BAG FOR SPRING TOUCH-UP. BOWSER-MORNER WILL SPREAD STRAW MONDAY & TUESDAY.

1630 RETURN TO BLD 3245 TR & BB OFF SITE TO PICK-UP ICE. KS PAPER WORK

1705 DEPART SITE

— DAILY SUMMARY —

ON SITE: T+NWS, KEITH S.
BOB B.
TERRY R

BOWSER-MORNER, TED K.
TIM S.
TOM VYSOCKY

SPREADING STRAW 5 HRS (1030-1130 + 1200 TO 1600)
MOB SPREADER 1 HR

SAMPLED 4 SW/SDs, 3 @ SWMU 4 &
1 @ SWMU 5
104 BALLS OF STRAW DELIVERED
SHIPPED 12 COOLERS TO LAUCKS
FID RETURNED
HOURIBA RETURNED

SEE ALSO LOG BOOK # 2494,
SAMPLE LOG SHEETS & COCs

MONDAY 12.18.00

Work continued from Page WEATHER: 0-9°F

0700 KS TO SWMU 5 TO MEET DENNY WITH STRAW
TR & BB TO BLD 3245 PREP FOR SW/SD @ SWMU 4
0800 KS MET DENNY WITH STRAW 35 BALLS @ SWMU
4, 35 @ SWMU 5 & 34 @ SWMU 9 TOTAL 104
@ 3 EACH $312.00.
0930 TED KEEN @ SWMU 4 WAITING ON TIM S. &
TOM V. TO THROW STRAW ON SEEDED ACCESS
1000 AREAS. TIM S. & TOM V. ARRIVE @ SWMU 4.
1055 KS, TR & BB @ BLD 3245 PREP BOTTLES/
SAMPLES FOR FEDEX SHIPPMENT.
1130 CALLED BOC GASES FOR A PICK-UP OF THE
HYDROGEN UP. CYL. IT WILL BE PICKED UP
WED. PHONE 800 262 4273 CONF. #651540
12 COOLERS PACKED FOR FEDEX TO LAUCKS
FID RETURNED TO USENVIRONMENTAL
HORIBA RETURNED TO F.E.I.
1530 KS & TR TO SWMU 5 TO SAMPLE SW/SD
SAMPLED 05 SW/SD 05 COLLECTED @ MS/MSD
1650 ON SD. RETURN TO BLD 3245 TAG SAMPLES
DRILLERS DEPART FOR HOTEL FROM SWMU 5 @ 1600
CLEAN EQ, PREP FOR SW/SD SAMPLING @ SWMU 5
ON TUES.
1810 TO BQ

ORDERED 20 COOLERS, TEMP BLANKS & SHIPPING
LABELS FROM LAUCKS

— DAILY SUMMARY —

ON SITE: T+M'S; BOB B.
KEITH S.
TERRY R

BOWSER-MORNER TED K.
TIM S.
TOM V.
DEPART FOR HOME @ 1100

4 SW/SDs @ SWMU 5

SHIPPED 7 COOLERS TO LANCLS &
2 TO TRIANGLE LABS

TUESDAY 12.19.00

Work continued from Page WEATHER: 2" SNOW OVERNITE, 2-14°F

0655 CHECK-OUT OF BQ TO BLD 3245 PREP. FOR SW/SD SAMPLING @ SWMU 5

0730 DRILLERS ON SITE FOR SITE RESTORATION

0810 BOB, TERRY & KEITH TO SWMU 5

1050 RETURN TO BLD 3245 PREP SAMPLES FOR SHIPPMENT. ALL SW/SD LOCATIONS COMPLETE DRILLERS OFF SITE SITE RESTORATION COMPLETE ≈ 8 BAILS & 10 BAILS REMAIN @ SWMU 5 & 9 FOR TOUCH-UP WHEN THE SNOW MELTS

1200 RS TO SWMU 4 DRILLERS HOIST WAS FROZEN SO THERE IS 3 DRUMS OF DECON/PURGE WATER THAT NEEDS TO BE DUMPED AFTER THE NEW YEAR. LABELED DRUMS 2 ON GROUND 1 ON "BOMB". TO NEX STATION PICKED UP 20 BAGS OF ICE RETURN TO 3245 PACK SAMPLES & PAPER WORK

START OF SHIFT 2001

— DAILY SUMMARY —

ON SITE: T+NUS;

BOB B.
KEITH S.
TERRY R.

TRAVEL
EQUIPMENT PREP.

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

TUES. 1.2.01

Work continued from Page

0740 KEITH SIMPSON, TERRY ROJAHN & BOB BALICOLEC
@ PGH AIRPORT FLT. DELAYS @ INDIANAPOLIS 1220
PICK-UP RENTAL SUV BOB & TERRY PICK-UP SUPPLIES
ZIPLOC, WATER ETC TO BQ TO BID 3245
RES TO BEDFORD BOC GASES PICK-UP 2 CYL
1700 OF NITROGEN TO BQ TO BID 3245
PREP. EQ. FOR GW SAMPLING & NW DEVELOPMENT
1715 TALK WITH RALPH BASINSKI, I AM GOING TO
START SITE WIDE (4 SWMU) NEXT SHIFT
RALPH WILL BE ON SITE 1.8.01, MONDAY FOR
SITE TOUR OF SWMUS 2, 4, 5, 9, 10, 12, 13, 16 & 19
WITH TOM BRENT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE

DATE 1.2.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS, TERRY R.
BOB B.
KEITH S.
BOWSER-MORNER TED K.
TOM V.

4 WELLS DEVELOPED

3 WELLS SAMPLED
DUP & MS/MSD @ 04GW103

SEE ALSO: LOG BOOKS 2493 & 2494
SAMPLE LOG SHEETS, MW DEVELOPMENT SHEETS
& COCs

WED 1.3.01

Work continued from Page WEATHER: COLD 3-30°F OVERCAST

0655 KS, TR & BB @ BLD 3245 CAL EQUIPMENT
0845 BOB TO SWMU 5 FOR MW DEVELOPMENT
0855 KS & TR TO SWMU 4 FOR GW SAMPLING
TR SET-UP ON 04-02 w/BLADDER PUMP
KS SET-UP ON 04-06 w/PERISTALTIC PUMP
1315 COMPLETE 04-06 TO NEX STATION GAS, ICE
TO BLD 3245 RESTOCK SUV
1405 RETURN TO SWMU 4 SET-UP ON 04T03
1845 COMPLETE SAMPLING + DUP - FD010301 01 & MS/MSD
TO BLD 3245 UNLOAD SUV PUT EQ ON
1910 CHARGE TO BQ

— DAILY SUMMARY —

ON SITE T+MS; BOB B.
TERRY R.
KEITH S.
BOWSER-MURNER TED K.
TOM V.

WELLS SAMPLED
WELLS DEVELOPED

SHIPPED COOLERS TO CAMCKS LAB
SEE ALSO SAMPLE LOG SHEETS,
MW DEV. SHEETS, COC & LOG
BOOKS 2493, 2494

TITLE NSWC CRANE **PROJECT NO.** 7141 **55**

KS ~~WED~~ THUR 1.4.01 **BOOK NO.** 1330

Work continued from Page WEATHER: 27-36°F OVERCAST

0655 @ BLD 3245 KS, BB & TR KS & TR PREP FOR GW SAMPLING BOB TO SWMU 10 FOR MW DEVELOPMENT

0705 TED & TOM ON SITE

0745 BOB, TED & TOM TO SWMU 10 FOR MW DEV.

0900 KS TO MW 04-05 PURGE & SAMPLE
TR TO MW 04-T02 PURGE & SAMPLE

1230 KS COMPLETE 04-05 TO LUNCH THEN BLD 3245

1500 PACKED 6 COOLERS FOR FEDEX TO LAUCKS

1630 KS TO BEDFORD, BOC GASES PICKED-UP 3 CYL. OF NITROGEN FOR BLADDER PUMP
TO HARDWARE STORE FOR SUPPLIES

1750 RETURN BLD 3245 UNLOAD SUV CHARGE/CLEAN EQUIPMENT

1810 DEPART TO BQ

— DAILY SUMMARY —

ON SITE: T + NUS KEITH S.
BOB B.
TERRY R.

BOWSER-MORNER TED K. - DEPARTS FOR HOME @ 1830
TOM V. - OFF SITE TO HOME @ 1400

4 WELLS SAMPLED
5 WELLS DEVELOPED
THIS COMPLETES WELL DEVELOPMENT

5 SHIPPED COOLERS TO CAUCK'S LAB

SEE ALSO: COCs, SAMPLE LOG SHEETS, DEV. LOGS, LOG BOOK #2493 & 2494

TITLE NSWC CRANE **PROJECT NO.** 7141 **57**

BOOK NO. 1330

FRIDAY 1.5.01

Work continued from Page WEATHER: OVERCAST 27-35°F

0655 KS, BB & TR @ 3245 LOADING SUVs CAL. EQ.

0710 TED K. & TOM V. @ 3245

0745 BOB & DRILLERS TO SWMU 10 FOR DEV.

0745 KS & TR TO SWMU 4 FOR MW SAMPLING

KS COMPLETE SAMPLING MW 04-03 TO BID 3245 CALL HRS IN FOR WEEK, RESTOCK SUV PICK-UP ICE @ NEX STATION

LUNCH, TO MW 05-01 PURGE & SAMPLE

1630 COMPLETE 05-01 TO BID 3245 PAPER WORK PACK SAMPLES

1815 KS & BB TO FEDEX

TR IS STILL @ SWMU 4 SAMPLING

RB 01050101 COLLECTED USING PERISTALTIC PUMP W/ TEFLON & SILICONE TUBING, BATCH BLANK FOR TUBING & FILTER

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE K. S. Simp DATE 1.5.00

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS KEITH S.
BOB B.
TERRY R

3 MW SAMPLED

SEE ALSO: SAMPLE LOG SHEETS, COCS
LOG BOOK #2493 & 2494

SATURDAY 1.6.01

Work continued from Page WEATHER: 22-34°F SUNNY

0655 KS, BB & TR @ BLD 3245 CLEAN-UP, CAL EQ. PREP. FOR GW SAMPLING @ SWMU 10

0830 TO SWMU 10 KS SET-UP ON 10-02 PURGE & SAMPLE ALSO COLLECTED FD 01060101 @ THIS LOCATION

TO BLD 3245 LUNCH, RESTOCK THE SUV

1215 CALLED LAUCKS TO SEE IF WE CAN SAMPLE @ SWMU 5 THIS WEEKEND, WE ARE OUT OF LOCATIONS.

1230 MIKE OWENS FROM LAUCKS CALLED IT IS OK

1300 TO SAMPLE @ SWMU 5 KS & BB SET-UP ON MW 05T02

1355 KS STOPPED TO CHECK ON TERRY @ SWMU 10 THEN TO SAM CLUB & WAL-MART FOR SUPPLIES

1550 RETURN TO SITE STOPED TO CHECK ON TR & BB TO BLD 3245 PAPER WORK & CLEAN-UP

1820 DEPART FOR BQ

DAILY SUMMARY

ON SITE: T+NUS, TERRY R.
BOB B
KEITH S.

MW WELLS SAMPLED

MOVED STRAW BALLS @ SWMU 5
STORED FOR USE AFTER SNOW MELTS

SEE ALSO: SAMPLE LOG S, COC &
LOG BOOK # 2493 & 2494

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

SUNDAY 1.7.01

Work continued from Page WEATHER: 25-35°F SUNNY

0700 KS, BB & TR @ BLD 3245 CAL. EQ. LOAD SUV TR TO SWMU 4 SAMPLE 04-04

0740 KS & BB TO SWMU 5, 2 PEOPLE WILL BE NEEDED FOR SOME OF THE WELL WE CAN NOT DRIVE CLOSE TO WITH SNOW COVER SET-UP PURGE & SAMPLE 05TO3

1230 COMPLETE SAMPLING, TO LUNCH RETURN TO SWMU 5 SET-UP & SAMPLE

1655 05GW1501 - COMPLETE SAMPLING RETURN TO BLD 3245. PAPER WORK, CLEAN GARAGE AREA CHARGE & CLEAN EQ.

1730 KS TO SWMU 5 MW 5-06 TO HELP T.R. COMPLETE SAMPLING TO BLD 3245 (KS & TR) UNLOAD SAMPLES & CHARGE EQ.

1955 TO BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE [signature] DATE 1.7.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS:

KEITH S.
BOB B
TERRY R.
RALPH BASINSKI @ 0820
OF SITE @ 1600 TO AIRPORT

2 MWs SAMPLED
RB 01080101 SAMPLED ON BLADDER
PUMP & TUBING

SHIPPED 11 COOLERS 9 TO CAUCKS 2 TO TRI.

SEE ALSO: LOG BOOKS 2493 & 2494
COCs & SAMPLE LOG SHEETS

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

MONDAY 1.8.01

Work continued from Page WEATHER: 25-34°F CLOUDY

0650 @ BID 3245 CAL EQUIPMENT LOAD SUV FOR
0745 GW SAMPLING BOB TO SWMU 5 TERRY TO 10
0820 CALLED NED TILLMAN, COLUMBIA TECH AND LET HIM KNOW WE WOULD SHIP 5 OR 6 SAMPLES (EXPLOSIVES) AT THE END OF THIS SHIFT.
0820 RALPH ON SITE TOUR OF UP COMING SWMU
1530 COMPLETE TOUR OF SWMUS RALPH B. TO AIR-PORT
1700 BOB DEPARTS FOR BQ
KS & TR BOTTLE PREP. & PAPER WORK
1750 KS & TR TO BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE K. F. Simpe DATE 1.8.01

DISCL SED TO AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE: T+NUS BOB B.
KEITH S.
TERRY R.

4 MWs SAMPLED
ALL SW FLOWS MEASURED @ SWMU 9

SHIPPED 4 COOLER TO LAUCKS
2 TO TRI.
1 TO UMBC

SEE ALSO: SAMPLE LOG SHEETS, COCs
LOG BOOK # 2493 & 2494

TUESDAY 1.9.01

Work continued from Page WEATHER: 16 - 34°F SUNNY

0655 KS, BB & TR @ BLD 3245 CAL. EQUIPMENT
LOAD SUV FOR GW SAMPLING
0740 TR TO SWMU 10, BB TO SWMU 5
0930 KS TO SWMU 10 MOVE STRAW BALLS FOR
STORAGE & USE WHEN SNOW MELTS
1030 WORKING ON SW FLOW MEASUREMENTS @ SWMU 9
1130 TOOK LUNCH & A CYL. OF NITROGEN TO TR @
SWMU 10, HELP TR COMPLETE SAMPLING @ 10C41
1345 TO SWMU 9 TO MEASURE SW LOCATIONS
1500 @ BLD 3245 ORDER QED PUMP FITTINGS
FROM US ENVIRONMENTAL.
PACKING SAMPLES FOR FEDEX
1815 KS & BB TO FEDEX

— DAILY SUMMARY —

ON SITE: T+NUS, BOB B.
TERRY R.
KEITH S.

WATER LEVELS @ SWMU 9

TRAVEL

END OF SHIFT 4

WED 1.10.01

Work continued from Page WEATHER:

0645 CHECK OUT OF BQ TO BLD 3245 PREP. FOR GW MEASURMENTS @ SWMU 9

0750 KS, TR & BB TO SWMU 9

0905 COMPLETE W/L RETURN TO BLD 3245 UNLOAD ALL EQUIPMENT, CLEAN & STORE EQ. FOR SHIFT BREAK

0925 BOB & TERRY TO AIRPORT / HOME

1010 KS TO AIRPORT / HOME

— DAILY SUMMARY —

ON SITE: T+NUS,

KEITH SIMPSON
BOB BAKOVEC
TERRY ROJAHN

TRAVEL DAY PGH TO CRANE

SW FLOW MEASURMENTS @ SWMU 4

MONDAY 1.15.01

Work continued from Page WEATHER: OVERCAST 32-35°F PM

0750 KEITH SIMPSON, TERRY ROJAHN & BOB BALKOVEC @ PGH AIRPORT TO CRANE

1400 @ BLD 3245 PAPER WORK, UNPACK SUPPLIES

CALLED TIM BOEHMER OF BOWSER MORNER HE AGREED TO REDUCE THE INVOICE BY 5 HRS STAND-BY * SEE 12.15.00 DAILY ACTIVITIESSHEET. TIM WILL MAKE THE REDUCTION ON THE FINAL INVOICE DUE OUT LATER THIS WEEK. I WILL SIGN-OFF ON THE CURRENT INVOICE AFTER WE RECEIVE THE FINAL WITH THE REDUCTION. (* $1000.00)

1540 KS, TR & BB TO SWMU 4 MEASURE SW LOCATIONS 6 TOTAL

1700 TOUR OF SWMU 7 ORR & OPR

1750 BOB & TERRY TO BQ

KS TO BLD 3245 PAPER WORK

1830 KS TO BQ

— DAILY SUMMARY —

ON SITE: T+NUS, BOB B.
TERRY R.
KEITH S.

BLEDSOE TAPP & RIGGER, DAVID MEIER
RICH JENKS
@ 0810

SEE ALSO: FIELD NOTES &
LOG BOOKS 2493, 2494

TITLE NSWC CRANE

PROJECT NO. 7141

B OK NO. 1330

TUES 1.16.01

Work continued from Page WEATHER: 30-34°F CLOUDY NO PERCIP.

0655 KS, BB & TR @ BLD 3245 - BOB & TERRY TO SWMU 4 & 5 FOR SW & MW WATER LEVEL FLOW MEASURMENT.

KS PASS FOR SURVEYORS, PHONE CALLS, PAPER WORK

0810 SURVEYORS @ BLD 3245, KS GO'S OVER H & S AND WORK @ THE 4 SITES

TO BLD 2516 PICK-UP CONTROL POINT INFORMATION FOR BASE. SITE TOUR OF SWMU 4, 5, 9 & 10

1100 RETURN TO BLD 3245

1215 KS, TR & BB TO SWMU 10 FOR WL MEASURMENTS

1540 COMPLETE WL RETURN TO BLD 3245

PAPER WORK, CLEAN EQUIPMENT

1720 DEPART 3245 TO BQ

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

SI NATURE

DATE 1.16.01

DISCL SED T AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE: T+NUS, BOB B.
TERRY R.
KEITH S.

SURVEYORS DAVE M.
RICH J.

COMPLETE SW FLOW MEASURMENTS

SAMPLED 2 MWs

SEE ALSO: FIELD FORMS & LOG BOOKS
2493, 2494 & COC.

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

WED 1.17.01

Work continued from Page WEATHER: 28-34°F OVERCAST

0655 KS, BB & TR @ BLD 3245 PREP FOR FLOW MEASURMENT @ SWMU 10
CAL & PREP EQUIPMENT FOR GW SAMPLING

0755 TR & BB TO SWMU 10
KS PAPER WORK

0900 CONFERENCE CALL AMOUNG BILL GATES, RAYE LAHTI, RALPH BASINSKI & KEITH SIMPSON
COVER LOCATIONS FOR 4 "NEW" SBs @ SWMU 4 (SEE REVISED FIG) LOCATIONS WILL BE SAMPLED USING @ DPT RIG AT THE START OF CTO ~~#~~ KS 56 ORR/OPR LATE FEB.

1130 TR & BB COMPLETE SW FLOW MEASURMENT
LOAD SUV FOR GW SAMPLING, LUNCH
KS & BB TO SWMU 5 SET-UP & SAMPLE

1730 05-16 COMPLETE SAMPLING RETURN TO BLD 3245 UNLOAD SUV CLEAN/CHARGE EQUIP.
TR COMPLETE SAMPLING 10-C26 RETURN TO BLD 3245 UNLOAD SAMPLES & EQUIPMENT

1825 BB TO BQ
1930 KS & TR TO BQ

Work continued to Page

SI NATURE [signature] DATE 1.17.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE, T+NUS KEITH S.
BOB B.
TERRY R.

4 MWs SAMPLED

3 COOLERS SHIPPED TO LAUCKS
RETURNED 1 WL METER & HORIBA TO
US ENVIRONMENTAL

SEE ALSO: SAMPLE LOG SHEETS, COCs
AND LOG BOOKS 2493, 2494

THUR 1.18.00

Work continued from Page WEATHER: 28-33°F CLOUDY

0655 KS, BB & TR @ BLD 3245 CAL. EQ. LOAD SUV FOR GW SAMPLING. PAPER WORK

0750 KS & BB TO SWMU 5 TR TO 10 FOR GW SAMPLING

0930 KS TO SWMU 4 TO TAKE A QUICK LOOK AT

0905 4 "NEW" SBs FOR ACCESS. RETURN TO 05-19 TO HELP BOB WITH SAMPLING

1200 COMPLETE 05-19 TO NEX STATION GAS & ICE TO LUNCH, TOOK LUNCH TO TR @ SWMU 10

1315 KS TO SWMU 5 SET-UP ON 05-03 BOB @ BLD 3245 PACKING SAMPLES FOR FEDEX AND RB ON TEFLON BLADDER RB0118010 WELL 05-03 IS A POOR PRODUCER ≈ 1/2 OF JARS FILLED WILL ALOW TO RECHARGE OVER NIGHT AND COMPLETE FRIDAY ≈ 0700.

1735 RETURN TO BLD 3245 SAMPLES TO FRIDGE CLEAN OUT SUV PAPER WORK

1820 TO BQ

— DAILY SUMMARY —

ON SITE: T + NUS, BOB B. DEPARTS @ 1645
TERRY R.
KEITH S.

2 MWs SAMPLED

SHIPPED 3 COOLERS TO LAUCKS

SEE ALSO; COCs, SAMPLE LOG SHEETS,
LOG BOOKS 2493 & 2494

TITLE NSWC CRANE **PROJECT NO.** 7141 **77**

BOOK NO. 1330

FRIDAY 1.19.01

Work continued from Page WEATHER: 28-32°F CLOUDY

0650 KS TO SUMMIT TO COMPLETE 05-03

0700 TR & BB TO BLD 3245 CAL. EQ. & PREP. FOR GW SAMPLING.

0745 COMPLETE 05-03 TO BLD 3245
PAPER WORK, FAX COCs TO PGH OFFICE, FAX HOURS TO SHARON C.

0900 TO SUMMIT TAKE BOB SUPPLIES FOR SAMPLING TO BEDFORD & RETURN 2 MT NITROGEN & PICK-UP 1 FULL NITROGEN, ALSO WAL-MART FOR SUPPLIES

1145 RETURN TO BLD 3245 DROP-OFF SUPPLIES
TO LUNCH THEN SUMMIT TO HELP BOB @ 05-02

1435 KS TO BLD 3245 MW 05-02 COMPLETE PACKING SAMPLES FOR FEDEX. TR RB ON PE BLADDER, TUBING & DECONED PUMP.

1645 BOB TO FEDEX THEN FAIRFIELD INN TO HOME ON SATURDAY
KS & TR PREP. FOR GW SAMPLING ON SAT.

1715 KS & TR TO LOWES FOR SUPPLIES

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE

DATE 1.19.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS: TERRY R.
KEITH S.

5 MWs SAMPLED

SEE ALSO: SAMPLE LOG SHEETS,
COCs & LOG BOOK # 2493

TITLE NSWC CRANE **PROJECT NO.** 7141 **79**

BOOK NO. 1330

SATURDAY 1.20.01

Work continued from Page WEATHER: SNOW OVER NIGHT = 2" 24-30°F OVERCAST

0650 KS & TR @ BLD 3245 CAL. EQUIPMENT LOAD SUV. CALL SECURITY FOR ACCESS TO ROCKEYE

0730 TALKED WITH PAT A GUARD WILL BE THERE AT 0800

0745 KS TO SUMMU 5, TR TO SUMMU 10 FOR GW SAMPLING.

0840 KS @ 05-13 WELL RAN DRY WILL ALLOW TO RECHARGE AND COMPLETE SAMPLING THIS PM

TO 05-07 & START PURGE

1345 COMPLETE 05-07 SAMPLING TO NEX STATION

1400 FOR GAS. TO 05-08 SET-UP, PURGE

1725 COMPLETE SAMPLING TO 05-13 TO COMPLETE SAMPLING AFTER RECHARGE

1815 COMPLETE 05-13 TO BLD 3245 UNLOAD SUV CLEAN & CHARGE EQUIP. SAMPLES TO 'FRIDGE

1855 DEPART TO BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE [signature] DATE 1.20.01

DISCLOSED T AND UNDERSTO D BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+ NUS, TERRY R.
KEITH S.

4 MWs SAMPLED @ SWMU 10
ALSO FD012101 01 & MS/MSD @ 10C55

SEE ALSO: LOG BOOK 2493, FIELD FORMS
& COCs

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

SUNDAY 1·21·01

Work continued from Page

WEATHER: 15-28°F SUNNY

0650 KS & TR @ BLD 3245 CAL. EQUIP. LOAD SUVs FOR GW SAMPLING @ SUMU 10

0715 CALL LAUCKS LAB (LEFT MESAGE) TO ORDER 25 CYANIDE BOTTLES FOR LATER THIS WEEK

0742 CALL SECURITY FOR ACCESS TO ROCKEYE

0750 KS & TR TO SUMU 10 FOR GW SAMPLING

0815 KS SET-UP PURGE & SAMPLE 10-16

1120 COMPLETE SAMPLING RETURN TO BLD 3245, SAMPLES TO FRIDGE RESTOCK SUV TO SUMU 10 & MW 10C55

1210 SET-UP PURGE & SAMPLED ALSO COLLECTED MS/MSD & FD 012101 01 AT THIS LOCATION 10C55

1725 RETURN TO BLD 3245 UNLOAD SUV CLEAN/CHARGE EQUIPMENT

1730 TR ARRIVES @ BLD 3245 CALL SECURITY TO LOCK GATE @ ROCKEYE PAPERWORK & CLEAN-UP

1820 TO BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE [signature] DATE 1·21·01

DISCL SED TO AND UNDERSTOOD BY DATE WITNESS DATE

B 100 P ©

— DAILY SUMMARY —

ON SITE: T+NUS, K. SIMPSON
T. ROJAHN

SURVEYORS DAVE M.
RICH J.

MWs SAMPLED @ SWMU 10

8 SHIPPED COOLERS TO:
6 LAUCKS
2 TRI. LAB

SEE ALSO: SAMPLE LOG SHEETS, COCs,
LOG BOOK # 2493

TITLE NSWC CRANE **PROJECT NO.** 7141 **83**

BOOK NO. 1330

MONDAY 1.22.01

Work continued from Page WEATHER: 23-36°F SUNNY

0655 KS & TR @ BLD 3245 CAL. EQUIPMENT LOAD SUVs FOR GW SAMPLING @ SWMU 10

0735 KS & TR TO SWMU 10 KS SET-UP & PURGE @ 10C55P2, SAMPLE COMPLETE CLEAN-UP

1005 TO BLD 3245, PACKED SAMPLES FOR FEDEX TO LAUCKS & TRI.

1440 CALLED HUGH P. @ LAUCKS & ORDERED 30 CYANIDE BOTTLES FOR FRIDAY & ENCORE + 8 oz W/M GLASS FOR FEB 16TH 90 ENCORE + 24-8oz. BOTTLE INVENTORY, PREP BOTTLES/PAPER WORK FOR GW SAMPLING ON 1.23.01

1620 KS TO SWMU 10 TO CHECK ON/HELP TR TR PURGING & SAMPLING 10C26P3

1740 KS OFF-SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE K. S. Simp DATE 1.22.01

DISCL SED T AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T + NUS, TERRY R.
KEITH S.

3 MWs SAMPLED

4 MW PURGED DRY, TO BE SAMPLED 1-24-01

SEE ALSO: LOG BOOK # 2493, SAMPLE LOG SHEETS, COCs

TITLE NSWC CRANE **PROJECT NO.** 7141 **85**

BOOK NO. 1330

TUESDAY 1.23.01

Work continued from Page WEATHER: 27 - 36 °F SUNNY

0650 KS & TR @ 3245 CAL. EQUIPMENT LOAD SUVs FOR GW SAMPLING @ ROCKEYE

0740 KS & TR TO SWMU 10 FOR GW SAMPLING

1020 KS COMPLETE PURGE & SAMPLING @ 10-17

1030 TR & KS TO BLD 3245 RESTOCKS SUVs TO LUNCH THEN SWMU 9 FOR GW SAMPLING

1145 KS SET-UP ON 09GWTP05, COMPLETE SAMPLING

1603 KS OFF-SITE TO PICK-UP ICE FOR THE SAMPLE PACKING/FEDEX TR TO BLD 3245 CLEANING WORK AREA & EQUIPMENT

1630 KS @ BLD 3245 PAPER WORK & CLEAN-UP

1745 KS & TR TO BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE [signature] DATE 1.23.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+NUS, TERRY R.
KEITH S.

SURVEYORS, DAVE M.
RICH J.

COMPLETED MW 10C57

SHIPPED 4 COOLERS
3 LAUCKS
1 UMBC

SEE ALSO: LOG BOOK #2493, SAMPLE LOG SHEETS, COCs

TRAVEL TO PGH

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

WED. 1.24.01

Work continued from Page WEATHER: 25-35°F

0650 KS & TR CHECK OUT OF BQ TO BLD 3245
LOAD EQUIPMENT FOR GW SAMPLING @ SWMU 10
0730 TR TO SWMU 10 TO COMPLETE MW 10C57
KS PACKING SAMPLES FOR FEDEX & PAPER WORK
0900 TR RETURNS TO BLD 3245
0955 KS & TR TO FEDEX
TO AIRPORT / HOME

END OF SHIFT 5

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 1.24.01

DISCLOSED AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: KEITH SIMPSON
T+NUS, TERRY ROJAHN

TRAVEL TO CRANE
START SHIFT 6

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

MONDAY 1.29.01

Work continued from Page WEATHER: PM RAIN 35°F

0800 KS & TR @ PGH AIRPORT, FLT DELAYS, TO INDIANAPOLIS, TO AMS PICK-UP 2 SUV'S KS TO SAMS CLUB FOR FIELD SUPPLIES, TO BQ CHECK-IN

1550 KS & TR @ 3245 PREP. FOR GW SAMPLING ON TUES.

RB0129010 1 ON BLADDER PUMP W/TEFLON TUBING & BLADDER

CAL. EQUIPMENT

LOAD SUVS FOR SAMPLING ON TUESDAY

1945 DEPART TO BQ

SI NATURE [signature] DATE 1.29.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T + NUS, KEITH S.
TERRY R

3 SAMPLED MWs + 1 DUP & 1 MS/MSD

RAIN HEAVY AT TIMES OVER NIGHT &
FROM 0900 TO 1600 ON 1.30.01

SEE ALSO, COC, LOG BOOK 2493, SAMPLE
SHEETS

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

TUESDAY 1.30.01

Work continued from Page

WEATHER: RAIN OVERNIGHT, OVERCAST 35-45°F RAIN STARTING 0900 TO 1600

0850 KS & TR @ BLD 41 PICK-UP BOTTLE SHIPPMENT FROM LAUCKS. TO BLD 3245 COMPLETE EQ. CHL.

0750 LOAD TRUCKS, TO SWMU 9 KS SET-UP ON

0950 09T05 - START SAMPLING @ 0950 ALSO COLLECTED FOR MS/MSD + FD 013001 01

1445 TO BLD 3245 STORE SAMPLES IN FRIDGE NOTES RESTOCK SUV.

1450 TO 09-02 SET-UP FOR PURGE, COMPLETE SAMPLING

1805 TO 09T01 & CHECK WITH TR

1815 TO BLD 3245 STORE SAMPLES CLEAN/CHARGE EQUIPMENT. TERRY WILL PURGE/PUMP 09T01 DRY AND SAMPLE ON 1.31.01 AM

HUGH PRENTICE, LAUCKS LABS CALLED - BOTH DIOXIN BOTTLES FOR MW 05-03 WERE BROKEN. WE WILL RESAMPLE FOR DIOXIN ONLY LATER IN THE WEEK

1900 KS TO SWMU 9 TO CHECK ON TR

1915 KS TO BQ TR PURGED 09T01 DRY @ 0915 TO BLD 3245 THEN BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE [signature] DATE

DISCLOSED TO AND UNDERST D BY DATE WITNESS DATE

— DAILY SUMMARY —

ON SITE: T+ NUS, TERRY R.

KEITH S.

SURVEYORS, DAVE M.

RICH J.

3 MWs SAMPLED

SHIPPED 8 COOLERS TO LAUCKS

SEE ALSO, COCs, LOG BOOK # 2493,

SAMPLE LOG SHEETS

TITLE NSWC CRANE

WED. 1.31.01

PROJECT NO. 7141

BOOK NO. 1330

Work continued from Page

WEATHER: 31-38°F OVERCAST, NO RAIN

0650 KS & TR @ BLD 3245 CAL. EQUIPMENT LOAD SUV FOR GW SAMPLING @ SWMU 9

0720 TO SWMU 9 KS SET-UP & PURGE 09-10

0930 SAMPLED 09-10 ALSO COLLECTED FD 013101 01 @ THIS WELL

1130 COMPLETE SAMPLING, TO 09-07 & CHECK ON TR TR PURGING PICK-UP SAMPLES FROM 09TO1

1205 TO NEX STATION FOR GAS & ICE. TO BLD

1230 3245 PACKING SAMPLES FOR FEDEX TO LAUCKS COMPLETE PACKING FOR FEDEX PICK-UP, 8 COOLERS. PAPERWORK & CLEAN-UP

1630 PACKING QED BLADDER PUMP ~~-~~ FOR RETURN TO US ENVIRONMENTAL. TALKED WITH SCOTT & THEY WILL CREDIT T+NUS FOR ANY UNUSED PARTS WE SEND BACK, SCOTT WILL FAX ME A LIST OF CREDITED PARTS SO I CAN CHECK THE INVOICE FOR THE ADJUSTED AMOUNT.

1755 TO BQ

SIGNATURE K. S. Lemp

DATE 1.31.01

DISCLOSED T AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE: T+NUS, KEITH S.
TERRY R.

SAMPLED 3 MWs

ALSO SEE: LOG BOOK #2493, SAMPLE LOGS,
COCs

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

THURSDAY 2.1.01

Work continued from Page WEATHER: 22 - 30 °F CLEAR

0650 KS & TR @ BLD 3245 CAL. EQUIPMENT LOAD SUVs FOR GW SAMPLING @ SWMU 9

0728 TO SWMU 9 KS SET-UP & PURGE @ 09T02

PURGED 09T02 DRY (POOR PRODUCER) WILL ALLOW TO RECHARGE & SAMPLE THIS PM

0950 TO BLD 3245 AFTER CHECKING ON TR

TO BLD 3245 CALLED RALPH B. CONFERENCE CALL WITH

1005 RALPH, MATT C., JUDY LAMEY & PHILL ~~TRA~~ TAPP (SURVEYORS) ABOUT PROGRESS OF SURVEY OF THE 4 SWMU

4 IS COMPLETE 5 WILL BE DONE THIS WEEK & THEY PLAN ON BEING DONE WITH ALL 4 BY MID FEB.

1115 LOAD NITROGEN CYL. INTO SUV (4) TO BEDFORD FOR RETURN OF CYL. TO BOC GASES.

TO WAL-MART FOR FIELD SUPPLIES.

1300 TO BLD 3245 LOAD SUV TO 09T02 VERY LITTLE RECHARGE WILL SAMPLE ON FRIDAY.

1330 TO 09T03 SET-UP & PURGE. COMPLETE SAMPLING

1845 TO BLD 3245 UNLOAD TRUCKS, SAMPLES TO FRIDGE PAPER WORK

1920 KS & TR TO BQ

NOTE: MARK ZINDER (PUBLIC WORKS) CALLED THIS PM & LEFT A MESSAGE THE OUR UTILITY CLEARANCE SHOULD BE DONE PRIOR TO THE 19TH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SIGNATURE [signature] DATE 2.1.01

DISCLOSED TO AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE, T+NUS, KEITH S.
TERRY R

SURVEYORS DAVE M.
RICH J.

SAMPLED 2 MWs

SHIPPED 5 COOLERS TO LAUCKS

SEE ALSO: LOG BOOK #2493, COCs,
SAMPLE LOG SHEETS

FRIDAY 2-2-01

Work continued from Page WEATHER: COLD LT. SNOW 7-21°F CLEAR AFTER 10:00

0700 KS & TR @ BLD 3245 CAL. EQUIPMENT LOAD SUVs FOR GW SAMPLING @ SWMU 9
CALLED FEDEX FOR PM PICK-UP

0735 TO SWMU 9 KS COMPLETES SAMPLING @ 09TT02

0910 TO SWMU 5 TO RESAMPLE 05-03 FOR DIOXINS CONTAINERS WERE BROKEN IN SHIPPMENT

1040 PURGED 05-03 DRY WILL ALLOW TO RECHARGE & SAMPLE LATER

1055 TO BLD 3245 SAMPLES TO FRIDGE, PAPER WORK PREP. FOR SAMPLE PACKING & FEDEX TO LAUCKS

1150 CALLED LAUCKS & TALKED WITH HUGH P. HE WILL CALL SAT. AFTER RECEIVING SAMPLES & LET US KNOW IF ALL SAMPLES ARRIVED OK. AFTER THAT WE WILL SHIP RENTED SAMPLING SUPPLIES/EQUIPMENT BACK.

1330 SAMPLES PACKED, START PACKING EQUIPMENT.

1600 KS TO SWMU 5 TO SAMPLE 05-03
TR PACKING EQUIPMENT

1645 COMPLETE SAMPLING RETURN TO BLD 3245
BOTTLE INVENTORY, PAPER WORK

1820 KS & TR TO BQ

COMPLETE SAMPLING FOR CTO 10—

4 "ADD ON" SBs @ SWMU 4 WILL BE SAMPLED LATER THIS MONTH

BOTTLE INVENTORY/ BID 3245
2-2-01

SOILS:

24 ENCORE

11 8oz w/M GLASS

24 4oz w/M GLASS

WATER: (ALL QTS.)

45 UN PE

13 CYANIDE NaOH PE

7 NITRATE/NITRITE H_2SO_4 PE

30 METALS HNO_3 PE

50 AMBER GLASS

11 COOLERS

TITLE NSWC CRANE

SUNDAY 2.4.01

PROJECT NO. 7141

BOOK NO. 1330

Work continued from Page

WORKING ON CTO 160, ORR/OPR, SAT & SUN
SUNDAY, THE SNOW HAS MELTED & TR, KS
SPREAD 10 STRAW BALLS & = 15 LBS OF SEED
TO "TOUCH-UP" DRILL LOCATIONS

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE Kirk E. Simp

DATE

DISCLOSED T AND UNDERSTOOD BY

DATE

WITNESS

DATE

— DAILY SUMMARY —

TRAVEL / MOB DAY

ON SITE: T + NUS,

KEITH SIMPSON

TERRY ROJAHN

EFS ADAM CERTAIN @ 1650

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK NO. 1330

MONDAY 2.19.01

Work continued from Page

WEATHER: NICE 40-55°F SUNNY

0755 KEITH SIMPSON AND TERRY ROJAHN @ PGH AIRPORT TO CRANE.

1330 CHECK INTO BQ TO BLD 3245 START PREP. WORK FOR COMPLETION OF 4 ADDITIONAL SBs @ SWMU 4.

1710 TR GIVES ADAM CERTAIN HEALTH & SAFETY TRAINING KS RB ON DPT CUTTING SHOE RB 021901 01 @ 1730

DISCUSSED DECON, SITE ACCESS ETC WITH ADAM

1800 EQ & DPT R19 CHECK

1900 DEPART 3245 FOR BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605 MADE IN USA

Work continued to Page

SI NATURE

DATE 2.19.01

DISCL SED TO AND UNDERSTOOD BY DATE WITNESS DATE

DAILY SUMMARY

ON SITE, T + NUS, K. SIMPSON
T. ROJAHN

EFS ADAM CERTAIN

4 SBs @ SWMU 4

SHIPPED 2 COOLERS TO LAUCKS

TUESDAY 2.20.01

Work continued from Page WEATHER: 40-48°F OVERCAST

0655 ON SITE RS, TR & AC
PREP. EQ. / LOAD SUV FOR SAMPLING @ SWMU 4
0730 DOUG JOHNSON & WALT SHEARIN ARMY SAFETY
STOPED @ 3245 FOR UXO TRAINING.
WALT SHEARIN 277-1246
0750 CALLED WALT W. #1317 AND LET HIM KNOW
WE WOULD BE @ THE ORR/OPR WED → SUN.
ALSO LEAVING EFS TRAILER @ ORR OVER NITE
TONY B. EMAILED SECURITY TO LET THEM KNOW
EFS TRAILER WOULD SET OVERNITE @ THE ORR
0815 TO PW & PICK-UP DIG PERMITS.
0835 @ SWMU 4 SET-UP ON 04SB11
0950 COMPLETE 04SB11 MOVE TO 04SB10
1050 COMPLETE 04SB10 MOVE TO 04SB09
1140 COMPLETE 04SB09 TO LUNCH
1210 SET-UP ON SB 04SB12 ALSO COLLECT
DUP + MS/MSD @ THIS LOCATION 00-02'
FD 02200101
1330 COMPLETE 04SB12
THIS CONCLUDES SAMPLING FOR CTO 10
LOAD EQUIPMENT TO BLD 3245
PACK FOR FEDEX CLEAN & CHARGE EQ.
MET SURVEYORS TOOK TR, ADAM C. EFS +
SURVEYORS DAVE M. & RICH J. TO ORR/OPR FOR
TOUR

APPENDIX C.2

SWMUs 4, 5, 9, AND 10
FIELD NOTEBOOK 2447

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DRILLING ACTIVITIES SWMU 4, 5, 9	25 - 44

TITLE NSWC Crane

PROJECT NO. 7141

BOOK 2447

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1720 09 SW/SD 05 Culvert upstream - approximately 20 FT. downstream is another ~~culvert~~ channel that joins to form one channel ~~Stre~~ Channel bed is orange - very good sediments. Low flow presently - suspect SW will flow throughout the year.

1742 Pick for FED EX and Airport

WEATHER: Sunny; low 40's - upper 60's

1011 SWN 3/30/99

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SIGNATURE

DATE 3/30/99

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DATE

TITLE NSWC CRANE DAILY ACTIVITIES

PROJECT NO. 7141

11-29-00

~~BOOK~~ 2447

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1330 M.G. COCHRAN ON ~~SITE~~ SITE MET W K. SIMPSON TO DISCUSS PROJECT. JAMES MAY & TOM BRENT ON SITE. DISCUSSED PROJECT. MGC & JAMES MAY TRAVELED TO SWMU'S 4, 5 + 9 TO VIEW WELL LOCATIONS.

1630 RETURN TO OFFICE.

1715 LEAVE SITE FOR DAY

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SIGNATURE

DATE 11-30-00

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 714[illegible]
DAILY ACTIVITIES 11-30-00 BOOK 2447

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0700 MG COCHRAN ON-SITE,
H+S TRAINING CONDUCTED
BY T. ROJAHN FOR MG.C.
AND JAMES MAY.

0820 TRAINING COMPLETED.
MOBILIZE TO SWMU 4 TO
START DRILLING, J. MAY + T. BRENT ON SITE

0930 MOB TO 04T03 WELL
LOCATION TO START DRILLING

1130 04T03 COMPLETED. ~~AT~~ EXCEPT PAD.

1200 LUNCH

1230 RETURN FROM LUNCH.
START MOBILIZATION TO
DRILL LOCATION 04T02 TO
START DRILLING

1415 START DRILLING 04T02
J. MAY LEAVES SITE, T. BRENT
LEFT EARLIER BEFORE LUNCH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE M R [illegible] DATE 11-30-00
WITNESS DATE

TITLE NSWC CRANE PROJECT 7141
DAILY ACTIVITIES 11-30-00 BOOK 2447

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1645 QUIT DRILLING FOR DAY
RETURN TO SITE OFFICE

VOID
MR [illegible]

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE M [illegible] DATE 11-30-00
WITNESS DATE

TITLE NSWC CRANE DAILY ACTIVITIES 12-1-00 PROJECT NO. 7141 BOOK 2447

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0710 ON-SITE, ACTIVITIES DISCUSSED FOR DAY W/ DRILLERS

0730 MOBILIZE TO WELL 04T02 TO CONTINUE DRILLING.

0820 RESUME DRILLING AT 04T02

1145 04T02 COMPLETED, EXCEPT PAD, START DEMOB FROM DRILL SITE

1200 MGC TAKES LUNCH. DRILLERS CONTINUE DEMOB FROM DRILL SITE

1300 RETURN FROM LUNCH, DRILLERS DECON AUGERS

1430 DECON COMPLETE, MOB TO 04T01 TO START DRILLING

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE [signature] DATE 12-1-00

WITNESS DATE

TITLE NSWC CRANE DAILY ACTIVITIES 12-1-00 PROJECT NO. 7141 BOOK 2447

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1650 STOPPED DRILLING FOR DAY

1720 RETURN TO OFFICE

1800 LEAVE SITE FOR DAY

VOID MGC 12-1-00

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE [signature] DATE 12-1-00

WITNESS DATE

12-2-00

TITLE NSWC CRANE DAILY ACTIVITIES

PROJECT NO. 71

BOOK 2447

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720 ON-SITE. DRILLERS FILL TANKER

0810 AT DRILL LOCATION 04T01 TO RESUME DRILLING

1030 04T01 COMPLETED, START MOB TO SWMU 5

1130 MGL TAKES LUNCH, DRILLERS CONTINUE MOB TO SWMU 5

1245 RIG ACROSS ROAD (DRIVE ON MATTING) AND CONTINUING TO DRILL LOCATION

1300 AT LOCATION 05T03 TO START DRILLING

1600 WELL 05T03 COMPLETED, RIGS STUCK ON WAY OUT. USED DOZER TO PULL OUT

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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DATE 12-2-00

DATE

TITLE NSWC CRANE DAILY ACTIVITIES

PROJECT 7141

BOOK 2447

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1645 RIG PULLED OUT, MOBED TO DECON PAD AREA.

1700 SECOND DRILL RIG ON SITE, TRAVEL TO OFFICE TO TRAIN W H+S

1820 DRILLERS TRAINED, LEAVE SITE FOR DAY

VOID

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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DATE 12-2-00

DATE

12-3-00

TITLE DAILY ACTIVITIES NSWC CRANE

PROJECT NO. 7141

BOOK 2447

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0730 ON-SITE. DISCUSSED ACTIVITIES FOR DAY W/ DRILLERS. B. BALKOVIC WILL OVERSEE HSA + MGC W OVERSEE 2ND RIG W/ ROCK CORING @ SWMU 9

0800 MGC + A. WOLFE CHECK DRILL LOCS @ SITE 9.

0815 MGC SETS UP B BALKOVIC W HSA AT ~~W~~ SWMU 5

0830 MGC RETURNS TO SWMU 9 TO START DRILLING

0900 DRILLERS SET UP ON WELL 09T01 TO START DRILLING. NOTE: NO SOIL SAMPLING WILL BE CONDUCTED SINCE DPT SAMPLING WAS PERFORMED IN AREA FOR LITH. DATA. NOTE ALL FIDS ARE NON FUNCTIONING EXCEPT ONE. B. BALKOVIC WILL USE FID

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE

DATE 12-3-00

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DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2447

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SINCE THAT AREA HAS NOT BEEN PREVIOUSLY DRILLED W DPT + SCANNED AS WAS THE SWMU 9 AREA

0930 START DRILLING 09T01

1200 - MGC TAKES LUNCH WHILE DRILLING

1530 - POLICE ARRIVE AND REQUIRE US TO LEAVE SINCE WE ARE NOT AUTHORIZED TO DRILL AT SWMU 9

1545 LEAVE SITE 9

1600 RETURN TO OFFICE TO COMPLETE DAILY LOGS

1645 LEAVE SITE FOR DAY

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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DATE 12-3-00

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TITLE 12-4-00 DAILY ACTIVITIES NSWC CRANE

PROJECT NO. 714

BOOK 2447

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0700 ON SITE, DISCUSS DAY ACTIVITIES.

0730 MGC GOES TO 09T01 LOCATION WHILE DRILLERS PICKUP WELL SUPPLIES

0815 DRILLERS ON SITE, RESUME DRILLING

1100 WELL 09T01 INSTALLED ADJACENT EXPLORATORY BORING 09T01A GROUTING PERFORMED.

1200 LUNCH

1230 RETURN FROM LUNCH CONTINUE GROUTING 09T01A

1250 09T01A GROUTED, DRILLERS DECON RIG.

1345 2ND RIG ARRIVES FROM SITE 5 TO ASSIST IN WELL DRILLING

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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TITLE DAILY ACTIVITIES NSWC CRANE

PROJECT 7141

BOOK 2447

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1400 SETUP ON 09T05 TO START DRILLING

1545 TRACK RIG @ AUGER REFUSAL @ 10' ON LOCATION 09T02. DRILLERS CHECK TO SEE IF RIG CAN BE ADAPTED FOR AIR ROTARY IN LIEU OF DRIVING TRUCK MOUNTED RIG TO LOCATION AND RISK GETTING STUCK. DRILLERS DECIDED TO ATTEMPT CORING WITH CONCRETE BIT. CONCRETE BIT NOT SUCCESSFUL. DRILLERS DECIDED TO DRILL TOMORROW AT LOCATION W TRUCK RIG WHILE GROUND IS FROZEN WITHOUT GETTING STUCK (HOPEFULLY)

1730 WELL 09T05 INSTALLED

1830 LEAVE SITE FOR DAY

VOID

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

WITNESS

DATE 12-4-00

DATE

12-5-00 CRANE [illegible]

TITLE DAILY ACTIVITIES **PROJECT NO.** 7141

BOOK 2447

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0700 - ON SITE, DRILLERS FILL H_2O TRUCKS

0730 DRIVE TO DECON PAD TO STEAM EQUIPMENT

0810 STEAM CLEANING FINISHED, MOB TO LOCATION 09T02 TO REDRILL HOLE WHICH COULD NOT BE DRILLED YESTERDAY WITH TRACK RIG. NOTE: GROUND FROZEN - GOOD CHANCE OF NOT GETTING STUCK

0845 RETURN TO DECON PAD TO STEM CASING, HAVE NOT YET MOVED TO 09T02 LOCATION

0900 MOVE TO LOCATION 09T02

0945 START DRILLING 09T02

1130 LUNCH

1230 RETURN FROM LUNCH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE [signature] DATE 12-5-00

WITNESS DATE

12-5-00

TITLE DAILY ACTIVITIES **PROJECT NO.** 7141

BOOK 2447

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1400 WELL 09T02 COMPLETED. DRILLERS DEMOB FROM SITE.

1600 DRILLERS START DECON

1645 DECON COMPLETE, DRILLERS RETURN TO LOCATION 09T03 AND SETUP TO DRILL, AND PUMP WATER FROM DECON PAD AREA

1730 MET W/ KEITH SIMPSON TO DISCUSS ITEMS NEEDED DONE

09T02 - LOCKS
09T05 - LOCK } STILL CURING

THESE ITEMS WILL BE ADDRESSED TOMORROW AFTER WELLS CURE

1800 LEAVE SITE FOR DAY

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE [signature] DATE 12-5-00

WITNESS DATE

TITLE 12-6-00 DAILY ACTIVITIES PROJECT NO. 714[illegible]
BOOK 2447

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0700 ON SITE, DISCUSS DAY'S ACTIVITIES W/ DRILLERS. PERFORM PAPER WORK.

0730 MGC CHECKS WELL LOCATIONS AND PAD DIGGING

1030 LEAVE SITE

12-11-00

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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DATE 12-6-00

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TITLE 12-11-00 DAILY ACTIVITIES PROJECT [illegible] 7141
BOOK 2447

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1430 TTNUS ON SITE, HEAVY RAINS ON GOING, DRILLERS NOT YET ARRIVED

1500 J. MAY ON-SITE, DISCUSSED PLANNED ACTIVITIES

1530 MGC REPAIRS FAX MACHINE, STILL RAINING, DRILLERS NOT YET ON SITE

1800 LEAVE SITE FOR DAY

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

DATE 12-12-00

DATE

TITLE DAILY ACTIVITIES **PROJECT NO.** 7141
12-12-00 **BOOK** 2447

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0700 ON-SITE

0715 DRILLERS ON SITE, FILL H_2O TRUCK

0730 MOB TO LOCATION 09T03 TO SET UP EQUIP TO START DRILLING, RIG FROZEN, EXTENSIVE THAWING WITH TORCH PERFORMED

0915 RIG THAWED, START DRILLING

1130 09T03 DRILLED & REAMED, TAKE LUNCH

1230 RETURN FROM LUNCH, FILL H_2O TRUCK & START WELL CONST.

1345 WELL 09T03 CONSTRUCTED, RIG GETS STUCK PULLING OFF HOLE

1545 RIG OFF HOLE, DRILLERS MOB TO DECON

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

WITNESS

DATE 12-12-00

DATE

TITLE DAILY ACTIVITIES **PROJECT NO.** 7141
12-12-00 **BOOK** 2447

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1700 RETURN TO OFFICE FOR PAPERWORK

1800 LEAVE SITE FOR DAY

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

WITNESS

DATE 12-12-00

DATE

LE DAILY ACTIVITIES PROJECT NO. 7[illegible]
12-13-00 BOOK 2447

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0700 ON SITE

0715 MOB TO DRILL SITE TO START EQUIPMENT

0745 MOVE ONTO LOCATION 09TO4 TO START DRILLING

0805 START DRILLING 09TO4

0945 DRILLERS WENT TO PICK UP WELL SUPPLIES

1000 DRILLERS RETURN, START WELL CONST.

1145 LUNCH

1230 RETURN FROM LUNCH, CONTINUE WELL CONST.

1330 WELL 09TO4 CONSTRUCTED, DRILLERS TAKE DOWN EQUIPMENT MGC RETURNS TO OFFICE TO GET WELL DEV. EQUIPMENT

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605

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SIGNATURE [signature] DATE 12-13-00

WITNESS DATE

TITLE DAILY ACTIVITIES PROJECT 7141
12-13-00 BOOK 2447

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1430 MGC RETURNS TO DRILL SITE, DRILLERS PULLED OFF HOLE, CONTINUE TO SECURE EQUIPMENT. ~NOTE ~ 6" SNOW HAS FALLEN SINCE THE A.M.

1545 MOB TO WELL LOCATION 09TO1 TO DEVELOP.

1640 DONE DEVELOPING, RETURN TO OFFICE, ASSIST IN PACKING SAMPLES & PAPERWORK

1830 LEAVE SITE FOR DAY

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605

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SIGNATURE [signature] DATE 12-13-00

WITNESS DATE

TITLE DAILY ACTIVITIES 12-14-00 PROJECT NO. 7141 BOOK 2447

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0700 ON-SITE, DISCUSS ACTIVITIES FOR DAY. MGC TO DEVELOP WELLS UNTIL LEAVING FOR AIRPORT. NOTE: ALL WELLS ARE NOW INSTALLED

0730 MOB TO DEVELOP 09TO2 & 09TO5

1015 RETURN TO OFFICE

1030 LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

DATE 12-14-00

WITNESS

DATE

TITLE PROJECT NO. BOOK

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

DATE

APPENDIX C

SITE LOGBOOK AND FIELD NOTEBOOKS
C.3 Field Notebook 2493

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SUBJECT

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TITLE NSWC CRANE

PROJECT 7141

BOOK 2493

TUES. 11/28/00

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HES INFO.:

ISSUED WORK PERMITS:

PERMIT #	FOR	PERSONNEL
112800-01	DPT @ SWMU 4, 5, 9 & 10 Good → 12/6/00	T. KEEN
112800-2	MULTI-MEDIA SWMU 4, 5, 9 & 10 Good → 12/6/00	K. SIMPSON, B. BALKOVEC & T. ROSAHN
112800-3	GENERAL CLEARING OF VEGETATION Good → 12/15/00	T. BOEHMER

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Ted Rozak

DATE 11/28/00

WITNESS

DATE

Scientific Bindery Productions 1255 S. Wabash Chicago Il. 60605

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

THURS · 11/30/00

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H&S INFO. 0715 - 0800 HRS

SPECIFIC H&S TRAINING FOR this date

PERSONNEL: JAMES MAY

MATT COCHRAN

DENNIS SINK

Issued Work Permits:

Permit #	For	Personnel
11290001	SWMU-4 Drilling	Dennis Sink & T. Sanders
11290002	SWMU-5,9 & 10 Drilling	D. Sink & T. Sanders

Copies were also given to M. Cochran & J. May

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

DATE 11/30/00

DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

FRI 12-01-00

Work continued from Page

B. Balkovec & T. Rovann

0700 Hrs - ARRIVE @ FIELD OFFICE
PREP to develop WELLS

0850 Hrs - ARRIVE @ WELL 04-04
- APPEARS water below bottom of FILTER (Just in S. ARES.)
- B.B. went back to office for bailers
- Will see if well will make any water

0924 Hrs - B.B. RETURNED w/ Bailers

0930 Hrs - Start WELL DEVELOPMENT @ 04-04

1105 Hrs - END DEV. @ 04-04
REMOVED 22 gals

1113 Hrs - FINISH CLEAN UP @ 04-04

1145 Hrs - LUNCH

1230 Hrs - ARRIVE @ 9-12
SURGE FOR 10 min

1250 Hrs - Start WELL DEV.

1321 Hrs - END WELL DEV.
DRIED out well 3 times
REMOVED 14 gals

1345 Hrs - ARRIVE @ 05-02
SURGE FOR 10 min

1406 Hrs - Start WELL DEV

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

DATE 12-01-00

DATE

TITLE NSWC CRANE

PROJECT NO. 7[illegible]

BOOK 2493

FRI 12-01-00 Cont

Work continued from Page

1444 HRS - END WELL DEV. @ 05-02
DRIED out WELL 4 times
REMOVED 3.5 gals

1515 HRS - Start Surge @ 0519
1525 HRS - Start WELL DEV.
1555 HRS - END WELL DEV.
DRIED OUT WELL 3 times
REMOVED 11 gals

1611 HRS - Start Surge @ 05-15
1619 HRS - Start WELL DEV.
1653 HRS - END WELL DEV.
DRIED OUT WELL 3 times
REMOVED 21 gals

1725 HRS - RETURNED to FIELD OFFICE
PAPERWORK
1800 HRS - LEFT BASE

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogers

DATE 12-1-00

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TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2493

SAT 12-02-00

Work continued from Page

0730 HRS - ARRIVED @ FIELD OFFICE
PREP. to DEV. Monitoring WELLS
0830 HRS - ARRIVE @ 10C26
0845 HRS - SURGE Monitoring WELL 10 MIN
0910 HRS - Start PURGING @ 10C26
1118 HRS - END PURGE @ 10C26
• REMOVED 158.5 LITERS
• DRIED out WELL 3 times
1200 HRS - LUNCH
1230 HRS - FINISH LUNCH
1245 HRS - ARRIVE @ 10C37
1300 HRS - SURGE WELL FOR 10 MIN
1330 HRS - Start WELL DEVELOPMENT
1520 HRS - END WELL DEVELOPMENT
REMOVED 192.5 L
1535 HRS - ARRIVE @ 10C31P3
1545 HRS - SURGE WELL FOR 10 MIN
1601 HRS - Start WELL DEVELOPMENT
1646 HRS - END WELL DEVELOPMENT
• REMOVED
• DRIED out WELL 3 times
1700 HRS - RETURNED to FIELD OFFICE
1715 HRS - GAVE H&S Site Specific training
to Alan Wolfe & Jared Rodgers
1800 HRS - Finish H&S training
1810 HRS - LEFT SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogers

DATE 12-02-00

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

WED 12-13-00

Work continued from Page WEATHER - SNOW & 15-32° TEMP

0700 Hrs - Arrive @ Field office
See Field Note Book 2494
Prior to 1430 Hrs
1430 Hrs - Driller Ready to Proceed to
SWMU 4 For Well Dev.
1506 Hrs - Start well dev. @ 04T01
1624 Hrs - END Well dev @ 04T01
Dried out well 3 times
Purged 22 gal
1655 Hrs - Return to Field office
Assist w/ Package & Shipping
Paperwork
1910 Hrs - Left site

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

DATE 12/13/00

DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

THURS. 12-14-00

Work continued from Page WEATHER - OVERCAST & COLD 30's

0700 Hrs - Arrive @ Field office
Cal. Hurlburt W-10
Prep For Well Dev.
0900 Hrs - Driller pull out Drum
truck stuck near 04T01
0943 Hrs - Start Development @ 04T03
1028 Hrs - END " " 04T03
Purged 60 gals
1105 Hrs - Finish Clean up
1130 Hrs - Break For Lunch
1200 Hrs - Get Gas on Base
1210 Hrs - Arrive @ Field office
Paperwork wait For TED Keen
1230 Hrs - Left Field office For SWMU 4
1337 Hrs - Start Development @ 04T02
1435 Hrs - END Development @ 04T02
• Dried out well 3 times
• Purged 8 gal
1533 Hrs - Start Development @ 05T02
1640 Hrs - END Dev. @ 05T02
• Purge 5 vol. = 190L
1710 Hrs - Return to Field Trailer
EQ. Drop off & Paperwork
1830 Hrs - Left For motel (BQ)

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

DATE 12-14-00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2493

WED 01-03-01

Work continued from Page WEATHER - Partly Cloudy TEMP 30°s

0700Hrs - ARRIVE @ FIELD OFFICE
CALI. YSI SN# 318312R
PREP. FOR GROUND WATER SAMPLING

0920Hrs - ARRIVE @ 0402
Start PURGE = 1005 Hrs
END PURGE = 1155 Hrs
VOL. PURGED = 10.2L
Start Sampling = 1200 Hrs
END Sampling = 1420Hrs

1440Hrs - FINISH CLEAN up @ 04-02

1452Hrs - ARRIVE @ FIELD OFFICE
DECON Bladder Pump

1640Hrs - Collect Rinsate on
Bladder Pump = RB010301
USED NERL REAGENT Grade H2O
Lot # = 0803310
Exp. Date = 08-2001

1800Hrs - FINISH PAPERWORK

1830Hrs - LEAT SITE

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

DATE 1-03-01

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2493

THURS 01-04-01

Work continued from Page WEATHER - Partly Sunny 35° High

0700Hrs - ARRIVE @ FIELD OFFICE
- PREP to sample groundwater
- Work out supply list FOR Bladder Pump

0840Hrs - ARRIVE @ 0402
Start PURGE = 0935
END PURGE = 1215
VOL PURGED = 12.9 L
Start Sampling = 1220
END " = 1440

FINISH CLEAN up @ 1455

1510Hrs - Gas up Pick up Truck

1530Hrs - ARRIVE @ FIELD OFFICE
- PAPERWORK & Sample handling.
- DECON Bladder Pump
- PREP Bottle sets & EQ.
- Dump PURGE H2O

1740Hrs - LEFT FIELD OFFICE

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 01-04-01

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

FRI. 01-05-01

Work continued from Page WEATHER - Sunny & 30's

0700 Hrs - ARRIVE @ FIELD OFFICE
- PREP. to collect Groundwater
- WORK UP bottle sets FOR SWMU 5

0800 Hrs - ARRIVE @ 0471
Start ~~SA~~ (TR) PURGE = 0840 Hrs
END PURGE = 1010 HRS
VOL. PURGED = 7.3 L
Start SAMPLING = 1045 Hrs
END SAMPLING = 1215 HRS
FINISH CLEAN UP = 1237 HRS

1253 Hrs - ARRIVE @ FIELD OFFICE
DECON Bladder Pump

1405 Hrs - ARRIVE @ 04-01
Start PURGE = 1450 Hrs
END PURGE = 1740 HRS
VOL PURGED = 14.1 L
Start SAMPLING = 17:45 HRS
END SAMPLING = 1940 HRS
FINISH CLEAN UP = 1955 HRS

2010 Hrs - ARRIVE @ FIELD OFFICE
Drop off sample & EQ

2025 Hrs - LEFT FIELD OFFICE for Motel

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogers DATE 01-05-01

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

SAT. 01-05-01

Work continued from Page WEATHER - Mostly Sunny High 30's

0700 HRS - ARRIVE @ FIELD OFFICE
- DECON Bladder Pump
- PREP to sample Groundwater

0815 Hrs - ARRIVE @ Monitoring WELL 10GWC37P3
Start PURGE = 0905
END PURGE = 1426
Vol. PURGED = 9.3 L
Start Sample = 1430 Hrs
END Sample = 1700 Hrs
FINISH CLEAN UP = 1715 Hrs

1720 Hrs - ARRIVE @ FIELD OFFICE
- Unload VEHICALE (EQ & Sample)
- PAPERWORK

1750 Hrs - LEFT FIELD OFFICE

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Terry Rogers DATE 01-06-01

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TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2493

SUN: 01-07-01

Work continued from Page WEATHER: Mostly Sunny & 30's

0700 Hrs - ARRIVE @ FIELD OFFICE
- DECON Bladder Pump
- PREP FOR Groundwater Sampling @ SWMU 4

0805 Hrs - ARRIVE @ WELL 04-04
Start PURGE = 0850 Hrs
END PURGE = 1030 Hrs
Vol. PURGED = 9.7 L
Start SAMPLE = 1035 Hrs
END SAMPLE = 1210 Hrs
FINISH CLEAN UP = 1221 Hrs

1234 Hrs - ARRIVE @ FIELD OFFICE
- REFRIGERATE above sample
- PAPERWORK
- DECON Bladder Pump

1340 Hrs - ARRIVE @ WELL 05-06
Start PURGE = 1420 Hrs
END PURGE = 1820
Vol. PURGED = 25.2 L
Start SAMPLE = 1830 Hrs
END SAMPLE = 1920 Hrs
FINISH CLEAN UP = 1928 Hrs
Assisted by K. Simpson

1945 Hrs - Drop off Samples & EQ @ FIELD OFFICE

1955 Hrs - LEFT FIELD OFFICE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 01-07-01

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2493

MON 01-08-01

Work continued from Page WEATHER: OVERCAST

0650 Hrs - ARRIVE @ FIELD OFFICE
- PAPERWORK & load EQ in Pick up
- Decon Bladder Pump

0755 Hrs - ARRIVE @ 10C31
Start PURGE = 0840 Hrs
END PURGE = 1040 Hrs
Vol. PURGED = 11.7 L
Start SAMPLING = 1045 Hrs
END SAMPLING = 1150 Hrs
FINISH CLEAN UP = 1153 Hrs

1200 Hrs - Drop off Samples @ FIELD OFFICE

1210 Hrs - LUNCH

1230 Hrs - GAS Pick-up TRUCK

1245 Hrs - RETURN to FIELD OFFICE
- PACKAGE Samples FOR FED-EX W/BB
- Decon Bladder Pump

1520 Hrs - Start Bladder Pump Rinsate FOR RB010801

~~150~~ 1700 Hrs - END Bladder Pump Rinsate

1730 Hrs - FINISH CLEAN-UP

1745 Hrs - LEFT FIELD OFFICE

JOHN

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

DATE 01-08-01

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

TUES 01-09-01

Work continued from Page

WEATHER - Mostly Sunny & 30's

0700 Hrs - Arrive @ Field Office
- Prep. Calculation sheet for Surface water Flow Est. For K.S.
- Prep for Groundwater Sampling

0805 Hrs - Arrive @ 10C41
Problem w/ air fitting
Start Purge @ 0930 Hrs
End Purge @ 1210 Hrs
Vol. Purged = 22.1 L
Start Sampling @ 1220
End Sampling @ 1305

1315 Hrs - Return to Field Office
Decon Bladder Pump

1350 Hrs - Return to Field Monitoring Well 10C41P3
Start Purge @ 1420 Hrs
Dry Well below Pump Intake @ 1523 Hrs
Vol. Purged = 2.9 L
Start Sampling @ 1610 Hrs
End Sampling @ 1750 Hrs

1805 Hrs - Return to Field Office
- Unload Pick-up Truck
- Clean Instruments
- Dump IDW
- Paperwork

1855 Hrs - Left Field Office for Motel

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogers DATE 01-09-01

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7141

BOOK 2493

WED 1-17-01

Work continued from Page

Overcast to Mostly Cloudy 30's

0700 Hrs - Arrive @ Field Office
- Cali VSIs & Turbidity meters w/ KS
- Decon Bladder Pump

0800 Hrs - Conduct Flow Meas. @ SWMU 10

1130 Hrs - Return to Field Office Finish doing Flows @ SWMU 10

1145 Hrs - Lunch

1215 Hrs - Return to Field Office
Prep. for Groundwater Sampling

1250 Hrs - Arrive @ SWMU 10 Well 10C26
Start Purge = 1320 Hrs
End Purge = 1830 Hrs
Vol Purged = 26.7 L
Start Sampling = 1835 Hrs
End Sampling = 1845 Hrs
Finish Clean-up = 1905 Hrs

1910 Hrs - Return to Field Office
- Unload EQ. & Sample

1925 Hrs - Left Field Office for Motel

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogers DATE 1-17-01

WITNESS DATE

TITLE NSWC CRANE PROJECT NO [redacted]1

BOOK 2493

THURS 01-18-01

Work continued from Page WEATHER - Partly Sunny & 30's

0700 Hrs - Arrive @ Field Office
- Paperwork
- Decon Bladder Pump

0800 Hrs - Arrive @ SWMU 10 Well 10C52
Start Purge = 0835 Hrs
End Purge = 1145 Hrs
Vol. Purge = 18.5 L
Start Sampling = 1150 Hrs
End Sampling = 1245 Hrs

Decon Bladder Pump @ 10-03
Start Purge @ 10-03 = 1340 Hrs
End Purge = 1640 Hrs
Vol. Purge = 16.2 L
Start Sampling = 1645 Hrs
End Sampling = 1750 Hrs
Finish Clean-up = 1800 Hrs
Call Security to Exist Gate 12

1816 Hrs - Arrive @ Field Office
Unloaded samples & EQ.

1830 Hrs - Left for Motel (EQ)

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605

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SIGNATURE Terry Rogal DATE 01-18-01

WITNESS DATE

TITLE NSWC CRANE PROJECT 7141

BOOK 2493

FRI. 01-19-01

Work continued from Page WEATHER: Overcast & 30's

0655 Hrs - Arrive @ Field Office
- Decon Bladder Pump
- Prep Bottle Sets
- Prep. to sample groundwater

0745 Hrs - Arrive @ Rockeye Bldg 2736
Bldg & Fence Closed

0810 Hrs - Arrive @ 10C37
Start Purge = 0850 Hrs
End Purge = 1310 Hrs
Vol. Purged = 23.5 L
Start Sampling = 1315 Hrs
End Sampling = 1405 Hrs
Finish Clean-up = 1417 Hrs

1420 Hrs - Arrive @ Field Office
Unload EQ. & Samples

1430 Hrs - Lunch

1500 Hrs - Gas up Vehical

1510 Hrs - Arrive @ Field Office
Prep. to do rinsate Blank w/
PE tubing Bladder & Pump

1530 Hrs - Start Rinsate RB0119010

1555 Hrs - End Rinsate "

1610 Hrs - Finish Clean up

1700 Hrs - Left Office for Lowes to
pick up wooden stakes

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogal DATE

WITNESS DATE

TITLE NSWC CRANE
SAT. 01-20-01

PROJECT NO. 7141
BOOK 2493

Work continued from Page

Weather - Overcast, snow & 30°s

0700 Hrs - Arrive @ Field Office
• Prep. to sample groundwater inside Rockeye - K.S. called security to open gate next to Bldg. 2736 @ 0800 Hrs

0753 Hrs - Arrive @ Rockeye Bldg 2736

0830 Hrs - Security hasn't shown up
Went to phone & recalled Security - spoke to Mr Nickoles
He will send someone out to open gate

0905 Hrs - Security opened gate to Rockeye
Arrive @ Well 10C33
Start Purge = 0945 Hrs
End Purge = 1205 Hrs
Vol. Purged = 11.2 L
Sample Start = 1210 Hrs
Sample End = 1330 Hrs

Well 10C33P2
Start Purge = 1355 Hrs
End Purge = 1445 Hrs
Vol. Purged = 4.6 L
Sample Start = 1450 Hrs
Sample End = 1545 Hrs
Finish Clean-up = 1558 Hrs

1619 Hrs - Called Security to lock gate

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE
WITNESS
DATE 01-20-01
DATE

TITLE NSWC CRANE
SAT. 01-20-01 (Cont)

PROJECT NO. 7141
BOOK 2493

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1605 Hrs - Arrive @ Field Office
• Called security sec A 18
• Unloaded EQ & samples
• Decon Bladder Pump

1640 Hrs - Left field office for SWMU 5 to find K.S.

1650 Hrs - K.S. @ 05-08
Assisted K.S. w/ clean-up & loaded two samples into my vehical

1735 Hrs - Secured K.S. samples from site 5 in refrigerator @ Field Office

1750 Hrs - Left Field Office for BQ
K.S. will knock on my room tonight when he returns

END

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE
WITNESS
DATE 01-20-01
DATE

TITLE NSWC CRANE PROJECT NO [redacted]1

SUN 01-21-01 BOOK 2493

Work continued from Page Weather - Mostly Sunny E 30's

0655 Hrs - Arrive @ Field Office
Prep to sample Groundwater
0750 Hrs - Arrive @ Rockeye
0800 Hrs - Guard opened Gate #6
0810 Hrs - Arrive @ Cluster 10-35
WELL 10C35 : some problems w/ freezer EQ.
Start Purge : 0920 Hrs
END Purge : 1130 Hrs
Vol Purged : 13 L
Start Sampling : 1135 Hrs
END Sampling : 1217 Hrs
WELL 10C35P2
Start Purge : 1245 Hrs
END Purge : 1615 Hrs
Vol Purged : 21.1 L
Start Sampling : 1620 Hrs
END Sampling : 1715 Hrs
Finish Cleanup : 1723 Hrs
1728 Hrs - Arrive @ Field Office
• Secure Samples
• K.S. Called Security to close Gate #6
• Unload EQ.
1820 Hrs - Left Office For BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE [signature] DATE 1/21/01

WITNESS DATE

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TITLE NSWC CRANE PROJECT 714

MON 01-22-01 BOOK 2493

Work continued from Page Weather - Mostly Sunny E 30's

0700 Hrs - Arrive @ Field Office
• Decon Bladder Pump
• Prep. to sample Groundwater
0745 Hrs - Arrive @ BLD 2736 - Personnel leaving the area - must call security to get inside Rockeye
0800 Hrs - Called security to access Gate #6
0810 Hrs - Return to Rockeye
0820 Hrs - Arrive @ 10C31P3
Start Purge - 0840 Hrs
END Purge - 1015 Hrs
Vol. Purged - 6.8 L
Sample Start - 1020 Hrs
Dry @ - 1035 Hrs
Sample END - 1330 Hrs
1345 Hrs - Drop of sample @ Field Office for shipment
1400 Hrs - Arrive @ 10C26P3
Start Purge : 1415 Hrs
END Purge : 1735 Hrs
Vol. Purged : 30.2 L
Start Sampling : 1740
END Sampling : 1750
Finish Clean up : 1759
1815 Hrs - Drop off EQ & Sample @ Field Office
Left Office For BQ.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE [signature] DATE 1/22/01

WITNESS DATE

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TITLE NSWC CRANE **PROJECT NO.** 7141 **BOOK** 2493

TUES 01-23-01

Work continued from Page

WEATHER - Mostly Sunny & 30's

0700 Hrs - ARRIVE @ FIELD OFFICE
PREP to sample groundwater
0750 Hrs - ARRIVE @ 10C57
Start PURGE = 0820 HRS
END PURGE = 0943 HRS (WELL Dry)
VOL. PURGED = 12.9 L
Will sample WELL tomorrow
MEASURED Recharge to 1020 Hrs
1040 Hrs - RETURNED to FIELD OFFICE
PREP to sample groundwater
@ SWMU 9
LUNCH @ 1100 Hrs
1130 Hrs - ARRIVE @ SWMU 9 WELL 9WTP6
Start PURGE = 1155 Hrs
END PURGE = 1405 HRS
VOL. PURGED = 10.9 L
Start Sampling = 1410 HRS
END Sampling = 1600 HRS
FINISH CLEAN UP = 1608 HRS
1615 Hrs - RETURN to FIELD OFFICE
- CLEAN EQ - unload VEHICAL
- SECURE SAMPLES
- CLEAN SINK AREA
- PREP. FOR Groundwater Sampling tomorrow

1736 Hrs - LEAVE for BQ

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Terry Rigel DATE 01-23-01

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7141 **BOOK** 2493

WED 01-24-01

Work continued from Page

0700 Hrs - ARRIVE @ FIELD OFFICE
AFTER CHECK out @ BQ
- Load VEHICAL FOR Sampling
@ ~~9WTP6~~ 10C57 - Dried out yesterday (will sample today)

0735 Hrs - ARRIVE @ 10C57
Start Sampling = 0755 Hrs
END Sampling = 0840 Hrs
FINISH CLEAN up = 0845 Hrs

0855 Hrs - RETURN to FIELD OFFICE
ASSIST with PACKAGING SAMPLES & CLEAN out VEHICAL

0940 Hrs - LEAVE FIELD OFFICE FOR Airport

END

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Terry Rigel DATE 01-24-01

WITNESS DATE

TITLE NSWC CRANE **PROJECT N** 7141

TUES 01-30-01 **BOOK** 2493

Work continued from Page WEATHER - Some Rain & 40's

0655 Hrs - ARRIVE @ FIELD OFFICE
- PREP to SAMPLE GROUNDWATER @ SWMU-9
- CALI YSI

0740 Hrs - ARRIVE @ 09-04
Start PURGE = 0815 HRS
END PURGE = 1215 HRS
VOL. PURED = 19L
Start SAMPLING = 1205 HRS
END SAMPLING = 1605 HRS
FINISH CLEAN-UP = 1616 HRS

1621 Hrs - ARRIVE @ FIELD OFFICE
- DECON Bladder Pump
- REFRIGERATE Sample

1645 Hrs - ARRIVE @ 09T01
Start PURGE = 1700 HRS
END PURGE 1905 HRS
VOL PURGED = 30.5L
FINISH CLEAN-UP @ 1915 HRS

1920 Hrs - ARRIVE @ FIELD OFFICE
EQ. Drop off & CHARGE YSI

1925 Hrs - LEFT FOR BQ

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605

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SIGNATURE [signature] DATE 01-30-01

WITNESS DATE

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TITLE NSWC CRANE **PROJECT** 7141

WED. 01-31-01 **BOOK** 2493

Work continued from Page WEATHER:

0655 Hrs - ARRIVE @ FIELD OFFICE
PREP. to SAMPLE GROUNDWATER

0720 Hrs - ARRIVE @ 09T01
Start SAMPLING = 0755 HRS
END SAMPLING = 0928 HRS
FINISH CLEAN-UP = 0935 HRS

0940 Hrs - ARRIVE @ FIELD OFFICE
- DECON BLADDER PUMP

1008 Hrs - ARRIVE @ 09-07
Start PURGE = 1025 HRS
END PURGE = 1425 HRS
VOL. PURGED = 22.4 L
Start SAMPLING = 1430 HRS
END SAMPLING = 1545 HRS
FINISH CLEAN-UP = 1555 HRS

1600 Hrs - ARRIVE @ FIELD OFFICE
- DECON Bladder Pump & EQ FOR SHIPMENT to US ENV.
Also, packaged same for shipment
- PAPERWORK
- Select WELL for tomorrow to sample

1750 Hrs - LEFT FOR BQ

SCIENTIFIC BINDERY PRODUCTS CHICAGO 60605

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SIGNATURE [signature] DATE 01-31-01

WITNESS DATE

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TITLE NSWC CRANE **PROJECT NO.** 7141

THURS 02-01-01 **BOOK** 2493

Work continued from Page WEATHER: Mostly Sunny & 30's 40's

0655 HRS - ARRIVE @ FIELD OFFICE
PREP. to SAMPLE groundwater w/ Peristaltic Pump.

0730 HRS - ARRIVE @ 09-12
START PURGE = 0800 HRS
END PURGE = 1120 HRS
VOL. PURGED = 37.3 L
START SAMPLING = 1125 HRS
END SAMPLING = 1320 HRS
FINISH CLEAN-UP = 1330 HRS

1336 HRS - ARRIVE @ FIELD OFFICE
Drop off Samples

1350 HRS - LUNCH

1435 HRS - ARRIVE @ 09-03
START PURGE = 1450 HRS
END PURGE = 1650 HRS
VOL. PURGED = 18.7 L
START SAMPLING = 1655 HRS
END SAMPLING = 1830 HRS
FINISH CLEAN-UP = 1836 HRS

1842 HRS - ARRIVE @ FIELD OFFICE
SECURE SAMPLES IN REFRIGERATOR
CHANGE VSI & drop off EQ.

1915 HRS - LEFT OFFICE FOR BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Terry Rogalski DATE 02-01-01

WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7141

FRI. 02-02-01 **BOOK** 2493

Work continued from Page WEATHER - Mostly Sunny & 20's

0700 HRS - ARRIVE @ FIELD OFFICE
PREP. VEHICAL FOR groundwater sampling w/ Peristaltic Pump Etc.

0740 HRS - ARRIVE @ 09T04
START PURGE = 0815 HRS
END PURGE = 0935 HRS
VOL. PURGED = 8.4 L
START SAMPLING = 0940 HRS
END SAMPLING = 1122 HRS
FINISH CLEAN-UP = 1127 HRS

1135 HRS - LUNCH

1200 HRS - GAS VEHICAL & PURCHASE ICE

1210 HRS - ARRIVE @ FIELD OFFICE
- PACKAGE SAMPLES FOR SHIPMENT
- PACKAGED Miscellaneous EQ to SHIP to U.S. ENV. w/ K.S.

1820 HRS - LEFT FIELD OFFICE FOR BQ

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Terry Rogalski DATE 02-02-01

WITNESS DATE

TITLE

PROJECT NO

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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DATE

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APPENDIX C

SITE LOGBOOK AND FIELD NOTEBOOKS
C.4 Field Notebook 2494

TABLE OF CONTENTS

SUBJECT

PROJECT TITLE NSWC CRANE

PROJECT 7141

BOOK 7494

Work continued from Page THES.

11/14/00

AM COLD, 30's CLOUDY
P.M. COLD WINDY 30's

0705 ARRIVE @ SITE. HEAD TO BLDG. 41 TO PICKUP EQUIP

0730 CAL. F.J.D. + MORIBA

0832 INSPECT WELL. G-10.

0845 BEGIN SURGING WELL.

0918 BEGIN PUMPING

1045 END PURGE REMOVED 11 gal 5 vol.

1050 LEAVE SITE TO GO TO BLDG. 3245 TO GO OVER H&S W/ DRILLERS.

1145 H&S MEETING OVER HEAD TO CAFETERIA

1240 ARRIVE BACK @ G-10. DRILLERS CLEAN UP INSPECT G-10 PUD. MISSING J-PLUG

1250 BEGIN SURGING G-10 PUD

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

DATE 11/14/00

WITNESS

DATE

Scientific Bindery Productions 1255 S. Wabash Chicago, IL 60605

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

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11/14/00

1305 BEGIN PUMPING.

1315 WELL RAN DRY. ALLOW FOR RECHARGE

1346 W/L @ 16.16 BEGIN PUMPING

1350 WELL RAN DRY ALLOW FOR RECHARGE.

1411 BEGIN PUMPING.

1415 WELL RAN DRY REMOVED 3 48L.
SOMEWHAT POOR PRODUCER.

1427 INSPECT 9-WTP05. PASSING LOCK

1430 SURGING WELL.

1442 START PUMPING.

1444 WELL RAN DRY.

1505 RESUME PUMPING

1507 WELL RAN DRY

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DATE

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TITLE NSWC CRANE

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11/14/00

1527 RESUME PUMPING.

1534 PUMPING STOPPED. WELL RAN DRY FOR 3RD TIME. REMOVED

1535 INSPECT 09-04

1538 BEGIN SURGING WELL

1544 START PUMPING

1554 WELL RAN DRY - ALLOW FOR RECHARGE.

1616 DECIDED TO RE-SURGE WELL.

1630 BEGIN PUMPING.

1633 WELL RAN DRY. STARTED UP SEDIMENTS WHILE SURGING WELL BAIL WELL TO REMOVE SED

1649 WELL RAN DRY. VERY SLOW RECOVERY DECIDED TO REMOVE

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SIGNATURE

DATE

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 744 BOOK 2444

Work continued from Page 11/14/00

1655 SECURE SITE. LEAVE FOR 3245.

1700 ARRIVE @ BLDG. 3245.

1705 DRILLERS PUMP OUT POLY TANK.

1730 FINISHED EMPTYING TANK.

1735 FINISH PAPERWORK.

1740 DRILLERS LEAVE SITE. WILL MEET TOMORROW @ 0700.

DRILLING TIMES %
4 HR HR DEVELOPMENT
1 HR TRANSPORT.

1830 LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkwill DATE 11/14/00

WITNESS DATE

TITLE NSWC CRANE PROJECT 744 BOOK 2444

Work continued from Page 11/15/00

AM COLD 30's CLEAR SKYS.
PM COOL 40's & SUNNY

0700 ARRIVE @ SITE. CAL HERTZBAUER F.I.D.

0730 GO OVER DAILY W/ DRILLER TED REED HELPER TIM SANDERS

0749 LEAVE BLDG 3245 TO DEVELOPE @ SUMMY 9.

0801 INSPECT 09-02

0809 DRILLER T. SANDERS SURGES WELL.

0816 BEGIN PUMPING.

0844 END DEVELOPMENT. REMOVED 125 gal AND RAN WELL DRY 3 TIMES

0857 INSPECT WELL 09-07

0903 DRILLER SURGED WELL.

0917 START PUMPING.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkwill DATE 11/15/00

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TITLE NSWC CRANE PROJECT NO. 7144 BOOK 2494

Work continued from Page 1/15/00

0930 WELL RAN DRY. RECOVERED 42L. ALLOW WELL TO RECHARGE.

0940 START PUMPING.

1011 WELL RAN DRY. THROTTLED DOWN TO 2A BEFORE WELL DRIED OUT. END DEVELOPMENT

1047 DRILLERS BEGIN SURGING 09-03.

1048 INSPECT 09-03.

1053 START PUMPING.

1054 WELL RAN DRY. ALLOW 30 MIN RECHARGE.

1115 WELL RECHARGE TO 5.70' INITIAL W/L 3.42. FROM NOW - 111M WELL RECHARGED .6' SLOW RECHARGE. BEGIN PUMPING.

1116 WELL RAN DRY. END DEVELOPMENT.

1125 BREAK FOR LUNCH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkwill DATE 1/15/00

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7144 BOOK 2494

Work continued from Page 1/15/00

1210 ARRIVE @ SUMMIT.

1217 CHECK ACCESS TO 04-12. GROUND TOO SOFT TO GET WATER TRUCK CLOSE TO WELL. WELL WAIT.

1230 ARRIVE @ SUMMIT 5.

1235 INSPECT 03-04. RISER BROKEN & WELL INFO. DOES NOT MATCH UP WITH FIELD READINGS.

1237 SURVE WELL

1246 BEGIN PUMPING

1325 WELL RAN DRY 4 TIMES. END DEVELOPMENT.

1342 SET-UP ON & BEGIN SURGING 05-03.

1343 INSPECT WELL.

1352 BEGIN PUMPING WELL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkwill DATE 1/15/00

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TITLE NSWC CRANE

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BOOK 2494

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11/15/00

1350 WELL RAN DRY.

1413 WELL RECHARGED 3' IN 20 MINUTES MAKE NOTE AND END PURGE

1428 INSPECT 05-01.

1430 BEGIN SURGING WELL.

1439 START PUMPING.

1502 END DEVELOPMENT. RAN WELL DRY 4 TIMES

1543 INSPECT WELL 04-13.

1548 SURGE WELL

1556 BEGIN PUMPING

1600 WELL RAN DRY. ALLOW FOR RECHARGE.

1610-1620 WELL RECOVERED 20.3-19.9

1623 PUMPED WELL DRY ONE MORE TIME

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SIGNATURE Robert Balkwill

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TITLE NSWC CRANE

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Work continued from Page

11/15/00

1630 HEAD TO BLDG. 3245.

1640 DRILLERS PUMP OUT WATER.

1700 DRILLERS FINISH EMPTYING TANK.

1715 FINISH PAPERWORK.

1745 LEAVE TO GO TO HOME DEPOT.

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SIGNATURE Robert Balkwill

WITNESS

DATE 11/15/00

DATE

TITLE NSWC CRANE PROJECT NO. 7141 BOOK 2494

Work continued from Page 11/16/00

A.M. 40°, Cold & Windy
P.M. 40°, Sunny

0705 Arrive @ Bldg 3342. Lab Maintenance F.Z.M.

0738 Head to Summit 5. To Develop.

0748 @ 05-09 Location on map but well reads 5-8-87. Well Inspect. Matches up w/ 05-04 info.

0758 Begin Surging.

0805 Start Purge

0850 End Development. Removed 16.5 gal & Parameters stabilized

0910 Inspect 05-06.

0913 Drillers Begin Surging.

0930 Start Pumping.

Work continued to Page

SIGNATURE Robert Belkner DATE 11/16/00
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7141 BOOK 2494

Work continued from Page 11/16/00

1018 End Development. Removed 23.5 gal Drew well dry twice. Slow Recharge.

1024 Inspect 05-07

1041 Surge Well

1055 Start Pumping.

1140 End Development. Removed 15 gal. Slow Recharge. Went dry twice.

1250 Break for Lunch

1300 Back @ Summit 5.

1305 Inspect 05-08.

1307 Drillers Surge Well.

1315 Start Pumping.

1403 End Purge. Removed 21.5 gal Pumped well dry 4 times.

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SIGNATURE Robert Belkner DATE 11/16/00
WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 71

BOOK 2444

Work continued from Page

11/16/00

1425 INSPECT 04-06

1428 SURGE WELL

1435 START PUMPING

1517 END DEVELOPMENT. REMOVED 9 gal WELL WENT DRY 4 TIMES

1530 INSPECT 04-02 DRAINED SURGE WELL

1540 START PUMPING

1609 END DEVELOPMENT. WELL WENT DRY 3 TIMES. REMOVED 9 gal.

1620 CLEAN UP AND HEAD BACK TO BLDG 3245.

1630 ARRIVE @ 3245. DRAINED EMPTY WATER TANK.

1640 TANK EMPTIED. GO OVER DATALOGS W/ TED KREN.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Belknap

WITNESS

DATE 11/16/00

DATE

TITLE NSWC CRANE

PROJECT NO. 141

BOOK 2444

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11/16/00

1800 LEAVE BLDG 3245. AND HEAD TO BASE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Belknap

WITNESS

DATE 11/16/00

DATE

TITLE NSWC CRANE

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BOOK 2444

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4/17/00

AM COLD LOW 30'S WITH FLURRIES
PM COLD HIGH 30'S FLURRIES

0705 ARRIVE @ BLDG 3245. CAL FIELD HURTADO.

0745 LEAVE FOR MC CORMICK GORE SUMMIT 4

0801 INSPECT 04-03. WELL INFORMATION DOESNOT MATCHUP W/ ACTUAL FIELD MEASURED DEPTHS.

0807 DESCRIBES SURGE WELL

0812 START PUMPING

0848 END PURGE. PUMPED WELL DRY 3 TIMES REMOVED 4gal.

0857 INSPECT 04-03

0905 DESCRIBES SURGE WELL V. SANDY

0914 BEGAN DEVELOPMENT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Belkner

WITNESS

DATE 4/17/00

DATE

TITLE NSWC CRANE

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BOOK 2444

Work continued from Page

4/17/00

0919 END DEVELOPMENT PUMPED OUT 4.75 gal WELL PUMPED DRY 3 TIMES

1000 INSPECT WELL # 04-01

1003 DESCRIBES SURGE WELL

1018 BEGAN PUMPING

1038 END PURGE REMOVED 38gal PUMPED WELL DRY 3 TIMES.

1100 CLEAN UP AND HEAD TO BLDG. 3245

1200 LEAVE SITE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Belkner

WITNESS

DATE 4/17/00

DATE

TITLE NSWC CRANE

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BOOK 2494

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11/27/00

1400 ARRIVE @ MAIN GATE W/ 12 SAMPLERS & T. ROJAHN VETTING ACCESS BADGES.

1430 ARRIVE @ BLDG 3245. GEAR UP TO SOIL SAMPLE ON 11/28/00.

1900 LEAVE SITE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

DATE 11/27/00

WITNESS

DATE

TITLE NSWC CRANE

PROJECT 7141

BOOK 2494

Work continued from Page

11/28/00

AM: 30°, CLOUD

PM. 40°, SUNNY & WARM

0700 ARRIVE @ SITE.

0710 CAL. F.I.D.? GEAR UP TO SOIL SAMPLE.

0800 LEAVE BLDG 3245 TO HEAD TO McCONNELL GORGE.

0830 SET-UP ON 045B05 25' DPT

0850 SAMPLING 045B050002 / 045B050102

1010 SAMPLING 045B050204

1025 SETUP ON 045B03 25' DPT

1035 SAMPLING 045B030002 / 045B030102

1120 SAMPLING 045B030406

1240 BREAK FOR LUNCH.

1230 SET-UP ON 045B04 16' DPT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

DATE 11/28/00

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 714

BOOK 2494

Work continued from Page

11/29/00

1255 SAMPLING 045B040002/045B040102

1315 SAMPLING 045B040608

1335 SET-UP ON 045B02 18' DPT

1345 SAMPLING 045B020002/045B020102

1420 SAMPLING 045B020608

1435 SET-UP ON 045B01 18' DPT

1438 SAMPLING 045B010002/045B010102

1455 SAMPLING 045B010204

1535 SET-UP ON 045B06 16' DPT

1544 SAMPLING 045B060002/045B060102

1555 SAMPLING 045B060204

1600 CLEAN UP AND HEAD BACK TO BLDG. 3245.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

WITNESS

DATE 11/29/00

DATE

TITLE NSWC CRANE

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11/29/00

1700 DRIVERS LEAVE SITE

1820 LEAVE FOR FED-EX

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

WITNESS

DATE 11/29/00

DATE

TITLE NSWC CRANE

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BOOK 2494

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11/29/00

AM 30°, CLOUD

PM 40°, COLD WINDY, SLEET/RAIN

0700 MEET @ STATE. ALL F.O.D.'S

0745 MEET TO MR CAMPBELL GOLD B. BALKOVICE + T. ROSAND

0800 SET-UP ON 045B07 12' DPT

0815 SAMPLING 045B070002/045B070102
FD11290002 TAKEN

0835 SAMPLING 045B070607

0850 SET-UP ON 045B08 16' DPT

0905 SAMPLING 045B080002/045B080102

0918 SAMPLING 045B080810.

0925 CLEAN UP AND MOVE TO 045B01

0950 SAMPLING 045B010002/045B010102

1020 R. SAMPSON GOES TO GET DZL PERMIT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovice

DATE 11/29/00

WITNESS

DATE

TITLE NSWC CRANE

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11/29/00

FOR BURN PIT SUMMIT

1025 WAITING W/ TIMEN @ SUMMIT.

1045 R. SAMPSON GOES BACK ACCESS/WEIGHT CLEARANCE NOT COMPLETE. MOVE BACK TO BLDG 3245 TO RE-ORGANIZE + GET SUPPLIES.

1130 BREAK FOR LUNCH.

1215 SET-UP ON 055B01. R. SAMPSON GIVE O.K.

1250 SAMPLING 055B010002/055B010102

1300 SAMPLING 055B010810. 14' DPT.

1330 SET-UP ON 055B07 18' DPT

1337 SAMPLING 055B070002/055B070102
TOOK FD11290003.

1400 SAMPLING 055B070608

1425 SET-UP ON 055B06 21' DPT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovice

DATE 11/29/00

WITNESS

DATE

TITLE NSWC CRANE PROJECT NO. 7141
BOOK 2494

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1430 SAMPLING 055B060002/055B060102

1455 SAMPLING 055B060608

1520 SET-UP ON 055B05 18'

1525 SAMPLING 055B050002/055B050102

1535 SAMPLING 055B050608

1615 HEAD BACK TO BUILD 3245

1745 LEAVE SITE TO GO TO WAL-MART
END OF DAY

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balthrop DATE 11/29/00
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7141
BOOK 2494

Work continued from Page 11/30/00

AM 30°, COLD & CLEAR
PM 40°, COLD

0700 ARRIVE @ SITE. CALL F-2 D'S AND COMPLETE DRILLER DAILY W/ TED KEEN.

0825 HEAD TO SWMU 5 W/ T. RUSHIN

0848 SET-UP ON 055B02 18' DPT

0905 SAMPLING 055B020002/0102

0920 SAMPLING 055B020608

0945 SET-UP ON 055B03 18' DPT
12. SAMPSON SAMPLED FOR 30000 + MS/MSD ON 055B030102/0002 @ 0945.

1008 SAMPLING 055B030507

1015 CLEAN-UP + HEAD TO SWMU 9.

1040 SET-UP ON 09SB01 14' DPT

1115 SAMPLING 09SB010002/0102

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balthrop DATE 11/30/00
WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7141
BOOK 2444

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1120 SAMPLING 095B010000
BREAK FOR LUNCH @ 1140
1240 SET-UP ON 095B02 12' DPT

1241 SAMPLING 095B020007/0102

1300 SAMPLING 095B020000

1315 K. STAMPER GOES AHEAD OF DPT &
SAMPLES 095B030007/0102 & COLLECTS
FD113000 & MS/MSD @ 095B03 65'
02 DPT

1355 SAMPLING 095B030406

1425 SET-UP ON 095B10. 14' DPT

1430 SAMPLING 095B10 0007/0102

1515 SAMPLING 095B100204.

1600 LEAVE SUMMIT AND HEAD BACK TO
BLDG 3245 TO PACK SAMPLES & DO
PAPERWORK.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balthrop DATE 11/30/00
WITNESS DATE

TITLE NSWC CRANE PROJECT 7141
BOOK 2444

Work continued from Page 12/01/00

AM 30's, CLOUD
PM 40's, CLOUD

0705 ARRIVE @ SITE. GEAR UP TO DEVELOPE
EXISTING WELLS W/ T. RUSHAN.

1300 SEE LOG BOOK 2444 FOR DEVELOPMENT
PERFORMANCE. LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balthrop DATE 12/01/00
WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 714

BOOK 3494

Work continued from Page

12/02/00

AM 30° SNOWING
PM 30° WARMER CLOUDY

0725 ARRIVE ON SITE. CAL FOR

1730 SEE LOG BOOK # 1330 FOR DEVELOPMENT RECORDING.

LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balhere

WITNESS

DATE 12/02/00

DATE

TITLE NSWC CRANE

PROJECT NO. 714

BOOK 3494

Work continued from Page

12/03/00

AM 20's CLOUDY + SUNNY
PM. 30's CLOUDY + SUNNY

0725 ARRIVE @ SITE. LOOK UP TO DRILL 05T02.

0730 ARRIVE @ LOCATION. GO OVER DRILLING PLAN W/ M. CUCHRAN.

0836 ATU ROD HANGERS @ LOCATION. BEGIN SETTING UP @ SWMU 05. 05T02

0900 BEGIN DRILLING

0940 FOUND WATER @ 9'. WELL DRILL TO 18' + SET WELL.

1010 DRILLERS STARTED TO 18'. WELL DRILL W 18' CLEANOUT PUMP + BEGIN SETTING WELL

1157 FINISHED SETTING WELL TD. 18'
#6 SAND TO 7'
#7 SAND TO 6'
BENT SEAL TO 4'
* @ 1035 WELL FROZEN UP. PUT WEIGHTS AGAINST AUGERS.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balhere

WITNESS

DATE 12/03/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

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12/03/00

1200 BREAK FOR LUNCH

1310 DRILLERS PREPARE TO GROUT WELL.

1352 DRILLERS FINISH GROUTING AND SETTING PRO-TEC. HAND TO SURVEY + CASING ROCK CORING W/ M. CUNNAN

1600 ARRIVE @ BLDG 3245. DO PAPERWORK,

1645 LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

WITNESS

DATE 12/03/00

DATE

TITLE NSWC CRANE

PROJECT N 141

BOOK 2444

Work continued from Page

12/4/00

AM 20'S CLOUD + GROUND

P.M 30'S CLOUD + GROUND

0700 ARRIVE @ SITE. CALL F.D'S LOAD VEHICLE W/ SUPPLIES TO LOC 05T01.

0805 LOCATE 05T01 W/ D. SINK. DRILLERS WILL MOVE RIG BACK INTO THE WOODS.

0900 ATV SETUP ON 05T01. BEGIN DRILLING

1109 DRILLERS @ 16' W/ 3" OD DRILLED TO 15' FOUND WATER @ ≈ 5'6 WILL SET WELL @ 15' ALLOWING FOR 2' OF SAND ABOVE SCREEN + 1' OF BENT. ASK NUT TO HANDLE PROTECTIVE CASING INSTALLATION.

1134 FINISHED SETTING WELL TO 15'
#6 SAND TO 4'
#7 SAND TO 3'
BENT. SEAL TO 1'
CLEANING + MOVE EQUIP OUT OF THE WOODS.

1145 BREAK FOR LUNCH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

WITNESS

DATE 12/4/00

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BOOK 2494

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12/4/00

1230 MET W/ MR STAMPSON. HEAD BACK TO BLDG. 3245 + PU A REMOTE WHILE DRILLERS LOAD ATV + EQUIP TO SWMU 9.

1300 CONNECT REMOTE PB120H0001.

1400 ARRIVE @ SWMU 9. DRILLERS HAVE ATV MOB'D TO SITE.

1430 ATV SET-UP ON 04T02. BEGIN DRILLING

1500 HEAD BEDROCK @ 35.5' WILL AUGER TO 10' + OBSERVE CUTTINGS FOR SIGNS OF WATER.

1505 ATV DOWN.

1515 ATV UP + RUNNING.

1535 @ 10'. AUGERS WILL NOT GO ANY FURTHER. WILL DISCUSS ACTIONS TO TAKE W/ MR COCHRAN & T. BOEHMER.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Baltrus

WITNESS

DATE 12/4/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page

12/4/00

1600 DRILLERS WILL CHANGE TO A ROCK BIT + TRY TO AUGER TO 15' AND SET A WELL. WELL DEPTH CONFIRMED BY MR. COCHRAN.

1614 W/L @ 7.75' IN OPEN BOREHOLE. THE PLAN IS TO SET THE WELL IN A FIVE FOOT SCREEN IN THE ROCK.

1624 DRILLERS BREAK DOWN TO 10'. HARD DRILLING NOT ADVANCING AUGERS.

1640 DRILLERS UNABLE TO GET PAST 10' W/ ROCK BIT ON THESE AUGERS. THEY ARE GOING TO PULL OUT AUGERS AND PULL OUT ATV AND WAIT TILL TOMORROW TO BREAK ROCK RIG DOWN.

1815 LEAVE SITE FOR FED-EX

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Baltrus

WITNESS

DATE 12/4/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

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12/5/00

Am. 30° Cloudy
P.M. 20's Cloud & Sunny

0700 ARRIVE @ SITE CAL. F.I.D.'s

0800 HEAD to Sunny 9 to DOT 0458.76

0833 SAMPLING 0458100SCW02/W2

0845 SAMPLING 0458030406.

0900 HEAD BACK to 3245.

0945 RECEIVED O.K. From R.S to DOT Rockets

0955 SET-UP ON 10SB01.

0400 SAMPLING 10SB01OCW2 MD

0450 SAMPLING 10SB01OSLO FD12050001

- SEE COC 00346 FOR SAMPLE TIMES

1200 BREAK FOR LUNCH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkner

DATE 12/5/00

WITNESS

DATE

TITLE NSWC CRANE

PROJECT # 7141

BOOK 2494

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12/5/00

1300 WORK W/ M Cochran @ Sunny 9.

1530 BACK @ BLDG 3245. PREPARING C.O.C'S & PAPERWORK

1730 LEAVE SITE & HEAD TO FED EX.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkner

DATE 12/5/00

WITNESS

DATE

TITLE NSWC CRANE **PROJECT NO.** 7141
BOOK 2444

Work continued from Page 12/12/00

A.M. 18° Cloudy Windy
P.M. 20's Cloud + Snowy

0700 Arrive @ Site. Cm. F.Z.D.'s Load Equipment to Resume DPT Sampling w/ Ted Keen.

0800 Leave For Swmu 10.

0825 Sampling 10SB03000 2.
Collect FD12120001 + MS/MSD.

0830 Drillers Arrive + Set-up on 10SB03.

0900 Begin Drilling After Rig Warms up.

0915 Sampling 10SB08 0002

0938 Sampling 10SB08 0406

0940 Clean-up and Head to Bldg 3245 + Wait for Drillers to Set-up for Hand DPT.

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SIGNATURE Robert Balkovec DATE 12/12/00
WITNESS DATE

TITLE NSWC CRANE **PROJECT NO.** 7141
BOOK 2444

Work continued from Page 12/12/00

1030 @ 10SB03 Hammer Not Working.

1100 Take Hammer Back to Bldg 3245 and Rest it by the Heater to Thaw out.

1130 Break for Lunch

1200 Set-up on 10SB03.

1302 Sampling 10SB03 0810.

1415 Set-up on 10SB10.

1425 Sampling 10SB 100002

1515 Sampling 10SB100608
Clean up + take samples to Bldg 3245.

1615 Collected RB 12120001.

1630 Go over Data w/ Kevin Simpson when he returns. Question about hand DPT charge.

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SIGNATURE Robert Balkovec DATE 12/12/00
WITNESS DATE

TITLE NSWC CRANE

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BOOK 2494

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12/12/00

1800 LEAVE SITE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE Robert Balkovec

WITNESS

DATE 12/12/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page

12/13/00

A.M. 20°, COLD SNOWING

P.M. 20°, SNOWING HEAVILY.

0650 ARRIVE @ SITE CHK F.I.D'S

0750 LEAVE BLDG 3245 & HEAD TO 05SB04 W/ T. RUZAIN, T. KEENI, T. SANDERS TO FINISH SUMM 5 DPT.

0800 ARRIVE @ SITE. BEGIN SETTING UP.

0825 BEGIN DRILLING.

0830 SAMPLING 05SB04W2/0002

0917 HAMMER DOWN. AMPTER RUN BLANK WITH PRIMARY RUN'S. CHANGE REFUSAL @ 5'.

0920 SAMPLING 05SB04W2W4

0930 CLEAN-UP & HEAD TO 05SB03

0948 ARRIVE @ 05SB03. START SETTING UP

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 12-13-00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page

12/13/00

0903 TEAM PRESENT ARRIVES @ SITE TO OBSERVE

1032 SAMPLING OSSBOX UNDERWAY

1138 UNABLE TO OBTAIN A SUBSURFACE SAMPLE DUE TO LACK OF RECOVERY. 3 ATTEMPTS MADE. 1ST. REFUSAL @ 3', 2ND REFUSAL @ 7' 3RD ATTEMPT REFUSAL @ 1.5'.

1140 CLEAN UP & BREAK FOR LUNCH

1230 ARRIVE @ SITE. GEAR UP TO COLLECT SW/SED W/ K. STAMPSON.

1700 PROCESSING SAMPLES.

1815 LEAVE FOR FED-EX. WEATHER VERY BAD.

1905 ARRIVE @ FED-EX. HEAD BACK TO CRANE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 12/13/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page

12/14/00

AM CLOUD 30° ICE

P.M. CLOUD 30°.

0700 ARRIVE @ SITE. GEAR UP TO SW/SD SAMPLE W/ K. STAMPSON.

1430 BACK @ BASE. PROCESSING SAMPLES

1600 COLLECT RBS17140001

1900 LEAVE FOR FED-EX.

1930 ARRIVE @ FED-EX. HEAD BACK TO BQ.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 12/14/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page

12/15/00

A.M 30°, Cold
P.M. 30°, Cold

0700 Arrive @ Site. Gather equipment for SW/SD @ Summit 4

1330 Head back to Block 3745 to process samples

1730 Leave for Fed. Ex

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkover

DATE 12/15/00

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page

12/16/00

AM 40's, Foggy + Drizzle
PM 30's, Rainy.

0730 Arrive @ Site. Load up to SW/SD sample summit 10

1300 Arrive back @ Block 3745. Process samples

1700 Leave Site

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkover

DATE 12/16/00

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page

12/17/00

AM. 6° Cloud Snow & Wind
PM. 20's Cloud Wind

0710 Arrive @ Bldg 3245. Gear up to collect SW/SD @ Sump 10.

1400 Arrive Back @ Bldg. 3245 to process samples.

1430 Leave to mark grass seed @ access locations where the ground was heavily disturbed

1635 Arrive Back @ Bldg 3245. Finish paperwork

1700 Leave site to Bay Tee.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Baltzer

WITNESS

DATE 12/17/00

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page

12/18/00

AM. 4° Cloud & Wind
PM. 20's Cloud Snow

0700 Arrive @ Bldg. 3245. Gear up to SW/SD sample @ Sump 4.

1045 Arrive Back @ Bldg. 3245. Sampled U4SW/SD01
U4SW/SD02
U4SW/SD03 FD12R001 & FD12R002 & MS/MSD

1100 Break for Lunch.

1145 Arrive Back @ Bldg. 3245 - Start processing samples.

1800 Leave site

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Baltzer

WITNESS

DATE 12/18/00

DATE

TIT NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page THIS. 12/19/00

AM 10'S CLOUD WEATHER
PM 20'S CLOUD.

0700 ARRIVE @ BLDG 3244. GEAR UP TO FIRESIGN SUPSO'S @ SUMMIT.

1300 BACK @ BLDG 3244 PROCESSING SAMPLES

1530 LEAVE FOR POO-EL.

SCIENTIFIC BINDERY PRODUCTIONS. CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 12/14/00

DATE

TITLE NSWC CRANE

PROJECT N 74

BOOK 2494

Work continued from Page THIS 1/2/01

1600 ARRIVE @ BLDG 3244. GO THROUGH SHIPMENT & GEAR UP TO GW SAMPLES + DEVELOPE TOMORROW 1/3/01.

1830 LEAVE FOR THE BQ.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 1/2/01

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page WED. 1/3/01

AM 10° COND.
PM 30° COND

0700 ARRIVE @ BLDG 3245. CAL. HORIBA.

0835 LEAVE FOR SITE 5 TO DEVELOPE W/ BREWERS

0900 SETUP ON 05T01

0910 BEGIN SURGING

0923 START PUMPING

1003 END DEVELOPMENT

1020 SETUP ON 05T03

1025 BEGIN SURGING

1032 START PUMPING.

1054 END DEVELOPMENT

1110 BREAK FOR LUNCH

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkema

WITNESS

DATE 1/3/01

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page WED 1/3/01

1238 WHILE NOTICING A SUCKER POINT ON 05-16 RISER, THE FILE BROKE FROM THE HANDLE & FELL IN WELL. WELL NO OPE R.S. OF INCIDENT.

1250 MEET DRILLERS @ SWMU 9.

1300 SET-UP ON 04T03.

1305 BEGIN SURGING

1313 START PUMPING

1340 END DEVELOPMENT.

1350 SETUP ON 04T04

1352 BEGIN PURGING.

1356 START PUMPING.

1431 END DEVELOPMENT. CLEAN UP & HEAD BACK TO BLDG 3245 TO COMPLETE PAPERWORK.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkema

WITNESS

DATE 1/3/01

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page WED. 1/3/01

1700 CHECK ON K.S @ SUNNY.

1730 BACK @ BASE. START PROCESSING SAMPLES

1850 LEAVE SITE

Work continued to Page

SIGNATURE Robert Baltzer

DATE 1/3/01

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page THURS. 1/4/01

AM 25° CLOUDY

PM 30° CLOUDY + SUNNY

0700 ARRIVE @ SITE CAL MURPHY + P.I.D.

0745 HEAD TO ROCKLIKE TO DOUGLAS

0810 SET-UP ON WR41

0815 BEGIN SURGING (0815-0832)

0858 BEGIN PUMPING

1013 END DEVELOPMENT

1045 SET-UP ON 10E33P2

1050 SURGING WELL (1050-1055)

1100 BEGIN PUMPING

1127 END DEVELOPMENT

1140 BREAK FOR LUNCH.

Work continued to Page

SIGNATURE Robert Baltzer

DATE 1/4/01

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page THURS 1/4/01

1230 SET-UP ON WOC33

1235 START SURGING WELL (1235-1240)

1248 START PUMPING

1322 END DEVELOPMENT

1340 DRILLERS HEAD TO MC CONNAN GARAGE TO GET THE BUMBADEER

1445 @ SWMU 40 HEADING IN TO DEVELOPE 10-16.

1515 SETUP ON 10-16

1520 SURGING WELL 1520-1525

1530 START PUMPING

1554 END DEVELOPMENT

1600 HEAD BACK TO BLDG. 3245.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkevec DATE 1/4/01

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page THURS 1/4/01

1745 LEAVE SITE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkevec DATE 1/4/01

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2444

Work continued from Page FR2. 1/5/01

AM 30° Cloudy
P.M 30° Cloudy Sunny

0700 Arrive @ site. Call Hubert + P.I.D.

0715 Leave for Sunny W.

0800 Arrive @ 10C55P2.

0805 Surge well 0805-0810

0811 Begin Pumping.

0832 End Development

0837 Surging well 10C55.

0845 Begin Purging

0917 End Development.

0920 Head back to empty water.

1000 Arrive back @ 10C57.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Belkowe DATE 1/5/01

WITNESS DATE

TITLE NSWC CRANE

PROJECT 7141

BOOK 2444

Work continued from Page FR2. 1/5/01

1003 Surging well.

1008 Begin Pumping

1020 End Development

1025 Set-up on 10-17

1030 Begin Surging well.

1038 Begin Pumping

1110 End Development

1115 Head back to empty water.

1130 Arrive @ Bldg 3245.

1145 Break for Lunch.

1330 Contact PBO1050101. on Station Turbine

1445 Drillers ready to develop 05-16

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Belkowe DATE 1/5/01

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page FOL.

V5/01

1510 SET-UP ON 05-16

1513 START PUMPING

1545 END DEVELOPMENT CLEAN-UP.

1630 BACK @ BLDG. 3245 COMPLETE DECONTAMINATE BASIZES.

1815 LEAVE FOR FED-EX.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Bellcrave

WITNESS

DATE V5/01

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page SAT.

V6/01

AM 70's CLOUDY
PM 80's CLOUDY & SUNNY

0700 ARRIVE @ STORE. GEAR UP TO GO SAMPLE

0800 HELP K.S ON W-03.

1130 BREAK FOR LUNCH

1230 GEAR UP TO SAMPLE 05W2

1320 BEGIN PUMPING 05W2

1415 BEGIN SAMPLING OTHER WELL & MYSELF FD010601-02

1755 END SAMPLING HEAD BACK TO BLDG 3245
1830 LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Bellcrave

WITNESS

DATE V6/01

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 7494

Work continued from Page Sun 1/7/01

AM 30's Cloud

PM 30's Cloud + Sunny

0700 Arrive @ Site. Will Bail Sample w/ K.S @ Sunny 5.

1815 Leave Site.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Robert Balkovec DATE 1/7/01

WITNESS DATE

TITLE NSWC CRANE

PROJECT 7141

BOOK 7494

Work continued from Page Mon 1/8/01

AM 25's Cloud

PM 30's Cloud + Sunny

0700 Arrive @ Site.

0730 Head to 05T01 to Sample 05GWT01

0800 Set-up on 05T01

0810 Begin Pumping. 1.8 g. per Vol.

0905 End Purge. Parameters Stable.

0907 Begin Sampling 05GWT01

1110 End Sampling.

1115 Pack up + Head to Get Ice to Pack Samples.

1200 Back @ Bldg 3245 Packing Samples.

1330 Connecting RBOW80101 to Bladder Pump + Tubing.

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Robert Balkovec DATE 1/8/01

WITNESS DATE

TITLE NSWC CRANE

PROJECT NO. 7141
BOOK 2494

Work continued from Page now. 1/8/01

1730 LEAVE SITE

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Robert Balkovec
WITNESS

DATE 1/8/01
DATE

TITLE NSWC CRANE

PROJECT NO. 7141
BOOK 2494

Work continued from Page Tues 1/9/01

AM 18° Cold
PM 30's Cold + Sunny

0640 ARRIVE @ SITE. GEAR UP TO SAMPLE 05-04.

0800 SET-UP ON 05-04

0830 BEGIN PUMPING.

0930 END PURGE

0937 BEGIN SAMPLING 05GW0401

1232 END SAMPLING COLLECTED FD01040101.

1350 SET-UP ON 05GW04.

1400 BEGIN PUMPING.

1532 SAMPLING 05GW0401.

1715 END SAMPLING

1720 HEAD BACK TO BLDG 3245 TO

Work continued to Page

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

SIGNATURE Robert Balkovec
WITNESS

DATE 1/9/01
DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page TUES 1/9/01

PROCESS SAMPLES

1800 LEAVE FOR FED-EX.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Bulkover

DATE 1/9/01

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page WED. 1/10/01

AM 20's COLD.

PM 30's COLD & SUNNY

0655 ARRIVE @ SITE. COMPLETE PAPERWORK & GEAR UP TO TAKE WATER LEVELS @ SWMU 9.

0900 BACK @ BLDG 3245

0930 LEAVE FOR AIRPORT.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Bulkover

DATE 1/10/01

WITNESS

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page TUES. 1/16/01

AM: 20'S COLD
PM: 30'S COLD + OVERCAST.

0700 ARRIVE @ BLDG. 3245. PREPARE TO TAKE WATER LEVELS @ SWMU 4&5 AND MEASURE SW FLOW @ SWMU 5.

0745 LEAVE FOR SWMU 5.

1120 BREAK FOR LUNCH

1200 HEAD FOR SWMU 10 TO MEASURE WATER LEVELS.

1730 LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 1/16/01

DATE

TITLE NSWC CRANE

PROJECT NO. 7141

BOOK 2494

Work continued from Page WED 1/17/01

AM 30'S COLD & WINDY
PM 30'S PARTLY CLOUDY.

0700 ARRIVE @ SITE.

0745 LEAVE FOR SWMU 10 TO FINISH SW FLOW MEASUREMENTS.

1200 GEAR UP TO RESUME GW SAMPLING @ SWMU 5.

1830 END OF DAY.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec

WITNESS

DATE 1/17/01

DATE

TITLE NSWC CRANE PROJECT NO. 7141 BOOK 2494

Work continued from Page THURS. 1/18/01

AM 29° COLD.
PM HIGH 30's SUNNY

0655 ARRIVE @ SITE.

0745 HEAD TO 05-19 TO SAMPLE

0942 SAMPLING 05GW1901

1200 BREAK FOR LUNCH

1245 BACK @ BLDG 3245

1300 CONTINUE PURGING ON PE BLADDER

1310 CONTINUE PACKING SAMPLES.

1700 HEAD TO SUMMIT 5 TO CHECK ON K. SIMPSON.

1715 ARRIVE @ SUMMIT TO TO HELP T. RUSAKOV

1810 LEAVE SITE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec DATE 1/18/01

WITNESS DATE

TITLE NSWC CRANE PROJECT NO. 7141 BOOK 2494

Work continued from Page FRI. 1/19/01

AM LOW 30's
PM. 30's CLOUDS & WINDY

0700 ARRIVE @ SITE. GEAR UP TO GET SAMPLE

0810 SETUP ON 05-13

0815 BEGIN PUMPING

0955 WELL DRY?. CANNOT PUMP @ 2280 WITH PERISTALTIC.
ALLOW WELL TO RECHARGE OVER NIGHT THEN SAMPLE.

1100 SETUP ON 05-02

1120 BEGIN PUMPING.

1242 BEGIN SAMPLING 05GW0201

1400 LEAVE TO PACK SAMPLES. K. SIMPSON WILL FINISH SAMPLING.

1630 LEAVE FOR FED-EX

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE Robert Balkovec DATE 1/19/01

WITNESS DATE

APPENDIX D

SWMUs 4, 5, 9, AND 10
SURVEY DATA

SURVEY DATA

SWMU 4 - McCOMISH GORGE					
LOCATION	NORTHING NAD 83	EASTING NAD 83	GROUND ELEV. (ft. msl)	REFERENCE POINT ELEV. (ft. msl)	TOP OF CASING ELEV. (ft. msl)
0401	1325971.353	3007906.900	594.53	596.68	NA
0402	1325937.125	3008427.291	576.53	578.86	NA
0403	1326194.407	3008592.712	556.68	559.28	NA
0404	1326175.242	3008453.970	583.34	586.20	NA
0405	1326106.595	3008643.832	565.67	568.09	NA
0406	1325947.243	3008610.196	570.16	572.86	NA
04C01	1325938.250	3008094.504	587.52	590.00	590.36
04T01	1326144.004	3007702.313	583.99	586.34	587.02
04T02	1325713.961	3008384.225	594.76	596.98	597.50
04T03	1325977.337	3008926.774	554.82	557.21	557.80
04SS01	1325962.613	3008435.405	576.30	NA	NA
04SS02	1326073.487	3008225.218	567.61	NA	NA
04SB01	1326072.159	3008298.624	567.30	NA	NA
04SB02	1326037.757	3008358.897	568.23	NA	NA
04SB03	1326053.206	3008483.720	569.17	NA	NA
04SB04	1326061.360	3008582.860	566.56	NA	NA
04SB05	1326031.805	3008508.218	568.70	NA	NA
04SB06	1326006.840	3008249.096	570.67	NA	NA
04SB07	1326012.483	3008086.002	571.05	NA	NA
04SB08	1326081.946	3008124.127	569.42	NA	NA
04SB09	1325931.826	3008085.527	588.19	NA	NA
04SB10	1325947.163	3008238.741	580.74	NA	NA
04SB11	1325868.754	3008490.844	574.10	NA	NA
04SB12	1326124.171	3008271.262	582.07	NA	NA
04SW/SD01	1326297.318	3007747.486	552.51	NA	NA
04SW/SD02	1326283.307	3008488.837	548.93	NA	NA
04SW/SD03	1326289.089	3008600.281	548.91	NA	NA
04SW/SD04	1326106.059	3008788.915	552.51	NA	NA
04SW/SD05	1325906.555	3008691.052	556.32	NA	NA
04SW/SD06	1325987.089	3008836.771	554.41	NA	NA

Note: Elevations are NGVD 88

SURVEY DATA

SWMU 5 - OLD BURN PIT					
LOCATION	NORTHING NAD 83	EASTING NAD 83	GROUND ELEV. (ft. msl)	REFERENCE POINT ELEV. (ft. msl)	TOP OF CASING ELEV. (ft. msl)
0501	1326508.592	3011496.862	597.19	599.74	NA
0502	1326314.290	3010886.759	584.41	586.69	NA
0503	1326579.933	3011010.071	590.18	592.92	NA
0504	1326552.582	3010750.306	585.88	588.70	NA
0505	1326463.336	3010758.156	584.41	586.87	587.02
0506	1326799.880	3010767.602	570.79	573.53	573.66
0507	1327068.905	3011118.502	577.41	579.29	NA
0508	1326983.032	3010885.044	564.63	567.05	NA
0509	1326444.181	3010568.245	582.65	585.27	585.43
0510	1326493.371	3010580.944	584.49	587.21	587.39
0511	1326540.211	3010592.677	585.50	588.29	588.47
0512	1326589.023	3010604.698	585.77	589.55	589.71
0513	1326689.168	3010654.355	582.17	585.90	585.10
0514	1326704.415	3010285.843	551.91	554.29	NA
0515	1326781.083	3010329.981	552.62	555.49	NA
0516	1326606.015	3010229.620	550.97	553.94	NA
0517	1326704.286	3010443.116	557.94	560.45	NA
0518	1326762.088	3010473.577	553.22	556.15	NA
0519	1326647.137	3010414.946	562.63	565.06	NA
05T01	1326092.796	3011627.733	586.67	589.10	589.82
05T02	1326055.939	3010485.030	570.99	572.86	573.76
05T03	1326727.857	3010091.535	551.65	554.07	554.72
05SB01	1326444.258	3011046.161	589.61	NA	NA
05SB02	1326455.171	3011305.934	590.50	NA	NA
05SB03	1326268.348	3011286.563	593.84	NA	NA
05SB04	1326681.657	3011479.311	605.32	NA	NA
05SB05	1326782.304	3011221.060	590.74	NA	NA
05SB06	1326773.232	3011118.799	585.01	NA	NA
05SB07	1326894.685	3011035.471	581.46	NA	NA
05SB08	1326736.639	3010886.208	581.85	NA	NA
05SW/SD01	1327492.625	3011022.301	585.00	NA	NA
05SW/SD02	1326926.064	3010853.197	557.94	NA	NA
05SW/SD03	1326724.417	3010281.567	548.84	NA	NA
05SW/SD04	1326457.330	3010272.121	556.69	NA	NA
05SW/SD05	1326275.663	3010637.978	577.95	NA	NA

Note: Elevations are NGVD 88

SURVEY DATA

SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA					
LOCATION	NORTHING NAD 83	EASTING NAD 83	GROUND ELEV. (ft. msl)	REFERENCE POINT ELEV. (ft. msl)	TOP OF CASING ELEV. (ft. msl)
0901	1312457.543	3025490.820	733.51	736.72	NA
0902	1312923.373	3025388.236	722.90	725.66	NA
0903	1312205.141	3024911.735	705.88	708.88	NA
0904	1312413.311	3025163.759	721.45	724.04	NA
0905	1312333.351	3025044.289	714.86	717.49	NA
0906	1312775.949	3025447.471	719.13	721.63	NA
0907	1313082.909	3025566.679	734.53	737.28	NA
0908	1312381.442	3025117.554	719.79	722.48	NA
0909	1312971.099	3025496.941	722.46	725.11	NA
0910	1312055.418	3025373.755	723.83	726.51	726.64
0911	1312083.854	3024827.941	714.60	717.41	717.57
0912	1312323.664	3024738.653	694.24	696.87	NA
0913	1312380.502	3024820.944	698.02	700.97	NA
0914A	1312266.400	3024655.812	692.44	695.07	NA
09C01	1312059.505	3024850.638	715.99	718.36	718.46
09T01	1312804.336	3025759.952	737.56	740.02	740.63
09T02	1312576.157	3025069.715	705.96	708.45	709.01
09T03	1311791.416	3025295.689	705.55	708.08	708.56
09T04	1311679.977	3025257.301	703.13	705.70	706.53
09T05	1311681.497	3025540.482	716.73	719.19	719.71
09WTP1	1312399.734	3025284.938	726.22	728.62	NA
09WTP2	1312379.155	3025224.804	723.81	726.22	NA
09WTP3	1312330.736	3025240.797	724.33	726.54	NA
09WTP4	1312358.703	3025280.882	726.15	728.50	NA
09WTP5	1312369.146	3025253.139	724.55	726.81	NA
09WTP6	1312307.483	3025423.987	733.10	735.09	NA
09SB01	1312906.202	3025740.184	737.46	NA	NA
09SB02	1312846.825	3025663.723	733.23	NA	NA
09SB03	1312704.751	3025696.986	731.58	NA	NA
09SB04	1312837.459	3025547.718	725.63	NA	NA
09SB05	1312431.037	3025228.783	723.60	NA	NA
09SB06	1312359.295	3025249.027	724.46	NA	NA
09SB07	1312265.270	3025247.080	724.94	NA	NA
09SB08	1312154.622	3024872.578	709.75	NA	NA
09SB09	1311736.974	3025405.435	710.02	NA	NA
09SB10	1311722.072	3025328.648	707.26	NA	NA
09SB11	1311674.239	3025477.633	713.77	NA	NA
09T01A	1312796.377	3025757.887	737.48	NA	NA
09T02A	1312583.463	3025058.201	704.19	NA	NA
09SW/SD01	1313158.673	3025702.233	723.37	NA	NA
09SW/SD02	1312889.674	3025422.576	714.17	NA	NA
09SW/SD03	1312272.246	3024945.894	702.83	NA	NA
09SW/SD04	1312210.380	3024436.849	671.76	NA	NA
09SW/SD05	1311564.699	3025200.320	693.69	NA	NA

Note: Elevations are NGVD 88

SURVEY DATA

SWMU 10 - ROCKEYE					
LOCATION	NORTHING NAD 83	EASTING NAD 83	GROUND ELEV. (ft. msl)	REFERENCE POINT ELEV. (ft. msl)	TOP OF CASING ELEV. (ft.msl)
1001	1327710.944	3048397.78	618.31	620.79	NA
1002	1327653.025	3048428.578	618.78	621.45	NA
1003	1326211.829	3044731.059	808.84	811.55	812.02
1004	1327236.238	3043253.611	827.27	830.03	830.47
1005	1328184.516	3043847.136	828.98	831.84	832.01
1006	1327648.671	3045143.952	809.22	811.82	812.09
1007	1327744.244	3044829.179	786.65	789.70	789.77
1008	1327754.203	3044800.708	787.75	790.67	790.86
1009	1326732.692	3044077.836	786.98	789.56	NA
1010	1326673.501	3044097.01	782.15	785.27	NA
1011	1328020.222	3044166.236	805.26	808.08	808.21
1012	1327911.892	3044420.681	823.30	825.76	826.19
1013	1326529.529	3044516.225	813.74	816.60	816.76
1014	1326887.989	3045164.362	812.59	815.37	815.75
1014A	1326896.545	3045157.234	813.42	816.67	816.49
1014B	1326877.256	3045153.109	813.10	815.88	815.97
1015	1326294.189	3044915.862	790.03	792.78	792.90
1016	1327249.735	3045209.858	786.18	788.88	789.16
1017	1327922.835	3045087.382	777.45	779.97	NA
1018	1327941.191	3045027.831	774.56	777.45	777.78
1019	1327703.047	3044969.144	784.35	787.07	787.19
1020	1327809.345	3044661.078	803.35	806.27	806.60
1021	1327872.409	3044898.512	782.27	785.16	NA
1022	1326971.341	3043647.251	822.52	825.08	825.41
10C23	1327237.864	3043244.784	827.21	829.24	829.30
10C24	1327096.987	3043598.63	818.21	820.87	820.92
10C24P2	1327094.818	3043603.216	818.19	820.77	820.83
10C24P3	1327092.669	3043608.358	818.17	820.44	820.49
10C25	1326954.048	3043972.551	814.25	816.60	816.67
10C25P2	1326955.803	3043967.382	814.16	816.59	816.64
10C25P3	1326959.047	3043971.376	814.27	816.60	816.65
10C26	1326799.657	3044335.605	812.92	815.40	815.46
10C26P2	1326801.762	3044330.037	812.94	815.40	815.62
10C26P3	1326797.273	3044331.224	813.08	815.53	815.63
10C27	1326634.062	3044700.693	814.95	817.26	817.36
10C27P2	1326634.446	3044706.703	814.88	817.16	817.26
10C28	1326988.837	3044872.767	819.03	821.40	821.42
10C28P2	1326993.397	3044873.915	819.10	821.42	821.57
10C29	1327363.909	3045006.908	813.49	815.70	815.77
10C29P2	1327358.745	3045005.973	813.56	815.92	815.97
10C30	1327434.552	3043774.607	820.26	822.44	822.50
10C30P2	1327439.476	3043776.146	820.33	822.45	822.48
10C31	1327443.464	3044157.831	817.78	820.09	820.16
10C31P3	1327450.029	3044152.641	817.78	820.10	820.15
10C32	1327152.476	3044484.674	816.95	819.55	819.61
10C32P2	1327149.623	3044495.68	817.27	819.64	819.73
10C32P3	1327151.167	3044490.122	817.21	819.47	819.55
10C33	1327513.967	3044638.991	811.95	814.31	814.40

SURVEY DATA

SWMU 10 - ROCKEYE					
LOCATION	NORTHING NAD 83	EASTING NAD 83	GROUND ELEV. (ft. msl)	REFERENCE POINT ELEV. (ft. msl)	TOP OF CASING ELEV. (ft.msl)
10C33P2	1327517.326	3044642.989	811.90	814.24	814.33
10C34	1327669.649	3044275.045	821.58	824.05	824.09
10C34P2	1327674.392	3044273.938	821.69	824.14	824.19
10C34P3	1327679.261	3044272.938	821.72	824.07	824.12
10C35	1327819.715	3043895.502	826.76	829.12	829.17
10C35P2	1327817.339	3043890.804	826.82	829.26	829.32
10C35P3	1327814.951	3043886.478	826.92	829.11	829.33
10C36	1327611.690	3043350.43	821.44	823.83	823.89
10C36P2	1327607.033	3043348.436	821.65	823.94	824.00
10C36P3	1327605.266	3043343.718	821.57	823.84	823.88
10C37	1327402.357	3042823.549	818.22	820.35	820.40
10C37P2	1327398.88	3042827.103	818.41	820.33	820.39
10C37P3	1327395.202	3042830.938	818.45	820.45	820.51
10C38	1326967.202	3042737.29	825.46	827.40	827.44
10C38P2	1326963.751	3042733.301	825.43	827.68	827.72
10C39	1327985.467	3043473.205	827.36	829.52	829.58
10C39P2	1327982.439	3043477.905	827.28	829.51	829.56
10C40	1328345.298	3043683.709	826.94	829.19	829.25
10C40P2	1328341.135	3043680.303	826.94	829.19	829.25
10C40P3	1328337.496	3043677.193	827.04	829.19	829.21
10C40P4	1328333.32	3043673.732	826.96	829.27	829.33
10C41	1326856.943	3043110.232	830.36	832.62	832.66
10C41P2	1326852.328	3043112.701	830.38	832.50	832.60
10C41P3	1326848.376	3043114.974	830.52	832.73	832.77
10C42	1326742.204	3043435.723	832.21	834.38	834.42
10C42P2	1326733.459	3043447.871	832.33	834.53	834.59
10C43	1326318.658	3044468.923	818.03	820.26	820.30
10C43P2	1326318.672	3044464.119	817.92	820.16	820.20
10C43P3	1326318.936	3044459.33	817.99	820.35	820.40
10C44	1326461.055	3044150.675	792.79	794.51	794.56
10C44P2	1326464.017	3044153.235	792.76	794.65	794.69
10C45	1326611.654	3043814.684	810.77	813.33	813.39
10C45CP2	1326609.443	3043810.074	810.88	813.52	813.57
10C46	1328194.562	3044047.912	815.33	817.63	817.67
10C46P2	1328193.608	3044043.603	815.58	818.02	818.07
10C46P3	1328192.029	3044038.853	815.72	818.23	818.28
10C47	1328077.297	3044426.49	819.06	821.54	821.58
10C47P2	1328072.154	3044425.407	839.89	821.73	821.76
10C47P3	1328066.942	3044423.964	819.36	821.66	821.70
10C48	1327915.728	3044798.844	795.93	797.96	798.01
10C48P2	1327917.018	3044793.553	795.88	797.98	798.03
10C49	1327757.715	3045131.789	805.83	807.91	807.95
10C49P2	1327753.233	3045131.518	805.96	808.07	808.11
10C50	1327329.337	3045227.13	802.34	805.00	805.05
10C50P2	1327334.674	3045224.972	802.51	804.95	805.00
10C51	1327626.604	3045398.752	807.79	809.93	810.00
10C51P2	1327630.058	3045394.316	808.05	810.19	810.25
10C52	1326218.318	3044737.357	809.42	811.73	811.78

SURVEY DATA

SWMU 10 - ROCKEYE					
LOCATION	NORTHING NAD 83	EASTING NAD 83	GROUND ELEV. (ft. msl)	REFERENCE POINT ELEV. (ft. msl)	TOP OF CASING ELEV. (ft.msl)
10C52P3	1326223.153	3044739.551	809.43	811.68	811.74
10C53	1326530.568	3044978.43	814.49	816.02	816.05
10C53P2	1326533.825	3044982.47	814.20	815.93	815.96
10C54	1326886.524	3045121.436	813.91	816.39	816.70
10C55	1327823.921	3044979.138	779.41	781.59	781.65
10C55P2	1327829.164	3044977.599	779.45	781.72	NA
10C56	1328068.781	3045381.31	767.82	770.23	770.28
10C57	1328213.851	3045260.534	767.77	770.21	770.28
10C60	1327113.893	3047089.489	648.25	651.02	651.08
10C61	1326525.219	3050507.181	594.45	597.30	597.38
10SW/SD01	1326199.661	3045084.595	762.98	NA	NA
10SW/SD02	1327218.866	3045179.73	778.32	NA	NA
10SW/SD03	1327082.114	3045561.782	697.65	NA	NA
10SW/SD04	1328083.832	3045217.325	756.25	NA	NA
10SW/SD05	1326933.867	3045982.88	676.30	NA	NA
10SW/SD06	1327605.203	3048225.681	617.16	NA	NA
10SW/SD07	1327757.117	3044863.848	782.84	NA	NA
10SW/SD08	1328358.112	3044459.047	776.88	NA	NA
10SW/SD09	1327351.293	3042892.648	815.23	NA	NA
10SW/SD10	1327700.93	3042934.501	787.48	NA	NA
10SW/SD11	1326729.972	3044108.09	781.70	NA	NA
10SW/SD12	1326109.958	3043682.42	749.39	NA	NA

Note : Elevations are NGVD 88

APPENDIX E.1

ANALYTICAL DATABASE

APPENDIX E.1.1

SWMU 4
ANALTYICAL DATABASE

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB01	04SB02	04SB02	04SB03	04SB03	04SB04	04SB04	04SB05	04SB05	04SB06	04SB06	04SB07	04SB07	04SB07	04SB07	04SB08	04SB08	04SB09	04SB09	04SB10	04SB10	04SB11	04SB11
nsample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	04SB070002-D	04SB070102	04SB070102-D	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
sample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	FD11290002	04SB070102	FD11290002	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatile Organics (UG/KG)																								
1,1,1,2-TETRACHLOROETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,1,1-TRICHLOROETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,1,2,2-TETRACHLOROETHANE		3 U		3 U		4 U		3 U		4 UJ		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,1,2-TRICHLOROETHANE		3 U		3 U		4 UJ		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,1-DICHLOROETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,1-DICHLOROETHENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,2,3-TRICHLOROPROPANE		3 U		3 U		4 UJ		3 U		4 UJ		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,2-DIBROMO-3-CHLOROPROPANE		3 U		3 U		4 UJ		3 U		4 UJ		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,2-DIBROMOETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,2-DICHLOROETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,2-DICHLOROPROPANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
1,4-DIOXANE		200 U		190 U		460 UJ		190 U		240 UJ		200 U			190 U	200 U		190 U		200 U		210 U		180 U
2-BUTANONE		14 U		14 U		18 U		17 U		17 U		14 U			15 U	16 U		14 U		15 U		16 U		14 U
2-HEXANONE		14 U		14 U		18 U		17 U		17 U		14 U			15 U	16 U		14 U		15 U		16 U		14 U
3-CHLOROPROPENE		10 UJ		9 UJ		12 U		11 UJ		12 U		10 UJ			10 UJ	11 U		10 UJ		10 UJ		11 UJ		9 UJ
4-METHYL-2-PENTANONE		14 U		14 U		18 U		17 U		17 U		14 U			15 U	16 U		14 U		15 U		16 U		14 U
ACETONE		14 U		14 U		43		17 U		17 U		14 U			15 U	16 U		14 U		27 BU		16 UJ		14 UJ
ACETONITRILE		78 U		75 U		180 UJ		74 U		96 UJ		78 U			76 U	79 U		76 U		80 U		84 U		72 U
ACROLEIN		48 UR		45 UR		60 UR		57 UR		58 UR		47 UR			51 UR	55 UR		48 UR		50 UR		54 UR		45 UR
ACRYLONITRILE		10 UR		9 UR		12 UR		11 UR		12 UR		10 UR			10 UR	11 UR		10 UR		10 UR		11 UR		9 UR
BENZENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
BROMODICHLOROMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
BROMOFORM		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
BROMOMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CARBON DISULFIDE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CARBON TETRACHLORIDE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CHLOROBENZENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CHLORODIBROMOMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CHLOROETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CHLOROFORM		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CHLOROMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CHLOROPRENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 UJ		3 UJ		3 UJ
CIS-1,2-DICHLOROETHENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
CIS-1,3-DICHLOROPROPENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
DIBROMOMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
DICHLORODIFLUOROMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
ETHYL METHACRYLATE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
ETHYLBENZENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
ISOBUTANOL		78 U		75 U		180 UJ		74 U		96 UJ		78 U			76 U	79 U		76 U		80 U		84 U		72 U
METHACRYLONITRILE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
METHYL IODIDE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 UJ		3 UJ		3 UJ
METHYL METHACRYLATE		29 U		27 U		36 U		34 U		35 U		28 U			31 U	33 U		29 U		30 U		32 U		27 U
METHYLENE CHLORIDE		3 U		3 U		4 U		5 BU		4 U		3 U			5 BU	3 U		3 U		3 UJ		3 UJ		3 UJ
PROPIONITRILE		78 U		75 U		180 UJ		74 U		96 UJ		78 U			78 U	79 U		76 U		80 U		84 U		72 U
STYRENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
TETRACHLOROETHENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
TOLUENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
TRANS-1,2-DICHLOROETHENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
TRANS-1,3-DICHLOROPROPENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
TRANS-1,4-DICHLORO-2-BUTENE		3 U		3 U		4 UJ		3 U		4 UJ		3 U			3 U	3 U		3 U		3 UJ		3 UJ		3 UJ
TRICHLOROETHENE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
TRICHLOROFLUOROMETHANE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
VINYL ACETATE		29 U		27 U		36 U		34 U		35 U		28 U			31 U	33 U		29 U		30 U		32 U		27 U
VINYL CHLORIDE		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		3 U		3 U		3 U
XYLENES, TOTAL		3 U		3 U		4 U		3 U		4 U		3 U			3 U	3 U		3 U		6		6		4
Semi-Volatile Organics (UG/KG)																								
1,2,4,5-TETRACHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
1,2,4-TRICHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
1,2-DICHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB01	04SB02	04SB02	04SB03	04SB03	04SB04	04SB04	04SB05	04SB05	04SB06	04SB06	04SB07	04SB07	04SB07	04SB07	04SB08	04SB08	04SB09	04SB09	04SB10	04SB10	04SB11	04SB11
nsample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	04SB070002-D	04SB070102	04SB070102-D	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
sample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	FD11290002	04SB070102	FD11290002	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
tscode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1,3-DICHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
1,4-DICHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
1,4-NAPHTHOQUINONE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
1,4-PHENYLENEDIAMINE	3000 UJ		380 UJ		6000 UJ		400 UJ		5800 UJ		380 UJ		400 U	390 U			390 U		400 UJ		410 U		390 U	
1-NAPHTHYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,2'-OXYBIS(1-CHLOROPROPANE)	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 UJ		410 UJ		390 UJ	
2,3,4,6-TETRACHLOROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,4,5-TRICHLOROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,4,6-TRICHLOROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,4-DICHLOROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,4-DIMETHYLPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,4-DINITROPHENOL	3000 UJ		380 UJ		6000 UJ		400 UJ		5800 UJ		380 UJ		400 UJ	390 UJ			390 UJ		400 U		410 U		390 U	
2,4-DINITROTOLUENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,6-DICHLOROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2,6-DINITROTOLUENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-ACETYLAMINOFLUORENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-CHLORONAPHTHALENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-CHLOROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-METHYLNAPHTHALENE	3000 U		8 00 U		6000 U		8 00 U		5800 U		8 00 U		8 00 U	8 00 U			8 00 U		8 U		8 U		8 U	
2-METHYLPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-NAPHTHYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-NITROANILINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 UJ		390 UJ	
2-NITROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
2-PICOLINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
3,3'-DICHLOROBENZIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
3,3'-DIMETHYLBENZIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 UR			390 U		400 U		410 U		390 U	
3-METHYLCHOLANTHRENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
3-NITROANILINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4,6-DINITRO-2-METHYLPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-AMINOBIPHENYL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-BROMOPHENYL PHENYL ETHER	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-CHLORO-3-METHYLPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-CHLOROANILINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-CHLOROPHENYL PHENYL ETHER	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-METHYLPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-NITROANILINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-NITROPHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
4-NITROQUINOLINE-1-OXIDE	3000 UR		380 UR		6000 UR		400 UR		5800 UR		380 UR		400 UR	390 UR			390 UR		400 UR		410 UR		390 UR	
5-NITRO-O-TOLUIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
A,A-DIMETHYLPHENETHYLAMINE	6000 U		760 U		12000 U		790 U		12000 U		770 U		790 U	780 U			780 U		800 U		820 U		780 U	
ACENAPHTHENE	3000 U		8 00 U		6000 U		8 00 U		5800 U		8 00 U		8 00 U	8 00 U			8 00 U		8 U		8 U		8 U	
ACENAPHTHYLENE	3000 U		8 00 U		6000 U		8 00 U		5800 U		8 00 U		8 00 U	8 00 U			8 00 U		8 U		8 U		8 U	
ACETOPHENONE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
ANILINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
ANTHRACENE	3000 U		8 00 U		6000 U		8 00 U		5800 U		8 00 U		8 00 U	8 00 U			8 00 U		8 U		8 U		8 U	
ARAMITE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
BENZO(A)ANTHRACENE	3000 U		8 00 UJ		2800 J		8 00 U		5800 U		8 00 U		8 00 U	8 00 U			8 00 U		8 U		8 U		8 U	
BENZO(A)PYRENE	3000 U		8 00 UJ		3000 J		8 00 UJ		5800 U		8.00 UJ		8 00 UJ	8.00 UJ			8.00 UJ		8 U		8 U		8 U	
BENZO(B)FLUORANTHENE	3000 U		8 00 UJ		4800 J		8 00 UJ		5800 U		8 00 UJ		8 00 UJ	8.00 UJ			8 00 UJ		8 U		8 U		8 U	
BENZO(G,H,I)PERYLENE	3000 U		8 00 UJ		3700 J		8 00 UJ		5800 U		8 00 UJ		8 00 UJ	8 00 UJ			8 00 UJ		8 U		8 U		8 U	
BENZO(K)FLUORANTHENE	3000 U		8 00 U		6000 U		8 00 UJ		5800 U		8.00 UJ		8 00 UJ	8 00 UJ			8 00 UJ		8 U		8 U		8 U	
BENZYL ALCOHOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
BIS(2-CHLOROETHOXY)METHANE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
BIS(2-CHLOROETHYL)ETHER	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
BIS(2-ETHYLHEXYL)PHTHALATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		540	
BUTYL BENZYL PHTHALATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
CHLOROBENZILATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
CHRYSENE	3000 U		8 00 UJ		2900 J		8 00 U		5800 U		8.00 U		8 00 U	8 00 U			8 00 U		8 U		8 U		8 U	
DI-N-BUTYL PHTHALATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB01	04SB02	04SB02	04SB03	04SB03	04SB04	04SB04	04SB05	04SB05	04SB06	04SB06	04SB07	04SB07	04SB07	04SB07	04SB08	04SB08	04SB09	04SB09	04SB10	04SB10	04SB11	04SB11
nsample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	04SB070002-D	04SB070102	04SB070102-D	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
sample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	FD11290002	04SB070102	FD11290002	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DI-N-OCTYL PHTHALATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
DIALLATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 UJ			390 U		400 U		410 U		390 U	
DIBENZO(A,H)ANTHRACENE	3000 U		8.00 U		6000 U		8.00 UJ		5800 U		8.00 UJ		8.00 UJ	8.00 UJ			8.00 UJ		8 U		8 U		8 U	
DIBENZOFURAN	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
DIETHYL PHTHALATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
DIMETHOATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 UJ		410 UJ		390 UJ	
DIMETHYL PHTHALATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
DIPHENYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
DISULFOTON	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 UJ		390 UJ	
ETHYL METHANE SULFONATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
ETHYL PARATHION	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 UJ		410 UJ		390 UJ	
FAMPHUR	6000 UR		760 UR		12000 UR		790 UR		12000 UR		770 UR		790 UR	780 UR			780 UR		800 UR		820 UR		780 UR	
FLUORANTHENE	3000 U		8.00 U		5400 J		8.00 U		5800 U		8.00 U		8.00 U	8.00 U			8.00 U		8 U		8 U		8 U	
FLUORENE	3000 U		8.00 U		6000 U		8.00 U		5800 U		8.00 U		8.00 U	8.00 U			8.00 U		8 U		8 U		8 U	
HEXACHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
HEXACHLOROBUTADIENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
HEXACHLOROCYCLOPENTADIENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
HEXACHLOROETHANE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
HEXACHLOROPROPENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
INDENO(1,2,3-CD)PYRENE	3000 U		8.00 UJ		2200 J		8.00 UJ		5800 U		8.00 UJ		8.00 UJ	8.00 UJ			8.00 UJ		8 U		8 U		8 U	
ISODRIN	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
ISOPHORONE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
ISOSAFROLE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
KEPONE	3000 UR		380 UR		6000 UR		400 UR		5800 UR		380 UR		400 UR	390 UR			390 UR		400 UJ		410 UJ		390 UJ	
METHAPYRILENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 UJ			390 U		400 UJ		410 UJ		390 UJ	
METHYL METHANE SULFONATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
METHYL PARATHION	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 UJ		410 UJ		390 UJ	
N-NITROSO-DI-N-PROPYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 UJ		390 U	
N-NITROSODI-N-BUTYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
N-NITROSODIETHYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
N-NITROSODIMETHYLAMINE	3000 UJ		380 UJ		6000 UJ		400 UJ		5800 UJ		380 UJ		400 U	390 U			390 U		400 U		410 U		390 U	
N-NITROSOMETHYLETHYLAMINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
N-NITROSOMORPHOLINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 UJ		390 U	
N-NITROSOPIPERIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 UJ		410 UJ		390 U	
N-NITROSOPYRROLIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
NAPHTHALENE	3000 U		8.00 U		6000 U		8.00 U		5800 U		8.00 U		8.00 U	8.00 U			8.00 U		8 U		8 U		8 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
O-TOLUIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
P-(DIMETHYLAMINO)AZOBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 UJ		410 UJ		390 U	
PENTACHLOROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
PENTACHLOROETHANE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
PENTACHLORONITROBENZENE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
PHENACETIN	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
PHENANTHRENE	3000 U		8.00 U		3800 J		8.00 U		5800 U		8.00 U		8.00 U	8.00 U			8.00 U		8 U		8 U		8 U	
PHENOL	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 UJ			390 U		400 U		410 U		390 U	
PHORATE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 UJ		390 UJ	
PRONAMIDE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
PYRENE	3000 U		8.00 U		6000		8.00 U		5800 U		8.00 U		8.00 U	8.00 U			8.00 U		8 U		8 U		8 U	
PYRIDINE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
SAFROLE	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
SULFOTEPP	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 U		390 U	
THIONAZIN	3000 U		380 U		6000 U		400 U		5800 U		380 U		400 U	390 U			390 U		400 U		410 UJ		390 UJ	
Pesticides (UG/KG)																								
4,4'-DDD	29 U		3.8 U		59 U		3.9 U		58 U		3.8 U		3.9 U	3.9 U			3.8 U		4.0 UJ		4.1 UJ		3.8 UJ	
4,4'-DDE	29 U		3.8 U		59 U		3.9 U		58 U		3.8 U		3.9 U	3.9 U			3.8 U		4.0 U		4.1 U		3.8 U	
4,4'-DDT	29 U		3.8 U		59 U		3.9 U		110		3.8 U		3.9 U	3.9 U			3.8 U		4.0 U		4.1 U		3.8 U	
ALDRIN	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
ALPHA-BHC	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 UJ		2.1 UJ		2.0 UJ	
ALPHA-CHLORDANE	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
AROCLOR-1016	290 UJ		38 UJ		590 U		39 UJ		580 U		38 UJ		39 U	39 U			38 U		40 U		41 U		38 U	

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB01	04SB02	04SB02	04SB03	04SB03	04SB04	04SB04	04SB05	04SB05	04SB06	04SB06	04SB07	04SB07	04SB07	04SB07	04SB08	04SB08	04SB09	04SB09	04SB10	04SB10	04SB11	04SB11
nsample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	04SB070002-D	04SB070102	04SB070102-D	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
sample	04SB010002	04SB010102	04SB020002	04SB020102	04SB030002	04SB030102	04SB040002	04SB040102	04SB050002	04SB050102	04SB060002	04SB060102	04SB070002	FD11290002	04SB070102	FD11290002	04SB080002	04SB080102	04SB090002	04SB090102	04SB100002	04SB100102	04SB110002	04SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
AROCLOR-1221	590 U		75 U		1200 U		79 U		1200 U		76 U		79 U	78 U			77 U		80 U		81 U		77 U	
AROCLOR-1232	290 U		38 U		590 U		39 U		580 U		38 U		39 U	39 U			38 U		40 U		41 U		38 U	
AROCLOR-1242	290 U		38 U		590 U		39 U		580 U		38 U		39 U	39 U			38 U		40 U		41 U		38 U	
AROCLOR-1248	290 U		38 U		590 U		39 U		580 U		38 U		39 U	39 U			38 U		40 U		41 U		38 U	
AROCLOR-1254	290 U		38 U		590 U		39 U		580 U		38 U		39 U	39 U			38 U		40 U		41 U		38 U	
AROCLOR-1260	290 U		38 U		590 U		39 U		580 U		38 U		39 U	39 U			38 U		40 U		41 U		38 U	
BETA-BHC	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
DELTA-BHC	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 UJ		2.1 UJ		2.0 UJ	
DIELDRIN	29 U		3.8 U		59 U		3.9 U		58 UJ		3.8 U		3.9 U	3.9 U			3.8 U		4.0 U		4.1 U		3.8 U	
ENDOSULFAN I	15 U		1.9 U		30 UJ		2.0 U		30 UJ		2.0 U		2.0 U	2.0 U			2.0 U		8.1		7.3		2.0 U	
ENDOSULFAN II	29 U		3.8 U		59 UJ		3.9 U		58 U		3.8 U		3.9 U	3.9 U			3.8 U		4.0 U		4.1 U		3.8 U	
ENDOSULFAN SULFATE	29 U		3.8 U		59 U		3.9 U		58 U		3.8 U		3.9 U	3.9 U			3.8 U		4.0 U		4.1 U		3.8 U	
ENDRIN	29 U		3.8 U		59 U		3.9 U		58 U		3.8 U		3.9 U	3.9 U			3.8 U		4.0 UJ		4.1 UJ		3.8 UJ	
ENDRIN ALDEHYDE	29 U		3.8 U		59 U		3.9 U		58 U		3.8 U		3.9 U	3.9 U			3.8 U		4.0 U		4.1 U		3.8 U	
GAMMA-BHC (LINDANE)	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
GAMMA-CHLORDANE	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
HEPTACHLOR	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
HEPTACHLOR EPOXIDE	15 U		1.9 U		30 U		2.0 U		30 U		2.0 U		2.0 U	2.0 U			2.0 U		2.0 U		2.1 U		2.0 U	
METHOXYCHLOR	150 U		19 U		300 U		20 U		300 U		20 U		20 U	20 U			20 U		20 U		21 U		20 U	
TOXAPHENE	1500 U		190 U		3000 U		200 U		3000 U		200 U		200 U	200 U			200 U		200 U		210 U		200 U	
Herbicides (UG/KG)																								
2,4,5-T	24 UJ		48 UJ		48 UJ		48 U		47 UJ		3.1 U		3.2 U	3.1 U			3.1 U		6.3		12		3.1 U	
2,4,5-TP (SILVEX)	24 U		48 U		48 U		48 UJ		47 U		3.1 U		3.2 U	3.1 U			3.1 U		3.2 U		3.3 U		3.1 U	
2,4-D	24 UJ		48 UJ		48 UJ		48 U		47 UJ		3.1 U		8.3 J	12 R			3.1 U		16 J		45 J		3.1 U	
DINOSEB	24 U		48 U		48 U		48 UJ		47 U		3.1 U		3.2 U	3.1 U			3.1 U		3.2 U		3.3 U		3.1 U	
HEXACHLOROPHENE	6.0 U		11 U		12 U		12 U		12 U		0.77 U		0.80 U	0.79 U			0.78 U		0.81 U		0.83 U		0.78 U	
PENTACHLOROPHENOL	6.0 U		11 U		120		12 U		220		0.77 U		2.8 R	0.79 U			0.78 U		1.9 R		0.83 U		0.78 U	
Inorganics (MG/KG)																								
ALUMINUM	5060 J		6460 J		3980 J		5060 J		5300 J		7480 J		8180 J	8610 J			9980 J		7410 J		9730 J		7420 J	
ANTIMONY	0.84 U		0.79 U		0.97 U		0.93 U		0.85 U		0.87 U		0.98	1.1			0.86 U		0.86 U		0.96 U		0.84 U	
ARSENIC	3.9		5.6		5.6		4.0		3.5		5.3		5.3	5.0			5.0		6.2		5.2		6.6	
BARIUM	52.7		62.8		29.4		48.7		26.0		71.6		63.6	78.5			68.9		75.2		1520		114	
BERYLLIUM	0.91 U		0.85 U		0.87 U		0.90 U		0.88 U		0.90 U		0.86 U	0.84 U			0.90 U		0.45		0.56		0.61	
CADMIUM	0.91 U		1.5		0.87 U		0.90 U		0.88 U		5.8		0.86 U	0.84 U			0.90 U		0.43 U		0.76		0.58	
CALCIUM	4570 U		4260 U		4340 U		4490 U		4400 U		4480 U		4300 U	4210 U			4490 U		1150		964		992	
CHROMIUM	7.5		16.5		7.8		7.7		8.1		9.1		10.1	9.1			10.3		13.5		12.0		11.7	
COBALT	5.0		5.4		4.4		7.7		3.9		5.2		6.3	5.5			8.4		11.4		6.5		7.1	
COPPER	10.2		13.5		8.3		9.0		6.8		11.6		13.6	11.5			11.4		10.3		53.2		13.7	
IRON	11900 J		14300 J		10400 J		16100 J		11000 J		15000 J		20800 J	17900 J			16100 J		15700 J		16500 J		20700 J	
LEAD	10.3 J		10.1 J		15.3 J		11.2 J		8.9 J		9.1 J		32.3 J	24.5 J			10.3 J		14.3 J		70.0 J		11.9 J	
MAGNESIUM	778 J		564 J		2970 J		596 J		1940 J		661 J		941 J	821 J			980 J		892 J		1050 J		863 J	
MANGANESE	326		298		195		408		194		309		418	343			457		569 J		514 J		611 J	
MERCURY	0.04 U		0.03 U		0.04		0.05 U		0.04 U		0.04 U		0.04 U	0.04 U			0.04 U		0.20 U		0.20 U		0.20 U	
NICKEL	7.7 J		9.5 J		17.9 J		9.8 J		18.3 J		10.8 J		10.2 J	9.0 J			8.6 J		7.2		11.6		13.7	
POTASSIUM	457 U		426 U		434 U		449 U		440 U		448 U		430 U	421 U			449 U		336 J		454 J		321 J	
SELENIUM	0.91 UJ		0.85 UJ		0.87 UJ		0.90 UJ		0.88 UJ		0.90 UJ		0.86 UJ	0.84 UJ			0.90 UJ		0.43 U		0.48 U		0.42 U	
SILVER	0.91 U		0.85 U		0.87 U		0.90 U		0.88 U		0.90 U		0.86 U	0.84 U			0.90 U		0.43 U		0.46 U		0.42 U	
SODIUM	457 UJ		426 UJ		434 UJ		449 UJ		440 UJ		448 UJ		430 UJ	421 UJ			449 UJ		214 U		231 U		208 U	
THALLIUM	0.91 U		0.85 U		0.87 U		0.90 U		0.88 U		0.90 U		0.86 U	0.84 U			0.90 UJ		0.43 U		0.48 U		0.42 U	
TIN	4.2 UJ		4.0 UJ		4.9 UJ		4.6 UJ		4.2 UJ		4.3 UJ		50.6 J	20.3 J			4.3 UJ		4.3 U		4.8 U		4.2 U	
VANADIUM	13.8		14.8		15.2		13.2		11.7		14.7		15.9	15.4			17.9		22.2		18.1		17.3	
ZINC	43.1		53.0		98.6		42.7		64.9		47.4		35.9	36.3			32.7		26.2		296		54.2	
Miscellaneous Parameters																								
CATION EXCHANGE CAPACITY MEQ/1													13.0				9.80							
CYANIDE MG/KG	0.60 UJ		0.60 UJ		0.60 UJ		0.60 UJ		0.60 UJ		0.60 UJ		0.60 UJ	0.60 UJ			0.60 UJ		1.0 U		1.3		1.0 U	
PH S.U.													5.50 J				5.20 J							
TOTAL ORGANIC CARBON MG/KG													6100				5100							

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04
location	04SB12	04SB12	04SB12	04SB12	04SS01	04SS01	04SS01	04SS01	04SS02	04SS02
nsample	04SB120002	04SB120002-D	04SB120102	04SB120102-D	04SS010002	04SS010102	04SS020002-D	04SS026102-D	04SS020002	04SS020102
sample	04SB120002	FD02200101	04SB120102	FD02200101	04SS010002	04SS010102	FD11290001	FD11290001	04SS020002	04SS020102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	DUP	DUP	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatile Organics (UG/KG)										
1,1,1,2-TETRACHLOROETHANE			3 U	3 U		3 U		3 U		3 U
1,1,1-TRICHLOROETHANE			6 J	3 U		3 U		3 U		3 U
1,1,2,2-TETRACHLOROETHANE			3 UJ	3 U		3 U		3 U		3 UJ
1,1,2-TRICHLOROETHANE			3 UJ	3 U		3 U		3 U		3 U
1,1-DICHLOROETHANE			3 U	3 U		3 U		3 U		3 U
1,1-DICHLOROETHENE			3 U	3 U		3 U		3 U		3 U
1,2,3-TRICHLOROPROPANE			3 U	3 U		3 U		5		3 U
1,2-DIBROMO-3-CHLOROPROPANE			3 U	3 U		3 U		3 U		3 U
1,2-DIBROMOETHANE			3 U	3 U		3 U		3 U		3 U
1,2-DICHLOROETHANE			3 UJ	3 U		3 U		3 U		3 U
1,2-DICHLOROPROPANE			3 U	3 U		3 U		3 U		3 U
1,4-DIOXANE			210 U	210 U		200 U		210 U		210 U
2-BUTANONE			16 U	16 U		13 U		15 U		15 UJ
2-HEXANONE			16 U	16 U		13 U		15 U		15 UJ
3-CHLOROPROPENE			11 UJ	11 UJ		9 U		10 U		10 U
4-METHYL-2-PENTANONE			16 U	16 U		13 U		15 U		15 UJ
ACETONE			46 BU	16 UJ		13 U		15 U		15 UJ
ACETONITRILE			84 U	85 U		79 U		84 U		83 U
ACROLEIN			53 UR	54 UR		45 UR		52 UR		51 UR
ACRYLONITRILE			11 UR	11 UR		9 UR		10 UR		10 UR
BENZENE			3 U	3 U		3 U		3 U		3 U
BROMODICHLOROMETHANE			3 U	3 U		3 U		3 U		3 U
BROMOFORM			3 UJ	3 U		3 U		3 U		3 UJ
BROMOMETHANE			3 U	3 U		3 U		3 U		3 U
CARBON DISULFIDE			3 U	3 U		3 U		3 U		3 U
CARBON TETRACHLORIDE			3 U	3 U		3 U		3 U		3 U
CHLOROBENZENE			3 U	3 U		3 U		3 U		3 U
CHLORODIBROMOMETHANE			3 U	3 U		3 U		3 U		3 U
CHLOROETHANE			3 U	3 U		3 U		3 U		3 U
CHLOROFORM			3 U	3 U		3 U		3 U		3 U
CHLOROMETHANE			3 U	3 U		3 U		3 U		3 U
CHLOROPRENE			3 UJ	3 UJ		3 U		3 U		3 U
CIS-1,2-DICHLOROETHENE			3 U	3 U		3 U		3 U		3 U
CIS-1,3-DICHLOROPROPENE			3 U	3 U		3 U		3 U		3 U
DIBROMOMETHANE			3 U	3 U		3 U		3 U		3 U
DICHLORODIFLUOROMETHANE			3 U	3 U		3 U		3 U		3 U
ETHYL METHACRYLATE			3 U	3 U		3 U		3 U		3 U
ETHYLBENZENE			3 U	3 U		3 U		3 U		3 U
ISOBUTANOL			84 U	85 U		79 U		84 U		83 U
METHACRYLONITRILE			3 U	3 U		3 U		3 U		3 U
METHYL IODIDE			3 UJ	3 UJ		3 U		3 U		3 U
METHYL METHACRYLATE			32 U	32 U		27 U		31 U		31 U
METHYLENE CHLORIDE			4 J	7 J		3 U		3 U		3 U
PROPIONITRILE			84 U	85 U		79 U		84 U		83 U
STYRENE			3 U	3 U		3 U		3 U		3 U
TETRACHLOROETHENE			3 UJ	3 U		3 U		3 U		3 U
TOLUENE			3 U	4		3 U		3 U		3 U
TRANS-1,2-DICHLOROETHENE			3 U	3 U		3 U		3 U		3 U
TRANS-1,3-DICHLOROPROPENE			3 UJ	3 U		3 U		3 U		3 U
TRANS-1,4-DICHLORO-2-BUTENE			3 UJ	3 UJ		3 U		3 U		3 U
TRICHLOROETHENE			3 U	3 U		3 U		3 U		3 U
TRICHLOROFLUOROMETHANE			3 U	3 U		3 U		3 U		3 U
VINYL ACETATE			32 U	32 U		27 U		31 U		31 U
VINYL CHLORIDE			3 U	3 U		3 U		3 U		3 U
XYLENES, TOTAL			5	6		3 U		3 U		3 U
Semi-Volatile Organics (UG/KG)										
1,2,4,5-TETRACHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	
1,2,4-TRICHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	
1,2-DICHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04
location	04SB12	04SB12	04SB12	04SB12	04SS01	04SS01	04SS01	04SS01	04SS02	04SS02
nsample	04SB120002	04SB120002-D	04SB120102	04SB120102-D	04SS010002	04SS010102	04SS020002-D	04SS020102-D	04SS020002	04SS020102
sample	04SB120002	FD02200101	04SB120102	FD02200101	04SS010002	04SS010102	FD11290001	FD11290001	04SS020002	04SS020102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	DUP	DUP	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1,3-DICHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	
1,4-DICHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	
1,4-NAPHTHOQUINONE	400 U	400 U			380 U		410 U		410 U	
1,4-PHENYLENEDIAMINE	400 UJ	400 UJ			380 U		410 U		410 UJ	
1-NAPHTHYLAMINE	400 U	400 U			380 U		410 U		410 U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U	400 UJ			380 U		410 U		410 U	
2,3,4,6-TETRACHLOROPHENOL	400 U	400 U			380 U		410 U		410 U	
2,4,5-TRICHLOROPHENOL	400 U	400 U			380 U		410 U		410 U	
2,4,6-TRICHLOROPHENOL	400 U	400 U			380 U		410 U		410 U	
2,4-DICHLOROPHENOL	400 UJ	400 U			380 U		410 U		410 U	
2,4-DIMETHYLPHENOL	400 U	400 U			380 U		410 U		410 U	
2,4-DINITROPHENOL	400 U	400 U			380 UJ		410 UJ		410 UJ	
2,4-DINITROTOLUENE	400 U	400 U			380 U		410 U		410 U	
2,6-DICHLOROPHENOL	400 U	400 U			380 U		410 U		410 U	
2,6-DINITROTOLUENE	400 U	400 U			380 U		410 U		410 U	
2-ACETYLAMINOFLUORENE	400 U	400 U			380 U		410 U		410 U	
2-CHLORONAPHTHALENE	400 U	400 U			380 U		410 U		410 U	
2-CHLOROPHENOL	400 U	400 U			380 U		410 U		410 U	
2-METHYLNAPHTHALENE	8 U	8 U			8.00 U		8.00 U		8.00 U	
2-METHYLPHENOL	400 U	400 U			380 U		410 U		410 U	
2-NAPHTHYLAMINE	400 U	400 U			380 U		410 U		410 U	
2-NITROANILINE	400 U	400 U			380 U		410 U		410 U	
2-NITROPHENOL	400 U	400 U			380 U		410 U		410 U	
2-PICOLINE	400 U	400 U			380 U		410 U		410 U	
3,3'-DICHLOROBENZIDINE	400 UR	400 U			380 U		410 U		410 U	
3,3'-DIMETHYLBENZIDINE	400 U	400 U			380 U		410 U		410 U	
3-METHYLCHOLANTHRENE	400 U	400 U			380 U		410 U		410 U	
3-NITROANILINE	400 U	400 U			380 U		410 U		410 U	
4,6-DINITRO-2-METHYLPHENOL	400 U	400 U			380 U		410 U		410 U	
4-AMINOBIPHENYL	400 U	400 U			380 U		410 U		410 U	
4-BROMOPHENYL PHENYL ETHER	400 U	400 U			380 U		410 U		410 U	
4-CHLORO-3-METHYLPHENOL	400 U	400 U			380 U		410 U		410 U	
4-CHLOROANILINE	400 UJ	400 U			380 U		410 U		410 U	
4-CHLOROPHENYL PHENYL ETHER	400 U	400 U			380 U		410 U		410 U	
4-METHYLPHENOL	400 U	400 U			380 U		410 U		410 U	
4-NITROANILINE	400 U	400 U			380 U		410 U		410 U	
4-NITROPHENOL	400 U	400 U			380 U		410 U		410 U	
4-NITROQUINOLINE-1-OXIDE	400 UR	400 UR			380 UR		410 UR		410 UR	
5-NITRO-O-TOLUIDINE	400 U	400 U			380 U		410 U		410 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE	400 U	400 U			380 U		410 U		410 U	
A,A-DIMETHYLPHENETHYLAMINE	790 U	800 U			770 U		820 U		810 U	
ACENAPHTHENE	8 U	8 U			8.00		8.00 U		8.00 U	
ACENAPHTHYLENE	8 U	8 U			30.0		8.00 U		8.00 U	
ACETOPHENONE	400 U	400 U			380 U		410 U		410 U	
ANILINE	400 U	400 U			380 U		410 U		410 U	
ANTHRACENE	8 U	8 U			38.0		8.00 U		8.00 U	
ARAMITE	400 U	400 U			380 U		410 U		410 U	
BENZO(A)ANTHRACENE	8 U	8 U			180		8.00 U		8.00 U	
BENZO(A)PYRENE	8 U	8 U			230 J		8.00 UJ		8.00 UJ	
BENZO(B)FLUORANTHENE	8 U	8 U			650 J		8.00 UJ		8.00 UJ	
BENZO(G,H,I)PERYLENE	8 U	8 U			140 J		8.00 UJ		8.00 UJ	
BENZO(K)FLUORANTHENE	8 U	8 U			8.00 UJ		8.00 UJ		8.00 UJ	
BENZYL ALCOHOL	400 U	400 U			380 U		410 U		410 U	
BIS(2-CHLOROETHOXY)METHANE	400 U	400 U			380 U		410 U		410 U	
BIS(2-CHLOROETHYL)ETHER	400 U	400 U			380 U		410 U		410 U	
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	820			380 U		410 U		410 U	
BUTYL BENZYL PHTHALATE	400 U	400 U			380 U		410 U		410 U	
CHLOROBENZILATE	400 U	400 U			380 U		410 U		410 U	
CHRYSENE	8 U	8 U			240		8.00 U		8.00 U	
DI-N-BUTYL PHTHALATE	400 U	400 U			380 U		410 U		410 U	

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04
location	04SB12	04SB12	04SB12	04SB12	04SS01	04SS01	04SS01	04SS01	04SS02	04SS02
nsample	04SB120002	04SB120002-D	04SB120102	04SB120102-D	04SS010002	04SS010102	04SS020002-D	04SS020102-D	04SS020002	04SS020102
sample	04SB120002	FD02200101	04SB120102	FD02200101	04SS010002	04SS010102	FD11290001	FD11290001	04SS020002	04SS020102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	DUP	DUP	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DI-N-OCTYL PHTHALATE	400 U	400 U			380 U		410 U		410 U	
DIALLATE	400 U	400 U			380 U		410 UJ		410 U	
DIBENZO(A,H)ANTHRACENE	8 U	8 U			28.0 J		8.00 UJ		8.00 UJ	
DIBENZOFURAN	400 U	400 U			380 U		410 U		410 U	
DIETHYL PHTHALATE	400 U	400 U			380 U		410 U		410 U	
DIMETHOATE	400 U	400 UJ			380 U		410 U		410 U	
DIMETHYL PHTHALATE	400 U	400 U			380 U		410 U		410 U	
DIPHENYLAMINE	400 U	400 U			380 U		410 U		410 U	
DISULFOTON	400 U	400 U			380 U		410 U		410 U	
ETHYL METHANE SULFONATE	400 U	400 U			380 U		410 U		410 U	
ETHYL PARATHION	400 UJ	400 UJ			380 U		410 U		410 U	
FAMPHUR	790 UR	800 UR			770 UR		820 UR		810 UR	
FLUORANTHENE	8 U	8 U			280		8.00 U		8.00 U	
FLUORENE	8 U	8 U			6.00 U		8.00 U		8.00 U	
HEXACHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	
HEXACHLOROBUTADIENE	400 U	400 U			380 U		410 U		410 U	
HEXACHLOROCYCLOPENTADIENE	400 U	400 U			380 U		410 U		410 U	
HEXACHLOROETHANE	400 UJ	400 U			380 U		410 U		410 U	
HEXACHLOROPROPENE	400 U	400 U			380 U		410 U		410 U	
INDENO(1,2,3-CD)PYRENE	8 U	8 U			120 J		8.00 UJ		8.00 UJ	
ISODRIN	400 U	400 U			380 U		410 U		410 U	
ISOPHORONE	400 U	400 U			380 U		410 U		410 U	
ISOSAFROLE	400 U	400 U			380 U		410 U		410 U	
KEPONE	400 UJ	400 UJ			380 UR		410 UR		410 UR	
METHAPYRILENE	400 U	400 U			380 U		410 UJ		410 U	
METHYL METHANE SULFONATE	400 U	400 U			380 U		410 U		410 U	
METHYL PARATHION	400 UJ	400 UJ			380 U		410 U		410 U	
N-NITROSO-DI-N-PROPYLAMINE	400 U	400 U			380 U		410 U		410 U	
N-NITROSODI-N-BUTYLAMINE	400 U	400 U			380 U		410 U		410 U	
N-NITROSODIETHYLAMINE	400 U	400 U			380 U		410 U		410 U	
N-NITROSODIMETHYLAMINE	400 U	400 U			380 U		410 U		410 UJ	
N-NITROSOMETHYLETHYLAMINE	400 U	400 U			380 U		410 U		410 U	
N-NITROSOMORPHOLINE	400 U	400 U			380 U		410 U		410 U	
N-NITROSOPIPERIDINE	400 U	400 U			380 U		410 U		410 U	
N-NITROSOPYRROLIDINE	400 U	400 U			380 U		410 U		410 U	
NAPHTHALENE	8 U	8 U			6.00		8.00 U		8.00 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE	400 U	400 U			380 U		410 U		410 U	
O-TOLUIDINE	400 U	400 U			380 U		410 U		410 U	
P-(DIMETHYLAMINO)AZOBENZENE	400 U	400 U			380 U		410 U		410 U	
PENTACHLOROBENZENE	400 U	400 U			380 U		410 U		410 U	
PENTACHLOROETHANE	400 U	400 U			380 U		410 U		410 U	
PENTACHLORONITROBENZENE	400 U	400 U			380 U		410 U		410 U	
PHENACETIN	400 U	400 U			380 U		410 U		410 U	
PHENANTHRENE	8 U	8 U			110		8.00 U		8.00 U	
PHENOL	400 U	400 U			380 U		410 U		410 U	
PHORATE	400 U	400 U			380 U		410 U		410 U	
PRONAMIDE	400 U	400 U			380 U		410 U		410 U	
PYRENE	8 U	8 U			400 J		8.00 U		8.00 U	
PYRIDINE	400 U	400 U			380 U		410 U		410 U	
SAFROLE	400 U	400 U			380 U		410 U		410 U	
SULFOTEPP	400 U	400 U			380 U		410 U		410 U	
THIONAZIN	400 U	400 U			380 U		410 U		410 U	
Pesticides (UG/KG)										
4,4'-DDD	3.9 UJ	4.0 UJ			3.8 U		4.1 U		4.0 U	
4,4'-DDE	3.9 U	6.0 R			3.8 U		4.1 U		4.0 U	
4,4'-DDT	3.9 U	4.0 U			8.0		4.1 U		4.0 U	
ALDRIN	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
ALPHA-BHC	2.0 UJ	2.0 UJ			2.0 U		2.1 U		2.1 U	
ALPHA-CHLORDANE	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
AROCLOR-1016	39 U	40 U			38 U		41 U		40 U	

CRANE CTO 10
SWMU 4 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04
location	04SB12	04SB12	04SB12	04SB12	04SS01	04SS01	04SS01	04SS01	04SS02	04SS02
nsample	04SB120002	04SB120002-D	04SB120102	04SB120102-D	04SS010002	04SS010102	04SS020002-D	04SS020102-D	04SS020002	04SS020102
sample	04SB120002	FD02200101	04SB120102	FD02200101	04SS010002	04SS010102	FD11290001	FD11290001	04SS020002	04SS020102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	DUP	DUP	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	11/29/2000 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
AROCLOR-1221	79 U	80 U			76 U		81 U		80 U	
AROCLOR-1232	39 U	40 U			38 U		41 U		40 U	
AROCLOR-1242	39 U	40 U			38 U		41 U		40 U	
AROCLOR-1248	39 U	40 U			38 U		41 U		40 U	
AROCLOR-1254	39 U	40 U			38 U		41 U		40 U	
AROCLOR-1260	39 U	40 U			38 U		41 U		40 U	
BETA-BHC	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
DELTA-BHC	2.0 UJ	2.0 UJ			2.0 U		2.1 U		2.1 U	
DIELDRIN	3.9 U	4.0 U			3.8 U		4.1 U		4.0 U	
ENDOSULFAN I	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
ENDOSULFAN II	3.9 U	4.0 U			3.8 U		4.1 U		4.0 U	
ENDOSULFAN SULFATE	3.9 U	4.0 U			3.8 U		4.1 U		4.0 U	
ENDRIN	3.9 UJ	4.0 UJ			3.8 U		4.1 U		4.0 U	
ENDRIN ALDEHYDE	3.9 UJ	4.0 U			3.8 U		4.1 U		4.0 U	
GAMMA-BHC (LINDANE)	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
GAMMA-CHLORDANE	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
HEPTACHLOR	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
HEPTACHLOR EPOXIDE	2.0 U	2.0 U			2.0 U		2.1 U		2.1 U	
METHOXYCHLOR	20 U	20 U			20 U		21 U		21 U	
TOXAPHENE	200 U	200 U			200 U		210 U		210 U	
Herbicides (UG/KG)										
2,4,5-T	3.2 U	5.1 J			3.1 U		3.3 U		3.3 U	
2,4,5-TP (SILVEX)	3.2 U	3.2 U			3.1 U		3.3 U		3.3 U	
2,4-D	7.0	8.5 J			3.1 U		3.3 U		3.3 U	
DINOSEB	3.2 U	3.2 U			3.1 U		3.3 U		3.3 U	
HEXACHLOROPHENE	0.80 UR	0.81 U			0.77 U		0.83 U		0.82 U	
PENTACHLOROPHENOL	0.80 U	0.81 U			2.9		2.5 R		0.82 U	
Inorganics (MG/KG)										
ALUMINUM	8180 J	8480 J			9560 J		8920 J		7670 J	
ANTIMONY	0.88 U	1.8			0.84 U		0.90 U		0.95 U	
ARSENIC	4.4	4.6			7.3		5.9		5.6	
BARIUM	45.5	43.3			15600		62.7		48.7	
BERYLLIUM	0.57	0.59			0.88 U		0.87 U		0.89 U	
CADMIUM	0.43 U	0.44 U			0.88 U		0.87 U		0.89 U	
CALCIUM	215 U	218 U			145000 J		4340 U		4440 U	
CHROMIUM	7.3	7.4			10.1		9.7		8.6	
COBALT	4.6	3.7			4.0		7.5		5.8	
COPPER	11.8	11.4			11.5		12.6		13.3	
IRON	13200 J	13300 J			12000 J		17500 J		18500 J	
LEAD	7.5 J	6.8 J			19.4 J		17.7 J		9.7 J	
MAGNESIUM	572 J	617 J			10400 J		969 J		723 J	
MANGANESE	483 J	314 J			293		527		399	
MERCURY	0.98	0.20 U			0.04 U		0.05 U		0.04 U	
NICKEL	9.3	8.5			11.5 J		11.1 J		11.6 J	
POTASSIUM	244 J	244 J			438 U		434 U		444 U	
SELENIUM	0.43 U	0.44 U			0.88 UJ		0.87 UJ		0.89 UJ	
SILVER	0.43 U	0.44 U			0.88 U		0.87 U		0.89 U	
SODIUM	215 U	218 U			438 UJ		434 UJ		444 UJ	
THALLIUM	0.43 U	0.44 U			0.88 U		0.87 U		0.89 U	
TIN	4.4 U	4.3 U			4.2 UJ		4.5 UJ		4.8 UJ	
VANADIUM	12.5	12.7			12.1		18.3		15.7	
ZINC	32.7	32.4			54.5		41.9		43.8	
Miscellaneous Parameters										
CATION EXCHANGE CAPACITY MEQ/1										
CYANIDE MG/KG	1.0 U	1.0 U			37.0 J		0.60 UJ		0.60 UJ	
PH S.U.										
TOTAL ORGANIC CARBON MG/KG										

CRANE CTO 10
SWMU 4 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB02	04SB03	04SB04	04SB05	04SB06	04SB07	04SB08	04SB09	04SB10	04SB11	04SB12
nsample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
sample	04SB010204	04SB020608	04SB030406	04SB040608.	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	2 - 4	6 - 8	4 - 6	6 - 8	2 - 4	7 - 9	5 - 7	8 - 10	8 - 10	6 - 8	8 - 10	8 - 10
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatile Inorganics (UG/KG)												
1,1,1,2-TETRACHLOROETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,1,1-TRICHLOROETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,1,2,2-TETRACHLOROETHANE	3 U	3 U	8 U	4 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,1,2-TRICHLOROETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,1-DICHLOROETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,1-DICHLOROETHENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,2,3-TRICHLOROPROPANE	3 U	3 U	8 U	4 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,2-DIBROMO-3-CHLOROPROPANE	3 U	3 U	8 U	4 UJ	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,2-DIBROMOETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,2-DICHLOROETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,2-DICHLOROPROPANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
1,4-DIOXANE	220 U	180 U	420 UJ	300 UJ	190 UJ	210 U	200 U	200 U	210 U	210 U	180 U	220 U
2-BUTANONE	17 U	13 U	39 U	20 U	15 U	15 U	16 U	16 U	16 U	16 U	14 U	18 U
2-HEXANONE	17 U	13 U	39 U	20 U	15 U	15 U	16 U	16 U	16 U	16 U	14 U	18 U
3-CHLOROPROPENE	11 UJ	9 UJ	26 UJ	13. U	10 UJ	10 UJ	11 UJ	10 U	10 UJ	11 UJ	9 UJ	12 UJ
4-METHYL-2-PENTANONE	17 U	13 U	39 U	20 U	15 U	15 U	16 U	16 U	16 U	16 U	14 U	18 U
ACETONE	21	13 U	63	26	15 U	15 U	16 U	16 U	46 BU	16 UJ	28 BU	18 UJ
ACETONITRILE	90 U	71 U	170 UJ	120 UJ	77 UJ	82 U	80 U	81 U	83 U	85 U	72 U ,	86 U
ACROLEIN	55 UR	43 UR	130 UR	68 UR	49 UR	50 UR	54 UR	52 UR	52 UR	53 UR	48 UR	60 UR
ACRYLONITRILE	11 UR	9 UR	26 UR	13 UR	10 UR	10 UR	11 UR	10 UR	10 UR	11 UR	9 UR	12 UR
BENZENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
BROMODICHLOROMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
BROMOFORM	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
BROMOMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CARBON DISULFIDE	3 U	3 U	10	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CARBON TETRACHLORIDE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CHLOROBENZENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CHLORODIBROMOMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CHLOROETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CHLOROFORM	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CHLOROMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CHLOROPRENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 UJ	3 UJ	3 UJ	4 UJ
CIS-1,2-DICHLOROETHENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
CIS-1,3-DICHLOROPROPENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
DIBROMOMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
DICHLORODIFLUOROMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
ETHYL METHACRYLATE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
ETHYLBENZENE	3 U	3 U	10	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
ISOBUTANOL	90 U	71 U	170 UJ	120 UJ	77 UJ	82 U	80 U	81 U	83 U	85 U	72 U	86 U
METHACRYLONITRILE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
METHYL IODIDE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 UJ	3 UJ	3 UJ	4 UJ
METHYL METHACRYLATE	33 U	26 U	79 U	41 U	29 U	30 U	32 U	31 U	31 U	32 U	27 U	36 U
METHYLENE CHLORIDE	4 BU	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 UJ	3 UJ	7 J	4 J
PROPIONITRILE	90 U	71 U	170 UJ	120 UJ	77 UJ	82 U	80 U	81 U	83 U	85 U	72 U	86 U
STYRENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
TETRACHLOROETHENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
TOLUENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	5	4 U
TRANS-1,2-DICHLOROETHENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
TRANS-1,3-DICHLOROPROPENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
TRANS-1,4-DICHLORO-2-BUTENE	3 U	3 U	8 U	4 UJ	3 U	3 U	3 U	3 U	3 UJ	3 UJ	3 UJ	4 UJ
TRICHLOROETHENE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
TRICHLOROFLUOROMETHANE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	4	4 U
VINYL ACETATE	33 U	26 U	79 U	41 U	29 U	30 U	32 U	31 U	31 U	32 U	27 U	36 U

CRANE CTO 10
SWMU 4 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB02	04SB03	04SB04	04SB05	04SB06	04SB07	04SB08	04SB09	04SB10	04SB11	04SB12
nsample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
sample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	2 - 4	6 - 8	4 - 6	6 - 8	2 - 4	7 - 9	5 - 7	8 - 10	8 - 10	6 - 8	8 - 10	8 - 10
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VINYL CHLORIDE	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	4 U
XYLENES, TOTAL	3 U	3 U	8 U	4 U	3 U	3 U	3 U	3 U	7	7	8	4 U
Semi-Volatile Inorganics (UG/KG)												
1,2,4,5-TETRACHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
1,2,4-TRICHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
1,2-DICHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
1,3-DICHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
1,4-DICHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
1,4-NAPHTHOQUINONE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
1,4-PHENYLENEDIAMINE	380 UJ	380 UJ	8100 UJ	6800 UJ	6000 UJ	380 UJ	410 U	400 U	390 U	410 U	380 U	370 UJ
1-NAPHTHYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,2'-OXYBIS(1-CHLOROPROPANE)	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
2,3,4,6-TETRACHLOROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,4,5-TRICHLOROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,4,6-TRICHLOROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,4-DICHLOROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,4-DIMETHYLPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,4-DINITROPHENOL	380 UJ	380 UJ	8100 UJ	6800 UJ	6000 UJ	380 UJ	410 UJ	400 UJ	390 U	410 U	380 U	370 U
2,4-DINITROTOLUENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,6-DICHLOROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2,6-DINITROTOLUENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2-ACETYLAMINOFLUORENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2-CHLORONAPHTHALENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2-CHLOROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2-METHYLNAPHTHALENE	8.00 U	47.0	8100 U	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
2-METHYLPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2-NAPHTHYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
2-NITROANILINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 U	370 U
2-NITROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 UJ	370 U
2-PICOLINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
3,3'-DICHLOROBENZIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 UR	410 U	400 U	390 U	410 U	380 U	370 U
3,3'-DIMETHYLBENZIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
3-METHYLCHOLANTHRENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
3-NITROANILINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4,6-DINITRO-2-METHYLPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-AMINOBIPHENYL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-BROMOPHENYL PHENYL ETHER	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-CHLORO-3-METHYLPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-CHLOROANILINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-CHLOROPHENYL PHENYL ETHER	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-METHYLPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-NITROANILINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-NITROPHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
4-NITROQUINOLINE-1-OXIDE	380 UR	380 UR	8100 UR	6800 UR	6000 UR	380 UR	410 UR	400 UR	390 UR	410 UR	380 UR	370 UR
5-NITRO-O-TOLUIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
A,A-DIMETHYLPHENETHYLAMINE	770 U	760 U	16000 U	14000 U	12000 U	760 U	810 U	800 U	780 U	820 U	770 U	750 U
ACENAPHTHENE	8.00 U	8.00 U	8100 U	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
ACENAPHTHYLENE	8.00 U	8.00 U	8100 U	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
ACETOPHENONE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
ANILINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
ANTHRACENE	8.00 U	8.00 U	8100 U	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
ARAMITE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
BENZO(A)ANTHRACENE	8.00 U	8.00 U	4800 J	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U

CRANE CTO 10
SWMU 4 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB02	04SB03	04SB04	04SB05	04SB06	04SB07	04SB08	04SB09	04SB10	04SB11	04SB12
nsample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
sample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	2 - 4	6 - 8	4 - 6	6 - 8	2 - 4	7 - 9	5 - 7	8 - 10	8 - 10	6 - 8	8 - 10	8 - 10
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BENZO(A)PYRENE	8.00 UJ	8.00 UJ	4500 J	6800 U	1400 J	8.00 UJ	8.00 UJ	8.00 UJ	8 U	8 U	8 U	8 U
BENZO(B)FLUORANTHENE	16.0 J	8.00 UJ	6700 J	6800 U	1800 J	8.00 UJ	8.00 UJ	8.00 UJ	8 U	8 U	8 U	8 U
BENZO(G,H,I)PERYLENE	8.00 UJ	8.00 UJ	4300 J	6800 U	2500 J	8.00 UJ	8.00 UJ	8.00 UJ	8 U	8 U	8 U	8 U
BENZO(K)FLUORANTHENE	8.00 UJ	8.00 UJ	8100 U	6800 U	6000 U	8.00 UJ	8.00 UJ	8.00 UJ	8 U	8 U	8 U	8 U
BENZYL ALCOHOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
BIS(2-CHLOROETHOXY)METHANE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
BIS(2-CHLOROETHYL)ETHER	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
BIS(2-ETHYLHEXYL)PHTHALATE	380 U	380 U	2200 BU	6800 U	6000 U	380 U	410 U	960 BU	390 U	440	380 U	370 U
BUTYL BENZYL PHTHALATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
CHLOROBENZILATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
CHRYSENE	11.0	8.00 U	4800 J	6800 U	1300 J	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
DI-N-BUTYL PHTHALATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DI-N-OCTYL PHTHALATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DIALLATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DIBENZO(A,H)ANTHRACENE	8.00 UJ	8.00 UJ	8100 U	6800 U	6000 U	8.00 UJ	8.00 UJ	8.00 UJ	8 U	8 U	8 U	8 U
DIBENZOFURAN	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DIETHYL PHTHALATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DIMETHOATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
DIMETHYL PHTHALATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DIPHENYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
DISULFOTON	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
ETHYL METHANE SULFONATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
ETHYL PARATHION	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 UJ
FAMPHUR	770 UR	760 UR	16000 UR	14000 UR	12000 UR	760 UR	810 UR	800 UR	780 UR	820 UR	770 UR	750 UR
FLUORANTHENE	17.0	8.00 U	9000	6800 U	2100 J	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
FLUORENE	8.00 U	9.00	8100 U	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
HEXACHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
HEXACHLOROBUTADIENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
HEXACHLOROCYCLOPENTADIENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
HEXACHLOROETHANE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
HEXACHLOROPROPENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
INDENO(1,2,3-CD)PYRENE	8.00 UJ	8.00 UJ	3000 J	6800 U	6000 U	8.00 UJ	8.00 UJ	8.00 UJ	8 U	8 U	8 U	8 U
ISODRIN	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
ISOPHORONE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
ISOSAFROLE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
KEPONE	380 UR	380 UR	8100 UR	6800 UR	6000 UR	380 UR	410 UR	400 UR	390 UJ	410 UJ	380 UJ	370 UJ
METHAPYRILENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
METHYL METHANE SULFONATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
METHYL PARATHION	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 UJ
N-NITROSO-DI-N-PROPYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
N-NITROSODI-N-BUTYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
N-NITROSODIETHYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
N-NITROSODIMETHYLAMINE	380 UJ	380 UJ	8100 UJ	6800 UJ	6000 UJ	380 UJ	410 U	400 U	390 U	410 U	380 U	370 U
N-NITROSOMETHYLETHYLAMINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
N-NITROSOMORPHOLINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
N-NITROSOPIPERIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
N-NITROSOPYRROLIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
NAPHTHALENE	8.00 U	10.0	8100 U	6800 U	6000 U	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
O-TOLUIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
P-(DIMETHYLAMINO)AZOBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
PENTACHLOROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
PENTACHLOROETHANE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
PENTACHLORONITROBENZENE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U

CRANE CTO 10
SWMU 4 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB02	04SB03	04SB04	04SB05	04SB06	04SB07	04SB08	04SB09	04SB10	04SB11	04SB12
nsample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
sample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	2 - 4	6 - 8	4 - 6	6 - 8	2 - 4	7 - 9	5 - 7	8 - 10	8 - 10	6 - 8	8 - 10	8 - 10
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
PHENACETIN	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
PHENANTHRENE	9.00	70 0	4200 J	6800 U	1600 J	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
PHENOL	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
PHORATE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
PRONAMIDE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
PYRENE	19 0	8 00 U	8900	6800 U	2600 J	8.00 U	8.00 U	8.00 U	8 U	8 U	8 U	8 U
PYRIDINE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
SAFROLE	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
SULFOTEPP	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 U	410 U	380 U	370 U
THIONAZIN	380 U	380 U	8100 U	6800 U	6000 U	380 U	410 U	400 U	390 UJ	410 UJ	380 UJ	370 U
Pesticides (UG/KG)												
4,4'-DDD	3 8 U	3.8 U	80 U	67 U	60 U	3.8 U	4.0 U	4 0 U	3.8 UJ	4.1 UJ	3.8 UJ	3.7 UJ
4,4'-DDE	3.8 U	3.8 U	80 U	67 U	60 U	3 8 U	4.0 U	4.0 U	3 8 U	4.1 U	3 8 U	3.7 U
4,4'-DDT	3 8 U	21 R	80 U	67 U	60 U	3 8 U	4.0 U	4.0 U	3.8 U	4.1 U	3.8 U	3.7 U
ALDRIN	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2 0 U	2.0 U	2.1 U	2.0 U	1.9 U
ALPHA-BHC	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2.0 U	2.0 UJ	2.1 UJ	2.0 UJ	1.9 UJ
ALPHA-CHLORDANE	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2.0 U	2.0 U	2.1 U	2.0 U	1.9 U
AROCLOR-1016	38 UJ	38 UJ	800 UJ	670 UJ	600 U	38 UJ	40 U	40 U	38 U	41 U	38 U	37 U
AROCLOR-1221	76 U	75 U	1600 U	1300 U	1200 U	75 U	80 U	80 U	77 U	81 U	76 U	74 U
AROCLOR-1232	38 U	38 U	800 U	670 U	600 U	38 U	40 U	40 U	38 U	41 U	38 U	37 U
AROCLOR-1242	38 U	38 U	800 U	670 U	600 U	38 U	40 U	40 U	38 U	41 U	38 U	37 U
AROCLOR-1248	38 U	38 U	800 U	670 U	600 U	38 U	40 U	40 U	38 U	41 U	38 U	37 U
AROCLOR-1254	38 U	2100	800 U	670 U	600 U	38 U	40 U	40 U	38 U	41 U	38 U	37 U
AROCLOR-1260	38 U	38 U	800 U	670 U	600 U	38 U	40 U	40 U	38 U	41 U	38 U	37 U
BETA-BHC	2 0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2.0 U	2.0 U	2.1 U	2.0 U	1.9 U
DELTA-BHC	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2 0 U	2.0 UJ	2.1 UJ	2.0 UJ	2.3 J
DIELDRIN	3 8 U	63 R	80 U	67 U	60 UJ	3.8 U	4.0 U	4.0 U	3.8 U	4.1 U	3 8 U	3.7 U
ENDOSULFAN I	2.0 U	1.9 U	41 U	34 U	31 UJ	1.9 U	2.1 U	2 0 U	2.0 U	2.1 U	2 0 U	1.9 U
ENDOSULFAN II	3.8 U	3.8 U	80 U	67 U	60 U	3 8 U	4.0 U	4.0 U	3 8 U	4.1 U	3 8 U	3.7 U
ENDOSULFAN SULFATE	3.8 U	3.8 U	80 U	67 U	60 U	3 8 U	4.0 U	4.0 U	3.8 U	4.1 U	3.8 U	3.7 U
ENDRIN	3.8 U	72 R	80 U	67 U	60 U	3 8 U	4.0 U	4 0 U	3.8 UJ	4.1 UJ	3.8 UJ	3.7 UJ
ENDRIN ALDEHYDE	3.8 U	3.8 U	80 U	67 U	60 U	3.8 UJ	4.0 U	4 0 U	3.8 U	4.1 U	3.8 U	3.7 U
GAMMA-BHC (LINDANE)	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2 0 U	2.0 U	2.1 U	2 0 U	1.9 U
GAMMA-CHLORDANE	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2 0 U	2.0 U	2.1 U	2.0 U	1.9 U
HEPTACHLOR	2.0 U	1.9 U	41 U	34 U	31 U	1.9 U	2.1 U	2.0 U	2.0 U	2.1 U	2.0 U	1.9 U
HEPTACHLOR EPOXIDE	2.0 U	7.6	41 U	34 U	31 U	1.9 U	2.1 U	2.0 U	2.0 U	2.1 U	2 0 U	1.9 U
METHOXYCHLOR	20 U	19 U	410 U	340 U	310 U	19 U	21 U	20 U	20 U	21 U	20 U	19 U
TOXAPHENE	200 U	190 U	4100 U	3400 U	3100 U	190 U	210 U	200 U	200 U	210 U	200 U	190 U
Herbicides (UG/KG)												
2,4,5-T	3.1 UJ	3 0 UJ	65 UJ	54 UJ	3 2 UJ	3.0 U	3.3 U	3 2 U	3.1 U	4 8 J	3.1 U	3.0 U
2,4,5-TP (SILVEX)	3.1 U	3.0 U	65 U	54 U	3.2 U	3.0 U	3.3 U	3 2 U	3.1 U	3.3 U	3.1 U	3 0 U
2,4-D	3.1 UJ	16 J	65 UJ	54 UJ	3.2 UJ	3 0 U	3.3 U	3 2 U	3.1 U	3.3 U	3.1 U	3.0 U
DINOSEB	3.1 U	3 0 U	65 U	54 U	3.2 U	5.0	3.3 U	3 2 U	3.1 U	3.3 U	3.1 U	3.0 U
HEXACHLOROPHENE	0.77 U	0.76 U	16 U	14 U	0.81 U	0.76 U	0.82 U	0.81 U	0.78 U	0.83 U	0.77 U	0.75 U
PENTACHLOROPHENOL	0.77 U	5 8	16 U	24	14	0.76 U	0.82 U	0.81 U	0.78 U	0.83 U	0.77 U	0.75 U
Inorganics (MG/KG)												
ALUMINUM	7230 J	4030 J	2040 J	3990 J	4600 J	4260 J	7730 J	5590 J	9600 J	6450 J	4840 J	3420 J
ANTIMONY	0 82 U	2 0	1.8	4.9	0.88 U	0 85 U	0.95 U	0.84 U	0.85 U	0.96 U	0.87 U	3.1 J
ARSENIC	4.7	7.5	5 9	7 0	4.8	3.2	5.2	8.1	8.5	8 0	2.2	11 6
BARIUM	65 3	54.3	52.2	91.0	54.8	24.5	37.3	45 0	66.3	1410	129	49.4
BERYLLIUM	0 82 U	0.88 U	1.3 U	0.98 U	0.89 U	0.90 U	0.93 U	0.94 U	0.77	0 64	0.81	0 67
CADMIUM	0 82 U	0.88 U	1.3	1.0	0 89 U	0.90 U	0.93 U	0 94 U	0.43 U	0 50	0.44	0.76
CALCIUM	4090 U	4400 U	18100 J	9660 J	19600 J	4490 U	4640 U	4680 U	474	217 U	426	303
CHROMIUM	8.6	138	18 8	18.7	9.1	5.4	7.4	15 2	14.2	7.7	6.4	12.9

CRANE CTO 10
SWMU 4 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SB01	04SB02	04SB03	04SB04	04SB05	04SB06	04SB07	04SB08	04SB09	04SB10	04SB11	04SB12
nsample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
sample	04SB010204	04SB020608	04SB030406	04SB040608	04SB050204	04SB060709	04SB070507	04SB080810	04SB090810	04SB100608	04SB110810	04SB120810
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	2 - 4	6 - 8	4 - 6	6 - 8	2 - 4	7 - 9	5 - 7	8 - 10	8 - 10	6 - 8	8 - 10	8 - 10
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/28/2000 0:00	11/29/2000 0:00	11/29/2000 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00	2/20/2001 0:00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COBALT	12.2	13.1	2.6	8.6	4.1	3.8	3.6	6.1	7.1	5.0	7.0	19.6
COPPER	12.9	79.4	33.6	26.4	9.1	7.6	9.3	12.5	16.6	13.2	6.4	11.2
IRON	16900 J	144000 J	5990 J	21600 J	9550 J	11000 J	16000 J	14300 J	26400 J	16600 J	8650 J	20700 J
LEAD	9.6 J	15.1 J	63.0 J	53.3 J	54.1 J	6.4 J	7.5 J	9.1 J	12.6 J	11.0 J	7.7 J	9.2 J
MAGNESIUM	736 J	672 J	4500 J	1560 J	3600 J	521 J	687 J	751 J	1030 J	654 J	664 J	619 J
MANGANESE	2000	1580	213	402	247	224	113	188	383 J	354 J	1020 J	830 J
MERCURY	0.04 U	0.04 U	0.17	0.10	0.06	0.04 U	0.04 U	0.04 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL	10.6 J	111 J	12.2 J	15.4 J	22.7 J	7.7 J	8.7 J	13.6 J	14.3	9.0	12.0	23.3
POTASSIUM	409 U	440 U	630 U	490 U	444 U	449 U	464 U	468 U	327 J	322 J	311 J	247 J
SELENIUM	0.82 UJ	1.7 J	1.3 UJ	0.98 UJ	0.89 UJ	0.90 UJ	0.93 UJ	2.1 J	0.43 U	0.43 U	0.40 U	0.42 U
SILVER	0.82 U	0.88 U	1.3 U	0.98 U	0.89 U	0.90 U	0.93 U	0.94 U	0.43 U	0.43 U	0.40 U	0.42 U
SODIUM	409 UJ	440 UJ	630 UJ	490 UJ	444 UJ	449 UJ	464 UJ	468 UJ	215 U	217 U	202 U	212 U
THALLIUM	0.82 U	0.88 U	1.3 U	0.98 U	0.89 U	0.90 U	0.93 U	0.94 U	0.43 U	0.43 U	0.40 U	0.42 U
TIN	4.1 UJ	8.1 J	25.0 J	7.7 J	4.3 UJ	4.3 UJ	4.7 UJ	4.2 UJ	4.2 U	4.8 U	4.3 U	4.2 U
VANADIUM	16.5	13.6	11.3	14.5	20.1	9.4	12.8	15.6	19.5	14.7	10.6	19.4
ZINC	38.9	51.6	122	98.7	60.0	31.8	37.8	42.9	53.3	36.9	24.2	52.5
Miscellaneous Parameters												
CATION EXCHANGE CAPACITY MEQ/I	7.50					2.80		8.00				4.6
CYANIDE MG/KG	0.60 UJ	0.60 UJ	0.80 UJ	0.70 UJ	0.60 UJ	0.60 UJ	0.60 UJ	0.60 UJ	1.0 U	1.0 U	1.0 U	1.0 U
PH S.U.	7.10 J					6.30 J		5.90 J				6.0
TOTAL ORGANIC CARBON MG/KG	7500					1200		6900				10000 U

TABLE E-1-3
SWMU 4 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04
location	04T02	04-01	04-02	04-03	04-04	04-05	04-06	04T01	04T02	04T03	04T03
nsample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	04GWT0301-D
sample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	FD01030101
matrix	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/4/01	1/5/01	1/3/01	1/5/01	1/7/01	1/4/01	1/3/01	1/5/01	1/4/01	1/3/01	1/3/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatile Organics (UG/L)											
1,1,1,2-TETRACHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-TRICHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-TRICHLOROPROPANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMO-3-CHLOROPROPANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-DIOXANE		100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
2-BUTANONE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE		5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
ACETONITRILE		40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
ACROLEIN		10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
ACRYLONITRILE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMOFORM		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE		1 UJ	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROBENZENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROMETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROPRENE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE		0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
DIBROMOMETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
DICHLORODIFLUOROMETHANE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYL METHACRYLATE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ISOBUTANOL		40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
METHACRYLONITRILE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL IODIDE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYL METHACRYLATE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE		1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PROPIONITRILE		40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
STYRENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,4-DICHLORO-2-BUTENE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROFLUOROMETHANE		1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
VINYL ACETATE		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
XYLENES, TOTAL		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-Volatile Organics (UG/L)											

TABLE E-1-3
SWMU 4 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04
location	04T02	04-01	04-02	04-03	04-04	04-05	04-06	04T01	04T02	04T03	04T03
nsample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	04GWT0301-D
sample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	FD01030101
matrix	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/4/01	1/5/01	1/3/01	1/5/01	1/7/01	1/4/01	1/3/01	1/5/01	1/4/01	1/3/01	1/3/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1,2,4,5-TETRACHLOROBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
1,3-DICHLOROBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
1,4-DICHLOROBENZENE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,4-NAPHTHOQUINONE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-PHENYLENEDIAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1-NAPHTHYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2'-OXYBIS(1-CHLOROPROPANE)		3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2,3,4,6-TETRACHLOROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,5-TRICHLOROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,6-TRICHLOROPHENOL		3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2,4-DICHLOROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DIMETHYLPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DINITROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
2,6-DICHLOROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-ACETYLAMINOFLUORENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLORONAPHTHALENE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U
2-CHLOROPHENOL		3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2-METHYLNAPHTHALENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
2-METHYLPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NAPHTHYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NITROANILINE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-NITROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-PICOLINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DICHLOROBENZIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DIMETHYLBENZIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-METHYLCHOLANTHRENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-NITROANILINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4,6-DINITRO-2-METHYLPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-AMINOBIPHENYL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-BROMOPHENYL PHENYL ETHER		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
4-CHLORO-3-METHYLPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROANILINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROPHENYL PHENYL ETHER		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROANILINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROPHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
4-NITROQUINOLINE-1-OXIDE		5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
5-NITRO-O-TOLUIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
7,12-DIMETHYLBENZ(A)ANTHRACENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
A,A-DIMETHYLPHENETHYLAMINE		10 U	10 U	10 U	10 U	10 U	9 U	10 U	9 U	10 U	9 U
ACENAPHTHENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
ACENAPHTHYLENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
ACETOPHENONE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANILINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
ARAMITE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(A)ANTHRACENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
BENZO(A)PYRENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
BENZO(B)FLUORANTHENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
BENZO(G,H,I)PERYLENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
BENZO(K)FLUORANTHENE		0.10 UJ	0.10 U	0.10 U	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
BENZYL ALCOHOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHOXY)METHANE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHYL)ETHER		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BIS(2-ETHYLHEXYL)PHTHALATE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2	2 U

TABLE E-1-3
SWMU 4 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04
location	04T02	04-01	04-02	04-03	04-04	04-05	04-06	04T01	04T02	04T03	04T03
nsample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	04GWT0301-D
sample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	FD01030101
matrix	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/4/01	1/5/01	1/3/01	1/5/01	1/7/01	1/4/01	1/3/01	1/5/01	1/4/01	1/3/01	1/3/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BUTYL BENZYL PHTHALATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZILATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHRYSENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
DI-N-BUTYL PHTHALATE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DI-N-OCTYL PHTHALATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIALLATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZO(A,H)ANTHRACENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
DIBENZOFURAN		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIETHYL PHTHALATE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DIMETHOATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIMETHYL PHTHALATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIPHENYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DISULFOTON		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHANE SULFONATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL PARATHION		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
FAMPHUR		10 UR	10 UR	10 UR	10 UR	10 UR	9 UR	10 UR	9 UR	10 UR	9 UR
FLUORANTHENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
FLUORENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
HEXACHLOROBENZENE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
HEXACHLOROBUTADIENE		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
HEXACHLOROCYCLOPENTADIENE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UR	2 U
HEXACHLOROETHANE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
HEXACHLOROPROPENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
INDENO(1,2,3-CD)PYRENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
ISODRIN		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPHORONE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOSAFROLE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
KEPONE		5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
METHAPYRILENE		5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
METHYL METHANE SULFONATE		5 UJ	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
METHYL PARATHION		5 UJ	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSO-DI-N-PROPYLAMINE		2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
N-NITROSODI-N-BUTYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSODIETHYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSODIMETHYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOMETHYLETHYLAMINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOMORPHOLINE		5 UJ	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOPIPERIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOPYRROLIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 UJ	0.090 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-TOLUIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
P-(DIMETHYLAMINO)AZOBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLORONITROBENZENE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENACETIN		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENANTHRENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
PHENOL		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHORATE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PRONAMIDE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE		0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.090 U
PYRIDINE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SAFROLE		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SULFOTEPP		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
THIONAZIN		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Pesticides (UG/L)

TABLE E-1-3
SWMU 4 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04
location	04T02	04-01	04-02	04-03	04-04	04-05	04-06	04T01	04T02	04T03	04T03
nsample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	04GWT0301-D
sample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	FD01030101
matrix	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/4/01	1/5/01	1/3/01	1/5/01	1/7/01	1/4/01	1/3/01	1/5/01	1/4/01	1/3/01	1/3/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4,4'-DDD		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
4,4'-DDE		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
4,4'-DDT		0.020 UJ	0.019 U	0.020 U	0.020 UJ	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
ALDRIN		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
ALPHA-BHC		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
ALPHA-CHLORDANE		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
AROCLOR-1016		0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.20 U	0.20 U	0.19 U
AROCLOR-1221		0.40 U	0.38 U	0.40 U	0.40 U	0.38 U	0.38 U	0.38 U	0.40 U	0.39 U	0.38 U
AROCLOR-1232		0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.20 U	0.20 U	0.19 U
AROCLOR-1242		0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.20 U	0.20 U	0.19 U
AROCLOR-1248		0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.20 U	0.20 U	0.19 U
AROCLOR-1254		0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.20 U	0.20 U	0.19 U
AROCLOR-1260		0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.20 U	0.20 U	0.19 U
BETA-BHC		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
DELTA-BHC		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
DIELDRIN		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
ENDOSULFAN I		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
ENDOSULFAN II		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
ENDOSULFAN SULFATE		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
ENDRIN		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 U	0.019 U
ENDRIN ALDEHYDE		0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.020 U	0.020 UJ	0.019 U
GAMMA-BHC (LINDANE)		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
GAMMA-CHLORDANE		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
HEPTACHLOR		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
HEPTACHLOR EPOXIDE		0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.009 U	0.009 U	0.010 U	0.010 U	0.009 U
METHOXYCHLOR		0.099 UJ	0.096 U	0.10 U	0.10 UJ	0.094 U	0.094 U	0.094 U	0.10 U	0.098 U	0.094 U
TOXAPHENE		0.99 U	0.96 U	1.0 U	1.0 U	0.94 U	0.94 U	0.94 U	1.0 U	0.98 U	0.94 U
Herbicides (UG/L)											
2,4,5-T		0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4,5-TP (SILVEX)		0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4-D		0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
DINOSEB		0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
HEXACHLOROPHENE		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
PENTACHLOROPHENOL		0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Inorganics (UG/L)											
ALUMINUM		200 U	200 U	200 U	200 U	200 U	200 U	200 U	513 J	200 U	200 U
ANTIMONY		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ARSENIC		0.31	0.35	0.34	3.6	0.15	0.35	0.10 U	0.77	1.3	1.4
BARIUM		25.1	13.9	147	74.6	61.8	12.2	86.4	30.9	55.6	58.4
BERYLLIUM		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CADMIUM		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CALCIUM		26000	61300	42400	34300	67300	45100	5000 U	30200	21300	22300
CHROMIUM		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
COBALT		3.0 U	3.0 U	3.0 U	10.1	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
COPPER		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
IRON		324	451 J	1370 J	4130	379 J	198 J	100 U	1140 J	33300 J	34200 J
LEAD		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MAGNESIUM		7400 J	22400	11000	9160 J	19900	12600	5000 U	7060	6230	6390
MANGANESE		15.0 U	15.0 U	114 J	1820 J	40.6 J	29.2 J	15.0 U	23.4 J	2000 J	2060 J
MERCURY		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL		10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
POTASSIUM		5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
SELENIUM		1.0 U	1.5	1.0 U	1.0 U	1.0 U	2.3	1.0 U	1.0 U	1.0 U	1.0 U
SILVER		3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SODIUM		5000 U	5000 U	5000 U	5000 U	5000 U	7210	5000 U	5000 U	5000 U	5000 U
THALLIUM		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TIN		10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

TABLE E-1-3
SWMU 4 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04
location	04T02	04-01	04-02	04-03	04-04	04-05	04-06	04T01	04T02	04T03	04T03
rsample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	04GWT0301-D
sample	04GWT0201-F	04GW0101	04GW0201	04GW0301	04GW0401	04GW0501	04GW0601	04GWT0101	04GWT0201	04GWT0301	FD01030101
matrix	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/4/01	1/5/01	1/3/01	1/5/01	1/7/01	1/4/01	1/3/01	1/5/01	1/4/01	1/3/01	1/3/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VANADIUM		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
ZINC		10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Filtered Metals (UG/L)											
ALUMINUM, FILTERED	200 U										
ANTIMONY, FILTERED	1.0 U										
ARSENIC, FILTERED	0.44										
BARIUM, FILTERED	24.1										
BERYLLIUM, FILTERED	1.0 U										
CADMIUM, FILTERED	1.0 U										
CALCIUM, FILTERED	29600										
CHROMIUM, FILTERED	5.0 U										
COBALT, FILTERED	3.0 U										
COPPER, FILTERED	2.0 U										
IRON, FILTERED	121 J										
LEAD, FILTERED	1.0 U										
MAGNESIUM, FILTERED	6680										
MANGANESE, FILTERED	15.0 U										
MERCURY, FILTERED	0.20 U										
NICKEL, FILTERED	10.0 U										
POTASSIUM, FILTERED	5000 U										
SELENIUM, FILTERED	1.0 U										
SILVER, FILTERED	3.0 U										
SODIUM, FILTERED	5000 U										
THALLIUM, FILTERED	1.0 U										
TIN, FILTERED	10.0 U										
VANADIUM, FILTERED	2.0 U										
ZINC, FILTERED	10.0 U										
Miscellaneous Parameter (UG/L)											
CYANIDE		10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

TABLE E-1-4
SWMU 4 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD04	04SW/SD05	04SW/SD05
rsample	04SW0101-F	04SW0201-F	04SW0301-F	04SW0301-F-D	04SW0101	04SW0201	04SW0301	04SW0301-D	04SW0401	04SW0401-F	04SW0501	04SW0501-F
sample	04SW0101-F	04SW0201-F	04SW0301-F	FD12180001-F	04SW0101	04SW0201	04SW0301	FD12180001	04SW0401	04SW0401-F	04SW0501	04SW0501-F
matrix	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatile Organics (UG/L)												
1,1,1,2-TETRACHLOROETHANE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,1,1-TRICHLOROETHANE					1 U	1 U	1 U	1 U	2 U		1 U	
1,1,2,2-TETRACHLOROETHANE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,1,2-TRICHLOROETHANE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,1-DICHLOROETHANE					1 U	1 U	1 U	1 U	2 U		1 U	
1,1-DICHLOROETHENE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,2,3-TRICHLOROPROPANE					1 U	1 U	1 U	1 U	2 U		1 UJ	
1,2-DIBROMO-3-CHLOROPROPANE					1 U	1 U	1 U	1 U	2 UJ		1 U	
1,2-DIBROMOETHANE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,2-DICHLOROETHANE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,2-DICHLOROPROPANE					0.5 U	0.5 U	1 U	1 U	1 U		1 U	
1,4-DIOXANE					100 U	100 U	100 U	100 U	100 U		100 U	
2-BUTANONE					5 UR	5 UR	5 UR	5 UR	10 UR		5 UR	
2-HEXANONE					5 U	5 U	5 U	5 U	10 U		5 U	
3-CHLOROPROPENE					10 U	10 U	10 U	10 U	10 U		10 U	
4-METHYL-2-PENTANONE					5 U	5 U	5 U	5 U	10 U		5 U	
ACETONE					5 UR	5 UR	5 UR	5 UR	10 UR		5 UR	
ACETONITRILE					40 U	40 U	40 U	40 U	40 U		40 U	
ACROLEIN					10 UR	10 UR	10 UR	10 UR	10 UR		10 UR	
ACRYLONITRILE					5 UR	5 UR	5 UR	5 UR	5 UR		5 UR	
BENZENE					0.5 U	1 U	1 U	1 U	1 U		1 U	
BROMODICHLOROMETHANE					0.5 U	1 U	1 U	1 U	1 U		1 U	
BROMOFORM					1 U	1 U	1 U	1 U	2 U		1 U	
BROMOMETHANE					1 UJ	1 UR	1 UJ	1 UJ	2 UJ		1 U	
CARBON DISULFIDE					1 UJ	1 UR	1 UJ	1 UJ	2 U		1 U	
CARBON TETRACHLORIDE					0.3 U	0.3 U	0.3 U	0.3 U	1 U		0.3 U	
CHLOROBENZENE					1 U	1 U	1 U	1 U	2 U		1 U	
CHLORODIBROMOMETHANE					1 U	1 U	1 U	1 U	2 U		1 U	
CHLOROETHANE					1 UJ	1 UJ	1 UJ	1 UJ	2 U		1 U	
CHLOROFORM					0.3 U	0.3 U	0.3 U	0.3 U	1 U		0.3 U	
CHLOROMETHANE					1 UJ	1 UJ	1 UJ	1 UJ	2 U		1 U	
CHLOROPRENE					10 U	10 U	10 U	10 U	10 UJ		10 UJ	
CIS-1,2-DICHLOROETHENE					1 U	1 U	1 U	1 U	2 U		1 U	
CIS-1,3-DICHLOROPROPENE					0.3 U	0.3 U	0.3 U	0.3 U	1 U		0.3 U	
DIBROMOMETHANE					1 U	1 U	1 U	1 U	2 U		1 U	
DICHLORODIFLUOROMETHANE					1 U	1 U	1 U	1 U	2 U		1 U	
ETHYL METHACRYLATE					10 U	10 U	10 U	10 U	10 U		10 U	
ETHYLBENZENE					1 U	1 U	1 U	1 U	2 U		1 U	
ISOBUTANOL					40 U	40 U	40 U	40 U	40 U		40 U	
METHACRYLONITRILE					1 UR	1 UR	1 UR	1 UR	1 UR		1 UR	
METHYL IODIDE					10 UJ	10 UJ	10 UJ	10 UJ	10 UJ		10 UJ	
METHYL METHACRYLATE					10 U	10 U	10 U	10 U	10 U		10 U	
METHYLENE CHLORIDE					1 U	1 U	1 U	1 U	2 U		1 U	
PROPIONITRILE					40 U	40 U	40 U	40 U	40 U		40 U	
STYRENE					1 U	1 U	1 U	1 U	2 U		1 U	
TETRACHLOROETHENE					1 U	1 U	1 U	1 U	2 U		1 U	
TOLUENE					1 U	1 U	1 U	1 U	2 U		1 U	
TRANS-1,2-DICHLOROETHENE					1 U	1 U	1 U	1 U	2 U		1 U	
TRANS-1,3-DICHLOROPROPENE					0.5 U	1 U	1 U	1 U	1 U		1 U	
TRANS-1,4-DICHLORO-2-BUTENE					10 U	10 U	10 U	10 U	10 U		10 U	
TRICHLOROETHENE					1 U	1 U	1 U	1 U	2 U		1 U	
TRICHLOROFLUOROMETHANE					1 U	1 U	1 U	1 U	2 U		1 U	
VINYL ACETATE					10 U	10 U	10 U	10 U	10 U		10 U	
VINYL CHLORIDE					0.5 U	1 U	1 U	1 U	1 U		1 U	
XYLENES, TOTAL					1 U	1 U	1 U	1 U	2 U		1 U	
Semi-Volatile Organics (UG/L)												
1,2,4,5-TETRACHLOROBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	

TABLE E-1-4
SWMU 4 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD04	04SW/SD05	04SW/SD05
nsample	04SW0101-F	04SW0201-F	04SW0301-F	04SW0301-F-D	04SW0101	04SW0201	04SW0301	04SW0301-D	04SW0401	04SW0401-F	04SW0501	04SW0501-F
sample	04SW0101-F	04SW0201-F	04SW0301-F	FD12180001-F	04SW0101	04SW0201	04SW0301	FD12180001	04SW0401	04SW0401-F	04SW0501	04SW0501-F
matrix	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1,2,4-TRICHLOROBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
1,2-DICHLOROBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
1,3-DICHLOROBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
1,4-DICHLOROBENZENE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
1,4-NAPHTHOQUINONE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
1,4-PHENYLENEDIAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
1-NAPHTHYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2,2'-OXYBIS(1-CHLOROPROPANE)					3 UJ	3 UJ	3 UJ	3 UJ	3 U		3 U	
2,3,4,6-TETRACHLOROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2,4,5-TRICHLOROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2,4,6-TRICHLOROPHENOL					3 UJ	3 UJ	3 UJ	3 UJ	3 U		3 U	
2,4-DICHLOROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2,4-DIMETHYLPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2,4-DINITROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 UJ		5 UJ	
2,6-DICHLOROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2-ACETYLAMINOFLUORENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2-CHLORONAPHTHALENE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
2-CHLOROPHENOL					3 UJ	3 UJ	3 UJ	3 UJ	3 U		3 U	
2-METHYLNAPHTHALENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
2-METHYLPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2-NAPHTHYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2-NITROANILINE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
2-NITROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
2-PICOLINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
3,3'-DICHLOROBENZIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
3,3'-DIMETHYLBENZIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 UJ		5 U	
3-METHYLCHOLANTHRENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
3-NITROANILINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4,6-DINITRO-2-METHYLPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 UJ		5 U	
4-AMINOBIPHENYL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-BROMOPHENYL PHENYL ETHER					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
4-CHLORO-3-METHYLPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-CHLOROANILINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-CHLOROPHENYL PHENYL ETHER					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-METHYLPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-NITROANILINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-NITROPHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
4-NITROQUINOLINE-1-OXIDE					5 UR	5 UR	5 UR	5 UR	5 UR		5 UR	
5-NITRO-O-TOLUIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
A,A-DIMETHYLPHENETHYLAMINE					10 UJ	10 UJ	10 UJ	10 UJ	9 U		9 U	
ACENAPHTHENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
ACENAPHTHYLENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
ACETOPHENONE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
ANILINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
ANTHRACENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
ARAMITE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
BENZO(A)ANTHRACENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
BENZO(A)PYRENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
BENZO(B)FLUORANTHENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
BENZO(G,H,I)PERYLENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ		0.10 UJ	
BENZO(K)FLUORANTHENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
BENZYL ALCOHOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
BIS(2-CHLOROETHOXY)METHANE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
BIS(2-CHLOROETHYL)ETHER					1 UJ	1 UJ	1 UJ	1 UJ	1 U		1 U	
BIS(2-ETHYLHEXYL)PHTHALATE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
BUTYL BENZYL PHTHALATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
CHLOROBENZILATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	

TABLE E-1-4
SWMU 4 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD04	04SW/SD05	04SW/SD05
nsample	04SW0101-F	04SW0201-F	04SW0301-F	04SW0301-F-D	04SW0101	04SW0201	04SW0301	04SW0301-D	04SW0401	04SW0401-F	04SW0501	04SW0501-F
sample	04SW0101-F	04SW0201-F	04SW0301-F	FD12180001-F	04SW0101	04SW0201	04SW0301	FD12180001	04SW0401	04SW0401-F	04SW0501	04SW0501-F
matrix	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CHRYSENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
DI-N-BUTYL PHTHALATE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
DI-N-OCTYL PHTHALATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5	
DIALLATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
DIBENZO(A,H)ANTHRACENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
DIBENZOFURAN					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
DIETHYL PHTHALATE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
DIMETHOATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
DIMETHYL PHTHALATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
DIPHENYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
DISULFOTON					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
ETHYL METHANE SULFONATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
ETHYL PARATHION					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
FAMPHUR					10 UR	10 UR	10 UR	10 UR	9 UR		9 UR	
FLUORANTHENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
FLUORENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
HEXACHLOROBENZENE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
HEXACHLOROBUTADIENE					1 UJ	1 UJ	1 UJ	1 UJ	1 U		1 U	
HEXACHLOROCYCLOPENTADIENE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
HEXACHLOROETHANE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
HEXACHLOROPROPENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
INDENO(1,2,3-CD)PYRENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
ISODRIN					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
ISOPHORONE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
ISOSAFROLE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
KEPONE					5 UR	5 UR	5 UR	5 UR	5 UR		5 UR	
METHAPYRILENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
METHYL METHANE SULFONATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
METHYL PARATHION					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSO-DI-N-PROPYLAMINE					2 UJ	2 UJ	2 UJ	2 UJ	2 U		2 U	
N-NITROSODI-N-BUTYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSODIETHYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSODIMETHYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSOMETHYLETHYLAMINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSOMORPHOLINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSOPIPERIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
N-NITROSOPYRROLIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
NAPHTHALENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
O-TOLUIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
P-(DIMETHYLAMINO)AZOBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PENTACHLOROBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PENTACHLOROETHANE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PENTACHLORONITROBENZENE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PHENACETIN					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PHENANTHRENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
PHENOL					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PHORATE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PRONAMIDE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
PYRENE					0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 U		0.10 U	
PYRIDINE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
SAFROLE					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
SULFOTEPP					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
THIONAZIN					5 UJ	5 UJ	5 UJ	5 UJ	5 U		5 U	
Pesticides (UG/L)												
4,4'-DDD					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	
4,4'-DDE					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 UJ		0.019 UJ	
4,4'-DDT					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	

TABLE E-1-4
SWMU 4 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD04	04SW/SD05	04SW/SD05
nsample	04SW0101-F	04SW0201-F	04SW0301-F	04SW0301-F-D	04SW0101	04SW0201	04SW0301	04SW0301-D	04SW0401	04SW0401-F	04SW0501	04SW0501-F
sample	04SW0101-F	04SW0201-F	04SW0301-F	FD12180001-F	04SW0101	04SW0201	04SW0301	FD12180001	04SW0401	04SW0401-F	04SW0501	04SW0501-F
matrix	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
ALDRIN					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
ALPHA-BHC					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
ALPHA-CHLORDANE					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
AROCLOR-1016					0.21 UR	0.19 UR	0.19 UR	0.20 UR	0.19 UJ		0.19 UJ	
AROCLOR-1221					0.43 UR	0.38 UR	0.38 UR	0.39 UR	0.38 U		0.38 U	
AROCLOR-1232					0.21 UR	0.19 UR	0.19 UR	0.20 UR	0.19 U		0.19 U	
AROCLOR-1242					0.21 UR	0.19 UR	0.19 UR	0.20 UR	0.19 U		0.19 U	
AROCLOR-1248					0.21 UR	0.19 UR	0.19 UR	0.20 UR	0.19 U		0.19 U	
AROCLOR-1254					0.21 UR	0.19 UR	0.19 UR	0.20 UR	0.19 U		0.19 U	
AROCLOR-1260					0.21 UR	0.19 UR	0.19 UR	0.20 UR	0.19 UJ		0.19 UJ	
BETA-BHC					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
DELTA-BHC					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
DIELDRIN					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	
ENDOSULFAN I					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
ENDOSULFAN II					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	
ENDOSULFAN SULFATE					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	
ENDRIN					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	
ENDRIN ALDEHYDE					0.021 UR	0.019 UR	0.019 UR	0.020 UR	0.019 U		0.019 U	
GAMMA-BHC (LINDANE)					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
GAMMA-CHLORDANE					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
HEPTACHLOR					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
HEPTACHLOR EPOXIDE					0.011 UR	0.010 UR	0.009 UR	0.010 UR	0.009 U		0.009 U	
METHOXYCHLOR					0.11 UR	0.096 UR	0.095 UR	0.098 UR	0.095 U		0.095 U	
TOXAPHENE					1.1 UR	0.98 UR	0.95 UR	0.98 UR	0.95 U		0.95 U	
Herbicides (UG/L)												
2,4,5-T					0.080 U	0.080 U	0.080 U	0.080 U	0.080 U		0.080 U	
2,4,5-TP (SILVEX)					0.080 U	0.080 U	0.080 U	0.080 U	0.080 U		0.080 U	
2,4-D					0.080 U	0.080 U	0.080 U	0.080 U	0.080 U		0.080 U	
DINOSEB					0.31 U	0.080 U	0.080 U	0.080 U	0.080 U		0.080 U	
HEXACHLOROPHENE					0.020 U	0.020 U	0.020 U	0.020 U	0.020 U		0.020 U	
PENTACHLOROPHENOL					0.020 U	0.020 U	0.020 U	0.020 U	0.020 U		0.020 U	
Inorganics (UG/L)												
ALUMINUM					203 J	200 U	200 U	200 U	730 J		561 J	
ANTIMONY					1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.0 U	
ARSENIC					0.60	0.60	0.57	0.56	0.90 J		0.48 J	
BARIUM					59.9 J	61.0 J	61.8 J	62.2 J	87.0		344	
BERYLLIUM					1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.0 U	
CADMIUM					1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.0 U	
CALCIUM					20800	18600	18600	18800	20000		6490	
CHROMIUM					5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		5.0 U	
COBALT					3.0 U	3.0 U	3.0 U	3.0 U	3.0 U		3.0 U	
COPPER					2.0 U	2.0 U	2.0 U	2.0 U	2.5		2.0 U	
IRON					1350 J	1230 J	1240 J	1210 J	986 J		823 J	
LEAD					1.0 U	1.0 U	1.0 U	1.0 U	1.1		1.0	
MAGNESIUM					6800 J	6150 J	6410 J	6290 J	7000 J		5000 U	
MANGANESE					212	207	211	215	249		64.1	
MERCURY					0.20 U	0.20 U	0.20 U	0.20 U	0.20 U		0.20 U	
NICKEL					10.0 U	10.0 U	10.0 U	10.0 U	10.0 U		10.0 U	
POTASSIUM					5000 U	5000 U	5000 U	5000 U	5000 U		5000 U	
SELENIUM					1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.0 U	
SILVER					3.0 U	3.0 U	3.0 U	3.0 U	3.0 UJ		3.0 UJ	
SODIUM					6910	6290	6590	6370	5000 U		5000 U	
THALLIUM					1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.0 U	
TIN					10.0 U	10.0 U	10.0 U	10.0 U	10.0 UR		10.0 UR	
VANADIUM					2.0 U	2.0 U	2.0 U	2.0 U	2.0		2.0 U	
ZINC					10.0 U	10.0 U	10.0 U	10.0 U	10.0 U		20.5	
Filtered Metals (UG/L)												
ALUMINUM, FILTERED	200 U	200 U	200 U	200 U						214 J		200 U

TABLE E-1-4
SWMU 4 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD04	04SW/SD05	04SW/SD05
nsample	04SW0101-F	04SW0201-F	04SW0301-F	04SW0301-F-D	04SW0101	04SW0201	04SW0301	04SW0301-D	04SW0401	04SW0401-F	04SW0501	04SW0501-F
sample	04SW0101-F	04SW0201-F	04SW0301-F	FD12180001-F	04SW0101	04SW0201	04SW0301	FD12180001	04SW0401	04SW0401-F	04SW0501	04SW0501-F
matrix	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
ANTIMONY, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U						1.0 U		1.0 U
ARSENIC, FILTERED	0.46	0.44	0.41	0.47						0.61 J		0.17 J
BARIUM, FILTERED	58.2 J	58.3 J	57.8 J	57.7 J						77.2		313
BERYLLIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U						1.0 U		1.0 U
CADMIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U						1.0 U		1.0 U
CALCIUM, FILTERED	22700	20200	19700	19600						22000		6410
CHROMIUM, FILTERED	5.0 U	5.0 U	5.0 U	5.0 U						5.0 U		5.0 U
COBALT, FILTERED	3.0 U	3.0 U	3.0 U	3.0 U						3.0 U		3.0 U
COPPER, FILTERED	2.0 U	2.0 U	2.0 U	2.0 U						2.0 U		2.0 U
IRON, FILTERED	952 J	912 J	908 J	921 J						398 J		145 J
LEAD, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U						1.0 U		1.0 U
MAGNESIUM, FILTERED	7360 J	6930 J	6580 J	6580 J						7610 J		5000 U
MANGANESE, FILTERED	202	203	199	204						238		47.0
MERCURY, FILTERED	0.20 U	0.20 U	0.20 U	0.20 U						0.20 U		0.20 U
NICKEL, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U						10.0 U		10.0 U
POTASSIUM, FILTERED	5000 U	5000 U	5000 U	5000 U						5000 U		5000 U
SELENIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U						1.0 U		1.0 U
SILVER, FILTERED	3.0 U	3.0 U	3.0 U	3.0 U						3.0 UJ		3.0 UJ
SODIUM, FILTERED	7020	6520	6180	6180						5000 U		5000 U
THALLIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U						1.0 U		1.0 U
TIN, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U						10.0 UR		10.0 UR
VANADIUM, FILTERED	2.0 U	2.0 U	2.0 U	2.0 U						2.0 U		2.0 U
ZINC, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U						10.0 U		15.7
Miscellaneous Parameters												
CYANIDE UG/L					10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ		10.0 UJ	
HARDNESS MG/L					80.0	73.0	74.0	73.0	79.0		16.0	
TOTAL SUSPENDED SOLIDS MG/L					4.0	4.0	3.0		13.0		52.0	

TABLE E-1-5
SWMU 4 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD05	04SW/SD06
nsample	04SD010006	04SD020006	04SD030006	04SD030006-D	04SD040006	04SD050006	04SD060006
sample	04SD010006	04SD020006	04SD030006	FD12180002	04SD040006	04SD050006	04SD060006
matrix	SD	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 6	0 - 6	0 - 6	0 - 6	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y
Volatile Organics (UG/KG)							
1,1,1,2-TETRACHLOROETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,1,1-TRICHLOROETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,1,2,2-TETRACHLOROETHANE	4 U	3 U	4 UJ	4 U	4 U	4 U	4 U
1,1,2-TRICHLOROETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,1-DICHLOROETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,1-DICHLOROETHENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,2,3-TRICHLOROPROPANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,2-DIBROMO-3-CHLOROPROPANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,2-DIBROMOETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,2-DICHLOROETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,2-DICHLOROPROPANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
1,4-DIOXANE	260 UJ	220 UJ	280 UJ	270 UJ	310 U	210 UJ	290 U
2-BUTANONE	19 U	17 U	21 UJ	22 U	22 U	19 U	23 U
2-HEXANONE	19 U	17 U	21 UJ	22 U	22 U	19 U	23 U
3-CHLOROPROPENE	12 UJ	11 UJ	14 UJ	15 UJ	14 UJ	13 UJ	15 UJ
4-METHYL-2-PENTANONE	19 U	17 U	21 UJ	22 U	22 U	19 U	23 U
ACETONE	19 U	17 U	21 UJ	22 U	22 U	19 U	23 U
ACETONITRILE	100 U	89 U	110 U	110 U	130 U	85 UJ	110 U
ACROLEIN	62 UR	57 UR	69 UR	73 UR	72 U	65 U	76 U
ACRYLONITRILE	12 UR	11 UR	14 UR	15 UR	14 U	13 U	15 U
BENZENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
BROMODICHLOROMETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
BROMOFORM	4 U	3 U	4 UJ	4 U	4 U	4 U	4 U
BROMOMETHANE	4 U	3 UJ	4 UJ	4 UJ	4 U	4 U	4 U
CARBON DISULFIDE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CARBON TETRACHLORIDE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CHLOROBENZENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CHLORODIBROMOMETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CHLOROETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CHLOROFORM	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CHLOROMETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CHLOROPRENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CIS-1,2-DICHLOROETHENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
CIS-1,3-DICHLOROPROPENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
DIBROMOMETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
DICHLORODIFLUOROMETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
ETHYL METHACRYLATE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
ETHYLBENZENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
ISOBUTANOL	100 U	89 U	110 U	110 U	130 U	85 UJ	110 U
METHACRYLONITRILE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
METHYL IODIDE	4 UJ	3 U	4 U	4 U	4 U	4 U	4 U
METHYL METHACRYLATE	37 U	34 U	42 U	44 U	43 U	39 U	45 U
METHYLENE CHLORIDE	4 J	5 J	8 J	5 J	4 U	4 J	4 U
PROPIONITRILE	100 U	89 U	110 U	110 U	130 U	85 UJ	110 U
STYRENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TETRACHLOROETHENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TOLUENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TRANS-1,2-DICHLOROETHENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TRANS-1,3-DICHLOROPROPENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TRANS-1,4-DICHLORO-2-BUTENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TRICHLOROETHENE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
TRICHLOROFLUOROMETHANE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
VINYL ACETATE	37 U	34 U	42 U	44 U	43 U	39 U	45 U
VINYL CHLORIDE	4 U	3 U	4 U	4 U	4 U	4 U	4 U
XYLENES, TOTAL	4 U	3 U	4 U	4 U	4 U	4 U	4 U
Semi-Volatile Organics (UG/KG)							
1,2,4,5-TETRACHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
1,2,4-TRICHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U

TABLE E-1-5
SWMU 4 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD05	04SW/SD06
nsample	04SD010006	04SD020006	04SD030006	04SD030006-D	04SD040006	04SD050006	04SD060006
sample	04SD010006	04SD020006	04SD030006	FD12180002	04SD040006	04SD050006	04SD060006
matrix	SD	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 6	0 - 6	0 - 6	0 - 6	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y
1,2-DICHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
1,3-DICHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
1,4-DICHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
1,4-NAPHTHOQUINONE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
1,4-PHENYLENEDIAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
1-NAPHTHYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2,2'-OXYBIS(1-CHLOROPROPANE)	440 UJ	420 U	460 U	500 UJ	460 U	430 U	450 U
2,3,4,6-TETRACHLOROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2,4,5-TRICHLOROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2,4,6-TRICHLOROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2,4-DICHLOROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2,4-DIMETHYLPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2,4-DINITROPHENOL	440 UJ	420 UJ	460 UJ	500 UJ	460 UJ	430 UJ	450 UJ
2,6-DICHLOROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-ACETYLAMINOFLUORENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-CHLORONAPHTHALENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-CHLOROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-METHYLNAPHTHALENE	9.00 U	8.00 U	9.00 U	10.0 U	9.00 U	9.00 U	9.00 U
2-METHYLPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-NAPHTHYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-NITROANILINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-NITROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
2-PICOLINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
3,3'-DICHLOROBENZIDINE	440 U	420 UJ	460 U	500 U	460 U	430 U	450 U
3,3'-DIMETHYLBENZIDINE	440 U	420 U	460 UR	500 U	460 U	430 U	450 U
3-METHYLCHOLANTHRENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
3-NITROANILINE	440 U	420 U	460 UJ	500 U	460 U	430 U	450 U
4,6-DINITRO-2-METHYLPHENOL	440 U	420 UJ	460 UJ	500 U	460 U	430 U	450 U
4-AMINOBIPHENYL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-BROMOPHENYL PRENYL ETHER	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-CHLORO-3-METHYLPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-CHLOROANILINE	440 U	420 U	460 UJ	500 U	460 U	430 U	450 U
4-CHLOROPHENYL PHENYL ETHER	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-METHYLPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-NITROANILINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-NITROPHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
4-NITROQUINOLINE-1-OXIDE	440 UR	420 UR	460 UR	500 UR	460 UR	430 UR	450 UR
5-NITRO-O-TOLUIDINE	440 UJ	420 U	460 U	500 UJ	460 U	430 U	450 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
A,A-DIMETHYLPHENETHYLAMINE	890 U	830 U	930 U	1000 U	910 U	870 U	900 U
ACENAPHTHENE	9.00 U	8.00 U	9.00 U	10.0 U	9.00 U	9.00 U	9.00 U
ACENAPHTHYLENE	20.0	8.00 U	9.00 U	10.0 U	9.00 U	9.00 U	9.00 U
ACETOPHENONE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
ANILINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
ANTHRACENE	87.0	8.00 U	9.00 U	10.0 U	9.00 U	9.00 U	9.00 U
ARAMITE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
BENZO(A)ANTHRACENE	330	42.0	31.0	21.0	13.0	15.0	9.00 U
BENZO(A)PYRENE	300	47.0	32.0	26.0	15.0 J	14.0 J	9.00 UJ
BENZO(B)FLUORANTHENE	330	50.0	31.0	25.0	15.0 J	24.0 J	9.00 UJ
BENZO(G,H,I)PERYLENE	160 J	36.0 J	27.0 J	19.0 J	9.00 UJ	9.00 UJ	9.00 UJ
BENZO(K)FLUORANTHENE	170	30.0	22.0	18.0	16.0 J	23.0 J	9.00 UJ
BENZYL ALCOHOL	440 UJ	420 U	460 U	500 UJ	460 U	430 U	450 U
BIS(2-CHLOROETHOXY)METHANE	440 U	420 U	460 U	500 U	460 UJ	430 UJ	450 UJ
BIS(2-CHLOROETHYL)ETHER	440 U	420 U	460 U	500 U	460 U	430 U	450 U
BIS(2-ETHYLHEXYL)PHTHALATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
BUTYL BENZYL PHTHALATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
CHLOROBENZILATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
CHRYSENE	320	42.0	31.0	25.0	16.0	24.0	9.00 U
DI-N-BUTYL PHTHALATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U

TABLE E-1-5
SWMU 4 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD05	04SW/SD06
nsample	04SD010006	04SD020006	04SD030006	04SD030006-D	04SD040006	04SD050006	04SD060006
sample	04SD010006	04SD020006	04SD030006	FD12180002	04SD040006	04SD050006	04SD060006
matrix	SD	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 6	0 - 6	0 - 6	0 - 6	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y
DI-N-OCTYL PHTHALATE	440 U	420 U	460 UJ	500 U	460 U	430 U	450 U
DIALLATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
DIBENZO(A,H)ANTHRACENE	65.0 J	14.0 J	11.0 J	10.0 UJ	9.00 UJ	9.00 UJ	9.00 UJ
DIBENZOFURAN	440 U	420 U	460 U	500 U	460 U	430 U	450 U
DIETHYL PHTHALATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
DIMETHOATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
DIMETHYL PHTHALATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
DIPHENYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
DISULFOTON	440 U	420 U	460 U	500 U	460 U	430 U	450 U
ETHYL METHANE SULFONATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
ETHYL PARATHION	440 U	420 U	460 U	500 U	460 U	430 U	450 U
FAMPHUR	890 UR	830 UR	930 UR	1000 UR	910 UR	870 UR	900 UR
FLUORANTHENE	740	88.0	76.0	50.0	24.0	40.0	9.00 U
FLUORENE	16.0	8.00 U	9.00 U	10.0 U	9.00 U	9.00 U	9.00 U
HEXACHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
HEXACHLOROBUTADIENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
HEXACHLOROCYCLOPENTADIENE	440 U	420 U	460 UR	500 U	460 U	430 U	450 U
HEXACHLOROETHANE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
HEXACHLOROPROPENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
INDENO(1,2,3-CD)PYRENE	170 J	32.0 J	24.0 J	17.0 J	9.00 UJ	9.00 UJ	9.00 UJ
ISODRIN	440 U	420 U	460 U	500 U	460 U	430 U	450 U
ISOPHORONE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
ISOSAFROLE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
KEPONE	440 UR	420 UR	460 UR	500 UR	460 UR	430 UR	450 UR
METHAPYRILENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
METHYL METHANE SULFONATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
METHYL PARATHION	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSO-DI-N-PROPYLAMINE	440 U	420 U	460 U	500 U	460 UJ	430 UJ	450 UJ
N-NITROSODI-N-BUTYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSODIETHYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSODIMETHYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSOMETHYLETHYLAMINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSOMORPHOLINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSOPIPERIDINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
N-NITROSOPYRROLIDINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
NAPHTHALENE	9.00 U	8.00 U	9.00 U	10.0 U	9.00 U	9.00 U	9.00 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
O-TOLUIDINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
P-(DIMETHYLAMINO)AZOBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PENTACHLOROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PENTACHLOROETHANE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PENTACHLORONITROBENZENE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PHENACETIN	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PHENANTHRENE	250	18.0	25.0	12.0	10.0	9.00 U	9.00 U
PHENOL	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PHORATE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PRONAMIDE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
PYRENE	540	70.0	50.0	39.0	22.0	35.0	9.00 U
PYRIDINE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
SAFROLE	440 U	420 U	460 U	500 U	460 U	430 U	450 U
SULFOTEPP	440 U	420 U	460 U	500 U	460 U	430 U	450 U
THIONAZIN	440 U	420 U	460 U	500 U	460 U	430 U	450 U
Pesticides (UG/KG)							
4,4'-DDD	4.4 U	4.1 U	4.6 U	4.9 U	4.5 UJ	4.3 UJ	4.5 UJ
4,4'-DDE	4.4 U	4.1 U	4.6 U	4.9 U	4.5 U	4.3 U	4.5 U
4,4'-DDT	4.4 U	4.1 U	4.6 U	4.9 U	4.5 U	4.3 U	4.5 U
ALDRIN	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
ALPHA-BHC	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
ALPHA-CHLORDANE	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U

TABLE E-1-5
SWMU 4 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	04	04	04	04	04	04	04
location	04SW/SD01	04SW/SD02	04SW/SD03	04SW/SD03	04SW/SD04	04SW/SD05	04SW/SD06
nsample	04SD010006	04SD020006	04SD030006	04SD030006-D	04SD040006	04SD050006	04SD060006
sample	04SD010006	04SD020006	04SD030006	FD12180002	04SD040006	04SD050006	04SD060006
matrix	SD	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 6	0 - 6	0 - 6	0 - 6	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/18/00	12/18/00	12/18/00	12/18/00	12/15/00	12/15/00	12/15/00
validated	Y	Y	Y	Y	Y	Y	Y
AROCLOR-1016	44 U	41 U	46 U	49 U	45 U	43 U	45 U
AROCLOR-1221	88 U	82 U	92 U	99 U	90 U	86 U	89 U
AROCLOR-1232	44 U	41 U	46 U	49 U	45 U	43 U	45 U
AROCLOR-1242	44 U	41 U	46 U	49 U	45 U	43 U	45 U
AROCLOR-1248	44 U	41 U	46 U	49 U	45 U	43 U	45 U
AROCLOR-1254	44 U	41 U	46 U	49 U	45 U	43 U	45 U
AROCLOR-1260	44 U	41 U	46 U	49 U	45 U	43 U	45 U
BETA-BHC	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
DELTA-BHC	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
DIELDRIN	4.4 U	4.1 U	4.6 U	4.9 U	4.5 U	4.3 U	4.5 U
ENDOSULFAN I	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
ENDOSULFAN II	4.4 U	4.1 U	4.6 U	4.9 U	4.5 U	4.3 U	4.5 U
ENDOSULFAN SULFATE	4.4 U	4.1 U	4.6 U	4.9 U	4.5 U	4.3 U	4.5 U
ENDRIN	4.4 U	4.1 U	4.6 U	4.9 U	4.5 U	4.3 U	4.5 U
ENDRIN ALDEHYDE	4.4 U	4.1 U	4.6 UJ	4.9 U	4.5 U	4.3 U	4.5 U
GAMMA-BHC (LINDANE)	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
GAMMA-CHLORDANE	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
HEPTACHLOR	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
HEPTACHLOR EPOXIDE	2.3 U	2.1 U	2.4 U	2.5 U	2.3 U	2.2 U	2.3 U
METHOXYCHLOR	23 U	21 U	24 U	25 U	23 UJ	22 UJ	23 UJ
TOXAPHENE	230 U	210 U	240 U	250 U	230 U	220 U	230 U
Herbicides (UG/KG)							
2,4,5-T	3.6 U	3.3 U	3.7 U	11 R	3.7 U	3.5 U	3.6 U
2,4,5-TP (SILVEX)	3.6 U	3.3 U	3.7 U	4.0 U	3.7 U	3.5 U	3.6 U
2,4-D	45 R	3.3 U	3.7 U	18 J	3.7 U	3.5 U	3.6 U
DINOSEB	3.6 U	3.3 U	3.7 U	4.0 U	3.7 U	3.5 U	3.6 U
HEXACHLOROPHENE	0.89 U	0.84 U	0.93 U	1.0 U	0.92 U	0.87 U	0.91 U
PENTACHLOROPHENOL	0.89 U	0.84 U	0.93 U	1.0 U	0.92 U	0.87 U	2.0 J
Inorganics (MG/KG)							
ALUMINUM	2650 J	3790 J	3350 J	2950 J	4300 J	6820 J	5130 J
ANTIMONY	0.98 U	0.94 U	1.0 U	1.1 U	1.0 U	1.1 J	0.97 U
ARSENIC	2.8	1.7	3.7	4.0	1.7	4.7	3.7
BARIUM	27.1 J	39.3 J	40.2 J	33.6 J	66.4	334	334
BERYLLIUM	1.0 U	0.94 U	1.1 U	1.1 U	0.88 U	0.94 U	0.99 U
CADMIUM	1.0 U	0.94 U	1.1 U	1.1 U	0.88 U	0.94 U	0.99 U
CALCIUM	755 J	477 J	1330 J	845 J	948 J	471 UJ	1310 J
CHROMIUM	5.7 J	6.1 J	9.2 J	6.5 J	6.3	10.7	6.8
COBALT	3.3	4.4	4.8	4.7	2.6	4.9	4.7
COPPER	4.6 J	5.6 J	6.2 J	5.7 J	6.5	8.9	7.8
IRON	8540 J	5740 J	12000 J	10500 J	6470 J	12700 J	9140 J
LEAD	7.4	10.8	9.4	8.8	9.7 J	9.6 J	10.5 J
MAGNESIUM	568 J	547 J	979 J	648 J	632 J	754 J	702 J
MANGANESE	111 J	76.9 J	120 J	127 J	96.4	200	456
MERCURY	0.04 UJ	0.04 UJ	0.05 UJ	0.06 UJ	0.06 U	0.04 U	0.05 U
NICKEL	5.8	7.3	8.5	7.6	6.3	8.1	7.2
POTASSIUM	515 U	472 U	555 U	532 U	441 UJ	471 UJ	494 UJ
SELENIUM	1.0 U	0.94 U	1.1 U	1.1 U	0.88 U	0.94 U	0.99 U
SILVER	1.0 U	0.94 U	1.1 U	1.1 U	0.88 UJ	0.94 UJ	0.99 UJ
SODIUM	515 U	472 U	555 U	532 U	441 U	471 U	494 U
THALLIUM	1.0 U	0.94 U	1.1 U	1.1 U	0.88 U	0.94 U	0.99 U
TIN	4.9 U	4.7 U	5.1 U	5.6 U	5.0 U	5.0 U	4.8 U
VANADIUM	8.3	10.3	12.6	11.3	11.0	15.2	12.1
ZINC	23.7	28.4	31.9	27.5	27.6	39.0	65.5
Miscellaneous Parameters (MG/KG)							
CYANIDE	0.70 UJ	0.60 UJ	0.70 UJ	0.70 UJ	1.0 UJ	1.0 UJ	1.0 UJ
TOTAL ORGANIC CARBON	6700	7000	10000	5100	19000	5800	17000

APPENDIX E.1.2

SWMU 5
ANALTYICAL DATABASE

TABLE E-2-1
SWMU 5 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05SB01	05SB01	05SB02	05SB02	05SB03	05SB03	05SB03	05SB03	05SB04	05SB04	05SB05	05SB05	05SB06	05SB06	05SB07	05SB07	05SB07	05SB07	05SB08	05SB08
neample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	05SB030002-D	05SB030102	05SB030102-D	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	05SB070002-D	05SB070102	05SB070102-D	05SB080002	05SB080102
sample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	FD11300001	05SB030102	FD11300001	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	FD11290003	05SB070102	FD11290003	05SB080002	05SB080102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/13/00	12/13/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	12/13/00	12/13/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dioxins (NG/KG)																				
1,2,3,4,6,7,8,9-OCDD	824 J		415 J		1220 J	858 J			1000 J		1220 J		683 J		1550 J	1090 J			5050 J	
1,2,3,4,6,7,8,9-OCDF	9.5 J		17.7 J		85.9 J	39.5 J			0.4 UJ		172 J		313 J		99.5 J	71.2 U			8.5 J	
1,2,3,4,6,7,8-HPCDD	25.1 BJ		49.3 BJ		103 J	66.5 J			7.2		128 J		359 J		123 J	124 J			64	
1,2,3,4,6,7,8-HPCDF	12.1 BJ		30.4 J		49 J	33.6 J			0.54 BU		168 J		541 J		96.8 J	101 J			12.7 J	
1,2,3,4,7,8,9-HPCDF	0.68 J		1.8 U		4.4 J	2.9 J			0.3 U		14.7		57.5		7.1	4.4 UJ			1.1 J	
1,2,3,4,7,8-HXCDD	1 J		1.1 U		2.1 U	2.1 J			0.2 U		6.3		21.7		3.9 J	5.8 U			1.2 J	
1,2,3,4,7,8-HXCDF	5.7 BJ		3.7 BJ		18.5 J	13.6 J			0.55 BU		78.8 J		361 J		47.1 J	57 J			6.6 J	
1,2,3,6,7,8-HXCDD	2.3 J		4.3 J		5.6 J	4.3 J			0.3 U		14.9 J		53 J		13 J	14.5 J			1.9 J	
1,2,3,6,7,8-HXCDF	2.8 BJ		1.3 BJ		7.4	5.4			0.28 J		29.2		128		17.1	20.4 J			2.8 J	
1,2,3,7,8,9-HXCDD	2.5 J		3.7 J		6.6 J	5.4 J			0.38 J		20.2 J		69.1 J		12.3 J	17.6 J			3 J	
1,2,3,7,8,9-HXCDF	0.35 U		0.8 U		0.3 U	0.77 U			0.2 U		4.1 J		9.8 J		3.2 U	1.9 UJ			0.41 J	
1,2,3,7,8-PECDD	1.4 J		0.7 U		2 J	1.5 J			0.3 U		5.9		22.1		4.8 J	10.8 U			0.9 U	
1,2,3,7,8-PECDF	2.3 J		1.3 J		5.8	4.5 J			0.2 U		30.4 U		105		16.5 U	19.1 U			1.9 U	
2,3,4,6,7,8-HXCDF	3.2 J		2.4 J		9.1	7.1			0.2 U		34.5		148		21.3	28.2 J			3.2 J	
2,3,4,7,8-PECDF	4.3 J		2.2 J		9.4	6.8			0.2 UJ		38.4		143		19.2 J	25.6			3.3 J	
2,3,7,8-TCDD	0.45 U		0.4 U		0.7 J	0.75 J			0.3 U		1.7		6.1		1.3	3			0.49 J	
2,3,7,8-TCDF	10.3 J		6.3		27.1	18.7			0.2 U		17.4		325		43.6	61.2			2.8	
TOTAL HPCDD	46.4 J		102 J		203 J	137 J			15.1		270 J		803 J		235 J	240 J			138	
TOTAL HPCDF	21.9 J		49.8 J		106 U	84.5 J			0.54 U		293 J		792 J		176 J	166 J			22.2 J	
TOTAL HXCDD	25.4 J		35.2 J		68.6 U	49 U			0.65 U		223 J		890 J		144 J	211 U			24.5 U	
TOTAL HXCDF	31.1 U		25.4 J		97.4 U	73.9 U			1.5 U		372 U		1390 U		229 U	250 U			28.6 U	
TOTAL PECDD	22.8 U		11.3 U		36.7 U	27.1 U			0.3 U		158 U		669 U		64 U	174 U			13.4 U	
TOTAL PECDF	53.1 U		31.2 U		139 U	104 U			1.3 J		574 U		1970 U		315 U	373 U			38.8 U	
TOTAL TCDD	16.1 U		5.6 U		38.2 U	28 U			0.3 U		133		404		66.1 U	93.3 U			11.6 U	
TOTAL TCDF	68.8 U		44.3 U		182 U	132 U			0.2 U		848 U		2100 U		310 U	419 U			52.4	
Volatiles (UG/KG)																				
1,1,1,2-TETRACHLOROETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,1,1-TRICHLOROETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,1,2,2-TETRACHLOROETHANE		3 U		3 U			3 UJ	3 U		3 U		3 U		4 UJ			4 UJ	3 U		3 U
1,1,2-TRICHLOROETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,1-DICHLOROETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,1-DICHLOROETHENE		3 U		3 U			3 UJ	3 U		3 U		3 U		13 J			4 U	3 U		3 U
1,2,3-TRICHLOROPROPANE		3 U		3 U			3 U	3 U		3 U		3 U		4 UJ			4 UJ	3 U		3 U
1,2-DIBROMO-3-CHLOROPROPANE		3 U		3 U			3 U	3 U		3 U		3 U		4 UJ			4 UJ	3 U		3 U
1,2-DIBROMOETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,2-DICHLOROETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,2-DICHLOROPROPANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
1,4-DIOXANE		190 UJ		200 U			230 U	250 UJ		200 U		190 U		1100 UJ			200 UJ	210 UJ		210 UJ
2-BUTANONE		15 U		16 U			17 UJ	17 U		15 U		14 U		18 U			18 U	16 U		15 U
2-HEXANONE		15 U		16 U			17 UJ	17 U		15 U		14 U		18 U			18 U	16 U		15 U
3-CHLOROPROPENE		10 U		11 UJ			11 U	11 UJ		10 UJ		10 UJ		12 U			12 U	11 UJ		10 UJ
4-METHYL-2-PENTANONE		15 U		16 U			17 UJ	17 U		15 U		14 U		18 U			18 U	16 U		15 U
ACETONE		15 U		16 U			17 UJ	17 U		15 U		14 U		18 U			18 U	16 U		15 U
ACETONITRILE		78 U		78 U			92 U	100 UJ		80 U		75 U		4400 U			79 U	86 UJ		83 UJ
ACROLEIN		50 UR		53 UR			57 UR	57 UR		50 U		48 UR		59 UR			60 UR	53 UJ		49 U
ACRYLONITRILE		10 UR		11 UR			11 UR	11 UR		10 U		10 UR		12 UR			12 UR	11 UR		10 U
BENZENE		3 U		3 U			3 U	3 U		3 U		3 U		5 J			4 U	3 U		3 U
BROMODICHLOROMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
BROMOFORM		3 U		3 U			3 UJ	3 U		3 U		3 U		4 U			4 U	3 U		3 U
BROMOMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CARBON DISULFIDE		3 U		3 U			3 UJ	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CARBON TETRACHLORIDE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CHLOROBENZENE		3 U		3 U			3 UJ	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CHLORODIBROMOMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CHLOROETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CHLOROFORM		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CHLOROMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
CHLOROPRENE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U

TABLE E-2-1
SWMU 5 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05SB01	05SB01	05SB02	05SB02	05SB03	05SB03	05SB03	05SB03	05SB04	05SB04	05SB05	05SB05	05SB08	05SB08	05SB07	05SB07	05SB07	05SB07	05SB08	05SB08
nsample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	05SB030002-D	05SB030102	05SB030102-D	05SB040002	05SB040102	05SB050002	05SB050102	05SB080002	05SB080102	05SB070002	05SB070002-D	05SB070102	05SB070102-D	05SB080002	05SB080102
sample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	FD11300001	05SB030102	FD11300001	05SB040002	05SB040102	05SB050002	05SB050102	05SB080002	05SB080102	05SB070002	FD11290003	05SB070102	FD11290003	05SB080002	05SB080102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/13/00	12/13/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	12/13/00	12/13/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CIS-1,2-DICHLOROETHENE		3 U		3 U			3 U	3 U		3 U		3 U		2800 J			4 U	3 U		8
CIS-1,3-DICHLOROPROPENE		3 U		3 U			3 UJ	3 U		3 U		3 U		4 U			4 U	3 U		3 U
DIBROMOMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
DICHLORODIFLUOROMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
ETHYL METHACRYLATE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
ETHYLBENZENE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
ISOBUTANOL		78 UJ		78 U			92 U	100 UJ		80 U		75 U		4400 U			79 UJ	86 UJ		83 UJ
METHACRYLONITRILE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
METHYL IODIDE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
METHYL METHACRYLATE		30 U		32 U			34 U	34 U		30 U		29 U		35 U			36 U	32 U		29 U
METHYLENE CHLORIDE		3 U		4 J			4 J	3 U		3 U		3 U		4 U			4 U	3 U		4 J
PROPIONITRILE		78 U		78 U			92 U	100 UJ		80 U		75 U		4400 U			79 U	86 UJ		83 UJ
STYRENE		3 U		3 U			3 UJ	3 U		3 U		3 U		4 U			4 U	3 U		3 U
TETRACHLOROETHENE		3 U		3 U			3 U	3 U		3 U		3 U		7 J			4 U	3 U		3
TOLUENE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
TRANS-1,2-DICHLOROETHENE		3 U		3 U			3 U	3 U		3 U		3 U		29 J			4 U	3 U		3 U
TRANS-1,3-DICHLOROPROPENE		3 U		3 U			3 UJ	3 U		3 U		3 U		4 U			4 U	3 U		3 U
TRANS-1,4-DICHLORO-2-BUTENE		3 U		3 U			3 U	3 U		3 U		3 U		4 UJ			4 UJ	3 U		3 U
TRICHLOROETHENE		3 U		3 U			4	4		3 U		7		5100 J			360 J	27		1200 J
TRICHLOROFLUOROMETHANE		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
VINYL ACETATE		30 U		32 U			34 U	34 U		30 U		29 U		35 U			36 U	32 U		29 U
VINYL CHLORIDE		3 U		3 U			3 U	3 U		3 U		3 U		5 J			4 U	3 U		3 U
XYLENES, TOTAL		3 U		3 U			3 U	3 U		3 U		3 U		4 U			4 U	3 U		3 U
Semi-Volatiles (UG/KG)																				
1,2,4,5-TETRACHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
1,2,4-TRICHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
1,2-DICHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
1,3-DICHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
1,4-DICHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
1,4-NAPHTHOQUINONE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
1,4-PHENYLENEDIAMINE	400 U		410 UJ		430 UJ	430 U			400 U		400 UJ		420 UJ		410 U	420 UJ			400 U	
1-NAPHTHYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2,2'-OXYBIS(1-CHLOROPROPANE)	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 UJ	420 U			400 U	
2,3,4,6-TETRACHLOROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2,4,5-TRICHLOROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2,4,6-TRICHLOROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2,4-DICHLOROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2,4-DIMETHYLPHENOL	400 U		410 U		430 UJ	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2,4-DINITROPHENOL	400 U		410 U		430 U	430 U			400 UJ		400 U		420 U		410 U	420 U			400 UJ	
2,6-DICHLOROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-ACETYLAMINOFLUORENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-CHLORONAPHTHALENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-CHLOROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-METHYLNAPHTHALENE	12		24		15	15			8.00 U		37 J		65		33 U	16 U			8.00 U	
2-METHYLPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-NAPHTHYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-NITROANILINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-NITROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
2-PICOLINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
3,3'-DICHLOROBENZIDINE	400 U		410 U		430 UR	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
3,3'-DIMETHYLBENZIDINE	400 U		410 UJ		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
3-METHYLCHOLANTHRENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
3-NITROANILINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4,6-DINITRO-2-METHYLPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-AMINOBIPHENYL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-BROMOPHENYL PHENYL ETHER	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-CHLORO-3-METHYLPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-CHLOROANILINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-CHLOROPHENYL PHENYL ETHER	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	

TABLE E-2-1
SWMU 5 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05SB01	05SB01	05SB02	05SB02	05SB03	05SB03	05SB03	05SB03	05SB04	05SB04	05SB05	05SB05	05SB06	05SB06	05SB07	05SB07	05SB07	05SB07	05SB08	05SB08
nsample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	05SB030002-D	05SB030102	05SB030102-D	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	05SB070002-D	05SB070102	05SB070102-D	05SB080002	05SB080102
sample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	FD11300001	05SB030102	FD11300001	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	FD11290003	05SB070102	FD11290003	05SB080002	05SB080102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/13/00	12/13/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	12/13/00	12/13/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4-METHYLPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-NITROANILINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-NITROPHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
4-NITROQUINOLINE-1-OXIDE	400 UR		410 UR		430 UR	430 UR			400 UR		400 UR		420 U		410 UR	420 UR			400 UR	
5-NITRO-O-TOLUIDINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
A,A-DIMETHYLPHENETHYLAMINE	800 U		810 U		870 U	850 U			790 U		800 U		830 U		820 U	830 U			800 U	
ACENAPHTHENE	120		8 U		9 U	6 U			8.00 U		110 J		30		33 U	16 U			8.00 U	
ACENAPHTHYLENE	8 U		8 U		16	13			8.00 U		32 U		8 U		33 U	16 U			8.00 U	
ACETOPHENONE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
ANILINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
ANTHRACENE	220		9		17	18			8.00 U		340 J		140		44	16 U			8.00 U	
ARAMITE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
BENZO(A)ANTHRACENE	520		31		140	130			8.00 U		950 J		400		190 J	81 J			8.00 U	
BENZO(A)PYRENE	510		31		170	130			8.00 U		820 J		380		280 J	210 J			8.00 U	
BENZO(B)FLUORANTHENE	440		39		250	180			8.00 U		790 J		470		210 J	210 J			8.00	
BENZO(G,H,I)PERYLENE	150 J		17		76	52			8.00 UJ		350 J		190		300 J	380 J			8.00 UJ	
BENZO(K)FLUORANTHENE	460		28		170	140			8.00 U		670 J		300		200 J	16 UJ			8.00 U	
BENZYL ALCOHOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
BIS(2-CHLOROETHOXY)METHANE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
BIS(2-CHLOROETHYL)ETHER	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
BIS(2-ETHYLHEXYL)PHTHALATE	400 U		410 U		430 U	430 U			400 U		3400		930		410 U	5100			400 U	
BUTYL BENZYL PHTHALATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
CHLOROBENZILATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
CHRYSENE	450		35		180	150			8.00 U		910 J		390 J		200 J	86 J			8.00 U	
DI-N-BUTYL PHTHALATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DI-N-OCTYL PHTHALATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DIALLATE	400 U		410 U		430 U	430 UJ			400 U		400 U		420 U		410 U	420 U			400 U	
DIBENZO(A,H)ANTHRACENE	89 J		8		23	25			8.00 UJ		180 J		82		120 J	140 J			8.00 UJ	
DIBENZOFURAN	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DIETHYL PHTHALATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DIMETHOATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DIMETHYL PHTHALATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DIPHENYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
DISULFOTON	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
ETHYL METHANE SULFONATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
ETHYL PARATHION	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
FAMPHUR	800 UR		810 UR		870 UR	850 UR			790 UR		800 UR		830 UR		820 UR	830 UR			800 UR	
FLUORANTHENE	960		51		130	130			8.00 U		2200 J		780		320 J	120 J			11.0	
FLUORENE	65		8 U		9 U	8 U			8.00 U		110 J		20		33 U	18 U			8.00 U	
HEXACHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
HEXACHLOROBUTADIENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
HEXACHLOROCYCLOPENTADIENE	400 U		410 U		430 UR	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
HEXACHLOROETHANE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
HEXACHLOROPROPENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
INDENO(1,2,3-CD)PYRENE	170 J		15		79	54			8.00 UJ		360 J		170		130 J	130 J			8.00 UJ	
ISODRIN	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
ISOPHORONE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
ISOSAFROLE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
KEPONE	400 UR		410 UR		430 UR	430 UR			400 UR		400 UR		420 UR		410 UR	420 UR			400 UR	
METHAPYRILENE	400 U		410 UR		430 U	430 UJ			400 U		400 U		420 U		410 U	420 U			400 U	
METHYL METHANE SULFONATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
METHYL PARATHION	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSO-DI-N-PROPYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSODI-N-BUTYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSODIETHYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSODIMETHYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSOMETHYLETHYLAMINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSOMORPHOLINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	

TABLE E-2-1
SWMU 5 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05SB01	05SB01	05SB02	05SB02	05SB03	05SB03	05SB03	05SB03	05SB04	05SB04	05SB05	05SB05	05SB06	05SB06	05SB07	05SB07	05SB07	05SB07	05SB08	05SB08
rsample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	05SB030002-D	05SB030102	05SB030102-D	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	05SB070002-D	05SB070102	05SB070102-D	05SB080002	05SB080102
sample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	FD11300001	05SB030102	FD11300001	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	FD11290003	05SB070102	FD11290003	05SB080002	05SB080102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/13/00	12/13/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	12/13/00	12/13/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N-NITROSOPIPERIDINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
N-NITROSOPYRROLIDINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
NAPHTHALENE	23		48		34	35			8.00 U		42 J		100		33 U	18 U			8.00 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
O-TOLUIDINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
P-(DIMETHYLAMINO)AZOBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PENTACHLOROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PENTACHLOROETHANE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PENTACHLORONITROBENZENE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PHENACETIN	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PHENANTHRENE	730		60		48	53.			8.00 U		1700		430		200	65			8.00 U	
PHENOL	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PHORATE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PRONAMIDE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
PYRENE	820		52		150	140			8.00 U		2400		730		410 J	170 J			9.00	
PYRIDINE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
SAFROLE	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
SULFOTEPP	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
THIONAZIN	400 U		410 U		430 U	430 U			400 U		400 U		420 U		410 U	420 U			400 U	
Pesticides (UG/KG)																				
4,4'-DDD	4.0 U		4.0 U		4.3 U	4.2 U			3.9 UJ		4.0 U		4.1 U		4.1 U	4.1 U			4.0 UJ	
4,4'-DDE	4.0 U		4.0 U		4.3 U	4.2 U			3.9 U		10 R		6.2 R		4.1 U	4.1 U			6.7	
4,4'-DDT	4.0 U		4.0 U		4.3 U	4.2 U			3.9 U		4.0 U		4.1 U		4.1 U	4.1 U			4.0 U	
ALDRIN	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
ALPHA-BHC	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
ALPHA-CHLORDANE	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
AROCLOR-1016	40 U		40 U		43 U	42 U			39 U		40 U		41 U		41 U	41 U			40 U	
AROCLOR-1221	80 U		80 U		86 U	85 U			79 U		80 U		82 U		81 U	82 U			80 U	
AROCLOR-1232	40 U		40 U		43 U	42 U			39 U		40 U		41 U		41 U	41 U			40 U	
AROCLOR-1242	40 U		40 U		43 U	42 U			39 U		40 U		41 U		41 U	41 U			40 U	
AROCLOR-1248	40 U		40 U		43 U	42 U			39 U		40 U		41 U		41 U	41 U			40 U	
AROCLOR-1254	40 U		40 U		43 U	42 U			39 U		220		150		100 J	41 UJ			240	
AROCLOR-1260	40 U		40 U		43 U	42 U			39 U		40 U		41 U		41 U	41 U			40 U	
BETA-BHC	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
DELTA-BHC	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
DIELDRIN	4.0 U		4.0 U		4.3 U	4.2 U			3.9 U		4.0 U		4.1 U		4.1 U	4.1 U			4.0 U	
ENDOSULFAN I	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
ENDOSULFAN II	4.0 U		4.0 U		4.3 U	4.2 U			3.9 U		4.0 U		4.1 U		4.1 U	4.1 U			12 R	
ENDOSULFAN SULFATE	4.0 U		4.0 U		4.3 U	4.2 U			3.9 U		4.0 U		4.1 U		4.1 U	4.1 U			4.0 U	
ENDRIN	4.0 U		4.0 U		4.3 U	4.2 U			3.9 UJ		4.0 U		4.1 U		4.1 U	4.1 U			4.0 UJ	
ENDRIN ALDEHYDE	4.0 UJ		4.0 UJ		4.3 UJ	4.2 UJ			3.9 U		4.0 UJ		4.1 UJ		4.1 UJ	4.1 UJ			4.0 U	
GAMMA-BHC (LINDANE)	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 UJ			2.0 U	
GAMMA-CHLORDANE	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
HEPTACHLOR	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 UJ			2.0 U	
HEPTACHLOR EPOXIDE	2.0 U		2.1 U		2.2 U	2.2 U			2.0 U		2.0 U		2.1 U		2.1 U	2.1 U			2.0 U	
METHOXYCHLOR	20 U		21 UJ		22 U	40 J			20 UJ		20 U		21 U		21 U	21 U			20 UJ	
TOXAPHENE	200 U		210 U		220 U	220 U			200 U		200 U		210 U		210 U	210 U			200 U	
Herbicides (UG/KG)																				
2,4,5-T	3.2 UJ		3.3 UJ		3.5 UJ	3.4 UJ			3.2 U		3.2 UJ		10 J		3.3 UJ	3.3 UJ			16 J	
2,4,5-TP (SILVEX)	3.2 U		3.3 U		3.5 U	3.4 U			3.2 U		3.2 U		3.3 U		3.3 U	3.3 U			3.2 U	
2,4-D	3.2 UJ		3.3 UJ		3.5 UJ	3.4 UJ			3.2 U		3.2 UJ		3.3 UJ		3.3 UJ	6.4 J			3.2 U	
DINOSEB	3.2 U		3.3 U		3.5 U	3.4 U			3.2 U		3.2 U		3.3 U		3.3 U	3.3 U			3.2 U	
HEXACHLOROPHENE	0.81 U		0.82 U		0.87 UJ	0.86 U			0.80 U		0.81 U		0.84 U		0.83 U	0.84 U			0.81 U	
PENTACHLOROPHENOL	0.81 U		2.7 J		2.4 J	2.2 J			0.80 U		12		4.5		5.8 J	3.5 J			4.5 R	
Inorganics (MG/KG)																				
ALUMINUM	9010 J		6830 J		9440 J	10600 J			14800 J		3580 J		10500 J		9680 J	9690 J			11200 J	
ANTIMONY	5.8 J		33.2 J		13.3 J	11.4 J			0.90 U		78.1 J		301 J		9.6 J	8.4 J			3.2 J	
ARSENIC	5.5 J		6.6 J		6.1 J	9.7 J			6.2		5.1 J		26.8 J		6.9 J	7.1 J			5.9	
BARIUM	113		348		200	256			99.3 J		328		2020		938	717			74.7 J	

TABLE E-2-1
SWMU 5 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05SB01	05SB01	05SB02	05SB02	05SB03	05SB03	05SB03	05SB03	05SB04	05SB04	05SB05	05SB05	05SB06	05SB06	05SB07	05SB07	05SB07	05SB07	05SB08	05SB08
nsample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	05SB030002-D	05SB030102	05SB030102-D	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	05SB070002-D	05SB070102	05SB070102-D	05SB080002	05SB080102
sample	05SB010002	05SB010102	05SB020002	05SB020102	05SB030002	FD11300001	05SB030102	FD11300001	05SB040002	05SB040102	05SB050002	05SB050102	05SB060002	05SB060102	05SB070002	FD11290003	05SB070102	FD11290003	05SB080002	05SB080102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/29/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/13/00	12/13/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	11/29/00	12/13/00	12/13/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
BERYLLIUM	0.86 U		0.87 U		0.92 U	0.97 U			0.83 U		0.92 U		0.96 U		0.88 U	0.90 U			0.84 U	
CADMIUM	1.6 J		3.3 J		3.7 J	9.2 J			0.83 U		5.6 J		31.1 J		3.9 J	3.5 J			0.84 U	
CALCIUM	30800 J		4780 J		15700 J	16000 J			413 UJ		241000 J		27700 J		3110 J	2520 J			685 J	
CHROMIUM	16.4 J		19.3 J		18.8 J	27.3 J			10.4		40.0 J		112 J		43.4 J	37.6 J			11.7	
COBALT	5.8		6.1		6.4	8.9			12.0		5.8		35.8		12.3	11.2			5.9	
COPPER	41.6 J		174 J		84.5 J	181 J			11.7		109 J		1520 J		198 J	173 J			15.9	
IRON	20400 J		21100 J		16700 J	58300 J			17300 J		17400 J		105000 J		32800 J	32400 J			15600 J	
LEAD	82.7 J		450 J		204 J	515 J			15.2 J		342 J		18900 J		196 J	183 J			16.4 J	
MAGNESIUM	1380 J		1050 J		2220 J	2280 J			660 J		4900 J		3640 J		1060 J	989 J			1020 J	
MANGANESE	306 J		381 J		361 J	672 J			1170		344 J		907 J		358 J	323 J			264	
MERCURY	0.43		0.11		0.39	0.20			0.09 J		0.06		0.10		0.14	0.06			0.04 J	
NICKEL	12.8		14.7		12.2	17.1			12.0		20.5		62.6		26.0	19.8			14.4	
POTASSIUM	432 U		565 J		651 J	681 J			413 UJ		462 U		1050 J		576 J	564 J			464 J	
SELENIUM	0.86 U		0.87 U		0.92 U	0.97 U			0.83 U		0.92 U		0.96 U		0.88 U	0.90 U			0.84 U	
SILVER	0.86 U		0.87 U		2.8 J	3.4 J			0.83 UJ		0.92 U		7.5 J		1.8 J	1.7 J			0.84 UJ	
SODIUM	432 U		437 U		459 U	484 U			413 U		462 U		478 U		442 U	450 U			419 U	
THALLIUM	0.86 U		0.87 U		0.92 U	0.97 U			0.83 U		0.92 U		9.6 U		0.88 U	0.90 U			0.84 U	
TIN	26.4 J		44.8 J		13.2 J	10.5 J			4.5 U		83.6 J		337 J		14.3 J	17.8 J			849	
VANADIUM	19.6		15.7		18.6	22.7			22.9		9.9		21.5		21.3	21.6			20.6	
ZINC	152 J		499 J		363 J	690 J			26.8		506 J		5110 J		950 J	773 J			51.8	
Miscellaneous Parameters																				
CATION EXCHANGE CAPACITY MEQ/1									13.0 J											
CYANIDE MG/KG	0.60 UJ		0.60 UJ		0.60 UJ	0.60 UJ			1.0 UJ		0.60 UJ		0.60 UJ		0.60 UJ	0.60 UJ			1.0 UJ	
PH S.U.									5.1 J											
TOTAL ORGANIC CARBON MG/KG									1700											

TABLE E-2-2
SWMU 5 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05
location	05SB01	05SB02	05SB03	05SB04	05SB05	05SB06	05SB07
nsample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
sample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
matrix	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	4 - 6	5 - 7	2 - 4	6 - 8	6 - 8	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/30/00	11/30/00	12/13/00	11/29/00	11/29/00	11/29/00
validated	Y	Y	Y	Y	Y	Y	Y
Dioxins (NG/KG)							
1,2,3,4,6,7,8,9-OCDD	58.1 J	666 J	1330 J	1520 J	278 J	1250 J	1760 J
1,2,3,4,6,7,8,9-OCDF	2.2 J	25.6 J	328 J	0.26 J	10 J	59 J	477 J
1,2,3,4,6,7,8-HPCDD	5.7 BU	67.7 J	736 J	9.8 J	9 U	188 J	498 J
1,2,3,4,6,7,8-HPCDF	2.4 BU	48 J	1590 J	0.76 U	66.6 J	109 J	807 J
1,2,3,4,7,8,9-HPCDF	0.49 J	1.6 U	23.1 J	0.1 U	6 U	7.7 UJ	68.6
1,2,3,4,7,8-HXCDD	0.26 J	1.2 U	84.9 J	0.13 U	3.3 UJ	5 UJ	29.8
1,2,3,4,7,8-HXCDF	1.1 BU	9.4 J	1010 J	0.66 BU	15.2 J	50.2 J	524 J
1,2,3,6,7,8-HXCDD	0.62 U	4.8 J	192 J	0.14 U	4.6 J	22.3 J	72.8 J
1,2,3,6,7,8-HXCDF	0.58 BJ	3.8 BJ	447 J	0.3 J	2.4 U	19.3 J	180
1,2,3,7,8,9-HXCDD	0.65 U	4.5 J	42.5 J	0.7 J	3.1 U	22 U	93.4 J
1,2,3,7,8,9-HXCDF	0.1 U	0.7 U	6.6 J	0.14 U	3.1 U	3.8 U	7.5 J
1,2,3,7,8-PECDD	0.1 U	1.4 J	97.7 J	0.11 U	2.4 U	7.9	36
1,2,3,7,8-PECDF	0.49 J	2.5 U	378 J	0.32 J	1.7 U	28.3 U	130
2,3,4,6,7,8-HXCDF	0.61 U	4.4 J	78.6 J	0.14 U	2.6 U	26 J	191
2,3,4,7,8-PECDF	0.77 J	5.2	118 J	0.22 J	1.7 U	30	189
2,3,7,8-TCDD	0.2 U	0.3 U	33.5 J	0.08 U	1.3 U	2.4	8.8
2,3,7,8-TCDF	1.6	15.3	453 J	0.36 J	3.1 U	20.3	107
TOTAL HPCDD	10.2 U	136 J	1690 J	26.1 J	17.4 U	427 J	1080 J
TOTAL HPCDF	4.4 U	78.8 J	1850 J	0.94 U	112 J	124 J	1200 J
TOTAL HXCDD	5 J	53.5 U	3040 J	3.5 U	30.8 U	27.3 U	1100 J
TOTAL HXCDF	4.4 U	55 U	3940 J	2.3 U	72 J	243 J	2010 U
TOTAL PECDD	1.2 U	25.8 U	2280 J	0.58 U	8.5 U	89.4 U	840 U
TOTAL PECDF	7 U	71.5 U	5740 J	2.7 U	67.3	396 U	2910 U
TOTAL TCDD	0.67 U	18.6 U	1760 U	0.28 U	5.7 U	118 U	511 U
TOTAL TCDF	10 U	109 U	36840 J	3.4 U	67.9 U	215 U	3040 U
Volatiles (UG/KG)							
1,1,1,2-TETRACHLOROETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,1,1-TRICHLOROETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,1,2,2-TETRACHLOROETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,1,2-TRICHLOROETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,1-DICHLOROETHANE	3 U	3 U	140	3 U	4 U	3 U	3 U
1,1-DICHLOROETHENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,2,3-TRICHLOROPROPANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,2-DIBROMO-3-CHLOROPROPANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,2-DIBROMOETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,2-DICHLOROETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,2-DICHLOROPROPANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
1,4-DIOXANE	220 UJ	220 UJ	9500 UJ	200 U	11000 UJ	210 U	210 UJ
2-BUTANONE	16 U	14 U	22 U	15 U	19 U	16 U	15 U
2-HEXANONE	16 U	14 U	22 U	15 U	19 U	16 U	15 U
3-CHLOROPROPENE	11 U	9 UJ	15 UJ	10 UJ	13 UJ	11 U	10 U
4-METHYL-2-PENTANONE	16 U	14 U	22 U	15 U	19 U	16 U	15 U
ACETONE	16 U	14 U	54	15 U	48	16 U	15 U
ACETONITRILE	90 U	87 UJ	3800 U	81 U	4400 U	86 U	84 U
ACROLEIN	53 UR	46 UR	75 UR	51 U	64 UR	54 UR	51 UR
ACRYLONITRILE	11 UR	9 UR	15 UR	10 U	13 UR	11 UR	10 UR
BENZENE	3 U	3 U	17	3 U	4 U	3	3 U
BROMODICHLOROMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U

TABLE E-2-2
SWMU 5 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05
location	05SB01	05SB02	05SB03	05SB04	05SB05	05SB06	05SB07
nsample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
sample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
matrix	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	4 - 6	5 - 7	2 - 4	6 - 8	6 - 8	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/30/00	11/30/00	12/13/00	11/29/00	11/29/00	11/29/00
validated	Y	Y	Y	Y	Y	Y	Y
BROMOFORM	3 U	3 U	4 U	3 U	4 U	3 U	3 U
BROMOMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CARBON DISULFIDE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CARBON TETRACHLORIDE	3 U.	3 U	4 U	3 U	4 U	3 U	3 U
CHLOROBENZENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CHLORODIBROMOMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CHLOROETHANE	3 U	3 U	48	3 U	4 U	3 U	3 U
CHLOROFORM	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CHLOROMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CHLOROPRENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
CIS-1,2-DICHLOROETHENE	130	3 U	61	3 U	5	51	3 U
CIS-1,3-DICHLOROPROPENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
DIBROMOMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
DICHLORODIFLUOROMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
ETHYL METHACRYLATE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
ETHYLBENZENE	3 U	3 U	19	3 U	4 U	3 U	3 U
ISOBUTANOL	90 UJ	87 UR	3800 U	81 U	4400 U	86 U	84 UJ
METHACRYLONITRILE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
METHYL IODIDE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
METHYL METHACRYLATE	32 U	28 U	45 U	31 U	38 U	32 U	31 U
METHYLENE CHLORIDE	3 U	3 U	42	4 J	4 U	3 U	3 U
PROPIONITRILE	90 U	87 UR	3800 U	81 U	4400 U	86 U	84 U
STYRENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
TETRACHLOROETHENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
TOLUENE	3 U	3 U	27	3 U	4 U	3 U	3 U
TRANS-1,2-DICHLOROETHENE	3 U	3 U	7	3 U	4 U	3 U	3 U
TRANS-1,3-DICHLOROPROPENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
TRANS-1,4-DICHLORO-2-BUTENE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
TRICHLOROETHENE	3 U	3 U	9	3 U	4 U	13	9
TRICHLOROFLUOROMETHANE	3 U	3 U	4 U	3 U	4 U	3 U	3 U
VINYL ACETATE	32 U	28 U	45 U	31 U	38 U	32 U	31 U
VINYL CHLORIDE	7	3 U	76	3 U	24	160	3 U
XYLENES, TOTAL	3 U	3 U	61	3 U	10	3 U	3 U
Semi-Volatiles (UG/KG)							
1,2,4,5-TETRACHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
1,2,4-TRICHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
1,2-DICHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
1,3-DICHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
1,4-DICHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
1,4-NAPHTHOQUINONE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
1,4-PHENYLENEDIAMINE	360 U	390 U	5900 U	400 UJ	420 UJ	410 UJ	410 UJ
1-NAPHTHYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,2'-OXYBIS(1-CHLOROPROPANE)	360 UJ	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,3,4,6-TETRACHLOROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,4,5-TRICHLOROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,4,6-TRICHLOROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,4-DICHLOROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,4-DIMETHYLPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2,4-DINITROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U

TABLE E-2-2
SWMU 5 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05
location	05SB01	05SB02	05SB03	05SB04	05SB05	05SB06	05SB07
nsample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
sample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
matrix	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	4 - 6	5 - 7	2 - 4	6 - 8	6 - 8	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/30/00	11/30/00	12/13/00	11/29/00	11/29/00	11/29/00
validated	Y	Y	Y	Y	Y	Y	Y
2,6-DICHLOROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-ACETYLAMINOFLUORENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-CHLORONAPHTHALENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-CHLOROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-METHYLNAPHTHALENE	7 U	120	2500 J	8.00 U	660 J	150	25
2-METHYLPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-NAPHTHYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-NITROANILINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-NITROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
2-PICOLINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
3,3'-DICHLOROBENZIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
3,3'-DIMETHYLBENZIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
3-METHYLCHOLANTHRENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
3-NITROANILINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4,6-DINITRO-2-METHYLPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-AMINOBIPHENYL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-BROMOPHENYL PHENYL ETHER	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-CHLORO-3-METHYLPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-CHLOROANILINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-CHLOROPHENYL PHENYL ETHER	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-METHYLPHENOL	360 U	460	5900 U	400 UJ	420 U	770 J	410 U
4-NITROANILINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-NITROPHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
4-NITROQUINOLINE-1-OXIDE	360 UR	390 UR	5900 UR	400 UR	420 UR	410 UR	410 UR
5-NITRO-O-TOLUIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
A,A-DIMETHYLPHENETHYLAMINE	720 U	780 U	12000 U	790 UJ	840 U	810 U	810 U
ACENAPHTHENE	7 U	45	5900 U	8.00 U	34 U	40	10
ACENAPHTHYLENE	7 U	9	5900 U	8.00 U	52 J	16	18
ACETOPHENONE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
ANILINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
ANTHRACENE	7 U	66	5900 U	8.00 U	34 U	50	89
ARAMITE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
BENZO(A)ANTHRACENE	7 U	78	5900 U	8.00 U	100 J	50 J	730
BENZO(A)PYRENE	7 U	53 J	5900 U	8.00 U	93 J	47 J	650
BENZO(B)FLUORANTHENE	10	67 J	5900 U	8.00 U	140 J	78 J	960
BENZO(G,H,I)PERYLENE	7 U	20 J	5900 U	8.00 UJ	68 J	37 J	260 J
BENZO(K)FLUORANTHENE	7 U	50 J	5900 U	8.00 U	34 UJ	16 UJ	530
BENZYL ALCOHOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
BIS(2-CHLOROETHOXY)METHANE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
BIS(2-CHLOROETHYL)ETHER	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	940	1600 J	400 UJ	1100	1900	410 U
BUTYL BENZYL PHTHALATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
CHLOROBENZILATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
CHRYSENE	7 U	75	1500 J	8.00 U	150 J	70 J	840
DI-N-BUTYL PHTHALATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DI-N-OCTYL PHTHALATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DIALLATE	360 U	390 UJ	5900 UJ	400 UJ	420 U	410 U	410 U
DIBENZO(A,H)ANTHRACENE	7 U	11 UJ	5900 U	8.00 UJ	34 UJ	18 UJ	130 J

TABLE E-2-2
SWMU 5 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05
location	05SB01	05SB02	05SB03	05SB04	05SB05	05SB06	05SB07
nsample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
sample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
matrix	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	4 - 6	5 - 7	2 - 4	6 - 8	6 - 8	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/30/00	11/30/00	12/13/00	11/29/00	11/29/00	11/29/00
validated	Y	Y	Y	Y	Y	Y	Y
DIBENZOFURAN	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DIETHYL PHTHALATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DIMETHOATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DIMETHYL PHTHALATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DIPHENYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
DISULFOTON	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
ETHYL METHANE SULFONATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
ETHYL PARATHION	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
FAMPHUR	720 UR	780 UR	12000 UR	790 UR	840 UR	810 UR	810 UR
FLUORANTHENE	10	130	5900 U	8.00 U	120 J	61 J	830
FLUORENE	7 U	50	5900 U	8.00 U	84 J	35	8 U
HEXACHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
HEXACHLOROBUTADIENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
HEXACHLOROCYCLOPENTADIENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
HEXACHLOROETHANE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
HEXACHLOROPROPENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
INDENO(1,2,3-CD)PYRENE	7 U	18 J	5900 U	8.00 UJ	39 J	20 J	240 J
ISODRIN	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
ISOPHORONE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
ISOSAFROLE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
KEPONE	360 UR	390 UR	5900 UR	400 UR	420 UR	410 UR	410 UR
METHAPYRILENE	360 U	390 UJ	5900 UJ	400 UJ	420 U	410 U	410 U
METHYL METHANE SULFONATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
METHYL PARATHION	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSO-DI-N-PROPYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSODI-N-BUTYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSODIETHYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSODIMETHYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSOMETHYLETHYLAMINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSOMORPHOLINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSOPIPERIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
N-NITROSOPYRROLIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
NAPHTHALENE	7 U	180	1200 J	8.00 U	250 J	330	41
O,O,O-TRIETHYL PHOSPHOROTHIOATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
O-TOLUIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
P-(DIMETHYLAMINO)AZOBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PENTACHLOROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PENTACHLOROETHANE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PENTACHLORONITROBENZENE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PHENACETIN	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PHENANTHRENE	12	210	2800 J	8.00 U	310 J	190	170
PHENOL	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PHORATE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PRONAMIDE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
PYRENE	9	190	3100 J	8.00 U	350 J	180 J	870
PYRIDINE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
SAFROLE	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
SULFOTEPP	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U
THIONAZIN	360 U	390 U	5900 U	400 UJ	420 U	410 U	410 U

TABLE E-2-2
SWMU 5 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05
location	05SB01	05SB02	05SB03	05SB04	05SB05	05SB06	05SB07
hsample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
sample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
matrix	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	4 - 6	5 - 7	2 - 4	6 - 8	6 - 8	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/30/00	11/30/00	12/13/00	11/29/00	11/29/00	11/29/00
validated	Y	Y	Y	Y	Y	Y	Y
Pesticides (UG/KG)							
4,4'-DDD	3.5 U	8.0	58 U	3.9 UJ	4.2 U	14 R	4.0 U
4,4'-DDE	3.5 U	3.9 U	58 U	3.9 U	4.2 U	62 R	4.0 U
4,4'-DDT	3.5 U	3.9 U	58 U	3.9 U	4.2 U	4.0 U	4.0 U
ALDRIN	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
ALPHA-BHC	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
ALPHA-CHLORDANE	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
AROCLOR-1016	35 U	39 U	580 U	39 U	42 U	40 U	40 U
AROCLOR-1221	71 U	78 U	1200 U	79 U	84 U	80 U	80 U
AROCLOR-1232	35 U	39 U	580 U	39 U	42 U	40 U	40 U
AROCLOR-1242	35 U	39 U	580 U	39 U	42 U	40 U	40 U
AROCLOR-1248	35 U	39 U	580 U	39 U	42 U	40 U	40 U
AROCLOR-1254	35 U	39 U	580 U	39 U	42 U	670	150
AROCLOR-1260	35 U	39 U	580 U	39 U	640	40 U	40 U
BETA-BHC	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
DELTA-BHC	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
DIELDRIN	3.5 U	3.9 U	58 U	3.9 U	7.4	4.0 U	4.0 U
ENDOSULFAN I	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
ENDOSULFAN II	3.5 U	3.9 U	58 U	3.9 U	4.2 U	29 R	4.0 U
ENDOSULFAN SULFATE	3.5 U	3.9 U	58 U	3.9 U	4.2 U	4.0 U	4.0 U
ENDRIN	3.5 U	3.9 U	58 U	3.9 UJ	39 R	25 R	4.0 U
ENDRIN ALDEHYDE	3.5 UJ	3.9 U	58 U	3.9 U	4.2 UJ	4.0 UJ	4.0 UJ
GAMMA-BHC (LINDANE)	1.8 U	2.0 U	30 UJ	2.0 U	2.2 U	2.1 U	2.1 U
GAMMA-CHLORDANE	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
HEPTACHLOR	1.8 U	2.0 U	30 UJ	2.0 U	2.2 U	2.1 U	2.1 U
HEPTACHLOR EPOXIDE	1.8 U	2.0 U	30 U	2.0 U	2.2 U	2.1 U	2.1 U
METHOXYCHLOR	18 U	20 U	300 U	20 UJ	22 U	28 J	49 J
TOXAPHENE	180 U	200 U	3000 U	200 U	220 U	210 U	210 U
Herbicides (UG/KG)							
2,4,5-T	2.9 UJ	3.1 UJ	47 UJ	3.2 U	3.4 UJ	3.3 UJ	3.3 UJ
2,4,5-TP (SILVEX)	2.9 U	3.1 U	47 U	3.2 U	3.4 U	3.3 U	3.3 U
2,4-D	2.9 UJ	3.1 UJ	47 UJ	3.2 U	13 R	3.3 UJ	3.3 UJ
DINOSEB	2.9 U	3.1 U	47 U	3.2 U	3.4 U	3.3 U	3.3 U
HEXACHLOROPHENE	0.72 U	0.79 U	12 U	0.80 U	0.85 U	0.82 U	0.82 U
PENTACHLOROPHENOL	1.5 J	3.0	12 U	0.80 U	2.4 J	3.3	4.8 J
Inorganics (MG/KG)							
ALUMINUM	3910 J	8240 J	14600 J	15700 J	8740 J	9240 J	6660 J
ANTIMONY	0.90 J	96.1 J	126 J	0.84 U	6.5 J	208 J	11.5 J
ARSENIC	2.9 J	9.0 J	10.5 J	4.0	6.9 J	12.2 J	5.6 J
BARIUM	30.3	593	1430	99.4 J	234	1230	193
BERYLLIUM	0.80 U	0.87 U	0.84 U	0.90 U	0.92 U	0.93 U	0.89 U
CADMIUM	0.80 U	9.8 J	27.9 J	0.90 U	1.8 J	13.4 J	4.8 J
CALCIUM	399 U	11400 J	17600 J	449 UJ	3190 J	15500 J	2760 J
CHROMIUM	5.7 J	30.0 J	54.2 J	8.8	20.8 J	110 J	29.6 J
COBALT	6.7	7.0	22.6	5.5	7.6	11.8	7.7
COPPER	8.1 J	258 J	2580 J	10.7	77.4 J	6370 J	387 J
IRON	11400 J	31600 J	72900 J	12700 J	29900 J	43900 J	35200 J
LEAD	9.0 J	1330 J	549 J	8.2 J	2550 J	2860 J	151 J
MAGNESIUM	496 J	2340 J	1740 J	702 J	1180 J	2590 J	1110 J

TABLE E-2-2
SWMU 5 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05
location	05SB01	05SB02	05SB03	05SB04	05SB05	05SB06	05SB07
nsample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
sample	05SB010810	05SB020406	05SB030507	05SB040204	05SB050608	05SB060608	05SB070608
matrix	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	4 - 6	5 - 7	2 - 4	6 - 8	6 - 8	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/29/00	11/30/00	11/30/00	12/13/00	11/29/00	11/29/00	11/29/00
validated	Y	Y	Y	Y	Y	Y	Y
MANGANESE	157 J	472 J	1070 J	258	383 J	626 J	286 J
MERCURY	0.04 U	0.11	0.04 U	0.04 J	93.2	0.06	0.17
NICKEL	8.8	20.0	50.5	12.0	15.7	33.4	18.8
POTASSIUM	399 U	1060 J	1070 J	449 UJ	561 J	1520 J	621 J
SELENIUM	0.80 U	0.87 U	0.84 U	0.90 U	0.92 U	0.93 U	0.89 U
SILVER	0.80 U	1.7 J	16.1 J	0.90 UJ	0.92 U	2.7 J	3.8 J
SODIUM	399 U	500	1300 J	449 U	462 U	933 J	447 U
THALLIUM	0.80 U	0.87 U	8.4 U	0.90 U	0.92 U	0.93 U	0.89 U
TIN	4.1 UJ	212 J	233 J	4.2 U	16.0 J	324 J	14.0 J
VANADIUM	9.6	21.1	22.7	17.6	18.2	21.3	16.3
ZINC	33.7 J	1140 J	2050 J	25.9	374 J	3010 J	491 J
Miscellaneous Parameters							
CATION EXCHANGE CAPACITY MEQ/I	3.20		8.10		11.0		
CYANIDE MG/KG	0.50 UJ	0.60 UJ	0.60 UJ	1.0 UJ	0.60 UJ	0.60 UJ	0.60 UJ
PH S.U.	7.20 J		7.60 J		7.50 J		
TOTAL ORGANIC CARBON MG/KG	1500		72000		23000		

TABLE E-2-3
SWMU 5 GROUND WATER
SUMMARY OF ANALYTIC RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05-03	05-13	05-01	05-02	05-03	05-04	05-06	05-07	05-08	05-09	05-09	05-13	05-15	05-16	05-19	05T01	05T02	05T02	05T03
nsample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	05GW0901-D	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	05GWT0201-D	05GWT0301
sample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	FD01090101	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	FD01060102	05GWT0301
matrix	GF	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/19/01	1/20/01	1/6/01	1/19/01	2/2/01	1/9/01	1/7/01	1/19/01	1/20/01	1/9/01	1/9/01	1/20/01	1/7/01	1/17/01	1/18/01	1/8/01	1/6/01	1/5/01	1/7/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dioxins (PG/L)																			
1,2,3,4,6,7,8,9-OCDD			19.2 U	6.3 U	54.5 U	6.10 J	12.4 J	3.8 UJ	36.5 J	11.4 J	5.50 U	269 J	63.4 J	18.5 J	38.8 J	7.20 U	35.4 J	37.1 J	16.8 J
1,2,3,4,6,7,8,9-OCDF			13.8 U	1.8 UJ	39.3 U	3.60 UJ	6.50 U	3 UJ	2.4 UJ	3.30 UJ	3.30 UJ	6.8 J	8.60 U	4.7 UJ	2.9 UJ	5.70 U	7.90 U	6.30 U	9.30 U
1,2,3,4,6,7,8-HPCDD			11.2 U	2 U	31.1 U	3.20 U	6.10 U	2.9 U	2.5 U	2.60 U	2.60 U	12.2 J	7.10 J	3.5 U	2.8 U	5.40 U	6.90 U	5.40 U	8.20 U
1,2,3,4,6,7,8-HPCDF			5.30 U	1 U	14.1 U	1.70 U	3.20 U	1.6 U	1.4 U	1.50 U	1.60 U	0.9 U	3.20 U	1.7 U	1.5 U	3.00 U	3.40 U	2.90 U	4.30 U
1,2,3,4,7,8,9-HPCDF			7.20 U	1.4 U	19.2 U	2.10 U	4.20 U	2.1 U	1.8 U	1.80 U	1.90 U	1.2 U	4.20 U	2.2 U	1.9 U	3.90 U	4.60 U	3.70 U	5.60 U
1,2,3,4,7,8-HXCDD			5.60 U	1.1 U	15.0 U	2.00 U	3.50 U	1.5 U	1.3 U	1.80 U	1.80 U	0.9 U	3.40 U	1.9 U	1.5 U	3.10 U	4.10 U	2.90 U	4.60 U
1,2,3,4,7,8-HXCDF			3.30 U	0.8 U	8.90 U	1.40 U	2.60 U	1.1 U	1.1 U	1.10 U	1.10 U	1.5 U	2.20 U	1.3 U	1.1 U	2.30 U	2.30 U	2.10 U	3.20 U
1,2,3,6,7,8-HXCDD			5.20 U	1 U	14.1 U	2.00 U	3.40 U	1.4 U	1.2 U	1.70 U	1.70 U	0.9 U	3.30 U	1.8 U	1.4 U	3.10 U	3.90 U	2.90 U	4.50 U
1,2,3,6,7,8-HXCDF			2.90 U	0.8 U	8.00 U	1.30 U	2.40 U	1 U	1 U	1.00 U	1.00 U	0.7 U	2.10 U	1.2 U	1 U	2.10 U	2.00 UJ	2.40 J	3.00 U
1,2,3,7,8,9-HXCDD			5.60 U	1 U	15.0 U	1.90 U	3.50 U	1.4 U	1.2 U	1.70 U	1.70 U	0.8 U	3.40 U	1.8 U	1.4 U	3.10 U	4.10 U	2.90 U	4.50 U
1,2,3,7,8,9-HXCDF			4.10 U	1 U	11.3 U	1.70 U	3.30 U	1.4 U	1.3 U	1.30 U	1.30 U	0.9 U	2.90 U	1.7 U	1.3 U	2.90 U	2.90 U	2.70 U	4.10 U
1,2,3,7,8-PECDD			3.30 U	1.2 U	7.80 U	2.00 U	3.50 U	1.7 U	1.5 U	1.50 U	1.60 U	1 U	3.00 U	2 U	1.5 U	3.10 U	2.50 U	2.90 U	4.20 U
1,2,3,7,8-PECDF			2.30 U	1 U	6.00 U	1.50 U	2.60 U	1.3 U	1 U	1.20 U	1.20 U	0.7 U	2.40 U	1.5 U	1.1 U	2.40 U	1.80 U	2.20 U	3.20 U
2,3,4,6,7,8-HXCDF			3.40 U	0.8 U	9.30 U	1.40 U	2.80 U	1.1 U	1.1 U	1.10 U	1.10 U	0.7 U	2.40 U	1.3 U	1.1 U	2.40 U	2.40 U	2.20 U	3.40 U
2,3,4,7,8-PECDF			2.30 U	1 U	6.00 U	1.60 U	2.60 U	1.3 U	1 U	1.20 U	1.20 U	0.7 U	2.40 U	1.5 U	1.1 U	2.30 U	1.80 U	2.20 U	3.20 U
2,3,7,8-TCDD			2.40 U	1.3 U	5.40 U	1.60 U	3.30 U	1.7 U	1.4 U	1.20 U	1.30 U	1 U	6.30 J	2 U	1.4 U	2.80 U	1.80 U	2.50 U	11.3
2,3,7,8-TCDF			1.80 U	0.9 U	3.90 U	1.10 U	2.60 U	1.2 U	0.9 U	0.9 U	0.9 U	0.7 U	2.30 U	1.4 U	1 U	2.40 U	1.30 U	2.00 U	2.90 U
TOTAL HPCDD			11.2 U	2 U	31.1 U	3.20 U	6.10 U	2.9 U	2.5 U	2.60 U	2.60 U	17.4 U	16.2	3.5 U	2.8 U	5.40 U	6.90 U	5.40 U	8.20 U
TOTAL HPCDF			6.10 U	1.2 U	16.3 U	1.90 U	3.70 U	1.8 U	1.6 U	1.60 U	1.80 U	2.4	3.60 U	1.9 U	1.6 U	3.40 U	3.90 U	3.30 U	4.90 U
TOTAL HXCDD			5.50 U	1 U	38.1 U	2.00 U	3.50 U	1.4 U	0.87 U	1.70 U	1.80 U	0.9 U	3.40 U	1.9 U	1.4 U	3.10 U	12.6 U	2.90 U	4.60 U
TOTAL HXCDF			3.40 U	0.9 U	9.20 U	1.40 U	2.70 U	1.2 U	1.1 U	1.10 U	1.10 U	1.5 U	2.40 U	1.4 U	1.1 U	2.40 U	2.40 UJ	2.40 J	3.40 U
TOTAL PECDD			3.30 U	1.2 U	7.80 U	2.00 U	3.50 U	1.7 U	1.5 U	1.50 U	1.60 U	1 U	3.00 U	2 U	1.5 U	3.10 U	2.50 U	2.90 U	4.20 U
TOTAL PECDF			2.30 U	1 U	6.00 U	1.60 U	2.60 U	1.3 U	1 U	1.20 U	1.20 U	0.7 U	2.40 U	1.5 U	1.1 U	2.40 U	1.80 U	2.20 U	3.20 U
TOTAL TCDD			2.40 U	1.3 U	5.40 U	1.60 U	3.30 U	1.7 U	1.4 U	1.20 U	1.30 U	1 U	6.30	2 U	1.4 U	2.80 U	1.80 U	2.50 U	11.3
TOTAL TCDF			1.80 U	0.9 U	3.90 U	1.10 U	2.60 U	1.2 U	1.7 U	0.9 U	0.9 U	0.7 U	2.30 U	1.4 U	1 U	2.40 U	1.30 U	2.00 U	2.90 U
Volatile Organics (UG/L)																			
1,1,1,2-TETRACHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-TRICHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-TRICHLOROPROPANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMO-3-CHLOROPROPANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-DIOXANE			100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
2-BUTANONE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-CHLOROPROPENE			10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE			5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
ACETONITRILE			40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
ACROLEIN			10 UR	10 UR	10 UR	10 U	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
ACRYLONITRILE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMOFORM			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE			1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
CARBON TETRACHLORIDE			0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROBENZENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM			0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1	0.3 U	0.3 U	0.3 U
CHLOROMETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

TABLE E-2-3
SWMU 5 GROUND WATER
SUMMARY OF ANALYTIC RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05-03	05-13	05-01	05-02	05-03	05-04	05-06	05-07	05-08	05-09	05-09	05-13	05-15	05-18	05-19	05T01	05T02	05T02	05T03
nsample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	05GW0901-D	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	05GWT0201-D	05GWT0301
sample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	FD01090101	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	FD01060102	05GWT0301
matrix	GF	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/19/01	1/20/01	1/6/01	1/19/01	2/2/01	1/9/01	1/7/01	1/19/01	1/20/01	1/9/01	1/9/01	1/20/01	1/7/01	1/17/01	1/18/01	1/8/01	1/6/01	1/5/01	1/7/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CHLOROPRENE			10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE			0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
DIBROMOMETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
DICHLORODIFLUOROMETHANE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYL METHACRYLATE			10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ISOBUTANOL			40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
METHACRYLONITRILE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
METHYL IODIDE			10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYL METHACRYLATE			10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE			1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PROPIONITRILE			40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
STYRENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,4-DICHLORO-2-BUTENE			10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROFLUOROMETHANE			1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
VINYL ACETATE			10 U	10 UJ	10 UJ	10 U	10 U	10 UJ	10 UJ	10 U	10 U	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U
VINYL CHLORIDE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
XYLENES, TOTAL			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-Volatile Organics (UG/L)																			
1,2,4,5-TETRACHLOROBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-TRICHLOROBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-DICHLOROBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-DICHLOROBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-DICHLOROBENZENE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,4-NAPHTHOQUINONE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-PHENYLENEDIAMINE			5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1-NAPHTHYLAMINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2'-OXYBIS(1-CHLOROPROPANE)			3 U	3 U	3 U	3 U	3 U	3 UJ	5 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2,3,4,6-TETRACHLOROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,5-TRICHLOROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,6-TRICHLOROPHENOL			3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2,4-DICHLOROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DIMETHYLPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DINITROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-DICHLOROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-ACETYLAMINOFLUORENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLORONAPHTHALENE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-CHLOROPHENOL			3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2-METHYLNAPHTHALENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
2-METHYLPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NAPHTHYLAMINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NITROANILINE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-NITROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-PICOLINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DICHLOROBENZIDINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DIMETHYLBENZIDINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-METHYLCHOLANTHRENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-NITROANILINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4,6-DINITRO-2-METHYLPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-AMINOBIPHENYL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-BROMOPHENYL PHENYL ETHER			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
4-CHLORO-3-METHYLPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

TABLE E-2-3
SWMU 5 GROUND WATER
SUMMARY OF ANALYTIC RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05-03	05-13	05-01	05-02	05-03	05-04	05-06	05-07	05-08	05-09	05-09	05-13	05-15	05-18	05-19	05T01	05T02	05T02	05T03
nsample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	05GW0901-D	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	05GWT0201-D	05GWT0301
sample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	FD01090101	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	FD01060102	05GWT0301
matrix	GF	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/19/01	1/20/01	1/6/01	1/19/01	2/2/01	1/9/01	1/7/01	1/19/01	1/20/01	1/9/01	1/9/01	1/20/01	1/7/01	1/17/01	1/18/01	1/8/01	1/6/01	1/5/01	1/7/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4-CHLOROANILINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROPHENYL PHENYL ETHER			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROANILINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROPHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROQUINOLINE-1-OXIDE			5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
5-NITRO-O-TOLUIDINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
7,12-DIMETHYLBENZ(A)ANTHRACENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
A,A-DIMETHYLPHENETHYLAMINE			10 U	10 U	10 U	10 U	10 U	10 U	9 U	9 U	10 U	9 U	10 U	10 U	10 U	10 U	10 U	10 U	9 U
ACENAPHTHENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ACENAPHTHYLENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ACETOPHENONE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANILINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
ARAMITE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(A)ANTHRACENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
BENZO(A)PYRENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
BENZO(B)FLUORANTHENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
BENZO(G,H,I)PERYLENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
BENZO(K)FLUORANTHENE			0.10 U	0.10 UJ	0.10 UR	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.090 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ
BENZYL ALCOHOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHOXY)METHANE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHYL)ETHER			1 U	1 U	1 U	1 U	1 U	1 U	4 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BIS(2-ETHYLHEXYL)PHTHALATE			2 U	2 U	2 U	4 BU	2 U	2 U	110	3 BU	4 BU	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
BUTYL BENZYL PHTHALATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZILATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHRYSENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
DI-N-BUTYL PHTHALATE			2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DI-N-OCTYL PHTHALATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIALLATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZO(A,H)ANTHRACENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
DIBENZOFURAN			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIETHYL PHTHALATE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DIMETHOATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIMETHYL PHTHALATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIPHENYLAMINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DISULFOTON			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHANE SULFONATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL PARATHION			5 U	5 UJ	5 UJ	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U
FAMPHUR			10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	9 UR	9 UR	10 UR	9 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	9 UR
FLUORANTHENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
FLUORENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
HEXACHLOROBENZENE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
HEXACHLOROBUTADIENE			1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
HEXACHLOROCYCLOPENTADIENE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
HEXACHLOROETHANE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
HEXACHLOROPROPENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
INDENO(1,2,3-CD)PYRENE			0.10 U	0.10 UJ	0.10 UR	0.10 U	0.10 U	0.10 UJ	0.10 UJ	0.090 U	0.10 U	0.10 UJ	0.10 U	0.10 UJ	0.10 UJ	0.10 U	0.10 U	0.10 U	0.10 U
ISODRIN			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPHORONE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOSAFROLE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
KEPONE			5 UR	5 UJ	5 UJ	5 UR	5 UR	5 UJ	5 U	5 UR	5 UR	5 UJ	5 UR	5 UJ	5 UJ	5 UR	5 UR	5 UR	5 UR
METHAPYRILENE			5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
METHYL METHANE SULFONATE			5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 UJ	5 U	5 U	5 U
METHYL PARATHION			5 U	5 UJ	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U	5 U
N-NITROSO-DI-N-PROPYLAMINE			2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
N-NITROSODI-N-BUTYLAMINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSODIETHYLAMINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

TABLE E-2-3
SWMU 5 GROUND WATER
SUMMARY OF ANALYTIC RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05-03	05-13	05-01	05-02	05-03	05-04	05-06	05-07	05-08	05-09	05-09	05-13	05-15	05-16	05-19	05T01	05T02	05T02	05T03
nsample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	05GW0901-D	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	05GWT0201-D	05GWT0301
sample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	FD01090101	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	FD01060102	05GWT0301
matrix	GF	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/18/01	1/20/01	1/5/01	1/18/01	2/2/01	1/9/01	1/7/01	1/19/01	1/20/01	1/9/01	1/9/01	1/20/01	1/7/01	1/17/01	1/18/01	1/8/01	1/8/01	1/5/01	1/7/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N-NITROSODIMETHYLAMINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOMETHYLETHYLAMINE			5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 UJ	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U
N-NITROSOMORPHOLINE			5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 UJ	5 U	5 U	5 U
N-NITROSOPIPERIDINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOPYRROLIDINE			5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-TOLUIDINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
P-(DIMETHYLAMINO)AZOBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLORONITROBENZENE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENACETIN			5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENANTHRENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
PHENOL			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHORATE			5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PRONAMIDE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE			0.10 U	0.10 U	0.10 UR	0.10 U	0.10 U	0.10 U	0.10 U	0.090 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
PYRIDINE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SAFROLE			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SULFOTEPP			5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
THIONAZIN			5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pesticides (UG/L)																			
4,4'-DDD			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
4,4'-DDE			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
4,4'-DDT			0.020 U	0.021 U	0.020 U	0.020 UJ	0.019 UJ	0.020 U	0.020 U	0.020 UJ	0.020 UJ	0.019 U	0.019 UJ	0.019 U	0.019 U	0.021 UJ	0.019 UJ	0.021 UJ	0.021 UJ
ALDRIN			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
ALPHA-BHC			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
ALPHA-CHLORDANE			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
AROCLOR-1016			0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.21 U	0.21 U
AROCLOR-1221			0.40 U	0.42 U	0.40 U	0.40 U	0.39 U	0.40 U	0.40 U	0.40 U	0.40 U	0.38 U	0.38 U	0.38 U	0.38 U	0.41 U	0.38 U	0.41 U	0.42 U
AROCLOR-1232			0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.21 U	0.21 U
AROCLOR-1242			0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.21 U	0.21 U
AROCLOR-1248			0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.21 U	0.21 U
AROCLOR-1254			0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.21 U	0.21 U
AROCLOR-1260			0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.20 U	0.20 U	0.20 U	0.20 U	0.19 U	0.19 U	0.19 U	0.19 U	0.21 U	0.19 U	0.21 U	0.21 U
BETA-BHC			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
DELTA-BHC			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
DIELDRIN			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
ENDOSULFAN I			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
ENDOSULFAN II			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
ENDOSULFAN SULFATE			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
ENDRIN			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
ENDRIN ALDEHYDE			0.020 U	0.021 U	0.020 U	0.020 U	0.019 U	0.020 U	0.020 U	0.020 U	0.020 U	0.019 U	0.019 U	0.019 U	0.019 U	0.021 U	0.019 U	0.021 U	0.021 U
GAMMA-BHC (LINDANE)			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
GAMMA-CHLORDANE			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
HEPTACHLOR			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
HEPTACHLOR EPOXIDE			0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U	0.010 U	0.009 U	0.010 U	0.010 U
METHOXYCHLOR			0.10 U	0.10 U	0.099 U	0.10 UJ	0.097 UJ	0.10 U	0.099 U	0.10 UJ	0.10 UJ	0.094 U	0.098 UJ	0.094 U	0.094 U	0.10 UJ	0.095 UJ	0.10 UJ	0.10 UJ
TOXAPHENE			1.0 U	1.0 U	0.99 U	1.0 U	0.97 U	1.0 U	0.99 U	1.0 U	1.0 U	0.94 U	0.96 U	0.94 U	0.94 U	1.0 U	0.95 U	1.0 U	1.0 U
Herbicides (UG/L)																			
2,4,5-T			0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4,5-TP (SILVEX)			0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4-D			0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
DINOSEB			0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
HEXACHLOROPHENE			0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
PENTACHLOROPHENOL			0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Inorganics (UG/L)																			

TABLE E-2-3
SWMU 5 GROUND WATER
SUMMARY OF ANALYTIC RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
location	05-03	05-13	05-01	05-02	05-03	05-04	05-06	05-07	05-08	05-09	05-09	05-13	05-15	05-16	05-19	05T01	05T02	05T02	05T03
hsample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	05GW0901-D	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	05GWT0201-D	05GWT0301
sample	05GW0301-F	05GW1301-F	05GW0101	05GW0201	05GW0301	05GW0401	05GW0601	05GW0701	05GW0801	05GW0901	FD01090101	05GW1301	05GW1501	05GW1601	05GW1901	05GWT0101	05GWT0201	FD01060102	05GWT0301
matrix	GF	GF	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/19/01	1/20/01	1/6/01	1/19/01	2/2/01	1/8/01	1/7/01	1/19/01	1/20/01	1/9/01	1/9/01	1/20/01	1/7/01	1/17/01	1/18/01	1/8/01	1/6/01	1/5/01	1/7/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
ALUMINUM			200 U	200 U	2320 J	200 U	200 U	200 U	200 U	200 U	200 U	341 J	200 U	200 U	200 U	200 U	200 U	200 U	200 U
ANTIMONY			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ARSENIC			0.14	1.0 U	1.0 U	0.16	0.82	1.2	1.0 U	0.12	0.11	1.0 U	1.6	1.0 U	1.0 U	0.16	0.20	0.24	0.31
BARIUM			82.1	145	90.6	188	112	227	113	68.1	68.8	36.1	118	90.3	62.0	54.5	67.0	68.5	36.3
BERYLLIUM			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CADMIUM			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CALCIUM			22900	91500	5000 U	71300	55900	75500	72500	44800	44800	72900	58000	48300	56500	23200	22100	22700	17200
CHROMIUM			5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
COBALT			3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
COPPER			2.0 U	2.0 U	4.9	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
IRON			658 J	287	4440	358	312	1170	2190	150	163	857	2270	512	298	188	100 U	100 U	157
LEAD			1.0 U	1.0 U	4.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MAGNESIUM			7000	11800 J	5000 U	10000 J	16700 J	27600 J	24400 J	6980 J	7130 J	15100 J	17300 J	8990 J	5000 U	5350 J	6010 J	5850 J	5000 J
MANGANESE			182 J	15.0 U	141	15.0 U	1170 J	855	1290	15.0 U	15.0 U	183	2270 J	147	18.3	167 J	15.0 U	15.0 U	105 J
MERCURY			0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL			10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
POTASSIUM			5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
SELENIUM			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.4
SILVER			3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SODIUM			5000 U	5000 U	5000 U	5130	5000 U	28800 J	13700 J	5000 U	5000 U	5530 J	10400	11500 J	14400 J	20400	19500	18200	5120
THALLIUM			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TIN			10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
VANADIUM			2.0 U	2.0 U	4.9	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
ZINC			41.3	10.0 U	25.5	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Filtered Metals (UG/L)																			
ALUMINUM, FILTERED	200 U	200 U																	
ANTIMONY, FILTERED	1.0 U	1.0 U																	
ARSENIC, FILTERED	1.0 U	1.0 U																	
BARIUM, FILTERED	61.1	33.2																	
BERYLLIUM, FILTERED	1.0 U	1.0 U																	
CADMIUM, FILTERED	1.0 U	1.0 U																	
CALCIUM, FILTERED	5000	61600																	
CHROMIUM, FILTERED	5.0 U	5.0 U																	
COBALT, FILTERED	3.0 U	3.0 U																	
COPPER, FILTERED	2.0 U	2.0 U																	
IRON, FILTERED	100 U	137																	
LEAD, FILTERED	1.0 U	1.0 U																	
MAGNESIUM, FILTERED	5000 U	13200 J																	
MANGANESE, FILTERED	15.4	51.2																	
MERCURY, FILTERED	0.20 U	0.20 U																	
NICKEL, FILTERED	10.0 U	10.0 U																	
POTASSIUM, FILTERED	5000 U	5000 U																	
SELENIUM, FILTERED	1.0 U	1.0 U																	
SILVER, FILTERED	3.0 U	3.0 U																	
SODIUM, FILTERED	5000 U	5010 J																	
THALLIUM, FILTERED	1.0 U	1.0 U																	
TIN, FILTERED	10.0 U	10.0 U																	
VANADIUM, FILTERED	2.0 U	2.0 U																	
ZINC, FILTERED	10.0 U	10.0 U																	
Miscellaneous Parameter (UG/L)																			
CYANIDE			10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

TABLE E-2-4
SWMU 5 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SW0101-F	05SW0201-F	05SW0201-F-D	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	05SW0201-D	05SW0301	05SW0401	05SW0501
sample	05SW0101-F	05SW0201-F	FD12190001-F	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	FD12190001	05SW0301	05SW0401	05SW0501
matrix	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dioxins (PG/L)												
1,2,3,4,6,7,8,9-OCDD							119 BU	78.0 BU	39.0 BU	42.7 BU	72.3 BU	61.5 BU
1,2,3,4,6,7,8,9-OCDF							9.80 U	13.2 UJ	6.40 U	14.0 UJ	16.6 UJ	20.2 UJ
1,2,3,4,6,7,8-HPCDD							7.80 U	12.9 U	5.80 U	11.4 U	13.9 U	16.5 U
1,2,3,4,6,7,8-HPCDF							4.60 U	6.20 U	3.40 U	5.90 U	6.30 U	8.10 U
1,2,3,4,7,8,9-HPCDF							6.20 U	7.90 U	4.60 U	7.50 U	8.00 U	10.3 U
1,2,3,4,7,8-HXCDD							4.20 U	7.00 U	3.00 U	6.70 U	7.90 U	9.10 U
1,2,3,4,7,8-HXCDF							2.80 U	4.40 U	2.90 U	4.50 U	4.50 U	5.90 U
1,2,3,6,7,8-HXCDD							4.40 U	6.70 U	3.10 U	6.50 U	7.60 U	8.70 U
1,2,3,6,7,8-HXCDF							2.70 U	4.30 U	2.10 J	4.40 U	4.40 U	5.70 U
1,2,3,7,8,9-HXCDD							4.10 U	7.10 U	2.90 U	6.80 U	8.00 U	9.20 U
1,2,3,7,8,9-HXCDF							3.80 U	5.80 U	3.00 U	6.00 U	5.90 U	7.70 U
1,2,3,7,8-PECDD							3.30 UJ	6.70 U	2.70 UJ	7.20 U	7.30 U	7.00 U
1,2,3,7,8-PECDF							2.30 UJ	4.90 U	1.70 UJ	5.60 U	6.30 U	5.40 U
2,3,4,6,7,8-HXCDF							3.10 U	4.70 U	2.10 U	4.90 U	4.80 U	6.30 U
2,3,4,7,8-PECDF							2.20 UJ	4.90 U	1.70 UJ	5.70 U	6.40 U	5.50 U
2,3,7,8-TCDD							2.40 U	5.90 U	2.00 U	6.20 U	5.80 U	7.90 U
2,3,7,8-TCDF							1.90 U	4.40 UJ	1.50 U	4.90 UJ	5.20 UJ	5.70 UJ
TOTAL HPCDD							7.80 U	12.9 U	5.80 U	11.4 U	13.9 U	16.5 U
TOTAL HPCDF							5.30 U	7.00 U	3.90 U	6.60 U	7.00 U	9.10 U
TOTAL HXCDD							2.80 U	6.90 U	3.00 U	6.70 U	22.1 U	9.00 U
TOTAL HXCDF							3.10 U	4.70 U	7.20 U	4.90 U	4.80 U	6.30 U
TOTAL PECDD							3.30 UJ	6.70 U	2.70 UJ	7.20 U	9.40	7.00 U
TOTAL PECDF							2.30 UJ	4.90 U	1.70 UJ	5.60 U	6.40 U	5.40 U
TOTAL TCDD							2.40 U	5.90 U	2.20 U	6.20 U	8.00 U	7.90 U
TOTAL TCDF							1.90 U	4.40 UJ	1.50 U	4.90 UJ	5.20 UJ	5.70 UJ
Volatile Organics (UG/L)												
1,1,1,2-TETRACHLOROETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-TRICHLOROETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE							1 U	2	2	1 U	1 U	1 U
1,2,3-TRICHLOROPROPANE							1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMO-3-CHLOROPROPANE							1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMOETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE							1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE							1 U	1 U	1 U	1 U	1 U	1 U
1,4-DIOXANE							100 U	100 U	100 U	100 U	100 U	100 U
2-BUTANONE							5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
2-HEXANONE							5 U	5 UJ	5 U	5 U	5 U	5 U
3-CHLOROPROPENE							10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE							5 U	5 UJ	5 U	5 U	5 U	5 U
ACETONE							5 UR	5 UR	5 UR	1 UR	5 UR	5 UR
ACETONITRILE							40 U	40 U	40 U	40 U	40 U	40 U
ACROLEIN							10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
ACRYLONITRILE							5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
BENZENE							1 U	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE							1 U	1 U	1 U	1 U	1 U	1 U
BROMOFORM							1 U	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE							1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
CARBON DISULFIDE							1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
CARBON TETRACHLORIDE							0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROBENZENE							1 U	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE							1 U	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE							1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
CHLOROFORM							0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROMETHANE							1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ

TABLE E-2-4
SWMU 5 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SW0101-F	05SW0201-F	05SW0201-F-D	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	05SW0201-D	05SW0301	05SW0401	05SW0501
sample	05SW0101-F	05SW0201-F	FD12190001-F	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	FD12190001	05SW0301	05SW0401	05SW0501
matrix	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CHLOROPRENE							10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE							1 U	290	290	110	1 U	1
CIS-1,3-DICHLOROPROPENE							0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
DIBROMOMETHANE							1 U	1 U	1 U	1 U	1 U	1 U
DICHLORODIFLUOROMETHANE							1 U	1 U	1 U	1 U	1 U	1 U
ETHYL METHACRYLATE							10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE							1 U	1 U	1 U	1 U	1 U	1 U
ISOBUTANOL							40 U	40 U	40 U	40 U	40 U	40 U
METHACRYLONITRILE							1 UR	1 UR	1 UR	1 UR	1 UR	1 UR
METHYL IODIDE							10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
METHYL METHACRYLATE							10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE							1 U	1 U	1 U	1 U	1 U	1 U
PROPIONITRILE							40 U	40 U	40 U	40 U	40 U	40 U
STYRENE							1 U	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE							1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE							1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE							1 U	9	8	3	1 U	1 U
TRANS-1,3-DICHLOROPROPENE							1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,4-DICHLORO-2-BUTENE							10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE							1 U	120	120	48	1 U	1 U
TRICHLOROFLUOROMETHANE							1 U	1 U	1 U	1 U	1 U	1 U
VINYL ACETATE							10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE							1 U	85	86	18	1 U	1 U
XYLENES, TOTAL							1 U	1 U	1 U	1 U	1 U	1 U
Semi-Volatile Organics (UG/L)												
1,2,4,5-TETRACHLOROBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
1,2,4-TRICHLOROBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
1,2-DICHLOROBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
1,3-DICHLOROBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
1,4-DICHLOROBENZENE							2 U	2 U	2 U	2 U	2 U	2 UJ
1,4-NAPHTHOQUINONE							5 U	5 U	5 U	5 U	5 U	5 UJ
1,4-PHENYLENEDIAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
1-NAPHTHYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
2,2'-OXYBIS(1-CHLOROPROPANE)							3 U	3 U	3 U	3 U	3 U	3 UJ
2,3,4,6-TETRACHLOROPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2,4,5-TRICHLOROPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2,4,6-TRICHLOROPHENOL							3 U	3 U	3 U	3 U	3 U	3 UJ
2,4-DICHLOROPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2,4-DIMETHYLPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2,4-DINITROPHENOL							5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
2,6-DICHLOROPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2-ACETYLAMINOFLUORENE							5 U	5 U	5 U	5 U	5 U	5 UJ
2-CHLORONAPHTHALENE							2 U	2 U	2 U	2 U	2 U	2 UJ
2-CHLOROPHENOL							3 U	3 U	3 U	3 U	3 U	3 UJ
2-METHYLNAPHTHALENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
2-METHYLPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2-NAPHTHYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
2-NITROANILINE							2 U	2 U	2 U	2 U	2 U	2 UJ
2-NITROPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
2-PICOLINE							5 U	5 U	5 U	5 U	5 U	5 UJ
3,3'-DICHLOROBENZIDINE							5 UJ	5 U	5 U	5 U	5 U	5 UJ
3,3'-DIMETHYLBENZIDINE							5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
3-METHYLCHOLANTHRENE							5 U	5 U	5 U	5 U	5 U	5 UJ
3-NITROANILINE							5 U	5 U	5 U	5 U	5 U	5 UJ
4,6-DINITRO-2-METHYLPHENOL							5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
4-AMINOBIPHENYL							5 U	5 U	5 U	5 U	5 U	5 UJ
4-BROMOPHENYL PHENYL ETHER							2 U	2 U	2 U	2 U	2 U	2 UJ
4-CHLORO-3-METHYLPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ

TABLE E-2-4
SWMU 5 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SW0101-F	05SW0201-F	05SW0201-F-D	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	05SW0201-D	05SW0301	05SW0401	05SW0501
sample	05SW0101-F	05SW0201-F	FD12190001-F	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	FD12190001	05SW0301	05SW0401	05SW0501
matrix	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4-CHLOROANILINE							5 U	5 U	5 U	5 U	5 U	5 UJ
4-CHLOROPHENYL PHENYL ETHER							5 U	5 U	5 U	5 U	5 U	5 UJ
4-METHYLPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
4-NITROANILINE							5 U	5 U	5 U	5 U	5 U	5 UJ
4-NITROPHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
4-NITROQUINOLINE-1-OXIDE							5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
5-NITRO-O-TOLUIDINE							5 U	5 U	5 U	5 U	5 U	5 UJ
7,12-DIMETHYLBENZ(A)ANTHRACENE							5 U	5 U	5 U	5 U	5 U	5 UJ
A,A-DIMETHYLPHENETHYLAMINE							10 U	10 U	10 U	10 U	10 U	10 UJ
ACENAPHTHENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
ACENAPHTHYLENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
ACETOPHENONE							5 U	5 U	5 U	5 U	5 U	5 UJ
ANILINE							5 U	5 U	5 U	5 U	5 U	5 UJ
ANTHRACENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
ARAMITE							5 U	5 U	5 U	5 U	5 U	5 UJ
BENZO(A)ANTHRACENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
BENZO(A)PYRENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
BENZO(B)FLUORANTHENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
BENZO(G,H,I)PERYLENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
BENZO(K)FLUORANTHENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
BENZYL ALCOHOL							5 U	5 U	5 U	5 U	5 U	5 UJ
BIS(2-CHLOROETHOXY)METHANE							5 U	5 U	5 U	5 U	5 U	5 UJ
BIS(2-CHLOROETHYL)ETHER							1 U	1 U	1 U	1 U	1 U	1 UJ
BIS(2-ETHYLHEXYL)PHTHALATE							2	2	2 U	2 U	2 U	2 UJ
BUTYL BENZYL PHTHALATE							5 U	5 U	5 U	5 U	5 U	5 UJ
CHLOROBENZILATE							5 U	5 U	5 U	5 U	5 U	5 UJ
CHRYSENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
DI-N-BUTYL PHTHALATE							2 U	2 U	2 U	2 U	2 U	2 UJ
DI-N-OCTYL PHTHALATE							5 U	5 U	5 U	5 U	5 U	5 UJ
DIALLATE							5 U	5 U	5 U	5 U	5 U	5 UJ
DIBENZO(A,H)ANTHRACENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
DIBENZOFURAN							5 U	5 U	5 U	5 U	5 U	5 UJ
DIETHYL PHTHALATE							2 U	2 U	2 U	2 U	2 U	2 UJ
DIMETHOATE							5 U	5 U	5 U	5 U	5 U	5 UJ
DIMETHYL PHTHALATE							5 U	5 U	5 U	5 U	5 U	5 UJ
DIPHENYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
DISULFOTON							5 U	5 U	5 U	5 U	5 U	5 UJ
ETHYL METHANE SULFONATE							5 U	5 U	5 U	5 U	5 U	5 UJ
ETHYL PARATHION							5 U	5 U	5 U	5 U	5 U	5 UJ
FAMPHUR							10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
FLUORANTHENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
FLUORENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
HEXACHLOROBENZENE							2 U	2 U	2 U	2 U	2 U	2 UJ
HEXACHLOROBUTADIENE							1 U	1 U	1 U	1 U	1 U	1 UJ
HEXACHLOROCYCLOPENTADIENE							2 U	2 UJ	2 U	2 U	2 U	2 UJ
HEXACHLOROETHANE							2 U	2 U	2 U	2 U	2 U	2 UJ
HEXACHLOROPROPENE							5 U	5 U	5 U	5 U	5 U	5 UJ
INDENO(1,2,3-CD)PYRENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
ISODRIN							5 U	5 U	5 U	5 U	5 U	5 UJ
ISOPHORONE							5 U	5 U	5 U	5 U	5 U	5 UJ
ISOSAFROLE							5 U	5 U	5 U	5 U	5 U	5 UJ
KEPONE							5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
METHAPYRILENE							5 U	5 U	5 U	5 U	5 U	5 UJ
METHYL METHANE SULFONATE							5 U	5 U	5 U	5 U	5 U	5 UJ
METHYL PARATHION							5 U	5 U	5 U	5 U	5 U	5 UJ
N-NITROSO-DI-N-PROPYLAMINE							2 U	2 U	2 U	2 U	2 U	2 UJ
N-NITROSODI-N-BUTYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
N-NITROSODIETHYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ

TABLE E-2-4
SWMU 5 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SW0101-F	05SW0201-F	05SW0201-F-D	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	05SW0201-D	05SW0301	05SW0401	05SW0501
sample	05SW0101-F	05SW0201-F	FD12190001-F	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	FD12190001	05SW0301	05SW0401	05SW0501
matrix	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N-NITROSODIMETHYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
N-NITROSOMETHYLETHYLAMINE							5 U	5 U	5 U	5 U	5 U	5 UJ
N-NITROSOMORPHOLINE							5 U	5 U	5 U	5 U	5 U	5 UJ
N-NITROSOPIPERIDINE							5 U	5 U	5 U	5 U	5 U	5 UJ
N-NITROSOPYRROLIDINE							5 U	5 U	5 U	5 U	5 U	5 UJ
NAPHTHALENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
O,O,O-TRIETHYL PHOSPHOROTHIOATE							5 U	5 U	5 U	5 U	5 U	5 UJ
O-TOLUIDINE							5 U	5 U	5 U	5 U	5 U	5 UJ
P-(DIMETHYLAMINO)AZOBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
PENTACHLOROBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
PENTACHLOROETHANE							5 U	5 U	5 U	5 U	5 U	5 UJ
PENTACHLORONITROBENZENE							5 U	5 U	5 U	5 U	5 U	5 UJ
PHENACETIN							5 U	5 U	5 U	5 U	5 U	5 UJ
PHENANTHRENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
PHENOL							5 U	5 U	5 U	5 U	5 U	5 UJ
PHORATE							5 U	5 U	5 U	5 U	5 U	5 UJ
PRONAMIDE							5 U	5 U	5 U	5 U	5 U	5 UJ
PYRENE							0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 UJ
PYRIDINE							5 U	5 U	5 U	5 U	5 U	5 UJ
SAFROLE							5 U	5 U	5 U	5 U	5 U	5 UJ
SULFOTEPP							5 U	5 U	5 U	5 U	5 U	5 UJ
THIONAZIN							5 U	5 U	5 U	5 U	5 U	5 UJ
Pesticides (UG/L)												
4,4'-DDD							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
4,4'-DDE							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
4,4'-DDT							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
ALDRIN							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
ALPHA-BHC							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
ALPHA-CHLORDANE							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
AROCLOR-1016							0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21 UJ
AROCLOR-1221							0.38 U	0.38 U	0.40 U	0.38 U	0.40 U	0.41 UJ
AROCLOR-1232							0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21 UJ
AROCLOR-1242							0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21 UJ
AROCLOR-1248							0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21 UJ
AROCLOR-1254							0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21 UJ
AROCLOR-1260							0.19 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21 UJ
BETA-BHC							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
DELTA-BHC							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
DIELDRIN							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
ENDOSULFAN I							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
ENDOSULFAN II							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
ENDOSULFAN SULFATE							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
ENDRIN							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
ENDRIN ALDEHYDE							0.019 U	0.019 U	0.020 U	0.019 U	0.020 U	0.021 UJ
GAMMA-BHC (LINDANE)							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
GAMMA-CHLORDANE							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
HEPTACHLOR							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
HEPTACHLOR EPOXIDE							0.009 U	0.009 U	0.010 U	0.010 U	0.010 U	0.010 UJ
METHOXYCHLOR							0.095 U	0.095 U	0.099 U	0.096 U	0.10 U	0.10 UJ
TOXAPHENE							0.95 U	0.95 U	0.99 U	0.96 U	1.0 U	1.0 UJ
Herbicides (UG/L)												
2,4,5-T							0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4,5-TP (SILVEX)							0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4-D							0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
DINOSEB							0.080 U	0.080 U	0.080 U	0.45 U	0.080 U	0.080 U
HEXACHLOROPHENE							0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
PENTACHLOROPHENOL							0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Inorganics (UG/L)												

TABLE E-2-4
SWMU 5 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SW0101-F	05SW0201-F	05SW0201-F-D	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	05SW0201-D	05SW0301	05SW0401	05SW0501
sample	05SW0101-F	05SW0201-F	FD12190001-F	05SW0301-F	05SW0401-F	05SW0501-F	05SW0101	05SW0201	FD12190001	05SW0301	05SW0401	05SW0501
matrix	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW	SW
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00	12/19/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
ALUMINUM							200 U	200 U	200 U	200 U	204 J	200 U
ANTIMONY							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.3
ARSENIC							0.55	0.41	0.41	0.52	0.64	0.34
BARIUM							67.7 J	68.3 J	67.5 J	80.7 J	84.0 J	184 J
BERYLLIUM							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CADMIUM							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CALCIUM							29200	24300	25300	33600	7570	72600
CHROMIUM							5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
COBALT							3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
COPPER							2.0 U	2.7	2.7	2.0 U	2.0 U	2.4
IRON							284 J	458 J	424 J	782 J	1520 J	337 J
LEAD							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MAGNESIUM							8490 J	9880 J	9950 J	11900 J	5000 U	11400 J
MANGANESE							41.4	238	250	315	105	15.0 U
MERCURY							0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL							10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
POTASSIUM							5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
SELENIUM							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SILVER							3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SODIUM							30700	9330	9350	11700	22800	10200
THALLIUM							1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TIN							10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
VANADIUM							2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
ZINC							10.0 U	19.5	18.5	19.9	10.0 U	10.0 U
Filtered Metals (UG/L)												
ALUMINUM, FILTERED	200 U	200 U	200 U	200 U	200 U	200 U						
ANTIMONY, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.3						
ARSENIC, FILTERED	0.51	0.30	0.38	0.50	0.56	0.29						
BARIUM, FILTERED	68.0 J	66.1 J	65.9 J	75.6 J	79.0 J	174 J						
BERYLLIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U						
CADMIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U						
CALCIUM, FILTERED	29500	27000	27100	35200	7920	74900						
CHROMIUM, FILTERED	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U						
COBALT, FILTERED	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U						
COPPER, FILTERED	2.0 U	2.0 U	2.0	2.0 U	2.0 U	2.1						
IRON, FILTERED	103 J	209 J	210 J	577 J	594 J	282 J						
LEAD, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U						
MAGNESIUM, FILTERED	6960 J	10900 J	11000 J	12500 J	5140 J	11800 J						
MANGANESE, FILTERED	33.9	226	231	304	85.8	15.0 U						
MERCURY, FILTERED	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U						
NICKEL, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U						
POTASSIUM, FILTERED	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U						
SELENIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U						
SILVER, FILTERED	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U						
SODIUM, FILTERED	27900	9150	9390	10900	22800	9530						
THALLIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U						
TIN, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U						
VANADIUM, FILTERED	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U						
ZINC, FILTERED	10.0 U	16.9	17.5	20.0	10.0 U	10.0 U						
Miscellaneous Parameters												
MISC CYANIDE UG/L							10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ
MISC HARDNESS MG/L							99.0	100	100	130	38.0	230
MISC TOTAL SUSPENDED SOLIDS MG/L							5.0	52.0		2.0 U	15.0	2.0

TABLE E-2-5
SWMU 5 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SD010006	05SD020006	05SD020006-D	05SD030006	05SD040006	05SD050006
sample	05SD010006	05SD020006	FD12190002	05SD030006	05SD040006	05SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/18/00
validated	Y	Y	Y	Y	Y	Y
Dioxins (NG/KG)						
1,2,3,4,6,7,8,9-OCDD	7110 J	6110 J	4370 J	2440 J	1380 J	1160 J
1,2,3,4,6,7,8,9-OCDF	8.3 UJ	223 J	163 J	41.9 J	2.2 J	73.5 J
1,2,3,4,6,7,8-HPCDD	46.3 J	203 J	154 J	63.8 J	35.5 J	103 J
1,2,3,4,6,7,8-HPCDF	4.1 BJ	86.1 J	172 J	24.2 J	4.5 BJ	47.5 J
1,2,3,4,7,8,9-HPCDF	2.5 UJ	6.5 J	22.7 J	1.6 J	0.32 U	3.2 J
1,2,3,4,7,8-HXCDD	0.61 J	2.7 J	4.2 J	0.95 J	0.5 J	2 J
1,2,3,4,7,8-HXCDF	2.4 BJ	21 J	74.8 J	7.8 J	3.2 BJ	11.3 J
1,2,3,6,7,8-HXCDD	0.88 J	7.2	8.9	2.2 J	0.92 J	5.4
1,2,3,6,7,8-HXCDF	1 J	8.3	28.7	3 J	1.4 J	5.1
1,2,3,7,8,9-HXCDD	1.2 U	7.7	11.9	2.8 J	1.5 J	5.5
1,2,3,7,8,9-HXCDF	0.9 U	1.4 J	2.8 J	0.58 J	0.1 U	0.79 J
1,2,3,7,8-PECDD	0.7 UJ	2.2 J	3.3 J	0.67 J	0.29 U	1.7 J
1,2,3,7,8-PECDF	0.89 J	5.9 J	13.2 J	1.6 J	2.0 U	2.8 J
2,3,4,6,7,8-HXCDF	0.51 U	10.7 J	30.3 J	3.5 J	1.0 J	6.7 J
2,3,4,7,8-PECDF	0.72 J	9.3 J	22.3 J	2.7 J	1.3 J	5.2 J
2,3,7,8-TCDD	0.4 U	1	1.2	0.42 J	0.26 J	3.7
2,3,7,8-TCDF	1.4 J	7.0	10.5	2.20 J	2.3 J	4.30 J
TOTAL HPCDD	102 J	422	306 J	137 J	84 J	221
TOTAL HPCDF	5.8 J	259 U	291 J	67.5 U	6.8 U	107 J
TOTAL HXCDD	12.2 U	99.2 U	104 U	30.9 U	18.7 U	52.9 U
TOTAL HXCDF	10.9 U	142 U	273 U	50.5 U	14.0 U	76.9 U
TOTAL PECDD	0.75 U	45.9 U	49.9 U	8.5 U	8.0 U	19.9 U
TOTAL PECDF	16.2 U	126 U	239 U	43.6 U	23.9 U	88.1 U
TOTAL TCDD	0.75	33 U	37.6 U	9.9 U	6.6 U	16.6 U
TOTAL TCDF	15.3 U	148 U	217 U	49.5 U	27.9 U	104 U
Volatiles (UG/KG)						
1,1,1,2-TETRACHLOROETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,1,1-TRICHLOROETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,1,2,2-TETRACHLOROETHANE	4 U	5 U	5 UJ	4 U	8 UJ	6 UJ
1,1,2-TRICHLOROETHANE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
1,1-DICHLOROETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,1-DICHLOROETHENE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,2,3-TRICHLOROPROPANE	4 U	5 U	5 UJ	4 U	8 UJ	6 U
1,2-DIBROMO-3-CHLOROPROPANE	4 U	5 U	5 UJ	4 U	8 UJ	6 U
1,2-DIBROMOETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,2-DICHLOROETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,2-DICHLOROPROPANE	4 U	5 U	5 UJ	4 U	8 U	6 U
1,4-DIOXANE	250 U	320 U	300 UJ	330 UJ	570 UJ	280 U
2-BUTANONE	19 U	25 U	23 UJ	22 U	40 U	27 UJ
2-HEXANONE	19 U	25 U	23 UJ	22 U	40 U	27 UJ
3-CHLOROPROPENE	12 UJ	17 UJ	15 UJ	15 UJ	27 UJ	18 UJ
4-METHYL-2-PENTANONE	19 U	25 U	23 UJ	22 U	40 U	27 UJ
ACETONE	19 U	25 U	23 UJ	22 U	40 U	27 UJ
ACETONITRILE	99 U	130 U	120 UJ	130 U	230 U	110 U
ACROLEIN	62 UR	83 UR	77 UJ	75 UR	130 UR	92 UR
ACRYLONITRILE	12 UR	17 UR	15 UJ	15 UR	27 UR	18 UR
BENZENE	4 U	5 U	5 UJ	4 U	8 U	6 U
BROMODICHLOROMETHANE	4 U	5 U	5 UJ	4 U	8 U	6 UJ

TABLE E-2-5
SWMU 5 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SD010006	05SD020006	05SD020006-D	05SD030006	05SD040006	05SD050006
sample	05SD010006	05SD020006	FD12190002	05SD030006	05SD040006	05SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/18/00
validated	Y	Y	Y	Y	Y	Y
BROMOFORM	4 U	5 U	5 UJ	4 U	8 U	6 UJ
BROMOMETHANE	4 UJ	5 UJ	5 UJ	4 U	8 U	6 UJ
CARBON DISULFIDE	4 U	5 U	5 UJ	4 U	8 U	6 U
CARBON TETRACHLORIDE	4 U	5 U	5 UJ	4 U	8 U	6 U
CHLOROBENZENE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
CHLORODIBROMOMETHANE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
CHLOROETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
CHLOROFORM	4 U	5 U	5 UJ	4 U	8 U	6 U
CHLOROMETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
CHLOROPRENE	4 U	5 U	5 UJ	4 U	8 U	6 U
CIS-1,2-DICHLOROETHENE	4 U	1000	800	4 U	8 U	6 U
CIS-1,3-DICHLOROPROPENE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
DIBROMOMETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
DICHLORODIFLUOROMETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
ETHYL METHACRYLATE	4 U	5 U	5 UJ	4 U	8 U	6 U
ETHYLBENZENE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
ISOBUTANOL	99 U	130 U	120 UJ	130 U	230 U	110 U
METHACRYLONITRILE	4 U	5 U	5 UJ	4 U	8 U	6 U
METHYL IODIDE	4 UJ	5 U	5 UJ	4 UJ	8 UJ	6 U
METHYL METHACRYLATE	37 U	50 U	46 UJ	45 U	80 U	55 U
METHYLENE CHLORIDE	4 J	5 J	9 J	7 J	8 J	6 J
PROPIONITRILE	99 U	130 U	120 UJ	130 U	230 U	110 U
STYRENE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
TETRACHLOROETHENE	4 U	5 U	5 UJ	4 U	8 U	6 U
TOLUENE	4 U	5 U	5 UJ	4 U	8 U	6 U
TRANS-1,2-DICHLOROETHENE	4 U	5 U	8 J	4 U	8 U	6 U
TRANS-1,3-DICHLOROPROPENE	4 U	5 U	5 UJ	4 U	8 U	6 UJ
TRANS-1,4-DICHLORO-2-BUTENE	4 U	5 U	5 UJ	4 U	8 UJ	6 U
TRICHLOROETHENE	4 U	700	600 J	4 U	8 U	6 U
TRICHLOROFLUOROMETHANE	4 U	5 U	5 UJ	4 U	8 U	6 U
VINYL ACETATE	37 U	50 U	46 UJ	45 U	80 U	55 U
VINYL CHLORIDE	4 U	5 U	5 UJ	4 U	8 U	6 U
XYLENES, TOTAL	4 U	5 U	5 UJ	4 U	8 U	6 UJ
Semi-Volatiles (UG/KG)						
1,2,4,5-TETRACHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
1,2,4-TRICHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
1,2-DICHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
1,3-DICHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
1,4-DICHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
1,4-NAPHTHOQUINONE	420 U	500 U	470 U	510 U	680 U	480 U
1,4-PHENYLENEDIAMINE	420 U	500 U	470 U	510 U	680 U	480 U
1-NAPHTHYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
2,2'-OXYBIS(1-CHLOROPROPANE)	420 UJ	500 UJ	470 UJ	510 UJ	680 UJ	480 U
2,3,4,6-TETRACHLOROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2,4,5-TRICHLOROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2,4,6-TRICHLOROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2,4-DICHLOROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2,4-DIMETHYLPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2,4-DINITROPHENOL	420 UJ	500 UJ	470 UR	510 UJ	680 UJ	480 UJ

TABLE E-2-5
SWMU 5 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SD010006	05SD020006	05SD020006-D	05SD030006	05SD040006	05SD050006
sample	05SD010006	05SD020006	FD12190002	05SD030006	05SD040006	05SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/18/00
validated	Y	Y	Y	Y	Y	Y
2,6-DICHLOROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2-ACETYLAMINOFLUORENE	420 U	500 U	470 U	510 U	680 U	480 U
2-CHLORONAPHTHALENE	420 U	500 U	470 U	510 U	680 U	480 U
2-CHLOROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2-METHYLNAPHTHALENE	14.0	10.0 U	9.00 U	10.0 U	14 U	24.0
2-METHYLPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2-NAPHTHYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
2-NITROANILINE	420 U	500 U	470 U	510 U	680 U	480 U
2-NITROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
2-PICOLINE	420 U	500 U	470 U	510 U	680 U	480 U
3,3'-DICHLOROBENZIDINE	420 U	500 U	470 U	510 U	680 U	480 U
3,3'-DIMETHYLBENZIDINE	420 U	500 U	470 U	510 U	680 U	480 UR
3-METHYLCHOLANTHRENE.	420 U	500 U	470 U	510 U	680 U	480 U
3-NITROANILINE	420 U	500 U	470 U	510 U	680 U	480 UJ
4,6-DINITRO-2-METHYLPHENOL	420 U	500 U	470 UR	510 U	680 U	480 UJ
4-AMINOBIPHENYL	420 U	500 U	470 U	510 U	680 U	480 U
4-BROMOPHENYL PHENYL ETHER	420 U	500 U	470 U	510 U	680 U	480 U
4-CHLORO-3-METHYLPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
4-CHLOROANILINE	420 U	500 U	470 U	510 U	680 U	480 UJ
4-CHLOROPHENYL PHENYL ETHER	420 U	500 U	470 U	510 U	680 U	480 U
4-METHYLPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
4-NITROANILINE	420 U	500 U	470 U	510 U	680 U	480 U
4-NITROPHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
4-NITROQUINOLINE-1-OXIDE	420 UR	500 UR	470 UR	510 UR	680 UR	480 UR
5-NITRO-O-TOLUIDINE	420 UJ	500 UJ	470 UJ	510 UJ	680 UJ	480 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	420 U	500 U	470 U	510 U	680 U	480 U
A,A-DIMETHYLPHENETHYLAMINE	840 U	1000 U	940 U	1000 U	1400 U	950 U
ACENAPHTHENE	78.0	10.0 U	9.00 U	10.0 U	14 U	10.0 U
ACENAPHTHYLENE	8.00 U	10.0 U	9.00 U	10.0 U	14 U	10.0 U
ACETOPHENONE	420 U	500 U	470 U	510 U	680 U	480 U
ANILINE	420 U	500 U	470 U	510 U	680 U	480 U
ANTHRACENE	95.0	10.0 U	13.0	10.0 U	14 U	10.0 U
ARAMITE	420 U	500 U	470 U	510 U	680 U	480 U
BENZO(A)ANTHRACENE	360	26.0	31.0	19.0	14 U	23.0
BENZO(A)PYRENE	300	24.0	30.0	22.0	14 U	30.0
BENZO(B)FLUORANTHENE	320	27.0	27.0	25.0	14 U	45.0
BENZO(G,H,I)PERYLENE	110	15.0	15.0	14.0	14 U	45.0
BENZO(K)FLUORANTHENE	260	22.0	30.0	18.0	14 U	33.0
BENZYL ALCOHOL	420 UJ	500 UJ	470 UJ	510 UJ	680 UJ	480 U
BIS(2-CHLOROETHOXY)METHANE	420 U	500 U	470 U	510 U	680 U	480 U
BIS(2-CHLOROETHYL)ETHER	420 U	500 U	470 U	510 U	680 U	480 U
BIS(2-ETHYLHEXYL)PHTHALATE	530 BU	500 U	470 U	510 U	680 U	480 U
BUTYL BENZYL PHTHALATE	420 U	500 U	470 U	510 U	680 U	480 U
CHLOROBENZILATE	420 U	500 U	470 U	510 U	680 U	480 U
CHRYSENE	370	29.0	33.0	25.0	14 U	39.0
DI-N-BUTYL PHTHALATE	420 U	500 U	470 U	510 U	680 U	480 U
DI-N-OCTYL PHTHALATE	420 U	500 U	470 U	510 U	680 U	480 U
DIALLATE	420 U	500 U	470 U	510 U	680 U	480 U
DIBENZO(A,H)ANTHRACENE	68.0	10.0 U	9.00 U	10.0 U	14 U	16.0

TABLE E-2-5
SWMU 5 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SD010006	05SD020006	05SD020006-D	05SD030006	05SD040006	05SD050006
sample	05SD010006	05SD020006	FD12190002	05SD030006	05SD040006	05SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/18/00
validated	Y	Y	Y	Y	Y	Y
DIBENZOFURAN	420 U	500 U	470 U	510 U	680 U	480 U
DIETHYL PHTHALATE	420 U	500 U	470 U	510 U	680 U	480 U
DIMETHOATE	420 U	500 U	470 U	510 U	680 U	480 U
DIMETHYL PHTHALATE	420 U	500 U	470 U	510 U	680 U	480 U
DIPHENYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
DISULFOTON	420 U	500 U	470 U	510 U	680 U	480 U
ETHYL METHANE SULFONATE	420 U	500 U	470 U	510 U	680 U	480 U
ETHYL PARATHION	420 U	500 U	470 U	510 U	680 U	480 U
FAMPHUR	840 UR	1000 UR	940 UR	1000 UR	1400 UR	950 UR
FLUORANTHENE	960	55.0	69.0	45.0	16	38.0
FLUORENE	56.0	10.0 U	9.00 U	10.0 U	14 U	10.0 U
HEXACHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
HEXACHLOROBUTADIENE	420 U	500 U	470 U	510 U	680 U	480 U
HEXACHLOROCYCLOPENTADIENE	420 U	500 U	470 U	510 U	680 U	480 UR
HEXACHLOROETHANE	420 U	500 U	470 U	510 U	680 U	480 U
HEXACHLOROPROPENE	420 U	500 U	470 U	510 U	680 U	480 U
INDENO(1,2,3-CD)PYRENE	120	13.0	15.0	12.0	14 U	27.0
ISODRIN	420 U	500 U	470 U	510 U	680 U	480 U
ISOPHORONE	420 U	500 U	470 U	510 U	680 U	480 U
ISOSAFROLE	420 U	500 U	470 U	510 U	680 U	480 U
KEPONE	420 UR	500 UR	470 UR	510 UR	680 UR	480 UR
METHAPYRILENE	420 U	500 U	470 U	510 U	680 U	480 U
METHYL METHANE SULFONATE	420 U	500 U	470 U	510 U	680 U	480 U
METHYL PARATHION	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSO-DI-N-PROPYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSODI-N-BUTYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSODIETHYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSODIMETHYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSOMETHYLETHYLAMINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSOMORPHOLINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSOPIPERIDINE	420 U	500 U	470 U	510 U	680 U	480 U
N-NITROSOPYRROLIDINE	420 U	500 U	470 U	510 U	680 U	480 U
NAPHTHALENE	37.0	10.0 U	12.0	10.0 U	14 U	16.0
O,O,O-TRIETHYL PHOSPHOROTHIOATE	420 U	500 U	470 U	510 U	680 U	480 U
O-TOLUIDINE	420 U	500 U	470 U	510 U	680 U	480 U
P-(DIMETHYLAMINO)AZOBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
PENTACHLOROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
PENTACHLOROETHANE	420 U	500 U	470 U	510 U	680 U	480 U
PENTACHLORONITROBENZENE	420 U	500 U	470 U	510 U	680 U	480 U
PHENACETIN	420 U	500 U	470 U	510 U	680 U	480 U
PHENANTHRENE	670	31.0	47.0	25.0	14 U	22.0
PHENOL	420 U	500 U	470 UR	510 U	680 U	480 U
PHORATE	420 U	500 U	470 U	510 U	680 U	480 U
PRONAMIDE	420 U	500 U	470 U	510 U	680 U	480 U
PYRENE	650	47.0	57.0	34.0	14 U	39.0
PYRIDINE	420 U	500 U	470 U	510 U	680 U	480 U
SAFROLE	420 U	500 U	470 U	510 U	680 U	480 U
SULFOTEPP	420 U	500 U	470 U	510 U	680 U	480 U
THIONAZIN	420 U	500 U	470 U	510 U	680 U	480 U

TABLE E-2-5
SWMU 5 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SD010006	05SD020006	05SD020006-D	05SD030006	05SD040006	05SD050006
sample	05SD010006	05SD020006	FD12190002	05SD030006	05SD040006	05SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/18/00
validated	Y	Y	Y	Y	Y	Y
Pesticides (UG/KG)						
4,4'-DDD	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
4,4'-DDE	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
4,4'-DDT	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
ALDRIN	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
ALPHA-BHC	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
ALPHA-CHLORDANE	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
AROCLOR-1016	42 U	49 U	46 U	50 U	67 U	47 U
AROCLOR-1221	84 U	99 U	93 U	100 U	130 U	94 U
AROCLOR-1232	42 U	49 U	46 U	50 U	67 U	47 U
AROCLOR-1242	42 U	49 U	46 U	50 U	67 U	47 U
AROCLOR-1248	42 U	49 U	46 U	50 U	67 U	47 U
AROCLOR-1254	42 U	49 U	46 U	50 U	67 U	47 U
AROCLOR-1260	42 U	49 U	46 U	50 U	67 U	170
BETA-BHC	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
DELTA-BHC	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
DIELDRIN	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
ENDOSULFAN I	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
ENDOSULFAN II	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
ENDOSULFAN SULFATE	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
ENDRIN	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 U
ENDRIN ALDEHYDE	4.2 U	4.9 U	4.6 U	5.0 U	6.7 U	4.7 UJ
GAMMA-BHC (LINDANE)	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
GAMMA-CHLORDANE	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
HEPTACHLOR	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
HEPTACHLOR EPOXIDE	2.2 U	2.5 U	2.4 U	2.6 U	3.5 U	2.4 U
METHOXYCHLOR	22 U	25 U	24 U	26 U	35 U	24 U
TOXAPHENE	220 U	250 U	240 U	260 U	350 U	240 U
Herbicides (UG/KG)						
2,4,5-T	3.4 U	20 R	3.8 U	18 R	5.4 U	3.8 UR
2,4,5-TP (SILVEX)	3.4 U	4.0 U	3.8 U	4.0 U	5.4 U	3.8 UJ
2,4-D	3.4 U	4.0 U	3.8 U	4.0 U	5.4 U	3.8 UR
DINOSEB	3.4 U	4.0 U	3.8 U	4.0 U	5.4 U	3.8 UJ
HEXACHLOROPHENE	0.85 U	1.0 U	0.94 U	1.0 U	3.1 J	0.96 UJ
PENTACHLOROPHENOL	0.85 U	1.0 U	3.1	1.0 U	1.4 U	6.0 J
Inorganics (MG/KG)						
ALUMINUM	5610 J	4750 J	3710 J	3790 J	5260 J	7660 J
ANTIMONY	1.0 U	2.2	2.9	1.6	1.6 U	5.8
ARSENIC	6.1	3.0	2.8	3.3	1.9	5.3
BARIUM	54.5 J	133 J	144 J	76.6 J	117 J	148 J
BERYLLIUM	1.1 J	1.1 U	1.0 U	1.1 U	1.6 U	1.1 U
CADMIUM	0.93 U	1.1 U	1.0 J	1.1 U	1.6 U	2.5 J
CALCIUM	12400 J	3050 J	3240 J	2370 J	1540 J	57300 J
CHROMIUM	13.4 J	13.4 J	10.1 J	9.5 J	6.9 J	17.4 J
COBALT	9.5	5.9	7.0	5.7	4	5.6
COPPER	12.0 J	24.3 J	30.3 J	15.0 J	9.5 J	37.1 J
IRON	24400 J	9630 J	10400 J	10300 J	5030 J	14000 J
LEAD	20.9	30.3	38.0	18.8	15.1	130
MAGNESIUM	1540 J	1150 J	952 J	734	788 U	4010 J

TABLE E-2-5
SWMU 5 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	05	05	05	05	05	05
location	05SW/SD01	05SW/SD02	05SW/SD02	05SW/SD03	05SW/SD04	05SW/SD05
nsample	05SD010006	05SD020006	05SD020006-D	05SD030006	05SD040006	05SD050006
sample	05SD010006	05SD020006	FD12190002	05SD030006	05SD040006	05SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/19/00	12/19/00	12/19/00	12/19/00	12/18/00	12/18/00
validated	Y	Y	Y	Y	Y	Y
MANGANESE	346 J	712 J	1290 J	812 J	109 J	328 J
MERCURY	0.03	0.04	0.04	0.05 U	0.08 U	0.09 J
NICKEL	22.5	9.2	8.7	14.5	10.3	12.8
POTASSIUM	464 U	554 U	508 U	544 U	788 U	648
SELENIUM	0.93 U	1.1 U	1.0 U	1.1 U	1.6 U	1.1 U
SILVER	0.93 U	1.1 U	1.0 U	1.1 U	1.6 U	1.1 U
SODIUM	464 U	554 U	508 U	544 U	788 U	553 U
THALLIUM	0.93 U	1.1 U	1.0 U	1.1 U	1.6 U	1.1 U
TIN	5.2 U	5.7 U	5.3 U	6.0 U	8.1 U	5.4 U
VANADIUM	15.1	10.5	8.7	11.0	10.2	16.7
ZINC	53.2	110	106	77.3	31.7	243
Miscellaneous Parameters (MG/KG)						
CYANIDE	3.2 UJ	0.70 UJ	0.70 UJ	0.80 UJ	1.0 UJ	3.6 UJ
TOTAL ORGANIC CARBON	3100	4000	3500	2600	11000	4400

APPENDIX E.1.3

SWMU 9
ANALYTICAL DATABASE

TABLE E-3-1
SWMU 9 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB01	09SB02	09SB02	09SB03	09SB03	09SB03	09SB03	09SB04	09SB04	09SB04	09SB04	09SB05	09SB05	09SB06	09SB06	09SB07	09SB07	09SB08	09SB08	09SB09	09SB09	09SB10	09SB10	09SB11	09SB11
sample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	09SB030002-D	09SB030102	09SB030102-D	09SB040002	09SB040002-D	09SB040102	09SB040102-D	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
sample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	FD11300002	09SB030102	FD11300002	09SB040002	FD12040001	09SB040102	FD12040001	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
qscode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/5/00	12/4/00	12/4/00	11/30/00	11/30/00	12/4/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatiles (UG/KG)																										
1,1,1,2-TETRACHLOROETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,1,1-TRICHLOROETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,1,2,2-TETRACHLOROETHANE		3 U		4 U			3 UJ	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,1,2-TRICHLOROETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,1-DICHLOROETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,1-DICHLOROETHENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,2,3-TRICHLOROPROPANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,2 DIBROMO-3-CHLOROPROPANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,2-DIBROMOETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,2 DICHLOROETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,2-DICHLOROPROPANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
1,4-DIOXANE		180 UJ		210 U			190 U	220 U			220 U	240 U		220 UJ		190 U		200 U		210 UJ		210 U		200 U		190 U
2-BUTANONE		15 U		18 U			15 UJ	15 UJ			17 UJ	18 UJ		17 U		14 U		15 U		18 U		17 U		17 U		15 U
2-HEXANONE		15 U		18 U			15 UJ	15 U			17 U	18 U		17 U		14 U		15 U		18 U		17 U		17 U		15 U
3-CHLOROPROPENE		10 UJ		12 UJ			10 UJ	10 UJ			11 UJ	12 UJ		11 UJ		9 UJ		10 UJ		11 UJ		11 UJ		12 UJ		10 UJ
4-METHYL-2-PENTANONE		15 U		18 U			15 UJ	15 U			17 U	18 U		17 U		14 U		15 U		18 U		17 U		17 U		15 U
ACETONE		15 U		18 U			15 UJ	15 U			17 U	18 U		17 U		14 U		15 U		18 U		17 U		17 U		15 U
ACETONITRILE		73 UJ		84 U			77 U	87 U			88 U	96 U		89 UJ		76 U		82 U		83 UJ		85 U		79 U		74 U
ACROLEIN		50 UR		60 UR			50 UR	51 UR			55 UR	59 UR		58 UR		45 UR		50 UR		54 UR		57 UR		58 UR		48 UR
ACRYLONITRILE		10 UR		12 UR			10 UR	10 UR			11 UR	12 UR		11 UR		9 UR		10 UR		11 UR		11 UR		12 UR		10 UR
BENZENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
BROMODICHLOROMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
BROMOFORM		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
BROMOMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CARBON DISULFIDE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CARBON TETRACHLORIDE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CHLOROBENZENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CHLORODIBROMOMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CHLOROETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CHLOROFORM		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CHLOROMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CHLOROPRENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CIS-1,2-DICHLOROETHENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
CIS-1,3-DICHLOROPROPENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
DIBROMOMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
DICHLORODIFLUOROMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
ETHYL METHACRYLATE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
ETHYLBENZENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
ISOBUTANOL		73 UJ		84 U			77 U	87 U			88 U	96 U		89 UJ		76 U		82 U		83 UJ		85 U		79 U		74 U
METHACRYLONITRILE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
METHYL IODIDE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
METHYL METHACRYLATE		30 U		36 U			30 U	31 U			33 U	35 U		34 U		27 U		30 U		83 UJ		34 U		35 U		29 U
METHYLENE CHLORIDE		4 J		4 U			5 J	6 J			3 U	4 U		3 U		3 U		3 U		6 J		6 J		5 J		3 U
PROPIONITRILE		73 UJ		84 U			77 U	87 U			88 U	96 U		89 UJ		76 U		82 U		87 U		85 U		79 U		74 U
STYRENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TETRACHLOROETHENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TOLUENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TRANS-1,2-DICHLOROETHENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TRANS-1,3-DICHLOROPROPENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TRANS-1,4-DICHLORO-2-BUTENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TRICHLOROETHENE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
TRICHLOROFLUOROMETHANE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
VINYL ACETATE		30 U		36 U			30 U	31 U			33 U	35 U		34 U		27 U		30 U		32 U		34 U		35 U		29 U
VINYL CHLORIDE		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
XYLENES, TOTAL		3 U		4 U			3 U	3 U			3 U	4 U		3 U		3 U		3 U		3 U		3 U		4 U		3 U
Semi-Volatiles (UG/KG)																										
1,2,4,5-TETRACHLOROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1,2,4-TRICHLOROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1,2-DICHLOROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1,3-DICHLOROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1,4-DICHLOROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1,4-NAPHTHOQUINONE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1,4-PHENYLENEDIAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
1-NAPHTHYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2,2'-OXYBIS(1-CHLOROPROPANE)	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2,3,4,6-TETRACHLOROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2,4,5-TRICHLOROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2,4,6-TRICHLOROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2,4-DICHLOROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2,4-DIMETHYLPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	

TABLE E-3-1
SWMU 9 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

survey	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB01	09SB02	09SB02	09SB03	09SB03	09SB03	09SB03	09SB04	09SB04	09SB04	09SB04	09SB05	09SB05	09SB06	09SB06	09SB07	09SB07	09SB08	09SB08	09SB09	09SB09	09SB10	09SB10	09SB11	09SB11
sample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	09SB030002-D	09SB030102	09SB030102-D	09SB040002	09SB040002-D	09SB040102	09SB040102-D	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
sample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	FD11300002	09SB030102	FD11300002	09SB040002	FD12040001	09SB040102	FD12040001	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
sc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/5/00	12/4/00	12/4/00	11/30/00	11/30/00	12/4/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2,4-DINITROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 UJ		430 U		400 U		390 U	
2,6-DICHLOROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-ACETYLAMINOFLUORENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-CHLORONAPHTHALENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-CHLOROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-METHYLNAPHTHALENE	8 U		8 U		40	8 U			8.00 U	9.00 U			9.00 U		8.00 U		8.00 U		8.00 U		1800		8 UJ		8.00 U	
2-METHYLPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-NAPHTHYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-NITROANILINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-NITROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
2-PICOLINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
3,3'-DICHLOROBENZIDINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
3,3'-DIMETHYLBENZIDINE	380 U		400 U		410 UJ	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
3-METHYLCHOLANTHRENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
3-NITROANILINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4,6-DINITRO-2-METHYLPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-AMINOBIPHENYL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-BROMOPHENYL PHENYL ETHER	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-CHLORO-3-METHYLPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-CHLOROANILINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-CHLOROPHENYL PHENYL ETHER	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-METHYLPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-NITROANILINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-NITROPHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
4-NITROQUINOLINE-1-OXIDE	380 UR		400 UR		410 UR	420 UR			420 UR	450 UR			440 UR		400 UR		400 UR		420 UR		430 UR		400 UR		390 UR	
5-NITRO-O-TOLUIDINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
A,A-DIMETHYLPHENETHYLAMINE	770 U		800 U		810 U	840 U			840 U	900 U			880 U		790 U		790 U		830 U		850 U		800 U		780 U	
ACENAPHTHENE	8 U		8 U		20	17			8.00 U	9.00 U			9.00 U		8.00 U		8.00 U		8.00 U		6.00 U		8 UJ		8.00 U	
ACENAPHTHYLENE	8 U		8 U		18	8 U			8.00 U	9.00 U			9.00 U		8.00 U		8.00 U		8.00 U		8.00 U		8 UJ		8.00 U	
ACETOPHENONE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
ANILINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
ANTHRACENE	8 U		8 U		52	24			8.00 U	9.00 U			9.00 U		8.00 U		8.00 U		8.00 U		8.00 U		8 UJ		8.00 U	
ARAMITE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
BENZO(A)ANTHRACENE	8 U		8 U		150	92			8.00 U	9.00 U			9.00 U		18.0		8.00 U		8.00 U		100		56 J		8.00 U	
BENZO(A)PYRENE	8 U		8 U		130	89			8.00 U	9.00 U			9.00 U		22.0 J		8.00 U		8.00 U		65.0 J		64 J		8.00 U	
BENZO(B)FLUORANTHENE	8 U		8 U		120	96			8.00 U	9.00 U			9.00 U		40.0 J		9.00		8.00 U		61.0 J		69 J		8.00 U	
BENZO(G,H,I)PERYLENE	8 U		9		57	38			8.00 U	9.00 U			9.00 U		26.0 J		8.00 U		8.00 U		29.0 J		37 J		8.00 U	
BENZO(K)FLUORANTHENE	8 U		8 U		110 J	77			8.00 U	9.00 U			9.00 U		18.0 J		8.00 U		8.00 U		47.0 J		54 J		8.00 U	
BENZYL ALCOHOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
BIS(2-CHLOROETHOXY)METHANE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
BIS(2-CHLOROETHYL)ETHER	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
BIS(2-ETHYLHEXYL)PHTHALATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
BUTYL BENZYL PHTHALATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
CHLOROBENZILATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
CHRYSENE	8 U		8 U		140	96			8.00 U	9.00 U			9.00 U		29.0		10.0		8.00 U		98.0		67 J		8.00 U	
DI-N-BUTYL PHTHALATE	380 U		1200		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DI-N-OCTYL PHTHALATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DIALLATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DIBENZO(A,H)ANTHRACENE	8 U		8 U		29	17			8.00 U	9.00 U			9.00 U		8.00 UJ		8.00 U		8.00 U		10.0 J		14 J		8.00 U	
DIBENZOFURAN	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DIETHYL PHTHALATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DIMETHOATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DIMETHYL PHTHALATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DIPHENYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
DISULFOTON	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
ETHYL METHANE SULFONATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
ETHYL PARATHION	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
FAMPHUR	770 UR		800 UR		810 UR	840 UR			840 UR	900 UR			880 UR		790 UR		790 UR		830 UR		850 UR		800 UR		780 UR	
FLUORANTHENE	8 U		8		300 J	230			8.00 UJ	11.0 J			9.00 U		23.0		8.00 U		8.00 U		100		130 J		8.00 U	
FLUORENE	8 U		8 U		29	13			8.00 U	9.00 U			9.00 U		8.00 U		8.00 U		8.00 U		8.00 U		8 UJ		8.00 U	
HEXACHLOROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
HEXACHLOROBUTADIENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
HEXACHLOROCYCLOPENTADIENE	380 U		400 U		410 UJ	420 U			420 UJ	450 U			440 UJ		400 UJ		400 UJ		420 U		430 UJ		400 U		390 U	
HEXACHLOROETHANE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
HEXACHLOROPROPENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
INDENO(1,2,3-CD)PYRENE	8 U		8 U		58	39			8.00 U	9.00 U			9.00 U		14.0 J		8.00 U		8.00 U		15.0 J		35 J		8.00 U	
ISODRIN	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
ISOPHORONE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
ISOSAFROLE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
KEPONE	380 UR		400 UR		410 UR	420 UR			420 UR	450 UR			440 UR		400 UR		400 UR		420 UR		430 UR		400 UR		390 UR	

TABLE E-3-1
SWMU 9 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA
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swmu	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB01	09SB02	09SB02	09SB03	09SB03	09SB03	09SB03	09SB04	09SB04	09SB04	09SB04	09SB05	09SB05	09SB06	09SB06	09SB07	09SB07	09SB08	09SB08	09SB09	09SB09	09SB10	09SB10	09SB11	09SB11
mssmple	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	09SB030002-D	09SB030102	09SB030102-D	09SB040002	09SB040002-D	09SB040102	09SB040102-D	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
sample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	FD11300002	09SB030102	FD11300002	09SB040002	FD12040001	09SB040102	FD12040001	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/5/00	12/4/00	12/4/00	11/30/00	11/30/00	12/4/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
METHAPYRILENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
METHYL METHANE SULFONATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
METHYL PARATHION	380 U		400 U		410 U	420 U			420 UJ	450 UJ			440 UJ		400 UJ		400 UJ		420 U		430 UJ		400 U		390 UJ	
N-NITROSO-DI-N-PROPYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSODI-N-BUTYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSODIETHYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSODIMETHYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSOMETHYLETHYLAMINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSOMORPHOLINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSOPIPERIDINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
N-NITROSOPYRROLIDINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
NAPHTHALENE	8 U		8 U		30	8 U			8 00 U	9 00 U			9 00 U		8 00 U		8 00 U		8 00 U		930		6 UJ		8 00 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
O-TOLUIDINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
P-(DIMETHYLAMINO)AZOBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PENTACHLOROBENZENE	380 U		400 U		410 U	420 U			420 UJ	450 UJ			440 UJ		400 UJ		400 UJ		420 U		430 UJ		400 U		390 UJ	
PENTACHLOROETHANE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PENTACHLORONITROBENZENE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PHENACETIN	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PHENANTHRENE	8 U		8 U		300 J	150			8 00 U	9 00 U			9 00 U		8 00 U		130		8 00 U		630		55 J		8 00 U	
PHENOL	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PHORATE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PRONAMIDE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
PYRENE	8 U		8 U		230 J	180			8 00 UJ	10 0 J			9 00 U		28 0		13 0		8 00 U		140		110 J		8 00 U	
PYRIDINE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
SAFROLE	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
SULFOTEPP	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
THIONAZIN	380 U		400 U		410 U	420 U			420 U	450 U			440 U		400 U		400 U		420 U		430 U		400 U		390 U	
Pesticides (UG/KG)																										
4,4'-DDD	38 UJ		40 U		40 UJ	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
4,4'-DDE	38 UJ		40 U		40 UJ	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
4,4'-DDT	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		47		40 UJ		38 U	
ALDRIN	20 UJ		20 U		21 UJ	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
ALPHA-BHC	20 UJ		20 U		21 UJ	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
ALPHA-CHLORDANE	20 UJ		20 U		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
AROCLOR-1016	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
AROCLOR-1221	76 UJ		80 U		80 U	84 UJ			84 U	89 U			87 U		78 U		78 U		82 U		85 U		80 UJ		77 U	
AROCLOR-1232	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
AROCLOR-1242	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
AROCLOR-1248	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
AROCLOR-1254	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
AROCLOR-1260	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
BETA-BHC	20 UJ		20 U		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
DELTA-BHC	20 UJ		20 U		21 UJ	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
DIELDRIN	38 UJ		40 U		40 UJ	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
ENDOSULFAN I	20 UJ		20 U		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
ENDOSULFAN II	38 UJ		40 U		40 UJ	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
ENDOSULFAN SULFATE	38 UJ		40 U		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
ENDRIN	38 UJ		40 U		40 UJ	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
ENDRIN ALDEHYDE	38 UJ		40 UJ		40 U	42 UJ			42 U	45 U			43 U		39 U		39 U		41 U		42 U		40 UJ		38 U	
GAMMA-BHC (LINDANE)	20 UJ		20 U		21 UJ	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
GAMMA-CHLORDANE	20 UJ		20 U		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
HEPTACHLOR	20 UJ		20 U		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
HEPTACHLOR EPOXIDE	20 UJ		20 U		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		22 U		20 UJ		20 U	
METHOXYCHLOR	20 UJ		20 UJ		21 U	22 UJ			22 U	23 U			22 U		20 U		20 U		21 U		25 J		20 UJ		20 U	
TOXAPHENE	200 UJ		200 U		210 U	220 UJ			220 U	230 U			220 U		200 U		200 U		210 U		220 U		200 UJ		200 U	
Herbicides (UG/KG)																										
2,4,5-T	31 UJ		32 U		33 U	34 U			34 U	22 R			15 R		32 U		32 U		49 R		100 R		32 UJ		31 U	
2,4,5-TP (SILVEX)	31 UJ		32 U		33 U	34 U			34 U	36 U			35 U		32 U		32 U		33 U		34 U		32 UJ		31 U	
2,4-D	31 UJ		17 R		33 U	34 U			20 J	15 J			18 R		32 U		85 R		62 R		12 R		32 UJ		31 U	
DINOSEB	31 UJ		32 U		33 U	34 U			22 R	42 R			35 U		32 U		14 R		14 J		34 U		32 UJ		31 U	
HEXACHLOROPHENE	0 77 UJ		0 81 U		0 82 UJ	0 85 U			0 85 U	0 91 U			0 88 U		0 80 U		0 80 U		0 84 U		2 9 R		0 81 UJ		0 78 U	
PENTACHLOROPHENOL	0 77 UJ		3 5		0 82 U	0 85 U			2 0 J	0 91 UJ			0 88 U		0 80 U		1 2 J		5 4 R		6 0 R		0 81 UJ		0 78 U	
Inorganics (UG/KG)																										
ALUMINUM	8680 J		11900 J		8950 J	9110 J			10900	10400			12000		5140		8450		12900		10500		5480 J		5040	
ANTIMONY	0 83 U		0 91 U		0 90 U	1 2			0 97 UJ	1 7 J			1 0 UJ		3 1 J		0 93 UJ		0 95 UJ		0 91 UJ		0 97		0 92 UJ	
ARSENIC	5 2		7 6		5 5	6 5			6 4 J	7 5 J			7 0 J		2 9 J		5 1 J		8 6 J		9 8 J		4 2		3 4 J	
BARIUM	49 6 J		98 8 J		62 8 J	63 7 J			104 J	108 J			85 2 J		52 9 J		78 7 J		105 J		108 J		68 1 J		103 J	
BERYLLIUM	0 82 U		0 89 U		0 93 U	0 92 U			0 91 U	0 95 U			1 0 U		0 90 U		0 91 U		1 0 U		0 92 U		0 92 U		0 83 U	
CADMIUM	0 82 U		0 89 U		0 93 U	0 92 J			0 91 U	0 95 U			1 0 U		0 90 U		0 91 U		1 0 U		0 92 U		0 95 J		0 83 U	
CALCIUM	1430 J		15900 J		15700 J	20800 J			1350 J	2000 J			1780 J		71700 J		93500 J		843 J		2150 J		130000 J		175000 J	

TABLE E-3-1
SWMU 9 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

sxrmn	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB01	09SB02	09SB02	09SB03	09SB03	09SB03	09SB03	09SB04	09SB04	09SB04	09SB04	09SB05	09SB05	09SB06	09SB06	09SB07	09SB07	09SB08	09SB08	09SB09	09SB09	09SB10	09SB10	09SB11	09SB11
rsample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	09SB030002-D	09SB030102	09SB030102-D	09SB040002	09SB040002-D	09SB040102	09SB040102-D	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
sample	09SB010002	09SB010102	09SB020002	09SB020102	09SB030002	FD11300002	09SB030102	FD11300002	09SB040002	FD12040001	09SB040102	FD12040001	09SB050002	09SB050102	09SB060002	09SB060102	09SB070002	09SB070102	09SB080002	09SB080102	09SB090002	09SB090102	09SB100002	09SB100102	09SB110002	09SB110102
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	DUP	DUP	NORMAL	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	0 - 2	1 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2	0 - 2	1 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/5/00	12/4/00	12/4/00	11/30/00	11/30/00	12/4/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CHROMIUM	8.4		12.9		11.3	13.7			10.8 J	12.7 J			13.4 J		11.2 J		10.9 J		13.7 J		13.1 J		8.7		7.6 J	
COBALT	5.4 J		14.0 J		5.1 J	5.5 J			23.0	17.7			16.8		5.1		8.7		13.4		13.6		4.8 J		5.5	
COPPER	9.3 J		13.6 J		11.9 J	19.6 J			9.5 J	12.9 J			11.4 J		12.4 J		9.8 J		13.4 J		12.7 J		20.1 J		7.6 J	
IRON	18300		19800		18000	19800			16100	18100			18300		13600		13600		20100		18700		10500		8840	
LEAD	8.6 J		19.8 J		18.7 J	65.3 J			19.8 J	34.4 J			18.3 J		14.3 J		18.2 J		16.8 J		25.6 J		34.9 J		12.7 J	
MAGNESIUM	731 J		1950 J		3070 J	3240 J			1490 J	1530 J			1480 J		1510 J		4490 J		1750 J		1490 J		10800 J		32500 J	
MANGANESE	333 J		755 J		225 J	238 J			1060 J	1120 J			903 J		135 J		531 J		782 J		912 J		327 J		385 J	
MERCURY	0.04 U		0.04 U		0.05 U	0.04			0.06	0.06			0.04		0.04 U		0.05		0.05		0.06		0.04 U		0.04 U	
NICKEL	9.5 J		12.8 J		11.7 J	19.0 J			12.5	12.9			12.4		12.1		13.5		13.7		15.0		18.3 J		14.5	
POTASSIUM	409 UJ		545 J		466 UJ	458 UJ			479 J	485 J			533 J		449 UJ		464 J		618 J		462 UJ		459 J		417 UJ	
SELENIUM	0.82 U		0.89 U		0.93 U	0.92 U			0.91 U	0.95 U			1.0 U		0.90 U		0.91 U		1.0 U		0.92 U		0.92 U		0.83 U	
SILVER	0.82 U		0.89 U		0.93 U	0.92 U			0.91 U	0.95 U			1.0 U		0.90 U		0.91 U		1.0 U		0.92 U		0.92 U		0.83 U	
SODIUM	409 U		445 U		466 U	458 U			453 U	477 U			501 U		449 U		453 U		515 U		462 U		461 U		417 U	
THALLIUM	0.82 U		0.89 U		0.93 U	0.92 U			0.91 U	0.95 U			1.0 U		0.90 U		0.91 U		1.0 U		0.92 U		0.92 U		0.83 U	
TIN	4.5 UJ		4.5 UJ		4.5 UJ	5.3 UJ			4.9 UJ	5.3 UJ			5.0 UJ		4.6 UJ		4.6 UJ		4.8 UJ		4.6 UJ		4.6 UJ		4.6 UJ	
VANADIUM	14.6		24.4		18.5	22.1			22.4 J	24.6 J			26.3 J		16.6 J		20.2 J		27.6 J		29.3 J		22.5		14.5 J	
ZINC	30.3 J		54.1 J		39.8 J	84.2 J			37.3 J	51.9 J			44.3 J		120 J		39.4 J		48.6 J		43.0 J		63.7 J		49.2 J	
Miscellaneous Parameters																										
CATION EXCHANGE CAPACITY MEQ/1									11.0 J				9.8 J				8.4 J									
CYANIDE MG/KG	0.60 UJ		0.60 UJ		0.60 UJ	0.60 UJ			1.0 UJ	1.0 UJ			1.0 UJ		1.0 UJ		1.0 UJ		1.0 UJ		1.0 UJ		0.60 UJ		1.0 UJ	
PH S U									6.9 J				7.2 J				8.0 J									
TOTAL ORGANIC CARBON MG/KG									8500				5700				6400									

TABLE E-3-2
SWMU 9 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB02	09SB02	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB09	09SB10	09SB11
nsample	09SB010810	09SB020608	09SB020608-D	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
sample	09SB010810	09SB020608	FD11300003	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	6 - 8	6 - 8	4 - 6	4 - 6	4 - 6	8 - 10	7 - 9	4 - 6	8 - 10	2 - 4	4 - 6
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/4/00	11/30/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatiles (UG/KG)												
1,1,1,2-TETRACHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1,1-TRICHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1,2,2-TETRACHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1,2-TRICHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1-DICHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,1-DICHLOROETHENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,2,3-TRICHLOROPROPANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,2-DIBROMO-3-CHLOROPROPANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,2-DIBROMOETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,2-DICHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,2-DICHLOROPROPANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
1,4-DIOXANE	190 U	190 U	210 U	220 U	220 U	180 UJ	190 U	200 U	190 UJ	170 UJ	210 UJ	190 U
2-BUTANONE	14 U	15 U	20 UJ	15 U	15 UJ	16 U	14 U	14 U	14 U	14 UJ	15 UJ	15 U
2-HEXANONE	14 U	15 U	20 U	15 U	15 U	16 U	14 U	14 U	14 U	14 U	15 U	15 U
3-CHLOROPROPENE	10 UJ	10 UJ	14 UJ	10 UJ	10 UJ	11 UJ	9 UJ	9 UJ	10 UJ	9 UJ	10 UJ	10 UJ
4-METHYL-2-PENTANONE	14 U	15 U	20 U	15 U	15 U	16 U	14 U	14 U	14 U	14 U	15 U	15 U
ACETONE	14 U	15 U	20 U	15 U	15 U	16 U	14 U	14 U	14 U	14 U	15 U	15 U
ACETONITRILE	77 U	74 U	84 U	86 U	89 U	72 UJ	74 U	79 U	77 UJ	70 UJ	83 UJ	77 U
ACROLEIN	48 UR	49 UR	68 UR	51 UR	51 UR	53 UR	45 UR	47 UR	48 UR	45 UR	51 UR	49 UR
ACRYLONITRILE	10 UR	10 UR	14 UR	10 UR	10 UR	11 UR	9 UR	9 UR	10 UR	9 UR	10 UR	10 UR
BENZENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
BROMODICHLOROMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
BROMOFORM	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
BROMOMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CARBON DISULFIDE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CARBON TETRACHLORIDE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CHLOROBENZENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CHLORODIBROMOMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CHLOROETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CHLOROFORM	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CHLOROMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CHLOROPRENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CIS-1,2-DICHLOROETHENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
CIS-1,3-DICHLOROPROPENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
DIBROMOMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
DICHLORODIFLUOROMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
ETHYL METHACRYLATE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
ETHYLBENZENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
ISOBUTANOL	77 U	74 U	84 U	86 U	89 U	72 UJ	74 U	79 U	77 UJ	70 UJ	83 UJ	77 U
METHACRYLONITRILE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
METHYL IODIDE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
METHYL METHACRYLATE	29 U	29 U	41 U	31 U	31 U	32 U	27 U	28 U	29 U	27 U	30 U	29 U
METHYLENE CHLORIDE	3 J	4 J	6 J	3 J	3 U	3 U	3 J	3 U	3 J	3 U	6 J	3 U
PROPIONITRILE	77 U	74 U	84 U	86 U	89 U	72 UJ	74 U	79 U	77 UJ	70 UJ	83 UJ	77 U
STYRENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
TETRACHLOROETHENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	4	3 U	3 U	3 U	3 U
TOLUENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
TRANS-1,2-DICHLOROETHENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U

TABLE E-3-2
SWMU 9 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB02	09SB02	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB09	09SB10	09SB11
nsample	09SB010810	09SB020608	09SB020608-D	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
sample	09SB010810	09SB020608	FD11300003	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	6 - 8	6 - 8	4 - 6	4 - 6	4 - 6	8 - 10	7 - 9	4 - 6	8 - 10	2 - 4	4 - 6
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/4/00	11/30/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
TRANS-1,3-DICHLOROPROPENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
TRANS-1,4-DICHLORO-2-BUTENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
TRICHLOROETHENE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	18	3 U	3 U	3 U	3 U
TRICHLOROFLUOROMETHANE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
VINYL ACETATE	29 U	29 U	41 U	31 U	31 U	32 U	27 U	28 U	29 U	27 U	30 U	29 U
VINYL CHLORIDE	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
XYLENES, TOTAL	3 U	3 U	4 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Semi-Volatiles (UG/KG)												
1,2,4,5-TETRACHLOROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1,2,4-TRICHLOROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1,2-DICHLOROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1,3-DICHLOROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1,4-DICHLOROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1,4-NAPHTHOQUINONE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1,4-PHENYLENEDIAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
1-NAPHTHYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,2'-OXYBIS(1-CHLOROPROPANE)	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,3,4,6-TETRACHLOROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,4,5-TRICHLOROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,4,6-TRICHLOROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,4-DICHLOROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,4-DIMETHYLPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,4-DINITROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2,6-DICHLOROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-ACETYLAMINOFLUORENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-CHLORONAPHTHALENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-CHLOROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-METHYLNAPHTHALENE	8 U	8 U	8 U	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
2-METHYLPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-NAPHTHYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-NITROANILINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-NITROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
2-PICOLINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
3,3'-DICHLOROBENZIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
3,3'-DIMETHYLBENZIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
3-METHYLCHOLANTHRENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
3-NITROANILINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4,6-DINITRO-2-METHYLPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-AMINOBIPHENYL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-BROMOPHENYL PHENYL ETHER	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-CHLORO-3-METHYLPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-CHLOROANILINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-CHLOROPHENYL PHENYL ETHER	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-METHYLPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-NITROANILINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-NITROPHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
4-NITROQUINOLINE-1-OXIDE	380 UR	380 UR	420 UR	410 UR	380 UR	390 UR	390 UR	380 UR	390 UR	370 UR	400 UR	390 UR
5-NITRO-O-TOLUIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U

TABLE E-3-2
SWMU 9 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB02	09SB02	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB09	09SB10	09SB11
nsample	09SB010810	09SB020608	09SB020608-D	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
sample	09SB010810	09SB020608	FD11300003	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	6 - 8	6 - 8	4 - 6	4 - 6	4 - 6	8 - 10	7 - 9	4 - 6	8 - 10	2 - 4	4 - 6
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/4/00	11/30/00	12/4/00
validatad	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
A,A-DIMETHYLPHENETHYLAMINE	770 U	770 U	840 U	820 U	770 U	780 U	780 U	770 U	780 UJ	750 U	790 U	780 U
ACENAPHTHENE	8 U	8 U	8 U	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
ACENAPHTHYLENE	8 U	8 U	8 U	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
ACETOPHENONE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
ANILINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
ANTHRACENE	8 U	8 U	8 U	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
ARAMITE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
BENZO(A)ANTHRACENE	8 U	8 U	25 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
BENZO(A)PYRENE	8 U	8 U	35 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
BENZO(B)FLUORANTHENE	8 U	8 U	38 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
BENZO(G,H,I)PERYLENE	8 U	8 U	17 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
BENZO(K)FLUORANTHENE	8 U	8 U	32 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
BENZYL ALCOHOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
BIS(2-CHLOROETHOXY)METHANE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
BIS(2-CHLOROETHYL)ETHER	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
BIS(2-ETHYLHEXYL)PHTHALATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	660	390 U	370 U	400 U	390 U
BUTYL BENZYL PHTHALATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
CHLOROBENZILATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
CHRYSENE	8 U	8 U	33 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
DI-N-BUTYL PHTHALATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DI-N-OCTYL PHTHALATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DIALLATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DIBENZO(A,H)ANTHRACENE	8 U	8 U	8 U	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
DIBENZOFURAN	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DIETHYL PHTHALATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DIMETHOATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DIMETHYL PHTHALATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DIPHENYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
DISULFOTON	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
ETHYL METHANE SULFONATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
ETHYL PARATHION	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
FAMPHUR	770 UR	770 UR	840 UR	820 UR	770 UR	780 UR	780 UR	770 UR	780 UR	750 UR	790 UR	780 UR
FLUORANTHENE	8 U	8 U	41 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
FLUORENE	8 U	8 U	8 U	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
HEXACHLOROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
HEXACHLOROBUTADIENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
HEXACHLOROCYCLOPENTADIENE	380 U	380 U	420 U	410 U	380 UJ	390 UJ	390 UJ	380 UJ	390 U	370 UJ	400 U	390 U
HEXACHLOROETHANE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
HEXACHLOROPROPENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
INDENO(1,2,3-CD)PYRENE	8 U	8 U	16 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
ISODRIN	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
ISOPHORONE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
ISOSAFROLE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
KEPONE	380 UR	380 UR	420 UR	410 UR	380 UR	390 UR	390 UR	380 UR	390 UR	370 UR	400 UR	390 UR
METHAPYRILENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
METHYL METHANE SULFONATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
METHYL PARATHION	380 U	380 U	420 U	410 U	380 UJ	390 UJ	390 UJ	380 UJ	390 U	370 UJ	400 U	390 UJ
N-NITROSO-DI-N-PROPYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
N-NITROSODI-N-BUTYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U

TABLE E-3-2
SWMU 9 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB02	09SB02	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB09	09SB10	09SB11
nsample	09SB010810	09SB020608	09SB020608-D	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
sample	09SB010810	09SB020608	FD11300003	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	6 - 8	6 - 8	4 - 6	4 - 6	4 - 6	8 - 10	7 - 9	4 - 6	8 - 10	2 - 4	4 - 6
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/4/00	11/30/00	12/4/00
validatad	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N-NITROSODIETHYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
N-NITROSODIMETHYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
N-NITROSOMETHYLETHYLAMINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
N-NITROSOMORPHOLINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
N-NITROSOPIPERIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
N-NITROSOPYRROLIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
NAPHTHALENE	8 U	8 U	11	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
O-TOLUIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
P-(DIMETHYLAMINO)AZOBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PENTACHLOROBENZENE	380 U	380 U	420 U	410 U	380 UJ	390 UJ	390 UJ	380 UJ	390 U	370 UJ	400 U	390 UJ
PENTACHLOROETHANE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PENTACHLORONITROBENZENE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PHENACETIN	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PHENANTHRENE	8 U	8 U	33 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
PHENOL	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PHORATE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PRONAMIDE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
PYRENE	8 U	8 U	41 J	8 UJ	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8.00 U	8 U	8.00 U
PYRIDINE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
SAFROLE	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
SULFOTEPP	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
THIONAZIN	380 U	380 U	420 U	410 U	380 U	390 U	390 U	380 U	390 U	370 U	400 U	390 U
Pesticides (UG/KG)												
4,4'-DDD	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	3.8 U	3.9 U	3.7 U	3.9 UJ	3.8 U
4,4'-DDE	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	3.8 U	3.9 U	3.7 U	3.9 UJ	3.8 U
4,4'-DDT	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	3.8 U	3.9 U	3.7 U	3.9 UJ	3.8 U
ALDRIN	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
ALPHA-BHC	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
ALPHA-CHLORDANE	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
AROCLOR-1016	38 UJ	38 UJ	42 UJ	41 UJ	38 U	38 U	39 U	38 U	39 U	37 U	39 UJ	38 U
AROCLOR-1221	76 UJ	76 UJ	84 UJ	81 UJ	76 U	77 U	78 U	76 U	78 U	74 U	79 UJ	77 U
AROCLOR-1232	38 UJ	38 UJ	42 UJ	41 UJ	38 U	38 U	39 U	38 U	39 U	37 U	39 UJ	38 U
AROCLOR-1242	38 UJ	38 UJ	42 UJ	41 UJ	38 U	38 U	39 U	38 U	39 U	37 U	39 UJ	38 U
AROCLOR-1248	38 UJ	38 UJ	42 UJ	41 UJ	38 U	38 U	39 U	38 U	39 U	37 U	39 UJ	38 U
AROCLOR-1254	38 UJ	38 UJ	42 UJ	41 UJ	38 U	38 U	39 U	460	39 U	37 U	39 UJ	38 U
AROCLOR-1260	38 UJ	38 UJ	42 UJ	41 UJ	38 U	38 U	39 U	38 U	39 U	37 U	39 UJ	38 U
BETA-BHC	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
DELTA-BHC	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
DIELDRIN	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	14 R	3.9 U	3.7 U	3.9 UJ	3.8 U
ENDOSULFAN I	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
ENDOSULFAN II	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	24 R	3.9 U	3.7 U	3.9 UJ	3.8 U
ENDOSULFAN SULFATE	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	3.8 U	3.9 U	3.7 U	3.9 UJ	3.8 U
ENDRIN	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	14 R	3.9 U	3.7 U	3.9 UJ	3.8 U
ENDRIN ALDEHYDE	3.8 UJ	3.8 UJ	4.2 UJ	4.1 UJ	3.8 U	3.8 U	3.9 U	3.8 U	3.9 U	3.7 UJ	3.9 UJ	3.8 U
GAMMA-BHC (LINDANE)	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
GAMMA-CHLORDANE	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
HEPTACHLOR	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U
HEPTACHLOR EPOXIDE	2.0 UJ	2.0 UJ	2.2 UJ	2.1 UJ	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	2.0 UJ	2.0 U

TABLE E-3-2
SWMU 9 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SB01	09SB02	09SB02	09SB03	09SB04	09SB05	09SB06	09SB07	09SB08	09SB09	09SB10	09SB11
nsample	09SB010810	09SB020608	09SB020608-D	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
sample	09SB010810	09SB020608	FD11300003	09SB030406	09SB040406	09SB050406	09SB060810	09SB070709	09SB080406	09SB090810	09SB100204	09SB110406
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	6 - 8	6 - 8	4 - 6	4 - 6	4 - 6	8 - 10	7 - 9	4 - 6	8 - 10	2 - 4	4 - 6
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	11/30/00	11/30/00	11/30/00	11/30/00	12/4/00	12/4/00	12/4/00	12/4/00	12/5/00	12/4/00	11/30/00	12/4/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
METHOXYCHLOR	20 UJ	20 UJ	22 UJ	21 UJ	20 U	20 U	20 U	20 U	20 U	19 U	20 UJ	20 U
TOXAPHENE	200 UJ	200 UJ	220 UJ	210 UJ	200 U	200 U	200 U	200 U	200 U	190 U	200 UJ	200 U
Herbicides (UG/KG)												
2,4,5-T	3.1 U	3.1 U	3.4 U	3.3 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.0 U	3.2 U	3.1 U
2,4,5-TP (SILVEX)	3.1 U	3.1 U	3.4 U	3.3 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.0 U	3.2 U	3.1 U
2,4-D	3.1 U	3.1 U	3.4 U	3.3 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.0 U	3.2 U	13 R
DINOSEB	3.1 U	3.1 U	3.4 U	3.3 U	3.1 U	3.1 U	3.1 U	3.1 U	3.1 U	3.0 U	3.2 U	28 R
HEXACHLOROPHENE	0.77 U	0.77 U	0.85 U	0.83 U	0.77 U	0.78 U	0.79 U	0.77 U	0.79 U	0.75 U	0.80 U	0.78 U
PENTACHLOROPHENOL	0.77 U	0.77 U	0.85 U	0.83 U	0.77 U	0.78 U	0.79 U	0.77 U	0.79 U	0.75 U	0.80 U	1.4 J
Inorganics (MG/KG)												
ALUMINUM	8690 J	9480 J	10600 J	11000 J	8340	8930	9820	7460	7370	3280	10000 J	8330
ANTIMONY	0.85 U	0.89 U	0.98 U	1.9	0.83 UJ	0.86 UJ	1.7 J	0.85 UJ	0.87 UJ	0.84 UJ	0.93 U	0.86 UJ
ARSENIC	3.0	2.2	2.8	3.0	3.4 J	4.8 J	3.8 J	3.4 J	3.3 J	0.26 J	5.8	4.8 J
BARIUM	62.5 J	94.2 J	91.9 J	108 J	34.3 J	41.7 J	92.7 J	77.1 J	30.3 J	15.8 J	51.5 J	90.3 J
BERYLLIUM	0.87 U	1.0 J	0.91 U	0.93 U	0.89 U	0.92 U	0.91 U	1.0 J	0.94 U	0.82 U	0.85 U	0.84 U
CADMIUM	0.87 U	0.82 U	0.91 U	0.93 U	0.89 U	0.92 U	0.91 U	0.89 U	0.94 U	0.82 U	0.85 U	0.84 U
CALCIUM	480 J	602 J	844 J	604 J	447 UJ	458 UJ	1740 J	516 J	472 UJ	409 UJ	1760 J	1380 J
CHROMIUM	11.7	12.0	13.0	13.9	12.6 J	12.9 J	12.7 J	9.1 J	8.8 J	3.0 J	12.2	10.1 J
COBALT	5.6 J	13.8 J	21.2 J	32.2 J	8.0	4.3	7.0	37.0	4.9	1.4	4.9 J	12.8
COPPER	6.1 J	11.5 J	13.7 J	8.2 J	9.8 J	11.2 J	13.5 J	11.6 J	9.1 J	2.3 J	12.1 J	7.2 J
IRON	17900	31900	28500	29100	26300	18100	19200	24200	26200	2610	18000	13100
LEAD	11.5 J	13.6 J	13.4 J	13.4 J	13.2 J	10.1 J	15.2 J	15.9 J	9.5 J	6.7 J	11.3 J	14.6 J
MAGNESIUM	925 J	2510 J	2900 J	1600 J	2010 J	1570 J	1550 J	1270 J	765 J	409 U	1350 J	1090 J
MANGANESE	117 J	335 J	605 J	275 J	116 J	106 J	255 J	494 J	84.7 J	4.4 J	236 J	516 J
MERCURY	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.03	0.04 U	0.04 U	0.04 U	0.05 U	0.05
NICKEL	7.0 J	24.3 J	28.0 J	13.1 J	12.8	8.0	9.5	14.8	8.1	2.7	8.2 J	9.4
POTASSIUM	434 UJ	411 UJ	468 J	484 UJ	447 UJ	458 UJ	630 J	443 UJ	472 UJ	409 UJ	424 UJ	418 UJ
SELENIUM	0.87 U	0.82 U	0.91 U	0.93 U	0.89 U	0.92 U	0.91 U	0.89 U	0.94 U	0.82 U	0.85 U	0.84 U
SILVER	0.87 U	0.82 U	0.91 U	0.93 U	0.89 U	0.92 U	0.91 U	0.89 U	0.94 U	0.82 U	0.85 U	0.84 U
SODIUM	434 U	411 U	453 U	464 U	447 U	458 U	454 U	443 U	472 U	409 U	424 U	418 U
THALLIUM	0.87 U	0.82 U	0.91 U	0.93 U	0.89 U	0.92 U	0.91 U	0.89 U	0.94 U	0.82 U	0.85 U	0.84 U
TIN	4.2 UJ	4.4 UJ	4.9 UJ	4.7 UJ	4.2 UJ	4.3 UJ	4.3 UJ	4.2 UJ	4.3 UJ	4.2 UJ	4.6 UJ	4.3 UJ
VANADIUM	19.0	15.9	17.9	21.4	19.8 J	20.1 J	22.4 J	13.3 J	13.5 J	2.4 J	19.7	19.4 J
ZINC	17.5 J	73.8 J	79.9 J	36.4 J	49.1 J	30.5 J	37.3 J	39.6 J	28.4 J	9.9 J	30.6 J	26.7 J
Miscellaneous Parameters												
CATION EXCHANGE CAPACITY MEQ/1	6.7			10.0					13.0 J	7.4 J	7.6	
CYANIDE MG/KG	0.60 UJ	0.60 UJ	0.60 UJ	0.60 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	0.60 UJ	1.0 UJ
PH S.U.	5.1 J			5.5 J					4.9 J	4.3 J	6.9 J	
TOTAL ORGANIC CARBON MG/KG	1200			2200					2400	1000 U	6500	

TABLE E-3-3
SWMU 9 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09-02	09-03	09-04	09-07	09-10	09-10	09-12	09-WTP5	09-WTP6	09T01	09T02	09T03	09T04	09T05	09T05
nsample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	09GW1001-D	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	09GWT0501-D
sample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	FD01310101	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	FD01300101
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/30/01	2/1/01	1/30/01	1/31/01	1/31/01	1/31/01	2/1/01	1/23/01	1/23/01	1/31/01	2/2/01	2/1/01	2/2/01	1/30/01	1/30/01
Volatile Organics (UG/L)															
1,1,1,2-TETRACHLOROETHANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-TRICHLOROETHANE	1 U	26	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHANE	1 U	14	50 U	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	0.5 U	6.4	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-TRICHLOROPROPANE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DIBROMO-3-CHLOROPROPANE	1 UJ	1 U	50 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 UJ	1 UJ
1,2-DIBROMOETHANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DIOXANE	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
2-BUTANONE	5 UR	5 UR	250 UR	5 UR	5 UR	5 UR	5 UR	5 U	5 U	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
2-HEXANONE	5 UR	5 UR	250 UR	5 UR	5 UR	5 UR	5 UR	5 U	5 U	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
3-CHLOROPROPENE	10 U	10 U	500 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	5 U	5 U	250 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 UR	5 UR	250 UR	5 UR	5 UR	5 UR	5 UR	5 UJ	5 UJ	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
ACETONITRILE	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
ACROLEIN	10 UR	10 UR	500 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR	10 UR
ACRYLONITRILE	5 UR	5 UR	250 UR	5 UR	5 UR	5 UR	5 UR	5 U	5 U	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
BENZENE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMODICHLOROMETHANE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
BROMOFORM	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 UJ	1 UJ	50 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
CARBON TETRACHLORIDE	0.3 U	0.3 U	15 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U
CHLOROBENZENE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLORODIBROMOMETHANE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	0.3 U	0.3 U	15 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CHLOROMETHANE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
CHLOROPRENE	10 U	10 U	500 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,2-DICHLOROETHENE	1 U	69	130	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.7	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	0.3 U	0.3 U	15 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
DIBROMOMETHANE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
DICHLORODIFLUOROMETHANE	1 UJ	1 U	50 U	1 U	1 UJ	1 UJ	1 U	1 UJ	1 UJ	1 UJ	1 U	1 U	1 U	1 UJ	1 UJ
ETHYL METHACRYLATE	10 U	10 UJ	500 UJ	10 UJ	10 U	10 U	10 UJ	10 U	10 U	10 U	10 UJ	10 UJ	10 UJ	10 U	10 U
ETHYLBENZENE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ISOBUTANOL	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
METHACRYLONITRILE	1 UR	1 UR	50 UR	1 UR	1 UR	1 UR	1 UR	1 U	1 U	1 UR	1 UR	1 UR	1 UR	1 UR	1 UR
METHYL IODIDE	10 UJ	10 U	500 U	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 UJ	10 U	10 U	10 U	10 UJ	10 UJ
METHYL METHACRYLATE	10 U	10 U	500 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	1 U	1 U	58 J	1 U	1 U	1 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U
PROPIONITRILE	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
STYRENE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,2-DICHLOROETHENE	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TRANS-1,4-DICHLORO-2-BUTENE	10 U	10 U	500 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	1 U	55	50 U	1 U	1	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROFLUOROMETHANE	1 UJ	1 U	50 U	1 U	1 UJ	1 UJ	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 UJ	1 UJ
VINYL ACETATE	10 UJ	10 UR	500 UR	10 UR	10 UJ	10 UJ	10 UR	10 UJ	10 UJ	10 UJ	10 UR	10 UR	10 UR	10 UJ	10 UJ
VINYL CHLORIDE	0.5 U	0.5 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
XYLENES, TOTAL	1 U	1 U	50 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Semi-Volatile Organics (UG/L)															
1,2,4,5-TETRACHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

TABLE E-3-3
SWMU 9 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09-02	09-03	09-04	09-07	09-10	09-10	09-12	09-WTP5	09-WTP6	09T01	09T02	09T03	09T04	09T05	09T05
nsample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	09GW1001-D	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	09GWT0501-D
sample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	FD01310101	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	FD01300101
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/30/01	2/1/01	1/30/01	1/31/01	1/31/01	1/31/01	2/1/01	1/23/01	1/23/01	1/31/01	2/2/01	2/1/01	2/2/01	1/30/01	1/30/01
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
1,3-DICHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UR	5 U
1,4-DICHLOROBENZENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UR	2 U
1,4-NAPHTHOQUINONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-PHENYLENEDIAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U
1-NAPHTHYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,2'-OXYBIS(1-CHLOROPROPANE)	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
2,3,4,6-TETRACHLOROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,5-TRICHLOROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,6-TRICHLOROPHENOL	3 U	3 UR	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
2,4-DICHLOROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DIMETHYLPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-DINITROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-DICHLOROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-ACETYLAMINOFLUORENE	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-CHLORONAPHTHALENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U
2-CHLOROPHENOL	3 U	3 UR	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 UJ	3 U
2-METHYLNAPHTHALENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-METHYLPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NAPHTHYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-NITROANILINE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-NITROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
2-PICOLINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DICHLOROBENZIDINE	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-DIMETHYLBENZIDINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-METHYLCHOLANTHRENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3-NITROANILINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4,6-DINITRO-2-METHYLPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-AMINOBIPHENYL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-BROMOPHENYL PHENYL ETHER	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
4-CHLORO-3-METHYLPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROANILINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-CHLOROPHENYL PHENYL ETHER	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROANILINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROPHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-NITROQUINOLINE-1-OXIDE	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR	5 UR
5-NITRO-O-TOLUIDINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
A,A-DIMETHYLPHENETHYLAMINE	10 U	10 U	11 U	10 U	10 U	10 U	10 U	10 U	9 U	10 U	11 U	10 U	10 U	10 U	10 U
ACENAPHTHENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ACENAPHTHYLENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ACETOPHENONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANILINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ARAMITE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZO(A)ANTHRACENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZO(A)PYRENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZO(B)FLUORANTHENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZO(G,H,I)PERYLENE	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.10 UJ	0.090 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
BENZO(K)FLUORANTHENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
BENZYL ALCOHOL	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BIS(2-CHLOROETHOXY)METHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U
BIS(2-CHLOROETHYL)ETHER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
BIS(2-ETHYLHEXYL)PHTHALATE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
BUTYL BENZYL PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
CHLOROBENZILATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

TABLE E-3-3
SWMU 9 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09-02	09-03	09-04	09-07	09-10	09-10	09-12	09-WTP5	09-WTP6	09T01	09T02	09T03	09T04	09T05	09T05
nsample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	09GW1001-D	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	09GWT0501-D
sample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	FD01310101	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	FD01300101
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/30/01	2/1/01	1/30/01	1/31/01	1/31/01	1/31/01	2/1/01	1/23/01	1/23/01	1/31/01	2/2/01	2/1/01	2/2/01	1/30/01	1/30/01
CHRYSENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
DI-N-BUTYL PHTHALATE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DI-N-OCTYL PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIALLATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZO(A,H)ANTHRACENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 UJ	0.090 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 UJ
DIBENZOFURAN	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIETHYL PHTHALATE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
DIMETHOATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIMETHYL PHTHALATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIPHENYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DISULFOTON	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL METHANE SULFONATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ETHYL PARATHION	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
FAMPHUR	10 UR	10 UR	11 UR	10 UR	10 UR	10 UR	10 UR	10 UR	9 UR	10 UR	11 UR	10 UR	10 UR	10 UR	10 UR
FLUORANTHENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
FLUORENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
HEXACHLOROBENZENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
HEXACHLOROBUTADIENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U
HEXACHLOROCYCLOPENTADIENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UR	2 U
HEXACHLOROETHANE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UR	2 U
HEXACHLOROPROPENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
INDENO(1,2,3-CD)PYRENE	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.10 UJ	0.090 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ISODRIN	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOPHORONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ISOSAFROLE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
KEPONE	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UR	5 UR	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
METHAPYRILENE	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
METHYL METHANE SULFONATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
METHYL PARATHION	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
N-NITROSO-DI-N-PROPYLAMINE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
N-NITROSODI-N-BUTYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSODIETHYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSODIMETHYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOMETHYLETHYLAMINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOMORPHOLINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-NITROSOPIPERIDINE	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
N-NITROSOPYRROLIDINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
NAPHTHALENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
O-TOLUIDINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
P-(DIMETHYLAMINO)AZOBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROETHANE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLORONITROBENZENE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENACETIN	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENANTHRENE	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
PHENOL	5 U	5 UR	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHORATE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PRONAMIDE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.090 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
PYRIDINE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SAFROLE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SULFOTEPP	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
THIONAZIN	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pesticides/PCB's (UG/L)															
4,4'-DDD	0.019 UJ	0.020 UJ	0.022 UJ	0.020 UJ	0.019 UJ	0.020 UJ	0.020 UJ	0.019 U	0.020 U	0.019 UJ	0.021 UJ	0.019 UJ	0.020 UJ	0.019 UJ	0.019 UJ
4,4'-DDE	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.019 U	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U
4,4'-DDT	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.019 U	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U

TABLE E-3-3
SWMU 9 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09	09	09	09
location	09-02	09-03	09-04	09-07	09-10	09-10	09-12	09-WTP5	09-WTP6	09T01	09T02	09T03	09T04	09T05	09T05
nsample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	09GW1001-D	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	09GWT0501-D
sample	09GW0201	09GW0301	09GW0401	09GW0701	09GW1001	FD01310101	09GW1201	09GWTP0501	09GWTP0601	09GWT0101	09GWT0201	09GWT0301	09GWT0401	09GWT0501	FD01300101
sacode	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	1/30/01	2/1/01	1/30/01	1/31/01	1/31/01	1/31/01	2/1/01	1/23/01	1/23/01	1/31/01	2/2/01	2/1/01	2/2/01	1/30/01	1/30/01
ALDRIN	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
ALPHA-BHC	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
ALPHA-CHLORDANE	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
AROCLOR-1016	0.19 U	0.20 U	0.22 U	0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.19 U	0.20 U	0.19 U	0.19 U
AROCLOR-1221	0.38 U	0.40 U	0.44 U	0.39 U	0.38 U	0.40 U	0.39 U	0.38 U	0.39 U	0.39 U	0.41 U	0.38 U	0.40 U	0.38 U	0.38 U
AROCLOR-1232	0.19 U	0.20 U	0.22 U	0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.19 U	0.20 U	0.19 U	0.19 U
AROCLOR-1242	0.19 U	0.20 U	0.22 U	0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.19 U	0.20 U	0.19 U	0.19 U
AROCLOR-1248	0.19 U	0.20 U	0.22 U	0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.19 U	0.20 U	0.19 U	0.19 U
AROCLOR-1254	0.19 U	0.20 U	0.22 U	0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.19 U	0.20 U	0.19 U	0.19 U
AROCLOR-1260	0.19 U	0.20 U	0.22 U	0.20 U	0.19 U	0.20 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.19 U	0.20 U	0.19 U	0.19 U
BETA-BHC	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
DELTA-BHC	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
DIELDRIN	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.030	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U
ENDOSULFAN I	0.009 UJ	0.010 UJ	0.011 UJ	0.010 UJ	0.010 UJ	0.010 UJ	0.010 UJ	0.009 U	0.010 U	0.010 UJ	0.010 UJ	0.009 UJ	0.010 UJ	0.009 UJ	0.009 UJ
ENDOSULFAN II	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.019 U	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U
ENDOSULFAN SULFATE	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.019 U	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U
ENDRIN	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.019 U	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U
ENDRIN ALDEHYDE	0.019 U	0.020 U	0.022 U	0.020 U	0.019 U	0.020 U	0.020 U	0.019 U	0.020 U	0.019 U	0.021 U	0.019 U	0.020 U	0.019 U	0.019 U
GAMMA-BHC (LINDANE)	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
GAMMA-CHLORDANE	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
HEPTACHLOR	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
HEPTACHLOR EPOXIDE	0.009 U	0.010 U	0.011 U	0.010 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.010 U	0.010 U	0.009 U	0.010 U	0.009 U	0.009 U
METHOXYCHLOR	0.095 U	0.10 U	0.11 U	0.098 U	0.096 U	0.10 U	0.098 U	0.094 U	0.098 U	0.097 U	0.10 U	0.095 U	0.10 U	0.095 U	0.095 U
TOXAPHENE	0.95 U	1.0 U	1.1 U	0.98 U	0.96 U	1.0 U	0.98 U	0.94 U	0.98 U	0.97 U	1.0 U	0.95 U	1.0 U	0.95 U	0.95 U
Herbicides (UG/L)															
2,4,5-T	0.080 UJ	0.080 U	0.080 U	0.080 U	0.080 U	0.082	0.080 U	0.080 U	0.080 U	0.13	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4,5-TP (SILVEX)	0.080 UJ	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.17 J	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
2,4-D	0.080 UJ	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
DINOSEB	0.080 UJ	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U	0.080 U
HEXACHLOROPHENE	0.020 UJ	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
PENTACHLOROPHENOL	0.020 UJ	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Inorganics (UG/L)															
ALUMINUM	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	1290 J	364 J	200 U	200 U	200 U
ANTIMONY	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ARSENIC	4.3	0.29	0.95	0.57	0.75	0.46	0.45	1.1	1.0 U	2.9	0.97	0.84	2.9	1.5	2.2
BARIUM	323	29.6	78.9	6.6	68.4	69.9	21.4	171	19.3	52.6	17.8	66.0	74.1	90.7	89.2
BERYLLIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.4	1.0	1.0 U	1.0 U	1.0 U
CADMIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CALCIUM	18200	32200	62100	118000	25800	25600	64600	79900	59300	39400	63100	7950	21100	24000	24900
CHROMIUM	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
COBALT	27.4	3.0 U	11.6	3.0 U	3.0 U	3.0 U	54.2	3.0 U	3.0 U	3.0 U	109	12.2	15.2	18.2	17.6
COPPER	2.0 U	2.0 U	2.1	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4.4	8.4	2.0 U	2.0 U	2.0	2.0 U
IRON	37300	217	833	623	136	159	20400	15200	149	144	561	217	24700	100 U	100 U
LEAD	1.0 U	1.0 U	1.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MAGNESIUM	11100 J	15800 J	24300 J	81500 J	10600 J	10600 J	23300 J	14100 J	19800 J	26500 J	68300 J	8360 J	9570 J	21900 J	22600 J
MANGANESE	7920	176	671	187	164	168	2550	385	15.0	34.8	7160	75.4	6550	178	178
MERCURY	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL	10.0 U	20.1	43.5	10.0 U	10.0 U	10.0 U	140	10.0 U	10.0 U	10.0 U	279	16.3	10.0 U	51.2	49.8
POTASSIUM	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
SELENIUM	1.0 U	1.0 U	1.3	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.1 J	1.0 U	1.7	1.0 U	1.0 U	1.0 U	1.0 U
SILVER	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ	3.0 U	3.0 U	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ	3.0 UJ
SODIUM	6730 J	20200 J	28200 J	110000 J	57600 J	58900 J	22700 J	5000 U	48900 J	134000 J	115000 J	26700 J	25100 J	102000 J	104000 J
THALLIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TIN	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
VANADIUM	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.1	2.0 U	2.0 U	2.0 U	2.0 U	2.0
ZINC	10.0 U	12.1	67.1	10.0 U	10.0 U	10.0 U	100	10.0 U	13.2	10.0 U	166	16.2	10.0 U	25.4	24.8
Miscellaneous Parameter (UG/L)															
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10.0 U	10.0 U	10 U	10 U	10 U	10 U	10 U	10 U

TABLE E-3-4
SWMU 9 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SW/SD01	09SW/SD01	09SW/SD02	09SW/SD02	09SW/SD03	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD05	09SW/SD05
rsample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	09SW0401-D	09SW0401-F	09SW0401-F-D	09SW0501	09SW0501-F
sample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	FD12130001	09SW0401-F	FD12130001-F	09SW0501	09SW0501-F
matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/15/00	12/14/00	12/14/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/14/00	12/14/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatiles (UG/L)												
1,1,1,2-TETRACHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,1,1-TRICHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,1,2,2-TETRACHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,1,2-TRICHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,1-DICHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,1-DICHLOROETHENE	1 U		1 U		1 U		1 U	1 U			1 U	
1,2,3-TRICHLOROPROPANE	1 UJ		1 UJ		1 UJ		1 UJ	1 UJ			1 UJ	
1,2-DIBROMO-3-CHLOROPROPANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,2-DIBROMOETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,2-DICHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,2-DICHLOROPROPANE	1 U		1 U		1 U		1 U	1 U			1 U	
1,4-DIOXANE	100 U		100 U		100 U		100 U	100 U			100 U	
2-BUTANONE	5 UR		5 UR		5 UR		5 UR	5 UR			5 UR	
2-HEXANONE	5 U		5 U		5 U		5 U	5 U			5 U	
3-CHLOROPROPENE	10 U		10 U		10 U		10 U	10 U			10 U	
4-METHYL-2-PENTANONE	5 U		5 U		5 U		5 U	5 U			5 U	
ACETONE	5 UR		5 UR		5 UR		5 UR	5 UR			5 UR	
ACETONITRILE	40 U		40 U		40 U		40 U	40 U			40 U	
ACROLEIN	10 UR		10 UR		10 UR		10 UR	10 UR			10 UR	
ACRYLONITRILE	5 UR		5 UR		5 UR		5 UR	5 UR			5 UR	
BENZENE	1 U		1 U		1 U		1 U	1 U			1 U	
BROMODICHLOROMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
BROMOFORM	1 U		1 U		1 U		1 U	1 U			1 U	
BROMOMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
CARBON DISULFIDE	1 U		1 U		1 U		1 U	1 U			1 U	
CARBON TETRACHLORIDE	0.3 U		0.3 U		0.3 U		0.3 U	0.3 U			0.3 U	
CHLOROBENZENE	1 U		1 U		1 U		1 U	1 U			1 U	
CHLORODIBROMOMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
CHLOROETHANE	1 U		1 U		1 U		1 U	1 U			1 UJ	
CHLOROFORM	0.3 U		0.3 U		0.3 U		0.3 U	0.3 U			0.3 U	
CHLOROMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
CHLOROPRENE	10 UJ		10 UJ		10 UJ		10 UJ	10 UJ			10 UJ	
CIS-1,2-DICHLOROETHENE	1 U		1 U		1 U		1 U	1 U			1 U	
CIS-1,3-DICHLOROPROPENE	0.3 U		0.3 U		0.3 U		0.3 U	0.3 U			0.3 U	
DIBROMOMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
DICHLORODIFLUOROMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
ETHYL METHACRYLATE	10 U		10 U		10 U		10 U	10 U			10 U	
ETHYLBENZENE	1 U		1 U		1 U		1 U	1 U			1 U	
ISOBUTANOL	40 U		40 U		40 U		40 U	40 U			40 U	
METHACRYLONITRILE	1 UR		1 UR		1 UR		1 UR	1 UR			1 UR	
METHYL IODIDE	10 UJ		10 UJ		10 UJ		10 UJ	10 UJ			10 UJ	
METHYL METHACRYLATE	10 U		10 U		10 U		10 U	10 U			10 U	
METHYLENE CHLORIDE	1 U		1 U		1 U		1 U	1 U			1 U	
PROPIONITRILE	40 U		40 U		40 U		40 U	40 U			40 U	
STYRENE	1 U		1 U		1 U		1 U	1 U			1 UJ	
TETRACHLOROETHENE	1 U		1 U		1 U		1 U	1 U			1 U	
TOLUENE	1 U		1 U		1 U		1 U	1 U			1 U	
TRANS-1,2-DICHLOROETHENE	1 U		1 U		1 U		1 U	1 U			1 U	
TRANS-1,3-DICHLOROPROPENE	1 U		1 U		1 U		1 U	1 U			1 U	
TRANS-1,4-DICHLORO-2-BUTENE	10 U		10 U		10 U		10 U	10 U			10 U	
TRICHLOROETHENE	1 U		1 U		1 U		1 U	1 U			1 U	
TRICHLOROFLUOROMETHANE	1 U		1 U		1 U		1 U	1 U			1 U	
VINYL ACETATE	10 U		10 U		10 U		10 U	10 U			10 U	
VINYL CHLORIDE	1 U		1 U		1 U		1 U	1 U			1 U	
XYLENES, TOTAL	1 U		1 U		1 U		1 U	1 U			1 U	
Semi-Volatiles (UG/L)												
1,2,4,5-TETRACHLOROBENZENE	5 U		5 U		5 U		5 U	5 U			5 U	
1,2,4-TRICHLOROBENZENE	5 U		5 U		5 U		5 U	5 U			5 UJ	
1,2-DICHLOROBENZENE	5 U		5 U		5 U		5 U	5 U			5 UJ	
1,3-DICHLOROBENZENE	5 U		5 U		5 U		5 U	5 U			5 UJ	
1,4-DICHLOROBENZENE	2 U		2 U		2 U		2 U	2 U			2 U	
1,4-NAPHTHOQUINONE	5 U		5 U		5 U		5 U	5 U			5 U	
1,4-PHENYLENEDIAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
1-NAPHTHYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	

TABLE E-3-4
SWMU 9 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SW/SD01	09SW/SD01	09SW/SD02	09SW/SD02	09SW/SD03	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD05	09SW/SD05
rsample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	09SW0401-D	09SW0401-F	09SW0401-F-D	09SW0501	09SW0501-F
sample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	FD12130001	09SW0401-F	FD12130001-F	09SW0501	09SW0501-F
matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/15/00	12/14/00	12/14/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/14/00	12/14/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2,2'-OXYBIS(1-CHLOROPROPANE)	3 U		3 U		3 U		3 U	3 U			3 U	
2,3,4,6-TETRACHLOROPHENOL	5 U		5 U		5 UJ		5 UJ	5 U			5 U	
2,4,5-TRICHLOROPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
2,4,6-TRICHLOROPHENOL	3 U		3 U		3 U		3 U	3 U			3 U	
2,4-DICHLOROPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
2,4-DIMETHYLPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
2,4-DINITROPHENOL	5 UJ		5 UJ		5 UJ		5 UJ	5 UJ			3 UJ	
2,6-DICHLOROPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
2-ACETYLAMINOFLUORENE	5 U		5 U		5 U		5 U	5 U			5 U	
2-CHLORONAPHTHALENE	2 U		2 U		2 U		2 U	2 U			2 UJ	
2-CHLOROPHENOL	3 U		3 U		3 U		3 U	3 U			3 U	
2-METHYLNAPHTHALENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
2-METHYLPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
2-NAPHTHYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
2-NITROANILINE	2 U		2 U		2 U		2 U	2 U			2 U	
2-NITROPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
2-PICOLINE	5 U		5 U		5 U		5 U	5 U			5 U	
3,3'-DICHLOROBENZIDINE	5 U		5 U		5 U		5 U	5 U			5 UJ	
3,3'-DIMETHYLBENZIDINE	5 U		5 U		5 U		5 U	5 U			5 U	
3-METHYLCHOLANTHRENE	5 U		5 U		5 U		5 U	5 U			5 U	
3-NITROANILINE	5 U		5 U		5 U		5 U	5 U			5 U	
4,6-DINITRO-2-METHYLPHENOL	5 U		5 U		5 UJ		5 UJ	5 U			5 U	
4-AMINOBIPHENYL	5 U		5 U		5 U		5 U	5 U			5 U	
4-BROMOPHENYL PHENYL ETHER	2 U		2 U		2 U		2 U	2 U			2 U	
4-CHLORO-3-METHYLPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
4-CHLOROANILINE	5 U		5 U		5 U		5 U	5 U			5 U	
4-CHLOROPHENYL PHENYL ETHER	5 U		5 U		5 U		5 U	5 U			5 U	
4-METHYLPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
4-NITROANILINE	5 U		5 U		5 U		5 U	5 U			5 U	
4-NITROPHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
4-NITROQUINOLINE-1-OXIDE	5 UR		5 UR		5 UR		5 UR	5 UR			5 UR	
5-NITRO-O-TOLUIDINE	5 U		5 U		5 UJ		5 UJ	5 U			5 U	
7,12-DIMETHYLBENZ(A)ANTHRACENE	5 U		5 U		5 U		5 U	5 U			5 U	
A,A-DIMETHYLPHENETHYLAMINE	9 U		10 U		10 U		10 U	10 U			9 U	
ACENAPHTHENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
ACENAPHTHYLENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
ACETOPHENONE	5 U		5 U		5 U		5 U	5 U			5 U	
ANILINE	5 U		5 U		5 U		5 U	5 U			5 U	
ANTHRACENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
ARAMITE	5 U		5 U		5 U		5 U	5 U			5 U	
BENZO(A)ANTHRACENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
BENZO(A)PYRENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
BENZO(B)FLUORANTHENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
BENZO(G,H,I)PERYLENE	0.10 UJ		0.10 UJ		0.10 UJ		0.10 UJ	0.10 UJ			0.10 UJ	
BENZO(K)FLUORANTHENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
BENZYL ALCOHOL	5 U		5 U		5 U		5 U	5 U			5 U	
BIS(2-CHLOROETHOXY)METHANE	5 U		5 U		5 U		5 U	5 U			5 U	
BIS(2-CHLOROETHYL)ETHER	1 U		1 U		1 U		1 U	1 U			1 U	
BIS(2-ETHYLHEXYL)PHTHALATE	2 U		2 U		2 U		2 U	2 U			2 U	
BUTYL BENZYL PHTHALATE	5 U		5 U		5 U		5 U	5 U			5 U	
CHLOROBENZILATE	5 U		5 U		5 U		5 U	5 U			5 U	
CHRYSENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
DI-N-BUTYL PHTHALATE	2 U		2 U		2 U		2 U	2 U			2 U	
DI-N-OCTYL PHTHALATE	5 U		5 U		5 U		5 U	5 U			5 U	
DIALLATE	5 U		5 U		5 U		5 U	5 U			5 U	
DIBENZO(A,H)ANTHRACENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
DIBENZOFURAN	5 U		5 U		5 U		5 U	5 U			5 U	
DIETHYL PHTHALATE	2 U		2 U		2 U		2 U	2 U			2 U	
DIMETHOATE	5 U		5 U		5 U		5 U	5 U			5 U	
DIMETHYL PHTHALATE	5 U		5 U		5 U		5 U	5 U			5 U	
DIPHENYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
DISULFOTON	5 U		5 U		5 U		5 U	5 U			5 U	
ETHYL METHANE SULFONATE	5 U		5 U		5 U		5 U	5 U			5 U	
ETHYL PARATHION	5 U		5 U		5 U		5 U	5 U			5 U	
FAMPHUR	9 UR		10 UR		10 UR		10 UR	10 UR			9 UR	

TABLE E-3-4
SWMU 9 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SW/SD01	09SW/SD01	09SW/SD02	09SW/SD02	09SW/SD03	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD05	09SW/SD05
rsample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	09SW0401-D	09SW0401-F	09SW0401-F-D	09SW0501	09SW0501-F
sample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	FD12130001	09SW0401-F	FD12130001-F	09SW0501	09SW0501-F
matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/15/00	12/14/00	12/14/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/14/00	12/14/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FLUORANTHENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
FLUORENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
HEXACHLOROBENZENE	2 U		2 U		2 U		2 U	2 U			2 U	
HEXACHLOROBUTADIENE	1 U		1 U		1 U		1 U	1 U			1 U	
HEXACHLOROCYCLOPENTADIENE	2 U		2 U		2 U		2 U	2 U			2 UR	
HEXACHLOROETHANE	2 U		2 U		2 U		2 U	2 U			2 U	
HEXACHLOROPROPENE	5 U		5 U		5 U		5 U	5 U			5 U	
INDENO(1,2,3-CD)PYRENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
ISODRIN	5 U		5 U		5 U		5 U	5 U			5 U	
ISOPHORONE	5 U		5 U		5 U		5 U	5 U			5 U	
ISOSAFROLE	5 U		5 U		5 U		5 U	5 U			5 U	
KEPONE	5 UR		5 UR		5 UR		5 UR	5 UR			5 UR	
METHAPYRILENE	5 U		5 U		5 U		5 U	5 U			5 U	
METHYL METHANE SULFONATE	5 U		5 U		5 U		5 U	5 U			5 U	
METHYL PARATHION	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSO-DI-N-PROPYLAMINE	2 U		2 U		2 U		2 U	2 U			2 U	
N-NITROSODI-N-BUTYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSODIETHYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSODIMETHYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSOMETHYLETHYLAMINE	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSOMORPHOLINE	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSOPIPERIDINE	5 U		5 U		5 U		5 U	5 U			5 U	
N-NITROSOPYRROLIDINE	5 U		5 U		5 U		5 U	5 U			5 U	
NAPHTHALENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
O,O,O-TRIETHYL PHOSPHOROTHIOATE	5 U		5 U		5 U		5 U	5 U			5 U	
O-TOLUIDINE	5 U		5 U		5 U		5 U	5 U			5 U	
P-(DIMETHYLAMINO)AZOBENZENE	5 U		5 U		5 U		5 U	5 U			5 U	
PENTACHLOROBENZENE	5 U		5 U		5 U		5 U	5 U			5 U	
PENTACHLOROETHANE	5 U		5 U		5 U		5 U	5 U			5 U	
PENTACHLORONITROBENZENE	5 U		5 U		5 U		5 U	5 U			5 U	
PHENACETIN	5 U		5 U		5 U		5 U	5 U			5 U	
PHENANTHRENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
PHENOL	5 U		5 U		5 U		5 U	5 U			5 U	
PHORATE	5 U		5 U		5 U		5 U	5 U			5 U	
PRONAMIDE	5 U		5 U		5 U		5 U	5 U			5 U	
PYRENE	0.10 U		0.10 U		0.10 U		0.10 U	0.10 U			0.10 U	
PYRIDINE	5 U		5 U		5 U		5 U	5 U			5 U	
SAFROLE	5 U		5 U		5 U		5 U	5 U			5 U	
SULFOTEPP	5 U		5 U		5 U		5 U	5 U			5 U	
THIONAZIN	5 U		5 U		5 U		5 U	5 U			5 U	
Pesticides (UG/L)												
4,4'-DDD	0.019 U		0.020 U		0.019 UJ		0.020 UJ	0.021 UJ			0.019 U	
4,4'-DDE	0.019 UJ		0.020 UJ		0.019 UJ		0.020 UJ	0.021 UJ			0.019 U	
4,4'-DDT	0.019 U		0.020 U		0.019 U		0.020 U	0.021 U			0.019 U	
ALDRIN	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
ALPHA-BHC	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
ALPHA-CHLORDANE	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
AROCLOR-1016	0.19 UJ		0.20 UJ		0.19 U		0.20 U	0.21 U			0.19 U	
AROCLOR-1221	0.38 U		0.39 U		0.39 U		0.40 U	0.42 U			0.38 U	
AROCLOR-1232	0.19 U		0.20 U		0.19 U		0.20 U	0.21 U			0.19 U	
AROCLOR-1242	0.19 U		0.20 U		0.19 U		0.20 U	0.21 U			0.19 U	
AROCLOR-1248	0.19 U		0.20 U		0.19 U		0.20 U	0.21 U			0.19 U	
AROCLOR-1254	0.19 U		0.20 U		0.19 U		0.20 U	0.21 U			0.19 U	
AROCLOR-1260	0.19 UJ		0.20 UJ		0.19 U		0.20 U	0.21 U			0.19 U	
BETA-BHC	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
DELTA-BHC	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
DIELDRIN	0.019 U		0.020 U		0.019 U		0.020 U	0.021 U			0.019 U	
ENDOSULFAN I	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
ENDOSULFAN II	0.019 U		0.020 U		0.019 U		0.020 U	0.021 U			0.019 U	
ENDOSULFAN SULFATE	0.019 U		0.020 U		0.019 U		0.020 U	0.021 U			0.019 U	
ENDRIN	0.019 U		0.020 U		0.019 U		0.020 U	0.021 U			0.019 U	
ENDRIN ALDEHYDE	0.019 U		0.020 U		0.019 U		0.020 U	0.021 U			0.019 U	
GAMMA-BHC (LINDANE)	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
GAMMA-CHLORDANE	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
HEPTACHLOR	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	

TABLE E-3-4
SWMU 9 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09	09	09	09	09	09	09
location	09SW/SD01	09SW/SD01	09SW/SD02	09SW/SD02	09SW/SD03	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD04	09SW/SD05	09SW/SD05
resample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	09SW0401-D	09SW0401-F	09SW0401-F-D	09SW0501	09SW0501-F
sample	09SW0101	09SW0101-F	09SW0201	09SW0201-F	09SW0301	09SW0301-F	09SW0401	FD12130001	09SW0401-F	FD12130001-F	09SW0501	09SW0501-F
matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	DUP	DUP	NORMAL	NORMAL
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/15/00	12/14/00	12/14/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/13/00	12/14/00	12/14/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
HEPTACHLOR EPOXIDE	0.009 U		0.010 U		0.010 U		0.010 U	0.010 U			0.009 U	
METHOXYCHLOR	0.094 U		0.098 U		0.097 UJ		0.099 UJ	0.10 UJ			0.094 U	
TOXAPHENE	0.94 U		0.98 U		0.97 U		0.99 U	1.0 U			0.94 U	
Herbicides (UG/L)												
2,4,5-T	0.080 U		0.080 U		0.080 U		0.080 U	0.080 U			0.080 U	
2,4,5-TP (SILVEX)	0.080 U		0.080 U		0.080 U		0.080 U	0.080 U			0.080 U	
2,4-D	0.080 U		0.18		0.080 U		0.080 U	0.080 U			0.080 U	
DINOSEB	0.080 U		0.080 U		0.080 U		0.080 U	0.080 U			0.080 U	
HEXACHLOROPHENE	0.020 U		0.020 U		0.020 U		0.020 U	0.020 U			0.020 U	
PENTACHLOROPHENOL	0.020 U		0.020 U		0.020 U		0.020 U	0.020 U			0.020 U	
Inorganics (UG/L)												
ALUMINUM	5990 J		245 J		200 U		220 J	242 J			200 U	
ANTIMONY	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U			1.6	
ARSENIC	4.6 J		0.75 J		0.49 J		0.41 J	0.48 J			1.9 J	
BARIUM	173		55.5		47.0		37.3	37.0			72.5	
BERYLLIUM	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U			1.0 U	
CADMIUM	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U			1.0 U	
CALCIUM	34800		42200		49400		17600	17700			57300	
CHROMIUM	7.1		5.0 U		5.0 U		5.0 U	5.0 U			5.0 U	
COBALT	9.8		3.0 U		3.0 U		3.0 U	3.0 U			5.5	
COPPER	18.5		2.0 U		2.0 U		2.0 U	2.0 U			12.4	
IRON	8390 J		526 J		288 J		358 J	386 UJ			1830 J	
LEAD	21.9		1.0 U		1.0 U		1.0 U	1.0 U			3.8	
MAGNESIUM	15400 J		15000 J		6580 J		5960 J	6000 J			9720 J	
MANGANESE	637		583		76.6		57.6	65.6			436	
MERCURY	0.20 U		0.20 U		0.20 U		0.20 U	0.20 U			0.20 U	
NICKEL	14.5		10.0 U		10.0 U		10.0 U	10.0 U			10.0 U	
POTASSIUM	5000 U		5000 U		5000 U		5000 U	5000 U			5310 J	
SELENIUM	1.1		1.0 U		1.0 U		1.0 U	1.0 U			1.0 U	
SILVER	3.0 UJ		3.0 UJ		3.0 UJ		3.0 UJ	3.0 UJ			3.0 UJ	
SODIUM	36000		36400		18500		12600	12300			175000	
THALLIUM	1.0 U		1.0 U		1.0 U		1.0 U	1.0 U			1.0 U	
TIN	10.0 UR		10.0 UR		10.0 UR		10.0 UR	10.0 UR			10.0 UR	
VANADIUM	14.3		2.0 U		2.0 U		2.0 U	2.0 U			3.1	
ZINC	50.4		10.0 U		10.0 U		10.0 U	10.0 U			11.9	
Filtered Metals (UG/L)												
ALUMINUM		200 U		200 U		200 U			200 U	200 U		200 U
ANTIMONY		1.0 U		1.0 U		1.0 U			1.0 U	1.0 U		1.6
ARSENIC		1.1 J		0.70 J		0.42 J			0.27 J	0.33 J		2.3 J
BARIUM		94.9		51.9		45.8			33.2	33.4		71.0
BERYLLIUM		1.0 U		1.0 U		1.0 U			1.0 U	1.0 U		1.0 U
CADMIUM		1.0 U		1.0 U		1.0 U			1.0 U	1.0 U		1.0 U
CALCIUM		40300		40400		49500			17800	17300		57100
CHROMIUM		5.0 U		5.0 U		5.0 U			5.0 U	5.0 U		5.0 U
COBALT		3.0 U		3.0 U		3.0 U			3.0 U	3.0 U		5.1
COPPER		2.0 U		2.0 U		2.0 U			2.0 U	2.0 U		7.4
IRON		138 J		214 J		145 J			100 UJ	100 UJ		1460 J
LEAD		1.0 U		1.0 U		1.0 U			1.0 U	1.0 U		2.3
MAGNESIUM		17800 J		14100 J		6580 J			6210 J	5780 J		10000 J
MANGANESE		239		532		61.2			18.0	16.9		451
MERCURY		0.20 U		0.20 U		0.20 U			0.20 U	0.20 U		0.20 U
NICKEL		10.0 U		10.0 U		10.0 U			10.0 U	10.0 U		10.0 U
POTASSIUM		5000 U		5000 U		5000 U			5000 U	5000 U		5390 J
SELENIUM		1.0 U		1.0 U		1.0 U			1.0 U	1.0 U		1.0 U
SILVER		3.0 UJ		3.0 UJ		3.0 UJ			3.0 UJ	3.0 UJ		3.0 UJ
SODIUM		43200		39000		18200			12700	12200		182000
THALLIUM		1.0 U		1.0 U		1.0 U			1.0 U	1.0 U		1.0 U
TIN		10.0 UR		10.0 UR		10.0 UR			10.0 UR	10.0 UR		10.0 UR
VANADIUM		2.0 U		2.0 U		2.0 U			2.0 U	2.0 U		3.8
ZINC		10.0 U		10.0 U		10.0 U			10.0 U	10.0 U		10.2
Miscellaneous Parameters												
CYANIDE UG/L	10.0 UJ		10.0 UJ		10.0 U		10.0 U	10.0 U			10.0 UJ	
HARDNESS MG/L	150		170		150		70.0	70.0			180	
TOTAL SUSPENDED SOLIDS MG/L	640		8.0		3.0		10.0	8.0			2.0 U	

TABLE E-3-5
SWMU 9 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09
location	09SW/SD01	09SW/SD02	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD05
rsample	09SD010006	09SD020006	09SD030006	09SD040006	09SD040006-D	09SD050006
sample	09SD010006	09SD020006	09SD030006	09SD040006	FD12130002	09SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/14/00	12/13/00	12/13/00	12/13/00	12/14/00
validated	Y	Y	Y	Y	Y	Y
Volatiles (UG/KG)						
1,1,1,2-TETRACHLOROETHANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,1,1-TRICHLOROETHANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,1,2,2-TETRACHLOROETHANE	5 UJ	4 U	4 U	4 U	4 U	4 UJ
1,1,2-TRICHLOROETHANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,1-DICHLOROETHANE	5 U	4 U	4 U	4 U	4 U	4 U
1,1-DICHLOROETHENE	5 U	4 U	4 U	4 U	4 U	4 U
1,2,3-TRICHLOROPROPANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,2-DIBROMO-3-CHLOROPROPANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,2-DIBROMOETHANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,2-DICHLOROETHANE	5 U	4 U	4 U	4 U	4 U	4 U
1,2-DICHLOROPROPANE	5 UJ	4 U	4 U	4 U	4 U	4 U
1,4-DIOXANE	350 UJ	260 U	270 U	260 U	280 U	250 U
2-BUTANONE	27 U	22 U	20 U	20 U	19 U	17 UJ
2-HEXANONE	27 UJ	22 U	20 U	20 U	19 U	17 UJ
3-CHLOROPROPENE	18 UJ	15 UJ	13 UJ	14 UJ	13 UJ	12 UJ
4-METHYL-2-PENTANONE	27 UJ	22 U	20 U	20 U	19 U	17 UJ
ACETONE	27 U	22 U	20 U	20 U	28 J	17 UJ
ACETONITRILE	140 UJ	110 U	110 U	100 U	110 U	100 U
ACROLEIN	89 U	75 U	67 U	68 U	64 U	58 U
ACRYLONITRILE	18 U	15 U	13 U	14 U	13 U	12 U
BENZENE	5 UJ	4 U	4 U	4 U	4 U	4 U
BROMODICHLOROMETHANE	5 UJ	4 U	4 U	4 U	4 U	4 U
BROMOFORM	5 UJ	4 U	4 U	4 U	4 U	4 U
BROMOMETHANE	5 U	4 U	4 U	4 U	4 U	4 U
CARBON DISULFIDE	5 U	4 U	4 U	4 U	4 U	4 U
CARBON TETRACHLORIDE	5 UJ	4 U	4 U	4 U	4 U	4 U
CHLOROBENZENE	5 UJ	4 U	4 U	4 U	4 U	4 U
CHLORODIBROMOMETHANE	5 UJ	4 U	4 U	4 U	4 U	4 U
CHLOROETHANE	5 U	4 U	4 U	4 U	4 U	4 U
CHLOROFORM	5 U	4 U	4 U	4 U	4 U	4 U
CHLOROMETHANE	5 U	4 U	4 U	4 U	4 U	4 U
CHLOROPRENE	5 U	4 U	4 U	4 U	4 U	4 U
CIS-1,2-DICHLOROETHENE	5 U	4 U	4 U	4 U	4 U	4 U
CIS-1,3-DICHLOROPROPENE	5 UJ	4 U	4 U	4 U	4 U	4 U
DIBROMOMETHANE	5 U	4 U	4 U	4 U	4 U	4 U
DICHLORODIFLUOROMETHANE	5 U	4 U	4 U	4 U	4 U	4 U
ETHYL METHACRYLATE	5 U	4 U	4 U	4 U	4 U	4 U
ETHYLBENZENE	5 UJ	4 U	4 U	4 U	4 U	4 U
ISOBUTANOL	140 UJ	110 U	110 U	100 U	110 U	100 U
METHACRYLONITRILE	5 U	4 U	4 U	4 U	4 U	4 U
METHYL IODIDE	5 U	4 U	4 U	4 U	4 U	4 U
METHYL METHACRYLATE	53 U	45 U	40 U	41 U	39 U	35 U
METHYLENE CHLORIDE	8 J	4 U	4 J	4 J	4 J	4 U
PROPIONITRILE	140 UJ	110 U	110 U	100 U	110 U	100 U
STYRENE	5 UJ	4 U	4 U	4 U	4 U	4 U
TETRACHLOROETHENE	5 UJ	4 U	4 U	4 U	4 U	4 U
TOLUENE	5 UJ	4 U	4 U	4 U	4 U	4 U
TRANS-1,2-DICHLOROETHENE	5 U	4 U	4 U	4 U	4 U	4 U
TRANS-1,3-DICHLOROPROPENE	5 UJ	4 U	4 U	4 U	4 U	4 U
TRANS-1,4-DICHLORO-2-BUTENE	5 U	4 U	4 U	4 U	4 U	4 U
TRICHLOROETHENE	5 U	4 U	4 U	4 U	4 U	4 U
TRICHLOROFLUOROMETHANE	5 U	4 U	4 U	4 U	4 U	4 U
VINYL ACETATE	53 U	45 U	40 U	41 U	39 U	35 U
VINYL CHLORIDE	5 U	4 U	4 U	4 U	4 U	4 U
XYLENES, TOTAL	5 UJ	4 U	4 U	4 U	4 U	4 U
Semi-Volatiles (UG/KG)						
1,2,4,5-TETRACHLOROBENZENE	540 U	440 U	440 U	450 UJ	480 U	440 U
1,2,4-TRICHLOROBENZENE	540 U	440 U	440 U	450 UJ	480 U	440 U
1,2-DICHLOROBENZENE	540 U	440 U	440 U	450 UJ	480 U	440 U
1,3-DICHLOROBENZENE	540 U	440 U	440 U	450 UJ	480 U	440 U
1,4-DICHLOROBENZENE	540 U	440 U	440 U	450 UJ	480 U	440 U
1,4-NAPHTHOQUINONE	540 U	440 U	440 U	450 UJ	480 U	440 U
1,4-PHENYLENEDIAMINE	540 U	440 U	440 U	450 UJ	480 U	440 U

TABLE E-3-5
SWMU 9 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09
location	09SW/SD01	09SW/SD02	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD05
nsample	09SD010006	09SD020006	09SD030006	09SD040006	09SD040006-D	09SD050006
sample	09SD010006	09SD020006	09SD030006	09SD040006	FD12130002	09SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/14/00	12/13/00	12/13/00	12/13/00	12/14/00
validated	Y	Y	Y	Y	Y	Y
1-NAPHTHYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
2,2'-OXYBIS(1-CHLOROPROPANE)	540 U	440 U	440 U	450 UJ	460 U	440 U
2,3,4,6-TETRACHLOROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2,4,5-TRICHLOROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2,4,6-TRICHLOROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2,4-DICHLOROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2,4-DIMETHYLPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2,4-DINITROPHENOL	540 UJ	440 UJ	440 UJ	450 UJ	460 UJ	440 UJ
2,6-DICHLOROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2-ACETYLAMINOFLUORENE	540 U	440 U	440 U	450 UJ	460 U	440 U
2-CHLORONAPHTHALENE	540 U	440 U	440 U	450 UJ	460 U	440 U
2-CHLOROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2-METHYLNAPHTHALENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
2-METHYLPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2-NAPHTHYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
2-NITROANILINE	540 U	440 U	440 U	450 UJ	460 U	440 U
2-NITROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
2-PICOLINE	540 U	440 U	440 U	450 UJ	460 U	440 U
3,3'-DICHLOROBENZIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
3,3'-DIMETHYLBENZIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
3-METHYLCHOLANTHRENE	540 U	440 U	440 U	450 UJ	460 U	440 U
3-NITROANILINE	540 U	440 U	440 U	450 UJ	460 U	440 U
4,6-DINITRO-2-METHYLPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
4-AMINOBIPHENYL	540 U	440 U	440 U	450 UJ	460 U	440 U
4-BROMOPHENYL PHENYL ETHER	540 U	440 U	440 U	450 UJ	460 U	440 U
4-CHLORO-3-METHYLPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
4-CHLOROANILINE	540 U	440 U	440 U	450 UJ	460 U	440 U
4-CHLOROPHENYL PHENYL ETHER	540 U	440 U	440 U	450 UJ	460 U	440 U
4-METHYLPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
4-NITROANILINE	540 U	440 U	440 U	450 UJ	460 U	440 U
4-NITROPHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
4-NITROQUINOLINE-1-OXIDE	540 UR	440 UR	440 UR	450 UR	460 UR	440 UR
5-NITRO-O-TOLUIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
7,12-DIMETHYLBENZ(A)ANTHRACENE	540 U	440 U	440 U	450 UJ	460 U	440 U
A,A-DIMETHYLPHENETHYLAMINE	1100 U	880 U	890 U	900 UJ	910 U	880 U
ACENAPHTHENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
ACENAPHTHYLENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
ACETOPHENONE	540 U	440 U	440 U	450 UJ	460 U	440 U
ANILINE	540 U	440 U	440 U	450 UJ	460 U	440 U
ANTHRACENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
ARAMITE	540 U	440 U	440 U	450 UJ	460 U	440 U
BENZO(A)ANTHRACENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
BENZO(A)PYRENE	11.0 UJ	9.00 U	9.00 UJ	9.00 UJ	9.00 UJ	9.00 UJ
BENZO(B)FLUORANTHENE	14.0 J	9.00 U	9.00 UJ	9.00 UJ	9.00 UJ	9.00 UJ
BENZO(G,H,I)PERYLENE	11.0 UJ	9.00 U	9.00 UJ	9.00 UJ	9.00 UJ	9.00 UJ
BENZO(K)FLUORANTHENE	11.0 UJ	9.00 U	9.00 UJ	9.00 UJ	9.00 UJ	9.00 UJ
BENZYL ALCOHOL	540 U	440 U	440 U	450 UJ	460 U	440 U
BIS(2-CHLOROETHOXY)METHANE	540 UJ	440 UJ	440 U	450 UJ	460 U	440 U
BIS(2-CHLOROETHYL)ETHER	540 U	440 U	440 U	450 UJ	460 U	440 U
BIS(2-ETHYLHEXYL)PHTHALATE	540 U	440 U	440 U	450 UJ	460 U	440 U
BUTYL BENZYL PHTHALATE	540 U	440 U	440 U	450 UJ	460 U	440 U
CHLOROBENZILATE	540 U	440 U	440 U	450 UJ	460 U	440 U
CHRYSENE	11.0	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
DI-N-BUTYL PHTHALATE	540 U	440 U	440 U	450 UJ	460 U	440 U
DI-N-OCTYL PHTHALATE	540 U	440 U	440 U	450 UJ	460 U	440 U
DIALLATE	540 U	440 U	440 U	450 UJ	460 U	440 U
DIBENZO(A,H)ANTHRACENE	11.0 UJ	9.00 U	9.00 UJ	9.00 UJ	9.00 UJ	9.00 UJ
DIBENZOFURAN	540 U	440 U	440 U	450 UJ	460 U	440 U
DIETHYL PHTHALATE	540 U	440 U	440 U	450 UJ	460 U	440 U
DIMETHOATE	540 U	440 U	440 U	450 UJ	460 U	440 U
DIMETHYL PHTHALATE	540 U	440 U	440 U	450 UJ	460 U	440 U
DIPHENYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
DISULFOTON	540 U	440 U	440 U	450 UJ	460 U	440 U
ETHYL METHANE SULFONATE	540 U	440 U	440 U	450 UJ	460 U	440 U

TABLE E-3-5
SWMU 9 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09
location	09SW/SD01	09SW/SD02	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD05
naample	09SD010006	09SD020006	09SD030006	09SD040006	09SD040006-D	09SD050006
sample	09SD010006	09SD020006	09SD030006	09SD040006	FD12130002	09SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/14/00	12/13/00	12/13/00	12/13/00	12/14/00
validated	Y	Y	Y	Y	Y	Y
ETHYL PARATHION	540 U	440 U	440 U	450 UJ	460 U	440 U
FAMPHUR	1100 UR	880 UR	890 UR	900 UR	910 UR	880 UR
FLUORANTHENE	13.0	9.00 U	10.0	9.00 U	9.00 U	9.00 U
FLUORENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
HEXACHLOROBENZENE	540 U	440 U	440 U	450 UJ	460 U	440 U
HEXACHLOROBUTADIENE	540 U	440 U	440 U	450 UJ	460 U	440 U
HEXACHLOROCYCLOPENTADIENE	540 U	440 U	440 U	450 UJ	460 U	440 U
HEXACHLOROETHANE	540 U	440 U	440 U	450 UJ	460 U	440 U
HEXACHLOROPROPENE	540 U	440 U	440 U	450 UJ	460 U	440 U
INDENO(1,2,3-CD)PYRENE	11.0 UJ	9.00 U	9.00 UJ	9.00 UJ	9.00 UJ	9.00 UJ
ISODRIN	540 U	440 U	440 U	450 UJ	460 U	440 U
ISOPHORONE	540 U	440 U	440 U	450 UJ	460 U	440 U
ISOSAFROLE	540 U	440 U	440 U	450 UJ	460 U	440 U
KEPONE	540 UR	440 UR	440 UR	450 UR	460 UR	440 UR
METHAPYRILENE	540 U	440 U	440 U	450 UJ	460 U	440 U
METHYL METHANE SULFONATE	540 U	440 U	440 U	450 UJ	460 U	440 U
METHYL PARATHION	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSO-DI-N-PROPYLAMINE	540 UJ	440 UJ	440 U	450 UJ	460 U	440 U
N-NITROSODI-N-BUTYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSODIETHYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSODIMETHYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSOMETHYLETHYLAMINE	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSOMORPHOLINE	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSOPIPERIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
N-NITROSOPYRROLIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
NAPHTHALENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
O,O,O-TRIETHYL PHOSPHOROTHIOATE	540 U	440 U	440 U	450 UJ	460 U	440 U
O-TOLUIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
P-(DIMETHYLAMINO)AZOBENZENE	540 U	440 U	440 U	450 UJ	460 U	440 U
PENTACHLOROBENZENE	540 U	440 U	440 U	450 UJ	460 U	440 U
PENTACHLOROETHANE	540 U	440 U	440 U	450 UJ	460 U	440 U
PENTACHLORONITROBENZENE	540 U	440 U	440 U	450 UJ	460 U	440 U
PHENACETIN	540 U	440 U	440 U	450 UJ	460 U	440 U
PHENANTHRENE	11.0 U	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
PHENOL	540 U	440 U	440 U	450 UJ	460 U	440 U
PHORATE	540 U	440 U	440 U	450 UJ	460 U	440 U
PRONAMIDE	540 U	440 U	440 U	450 UJ	460 U	440 U
PYRENE	14.0	9.00 U	9.00 U	9.00 U	9.00 U	9.00 U
PYRIDINE	540 U	440 U	440 U	450 UJ	460 U	440 U
SAFROLE	540 U	440 U	440 U	450 UJ	460 U	440 U
SULFOTEPP	540 U	440 U	440 U	450 UJ	460 U	440 U
THIONAZIN	540 U	440 U	440 U	450 UJ	460 U	440 U
Pesticides (UG/KG)						
4,4'-DDD	5.3 UJ	4.3 UJ	4.4 UJ	4.5 UJ	4.5 UJ	4.3 UJ
4,4'-DDE	5.3 U	4.3 U	4.4 U	4.5 U	4.5 U	4.3 U
4,4'-DDT	5.3 U	4.3 U	4.4 U	4.5 U	4.5 U	4.3 U
ALDRIN	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
ALPHA-BHC	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
ALPHA-CHLORDANE	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
AROCLOR-1016	53 U	43 U	44 U	45 U	45 U	43 U
AROCLOR-1221	110 U	87 U	88 U	89 U	90 U	87 U
AROCLOR-1232	53 U	43 U	44 U	45 U	45 U	43 U
AROCLOR-1242	53 U	43 U	44 U	45 U	45 U	43 U
AROCLOR-1248	53 U	43 U	360 J	45 U	68	43 U
AROCLOR-1254	53 U	43 U	44 U	45 U	45 U	43 U
AROCLOR-1260	53 U	43 U	44 U	45 U	45 U	43 U
BETA-BHC	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
DELTA-BHC	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
DIELDRIN	5.3 U	4.3 U	4.4 U	4.5 U	4.5 U	4.3 U
ENDOSULFAN I	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
ENDOSULFAN II	5.3 U	4.3 U	4.4 U	4.5 U	4.5 U	4.3 U
ENDOSULFAN SULFATE	5.3 U	4.3 U	4.4 U	4.5 U	4.5 U	4.3 U
ENDRIN	5.3 U	4.3 U	4.4 UJ	4.5 UJ	4.5 UJ	4.3 UJ
ENDRIN ALDEHYDE	5.3 U	4.3 U	4.4 U	4.5 U	4.5 U	4.3 UJ

TABLE E-3-5
SWMU 9 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	09	09	09	09	09	09
location	09SW/SD01	09SW/SD02	09SW/SD03	09SW/SD04	09SW/SD04	09SW/SD05
rsample	09SD010006	09SD020006	09SD030006	09SD040006	09SD040006-D	09SD050006
sample	09SD010006	09SD020006	09SD030006	09SD040006	FD12134002	09SD050006
matrix	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL
qc_type	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/15/00	12/14/00	12/13/00	12/13/00	12/13/00	12/14/00
validated	Y	Y	Y	Y	Y	Y
GAMMA-BHC (LINDANE)	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
GAMMA-CHLORDANE	2.7 U	2.2 U	11 R	2.3 U	2.3 U	2.2 U
HEPTACHLOR	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
HEPTACHLOR EPOXIDE	2.7 U	2.2 U	2.3 U	2.3 U	2.3 U	2.2 U
METHOXYCHLOR	27 UJ	22 UJ	23 UJ	23 UJ	23 UJ	22 UJ
TOXAPHENE	270 U	220 U	230 U	230 U	230 U	220 U
Herbicides (UG/KG)						
2,4,5-T	39 R	3.5 U	3.6 U	3.6 U	9.2 R	3.5 U
2,4,5-TP (SILVEX)	4.3 U	3.5 U	3.6 U	3.6 U	3.7 U	3.5 U
2,4-D	4.3 U	3.5 U	3.6 U	3.6 U	3.7 U	3.5 U
DINOSEB	8.2 J	3.5 U	3.6 U	3.6 U	3.7 U	3.5 U
HEXACHLOROPHENE	4.7 R	0.88 U	0.89 U	0.91 U	0.92 U	0.88 UJ
PENTACHLOROPHENOL	2.7 J	0.88 U	0.89 U	7.1 R	1.8	0.88 U
Inorganics (MG/KG)						
ALUMINUM	7600 J	8690 J	7900 J	5470 J	5510 J	10800 J
ANTIMONY	1.2 U	1.3 J	1.0 U	0.96 U	0.96 U	0.98 U
ARSENIC	3.7	4.5	6.1	5.4	6.0	0.77
BARIUM	78.1	43.2	103	77.0	69.2	39.3
BERYLLIUM	1.2 U	0.97 U	0.83 U	0.82 U	1.0 U	1.0 U
CADMIUM	1.2 U	0.97 U	0.83 U	0.82 U	1.0 U	1.0 U
CALCIUM	2120 J	1010 J	1470 J	786 J	941 J	1130 J
CHROMIUM	8.7	11.9	11.4	11.1	9.9	13.0
COBALT	9.2	4.8	10.9	14.5	17.8	7.2
COPPER	18.0	9.1	10.3	9.0	9.4	27.7
IRON	9620 J	16700 J	18600 J	15700 J	18000 J	18000 J
LEAD	22.1 J	10.1 J	22.7 J	14.5 J	14.8 J	8.6 J
MAGNESIUM	1290 J	1450 J	760 J	597 J	675 J	1820 J
MANGANESE	350	181	1300	1290	1510	86.8
MERCURY	0.05 J	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U
NICKEL	12.2	7.4	9.8	11.8	12.7	10.7
POTASSIUM	589 UJ	487 UJ	413 UJ	411 UJ	516 UJ	813 J
SELENIUM	1.2 U	0.97 U	0.83 U	0.82 U	1.0 U	1.0 U
SILVER	1.2 UJ	0.97 UJ	0.83 UJ	0.82 UJ	1.0 UJ	1.0 UJ
SODIUM	589 U	487 U	413 U	411 U	516 U	500 U
THALLIUM	1.2 U	0.97 U	0.83 U	0.82 U	1.0 U	1.0 U
TIN	6.1 U	4.9 U	5.2 U	4.8 U	4.8 U	4.9 U
VANADIUM	15.2	19.9	21.2	16.8	16.7	12.2
ZINC	40.9	27.7	85.3	33.4	35.8	72.2
Miscellaneous Parameters (MG/KG)						
CYANIDE	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
TOTAL ORGANIC CARBON	38000	5500	7600	14000	11000	1800

APPENDIX E.1.4

SWMU 10
ANALYTICAL DATABASE

TABLE E-4-1
SWMU 10 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10
location	10SB01	10SB02	10SB03	10SB03	10SB04	10SB05	10SB06	10SB07	10SB08	10SB09	10SB10
nsample	10SB010002	10SB020002	10SB030002	10SB030002-D	10SB040002	10SB050002	10SB060002	10SB070002	10SB080002	10SB090002	10SB100002
sample	10SB010002	10SB020002	10SB030002	FD12120001	10SB040002	10SB050002	10SB060002	10SB070002	10SB080002	10SB090002	10SB100002
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/5/00	12/5/00	12/12/00	12/12/00	12/5/00	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/12/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Semi-Volatiles (UG/KG)											
1,2,4,5-TETRACHLOROBENZENE			380 U	400 U							
1,2,4-TRICHLOROBENZENE			380 U	400 U							
1,2-DICHLOROBENZENE			380 U	400 U							
1,3-DICHLOROBENZENE			380 U	400 U							
1,4-DICHLOROBENZENE			380 U	400 U							
1,4-NAPHTHOQUINONE			380 U	400 U							
1,4-PHENYLENEDIAMINE			380 U	400 U							
1-NAPHTHYLAMINE			380 U	400 U							
2,2'-OXYBIS(1-CHLOROPROPANE)			380 U	400 U							
2,3,4,6-TETRACHLOROPHENOL			380 U	400 U							
2,4,5-TRICHLOROPHENOL			380 U	400 U							
2,4,6-TRICHLOROPHENOL			380 U	400 U							
2,4-DICHLOROPHENOL			380 U	400 U							
2,4-DIMETHYLPHENOL			380 U	400 U							
2,4-DINITROPHENOL			380 UJ	400 UJ							
2,6-DICHLOROPHENOL			380 U	400 U							
2-ACETYLAMINOFLUORENE			380 U	400 U							
2-CHLORONAPHTHALENE			380 U	400 U							
2-CHLOROPHENOL			380 U	400 U							
2-METHYLNAPHTHALENE			38.0 U	40.0 U							
2-METHYLPHENOL			380 U	400 U							
2-NAPHTHYLAMINE			380 U	400 U							
2-NITROANILINE			380 U	400 U							
2-NITROPHENOL			380 U	400 U							
2-PICOLINE			380 U	400 U							
3,3'-DICHLOROBENZIDINE			380 UJ	400 U							
3,3'-DIMETHYLBENZIDINE			380 U	400 U							
3-METHYLCHOLANTHRENE			380 U	400 U							
3-NITROANILINE			380 U	400 U							
4,6-DINITRO-2-METHYLPHENOL			380 U	400 U							
4-AMINOBIPHENYL			380 U	400 U							
4-BROMOPHENYL PHENYL ETHER			380 U	400 U							
4-CHLORO-3-METHYLPHENOL			380 U	400 U							
4-CHLOROANILINE			380 U	400 U							
4-CHLOROPHENYL PHENYL ETHER			380 U	400 U							
4-METHYLPHENOL			380 U	400 U							
4-NITROANILINE			380 U	400 U							
4-NITROPHENOL			380 U	400 U							
4-NITROQUINOLINE-1-OXIDE			380 UR	400 UR							
5-NITRO-O-TOLUIDINE			380 U	400 U							
7,12-DIMETHYLBENZ(A)ANTHRACENE			380 U	400 U							
A,A-DIMETHYLPHENETHYLAMINE			770 U	800 U							
ACENAPHTHENE			38.0 U	40.0 U							
ACENAPHTHYLENE			470 J	500							
ACETOPHENONE			380 U	400 U							
ANILINE			380 U	400 U							
ANTHRACENE			110 J	130							
ARAMITE			380 U	400 U							
BENZO(A)ANTHRACENE			530 J	650							
BENZO(A)PYRENE			990 J	1100 J							
BENZO(B)FLUORANTHENE			960 J	1100 J							
BENZO(G,H,I)PERYLENE			860 J	890 J							
BENZO(K)FLUORANTHENE			740 J	870 J							
BENZYL ALCOHOL			380 U	400 U							
BIS(2-CHLOROETHOXY)METHANE			380 U	400 U							
BIS(2-CHLOROETHYL)ETHER			380 U	400 U							
BIS(2-ETHYLHEXYL)PHTHALATE			380 U	1800							
BUTYL BENZYL PHTHALATE			380 U	400 U							

TABLE E-4-1
SWMU 10 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10
location	10SB01	10SB02	10SB03	10SB03	10SB04	10SB05	10SB06	10SB07	10SB08	10SB09	10SB10
nsample	10SB010002	10SB020002	10SB030002	10SB030002-D	10SB040002	10SB050002	10SB060002	10SB070002	10SB080002	10SB090002	10SB100002
sample	10SB010002	10SB020002	10SB030002	FD12120001	10SB040002	10SB050002	10SB060002	10SB070002	10SB080002	10SB090002	10SB100002
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/5/00	12/5/00	12/12/00	12/12/00	12/5/00	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/12/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CHLOROBENZILATE			380 U	400 U							
CHRYSENE			560 J	720							
DI-N-BUTYL PHTHALATE			380 U	400 U							
DI-N-OCTYL PHTHALATE			380 U	400 U							
DIALLATE			380 U	400 U							
DIBENZO(A,H)ANTHRACENE			200 J	350 J							
DIBENZOFURAN			380 U	400 U							
DIETHYL PHTHALATE			380 U	400 U							
DIMETHOATE			380 U	400 U							
DIMETHYL PHTHALATE			380 U	400 U							
DIPHENYLAMINE			380 U	400 U							
DISULFOTON			380 U	400 U							
ETHYL METHANE SULFONATE			380 U	400 U							
ETHYL PARATHION			380 U	400 U							
FAMPHUR			770 UR	800 UR							
FLUORANTHENE			370 J	520							
FLUORENE			38.0 U	54 0							
HEXACHLOROBENZENE			380 U	400 U							
HEXACHLOROBUTADIENE			380 U	400 U							
HEXACHLOROCYCLOPENTADIENE			380 UJ	400 U							
HEXACHLOROETHANE			380 U	400 U							
HEXACHLOROPROPENE			380 U	400 U							
INDENO(1,2,3-CD)PYRENE			610 J	650 J							
ISODRIN			380 U	400 U							
ISOPHORONE			380 U	400 U							
ISOSAFROLE			380 U	400 U							
KEPONE			380 UR	400 UR							
METHAPYRILENE			380 U	400 U							
METHYL METHANE SULFONATE			380 U	400 U							
METHYL PARATHION			380 U	400 U							
N-NITROSO-DI-N-PROPYLAMINE			380 U	400 U							
N-NITROSODI-N-BUTYLAMINE			380 U	400 U							
N-NITROSODIETHYLAMINE			380 U	400 U							
N-NITROSODIMETHYLAMINE			380 U	400 U							
N-NITROSOMETHYLETHYLAMINE			380 U	400 U							
N-NITROSOMORPHOLINE			380 U	400 U							
N-NITROSOPIPERIDINE			380 U	400 U							
N-NITROSOPYRROLIDINE			380 U	400 U							
NAPHTHALENE			38.0 U	40.0 U							
O,O,O-TRIETHYL PHOSPHOROTHIOATE			380 U	400 U							
O-TOLUIDINE			380 U	400 U							
P-(DIMETHYLAMINO)AZOBENZENE			380 U	400 U							
PENTACHLOROBENZENE			380 U	400 U							
PENTACHLOROETHANE			380 U	400 U							
PENTACHLORONITROBENZENE			380 U	400 U							
PHENACETIN			380 U	400 U							
PHENANTHRENE			130 J	230							
PHENOL			380 U	400 U							
PHORATE			380 U	400 U							
PRONAMIDE			380 U	400 U							
PYRENE			390 J	570							
PYRIDINE			380 U	400 U							
SAFROLE			380 U	400 U							
SULFOTEPP			380 U	400 U							
THIONAZIN			380 U	400 U							
Explosives (MG/KG)											
1,3,5-TRINITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-DINITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,4,6-TRINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE E-4-1
SWMU 10 SURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10
location	10SB01	10SB02	10SB03	10SB03	10SB04	10SB05	10SB06	10SB07	10SB08	10SB09	10SB10
nsample	10SB010002	10SB020002	10SB030002	10SB030002-D	10SB040002	10SB050002	10SB060002	10SB070002	10SB080002	10SB090002	10SB100002
sample	10SB010002	10SB020002	10SB030002	FD12120001	10SB040002	10SB050002	10SB060002	10SB070002	10SB080002	10SB090002	10SB100002
matrix	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
sacode	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/5/00	12/5/00	12/12/00	12/12/00	12/5/00	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/12/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2,4-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-AMINO-4,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.53	0.50 U
2-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
3-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-AMINO-2,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
HMX	0.50 U	1.3	1.6 J	0.99 J	5.0	55	0.50 U	4.0	0.50 U	0.50 U	0.50 U
NITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
NITROGLYCERIN	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
PENTAERYTHRITOL TETRANITRATE	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
RDX	0.50 U	1.8	8.0	5.8	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
TETRYL	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Inorganics (MG/KG)											
ALUMINUM	7510 J	7980 J	8220 J	9290 J	4970 J	12200 J	5260 J	7270 J	1530 J	8120 J	9520 J
ANTIMONY	0.87 U	0.89 U	0.92 U	0.88 U	0.84 U	1.0 U	0.85 U	0.94 U	0.75 U	1.0 U	0.95 U
ARSENIC	3.4 J	3.9 J	4.4	4.8	4.0 J	3.6 J	3.2 J	2.7 J	0.87	9.3 J	4.5
BARIUM	52.1 J	55.4 J	48.0 J	65.5 J	54.1 J	117 J	48.8 J	50.9 J	60.4 J	95.8 J	72.1 J
BERYLLIUM	0.85 U	0.90 U	0.80 U	0.82 U	0.87 U	1.0 J	0.81 U	0.86 U	0.57 U	0.88 U	0.99 U
CADMIUM	0.85 U	3.4 J	0.80 U	0.82 U	0.87 U	0.98 U	0.81 U	0.86 U	0.57 U	1.0 J	0.99 U
CALCIUM	1330	32100	19500 J	18000 J	20000	1320	103000	2220	249000 J	6090	960 J
CHROMIUM	8.4	9.4	11.3	12.0	6.4	14.0	10.8	8.8	6.5	22.0	13.0
COBALT	4.0	4.5	3.5	3.7	4.4	8.2	3.6	3.3	1.5	9.7	6.3
COPPER	8.0 J	12.3 J	9.7	11.3	8.3 J	11.3 J	6.3 J	7.7 J	2.0	9.8 J	9.4
IRON	13100 J	14900 J	13900 J	14700 J	11500 J	13600 J	12100 J	13800 J	3420 J	26500 J	18100 J
LEAD	9.2	12.0	9.4 J	9.5 J	9.3	19.4	6.6	8.7	4.2 J	25.1	15.3 J
MAGNESIUM	1340 J	3040 J	1740 J	1770 J	1310 J	1380 J	10200 J	1010 J	14700 J	1190 J	1070 J
MANGANESE	93.9 J	123 J	94.2	119	215 J	165 J	144 J	104 J	78.1	674 J	353
MERCURY	0.05 U	0.05 U	0.03 U	0.04 U	0.03 U	0.04	0.04	0.04 U	0.04 U	0.04	0.05 U
NICKEL	7.0	8.1	7.2	7.9	9.1	13.9	9.5	8.4	15.7	9.8	7.9
POTASSIUM	427 UJ	452 UJ	401 UJ	423 J	434 UJ	508 J	405 UJ	430 UJ	321 J	440 UJ	493 UJ
SELENIUM	0.85 U	0.90 U	0.80 U	0.82 U	0.87 U	0.98 U	0.81 U	0.86 U	0.57 U	0.88 U	0.99 U
SILVER	0.85 U	0.90 U	0.80 UJ	0.82 UJ	0.87 U	0.98 U	0.81 U	0.86 U	0.57 UJ	0.88 U	0.99 UJ
SODIUM	427 UJ	452 UJ	401 U	409 U	434 UJ	492 UJ	405 UJ	430 UJ	286 U	440 UJ	493 U
THALLIUM	0.85 U	0.90 U	0.80 U	0.82 U	0.87 U	0.98 U	0.81 U	0.86 U	0.57 U	0.88 U	0.99 U
TIN	4.4 U	4.5 U	4.0 U	4.4 U	4.2 U	5.2 U	4.3 U	4.7 U	3.8 U	5.1 U	4.7 U
VANADIUM	18.4 J	18.1 J	17.9	18.9	11.3 J	25.6 J	13.2 J	18.0 J	4.4	26.6 J	21.2
ZINC	21.7 J	40.8 J	24.8	29.2	46.8 J	36.0 J	29.7 J	19.8 J	27.5	50.0 J	43.3
Miscellaneous Parameters											
CATION EXCHANGE CAPACITY MEQ/1		10.0 J							1.5 J		
CYANIDE MG/KG	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
PH S.U.		8.0 J							8.5 J		
TOTAL ORGANIC CARBON MG/KG		1900							1600		

TABLE E-4-2
SWMU 10 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10
location	10SB01	10SB01	10SB02	10SB03	10SB04	10SB05	10SB06	10SB07	10SB08	10SB09	10SB10
rsample	10SB010810	10SB010810-D	10SB020709	10SB030810	10SB040305	10SB050406	10SB060507	10SB070406	10SB080406	10SB090204	10SB100608
sample	10SB010810	FD12050001	10SB020709	10SB030810	10SB040305	10SB050406	10SB060507	10SB070406	10SB080406	10SB090204	10SB100608
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	8 - 10	7 - 9	8 - 10	3 - 5	4 - 6	5 - 7	4 - 6	4 - 6	2 - 4	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/12/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Semi-Volatiles (UG/KG)											
1,2,4,5-TETRACHLOROBENZENE				410 U							
1,2,4-TRICHLOROBENZENE				410 U							
1,2-DICHLOROBENZENE				410 U							
1,3-DICHLOROBENZENE				410 U							
1,4-DICHLOROBENZENE				410 U							
1,4-NAPHTHOQUINONE				410 U							
1,4-PHENYLENEDIAMINE				410 U							
1-NAPHTHYLAMINE				410 U							
2,2'-OXYBIS(1-CHLOROPROPANE)				410 U							
2,3,4,6-TETRACHLOROPHENOL				410 U							
2,4,5-TRICHLOROPHENOL				410 U							
2,4,6-TRICHLOROPHENOL				410 U							
2,4-DICHLOROPHENOL				410 U							
2,4-DIMETHYLPHENOL				410 U							
2,4-DINITROPHENOL				410 UJ							
2,6-DICHLOROPHENOL				410 U							
2-ACETYLAMINOFLUORENE				410 U							
2-CHLORONAPHTHALENE				410 U							
2-CHLOROPHENOL				410 U							
2-METHYLNAPHTHALENE				8.00 U							
2-METHYLPHENOL				410 U							
2-NAPHTHYLAMINE				410 U							
2-NITROANILINE				410 U							
2-NITROPHENOL				410 U							
2-PICOLINE				410 U							
3,3'-DICHLOROBENZIDINE				410 U							
3,3'-DIMETHYLBENZIDINE				410 U							
3-METHYLCHOLANTHRENE				410 U							
3-NITROANILINE				410 U							
4,6-DINITRO-2-METHYLPHENOL				410 U							
4-AMINOBIPHENYL				410 U							
4-BROMOPHENYL PHENYL ETHER				410 U							
4-CHLORO-3-METHYLPHENOL				410 U							
4-CHLOROANILINE				410 U							
4-CHLOROPHENYL PHENYL ETHER				410 U							
4-METHYLPHENOL				410 U							
4-NITROANILINE				410 U							
4-NITROPHENOL				410 U							
4-NITROQUINOLINE-1-OXIDE				410 UR							
5-NITRO-O-TOLUIDINE				410 U							
7,12-DIMETHYLBENZ(a)ANTHRACENE				410 U							
A,A-DIMETHYLPHENETHYLAMINE				810 U							
ACENAPHTHENE				11.0							
ACENAPHTHYLENE				8.00 U							
ACETOPHENONE				410 U							
ANILINE				410 U							
ANTHRACENE				8.00 U							
ARAMITE				410 U							
BENZO(A)ANTHRACENE				8.00 U							
BENZO(A)PYRENE				8.00 U							
BENZO(B)FLUORANTHENE				8.00 U							
BENZO(G,H,I)PERYLENE				8.00 UJ							
BENZO(K)FLUORANTHENE				8.00 U							
BENZYL ALCOHOL				410 U							
BIS(2-CHLOROETHOXY)METHANE				410 U							
BIS(2-CHLOROETHYL)ETHER				410 U							
BIS(2-ETHYLHEXYL)PHTHALATE				410 U							
BUTYL BENZYL PHTHALATE				410 U							

TABLE E-4-2
SWMU 10 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10
location	10SB01	10SB01	10SB02	10SB03	10SB04	10SB05	10SB06	10SB07	10SB08	10SB09	10SB10
nsample	10SB010810	10SB010810-D	10SB020709	10SB030810	10SB040305	10SB050406	10SB060507	10SB070406	10SB080406	10SB090204	10SB100808
sample	10SB010810	FD12050001	10SB020709	10SB030810	10SB040305	10SB050406	10SB060507	10SB070406	10SB080406	10SB090204	10SB100808
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	8 - 10	7 - 9	8 - 10	3 - 5	4 - 6	5 - 7	4 - 6	4 - 6	2 - 4	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/12/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CHLOROBENZILATE				410 U							
CHRYSENE				8.00 U							
DI-N-BUTYL PHTHALATE				410 U							
DI-N-OCTYL PHTHALATE				1400							
DIALLATE				410 U							
DIBENZO(A,H)ANTHRACENE				8.00 UJ							
DIBENZOFURAN				410 U							
DIETHYL PHTHALATE				410 U							
DIMETHOATE				410 U							
DIMETHYL PHTHALATE				410 U							
DIPHENYLAMINE				410 U							
DISULFOTON				410 U							
ETHYL METHANE SULFONATE				410 U							
ETHYL PARATHION				410 U							
FAMPHUR				810 UR							
FLUORANTHENE				8.00 U							
FLUORENE				8.00 U							
HEXACHLOROBENZENE				410 U							
HEXACHLOROBUTADIENE				410 U							
HEXACHLOROCYCLOPENTADIENE				410 U							
HEXACHLOROETHANE				410 U							
HEXACHLOROPROPENE				410 U							
INDENO(1,2,3-CD)PYRENE				8.00 UJ							
ISODRIN				410 U							
ISOPHORONE				410 U							
ISOSAFROLE				410 U							
KEPONE				410 UR							
METHAPYRILENE				410 U							
METHYL METHANE SULFONATE				410 U							
METHYL PARATHION				410 U							
N-NITROSO-DI-N-PROPYLAMINE				410 U							
N-NITROSODI-N-BUTYLAMINE				410 U							
N-NITROSODIETHYLAMINE				410 U							
N-NITROSODIMETHYLAMINE				410 U							
N-NITROSOMETHYLETHYLAMINE				410 U							
N-NITROSOMORPHOLINE				410 U							
N-NITROSOPIPERIDINE				410 U							
N-NITROSOPYRROLIDINE				410 U							
NAPHTHALENE				8.00 U							
O,O,O-TRIETHYL PHOSPHOROTHIOATE				410 U							
O-TOLUIDINE				410 U							
P-(DIMETHYLAMINO)AZOBENZENE				410 U							
PENTACHLOROBENZENE				410 U							
PENTACHLOROETHANE				410 U							
PENTACHLORONITROBENZENE				410 U							
PHENACETIN				410 U							
PHENANTHRENE				8.00 U							
PHENOL				410 U							
PHORATE				410 U							
PRONAMIDE				410 U							
PYRENE				8.00 U							
PYRIDINE				410 U							
SAFROLE				410 U							
SULFOTEPP				410 U							
THIONAZIN				410 U							
Explosives (MG/KG)											
1,3,5-TRINITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-DINITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,4,6-TRINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

TABLE E-4-2
SWMU 10 SUBSURFACE SOIL
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

ewmu	10	10	10	10	10	10	10	10	10	10	10
location	10SB01	10SB01	10SB02	10SB03	10SB04	10SB05	10SB06	10SB07	10SB08	10SB09	10SB10
nsample	10SB010810	10SB010810-D	10SB020709	10SB030810	10SB040305	10SB050406	10SB060507	10SB070406	10SB080406	10SB090204	10SB100608
sample	10SB010810	FD12050001	10SB020709	10SB030810	10SB040305	10SB050406	10SB060507	10SB070406	10SB080406	10SB090204	10SB100608
matrix	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	8 - 10	8 - 10	7 - 9	8 - 10	3 - 5	4 - 8	5 - 7	4 - 6	4 - 6	2 - 4	6 - 8
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
status	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
sample_dat	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/5/00	12/5/00	12/5/00	12/12/00	12/5/00	12/12/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2,4-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-AMINO-4,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
3-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-AMINO-2,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
HMX	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.57	0.50 U
NITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
NITROGLYCERIN	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
PENTAERYTHRITOL TETRANITRATE	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
RDX	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
TETRYL	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Inorganics (MG/KG)											
ALUMINUM	7340 J	8590 J	9580 J	7320 J	8950 J	8890 J	7270 J	6910 J	5430 J	9080 J	8590 J
ANTIMONY	0.90 U	0.86 U	0.96 U	0.88 U	0.90 U	1.4	0.87 U	0.94 U	0.82 U	1.0	0.94 U
ARSENIC	0.09 J	1.0 J	3.3 J	4.8	3.1 J	7.8 J	4.1 J	1.6 J	1.3	12.2 J	4.6
BARIUM	21.1 J	19.7 J	122 J	61.8 J	52.8 J	64.0 J	33.5 J	56.3 J	22.3 J	78.1 J	40.1 J
BERYLLIUM	0.88 U	0.93 U	0.91 U	0.82 U	0.91 U	0.91 U	0.82 U	0.85 U	0.88 U	0.94 U	0.83 U
CADMIUM	0.88 U	0.93 U	0.91 U	0.82 U	0.91 U	0.91 U	0.82 U	0.85 U	0.88 U	0.94 U	0.83 U
CALCIUM	810	1080	1660	1310 J	457 U	928	408 U	567	1080 J	998	525 J
CHROMIUM	5.0	6.4	8.3	8.3	11.2	12.9	14.5	8.0	6.2	27.6	10.8
COBALT	4.1	3.2	11.6	6.0	2.9	4.1	5.0	3.5	5.5	20.6	3.7
COPPER	2.3 J	3.3 J	6.9 J	9.0	7.7 J	12.0 J	7.6 J	4.5 J	6.6	7.2 J	9.8
IRON	2000 J	9430 J	12300 J	13300 J	14000 J	19900 J	23000 J	11500 J	10200 J	36600 J	16700 J
LEAD	6.3	7.3	14.7	9.1 J	9.1	15.6	12.8	8.9	7.5 J	20.8	10.0 J
MAGNESIUM	819 J	1040 J	983 J	911 J	1180 J	1330 J	896 J	1000 J	1430 J	858 J	1260 J
MANGANESE	18.8 J	36.2 J	1260 J	188	66.6 J	150 J	212 J	34.5 J	29.8	1140 J	173
MERCURY	0.03 U	0.05 U	0.05	0.04 U	0.04 U	0.03	0.04 U	0.04 U	0.04 U	0.05	0.05 U
NICKEL	5.1	6.6	10.4	8.5	6.1	7.8	5.6	6.5	9.8	7.2	6.9
POTASSIUM	438 UJ	465 UJ	454 UJ	410 UJ	457 UJ	456 UJ	408 UJ	424 UJ	513 J	472 UJ	417 UJ
SELENIUM	0.88 U	0.93 U	0.91 U	0.82 U	0.91 U	0.91 U	0.82 U	0.85 U	0.88 U	0.94 U	0.83 U
SILVER	0.88 U	0.93 U	0.91 U	0.82 UJ	0.91 U	0.91 U	0.82 U	0.85 U	0.88 UJ	0.94 U	0.83 UJ
SODIUM	438 UJ	465 UJ	454 UJ	410 U	457 UJ	456 UJ	408 UJ	424 UJ	442 U	472 UJ	417 U
THALLIUM	0.88 U	0.93 U	0.91 U	0.82 U	0.91 U	0.91 U	0.82 U	0.85 U	0.88 U	0.94 U	0.83 U
TIN	4.5 U	4.3 U	4.8 U	4.4 U	4.5 U	5.1 U	4.4 U	4.7 U	4.1 U	4.5 U	4.7 U
VANADIUM	2.8 J	9.7 J	18.8 J	17.1	20.3 J	22.0 J	23.8 J	15.5 J	6.3	33.8 J	19.7
ZINC	7.1 J	9.3 J	31.4 J	30.0	18.5 J	23.5 J	18.7 J	14.9 J	24.5	27.5 J	27.5
Miscellaneous Parameters											
CATION EXCHANGE CAPACITY MEQ/1	7.8 J				10.0		9.8 J			8.5 J	9.4 J
CYANIDE MG/KG	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
PH S.U.	5.9 J				5.2 J		5.2 J			7.7 J	5.8 J
TOTAL ORGANIC CARBON MG/KG	1000 U				2000		2200			3200	2900

TABLE E-4-3
SWMU 10 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
location	10-02	10-02	10-03	10-16	10-17	10C26	10C26P3	10C31	10C31P3	10C33	10C33P2	10C35	10C35P2	10C37	10C37P3	10C41	10C41P3	10C52	10C55	10C55	10C55P2	10C57	10C67
nsample	10GW0201	10GW0201-D	10GW0301	10GW1601	10GW1701	10GWC2601	10GWC26P301	10GWC3101	10GWC31P301	10GWC3301	10GWC33P201	10GWC3501	10GWC35P201	10GWC3701	10GWC37P301	10GWC4101	10GWC41P301	10GWC5201	10GWC5501	10GWC5501-D	10GWC55P201	10GWC5701	10GWC5701-F
sample	10GW0201	FD01060101	10GW0301	10GW1601	10GW1701	10GWC2601	10GWC26P301	10GWC3101	10GWC31P301	10GWC3301	10GWC33P201	10GWC3501	10GWC35P201	10GWC3701	10GWC37P301	10GWC4101	10GWC41P301	10GWC5201	10GWC5501	FD01210101	10GWC55P201	10GWC5701	10GWC5701-F
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sscode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	01/06/01	01/06/01	01/18/01	01/21/01	01/23/01	01/17/01	01/22/01	01/08/01	01/22/01	01/20/01	01/20/01	01/21/01	01/21/01	01/19/01	01/06/01	01/09/01	01/09/01	01/18/01	01/21/01	01/21/01	01/22/01	01/24/01	01/24/01
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Volatile Organics (UG/L)																							
1,1,1,2-TETRACHLOROETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,1,1-TRICHLOROETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,1,2,2-TETRACHLOROETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,1,2-TRICHLOROETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,1-DICHLOROETHANE			1 U			1 U	1 UJ	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,1-DICHLOROETHENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,2,3-TRICHLOROPROPANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,2-DIBROMO-3-CHLOROPROPANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,2-DIBROMOETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,2-DICHLOROETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,2-DICHLOROPROPANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
1,4-DIOXANE			100 U			100 U	100 U	100 U	100 U							100 U	100 U	100 U	100 U	100 U	100 U		
2-BUTANONE			5 U			5 U	5 U	5 U	5 U							5 U	5 U	5 U	5 U	5 U	5 U		
2-HEXANONE			5 U			5 U	5 U	5 U	5 U							5 U	5 U	5 U	5 U	5 U	5 U		
3-CHLOROPROPENE			10 U			10 U	10 U	10 U	10 U							10 U	10 U	10 U	10 U	10 U	10 U		
4-METHYL-2-PENTANONE			5 U			5 U	5 U	5 U	5 U							5 U	5 U	5 U	5 U	5 U	5 U		
ACETONE			5 UJ			5 UJ	5 UJ	5 UJ	5 UJ							5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ		
ACETONITRILE			40 U			40 U	40 U	40 U	40 U							40 U	40 U	40 U	40 U	40 U	40 U		
ACROLEIN			10 UR			10 UR	10 UR	10 UR	10 UR							10 UR	10 UR	10 UR	10 UR	10 UR	10 UR		
ACRYLONITRILE			5 U			5 U	5 U	5 U	5 U							5 U	5 U	5 U	5 U	5 U	5 U		
BENZENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
BROMODICHLOROMETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
BROMOFORM			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
BROMOMETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
CARBON DISULFIDE			1 U			1 U	1 U	1 UJ	1 U							.1 UJ	1 UJ	1 U	1 U	1 U	1 U		
CARBON TETRACHLORIDE			0.3 U			0.3 U	0.3 U	0.3 U	0.3 U							0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		
CHLOROBENZENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
CHLORODIBROMOMETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
CHLOROETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
CHLOROFORM			0.3 U			0.3 U	0.3 U	0.3 U	0.3 U							0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		
CHLOROMETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
CHLOROPRENE			10 U			10 U	10 U	10 U	10 U							10 U	10 U	10 U	10 U	10 U	10 U		
CIS-1,2-DICHLOROETHENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
CIS-1,3-DICHLOROPROPENE			0.3 U			0.3 U	0.3 U	0.3 U	0.3 U							0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U		
DIBROMOMETHANE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
DICHLORODIFLUOROMETHANE			1 U			1 U	1 UJ	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
ETHYL METHACRYLATE			10 U			10 U	10 U	10 U	10 U							10 U	10 U	10 U	10 U	10 U	10 U		
ETHYLBENZENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
ISOBUTANOL			40 U			40 U	40 U	40 U	40 U							40 U	40 U	40 U	40 U	40 U	40 U		
METHACRYLONITRILE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
METHYL IODIDE			10 U			10 U	10 U	10 U	10 U							10 U	10 U	10 U	10 U	10 U	10 U		
METHYL METHACRYLATE			10 U			10 U	10 U	10 U	10 U							10 U	10 U	10 U	10 U	10 U	10 U		
METHYLENE CHLORIDE			1 UJ			1 UJ	1 UJ	1 UJ	1 UJ							1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ		
PROPIONITRILE			40 U			40 U	40 U	40 U	40 U							40 U	40 U	40 U	40 U	40 U	40 U		
STYRENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
TETRACHLOROETHENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
TOLUENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
TRANS-1,2-DICHLOROETHENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
TRANS-1,3-DICHLOROPROPENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
TRANS-1,4-DICHLORO-2-BUTENE			10 U			10 U	10 U	10 U	10 U							10 U	10 U	10 U	10 U	10 U	10 U		
TRICHLOROETHENE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
TRICHLOROFLUOROMETHANE			1 UJ			1 UJ	1 U	1 UJ	1 UJ							1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ		
VINYL ACETATE			10 UJ			10 UJ	10 UJ	10 U	10 UJ							10 U	10 U	10 UJ	10 UJ	10 UJ	10 UJ		
VINYL CHLORIDE			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
XYLENES, TOTAL			1 U			1 U	1 U	1 U	1 U							1 U	1 U	1 U	1 U	1 U	1 U		
Energetics UG/L																							
1,3,5-TRINITROBENZENE	1.0 U	0.87 U	0.70 U	1.7 U	3.5 J			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	2.7 J	2.6	0.73 U	0.64 U	
1,3-DINITROBENZENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.72	0.73 U	0.64 U	
2,4,6-TRINITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	26 J			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	58 J	55 J	5.8 J	0.64 U	

TABLE E-4-3
SWMU 10 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
location	10-02	10-02	10-03	10-16	10-17	10C26	10C26P3	10C31	10C31P3	10C33	10C33P2	10C35	10C35P2	10C37	10C37P3	10C41	10C41P3	10C52	10C55	10C55	10C55P2	10C57	10C57
resample	10GW0201	10GW0201-D	10GW0301	10GW1601	10GW1701	10GWC2601	10GWC26P301	10GWC3101	10GWC31P301	10GWC3301	10GWC33P201	10GWC3501	10GWC35P201	10GWC3701	10GWC37P301	10GWC4101	10GWC41P301	10GWC5201	10GWC5501	10GWC5501-D	10GWC55P201	10GWC5701	10GWC5701-F
sample	10GW0201	FD01060101	10GW0301	10GW1601	10GW1701	10GWC2601	10GWC26P301	10GWC3101	10GWC31P301	10GWC3301	10GWC33P201	10GWC3501	10GWC35P201	10GWC3701	10GWC37P301	10GWC4101	10GWC41P301	10GWC5201	10GWC5501	FD01210101	10GWC55P201	10GWC5701	10GWC5701-F
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	01/06/01	01/06/01	01/18/01	01/21/01	01/23/01	01/17/01	01/22/01	01/08/01	01/22/01	01/20/01	01/20/01	01/21/01	01/21/01	01/19/01	01/06/01	01/09/01	01/09/01	01/18/01	01/21/01	01/21/01	01/22/01	01/24/01	01/24/01
2,4-DINITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.50	0.73 U	0.64 U	
2,6-DINITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	1.5	1.5	0.73 U	0.64 U	
2-AMINO-4,6-DINITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	20			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	2.8	2.7	7.2	0.64 U	
2-NITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.47 U	0.73 U	0.64 U	
3-NITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.47 U	0.73 U	0.64 U	
4-AMINO-2,6-DINITROTOLUENE	1.7 J	1.7	0.70 U	1.7 U	18			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	3.7	3.5 J	15	0.64 U	
4-NITROTOLUENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.47 U	0.73 U	0.64 U	
HMX	12	13	0.70 U	1.7 U	240			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	59	59	91	0.64 U	
NITROBENZENE	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.47 U	0.73 U	0.64 U	
NITROGLYCERIN	10 U	8.7 U	7.0 U	17 U	5.2 U			7.0 U	12 U	4.3 U	5.8 U	4.9 U	5.2 U	6.8 U	2.9 U	6.1 U	4.9 U	9.0 U	9.0 U	4.7 U	7.3 U	6.4 U	
PENTAERYTHRITOL TETRANITRATE	4.9 U	4.3 U	3.5 U	8.3 U	2.6 U			3.5 U	5.8 U	2.1 U	2.9 U	2.4 U	2.6 U	3.3 U	1.4 U	3.0 U	2.4 U	4.4 U	4.4 U	2.3 U	3.6 U	3.1 U	
RDX	4.9	8.1	0.70 U	1.7 U	33			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	240	240	21	0.64 U	
TETRYL	1.0 U	0.87 U	0.70 U	1.7 U	0.52 U			0.70 U	1.2 U	0.43 U	0.58 U	0.49 U	0.52 U	0.68 U	0.29 U	0.61 U	0.49 U	0.90 U	0.90 U	0.47 U	0.73 U	0.64 U	
Inorganics UG/L																							
ALUMINUM	200 U	200 U	200 U	22300 J	200 U			200 U	461 J	200 U	200 U	4200 J	3540 J	200 U	1640 J	200 U	200 U	200 U	200 U	200 U	200 U	200 U	
ANTIMONY	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
ARSENIC	0.18	0.20	1.0 U	1.0 U	1.0 U			1.0	1.2	1.0 U	5.1	2.3	2.0	1.0 U	0.83	0.22	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
BARIUM	51.0	51.2	28.8	11.4*	104			20.9	10.1	65.1	54.8	10.0	8.2	19.4	9.1	7.9	8.0	17.9	40.6	39.6	57.7	22.6	
BERYLLIUM	1.0 U	1.0 U	1.0 U	20.3	1.0 U			1.0 U	1.0 U	1.0 U	1.0 U	6.6	1.6	1.0 U	2.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
CADMIUM	1.0 U	1.0 U	1.0 U	4.5	1.0 U			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
CALCIUM	30000	31100	131000	62500	86800			45900	337000	124000	5000 U	107000	79100	27100	55700	154000	88400	17000	5000 U	5000 U	26100	35300	
CHROMIUM	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U			5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	
COBALT	3.0 U	3.0 U	7.8	299	3.0 U			3.0 U	163	3.0 U	17.4	140	60.2	3.0 U	145	154	72.7	3.0 U	14.6	14.9	3.0 U	28.7	
COPPER	2.0 U	2.0 U	2.0 U	8.5	2.0 U			2.0 U	8.9	2.0 U	2.0 U	2.0 U	2.7	2.0 U	13.3	2.0 U	34.8	2.0 U	2.1	2.0	2.0 U	2.0 U	
IRON	167	301	2400	23700	286			17100	1450	955	20200	93700	8050	16300	31400	39700	497	22200	612	595	100 U	17300	
LEAD	1.0 U	1.0 U	1.0 U	13.4	1.0 U			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.2	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
MAGNESIUM	7080 J	7860 J	22400 J	68000 J	10800 J			19800 J	326000 J	29100 J	5000 U	90100 J	59100 J	12200 J	34500 J	105000 J	90800 J	11500 J	5000 U	5000 U	5370 J	23300 J	
MANGANESE	15.0 U	43.9 J	643	5380	299			686 J	21800	178	5390	6780	2230	698	9100 J	20900 J	8050 J	897	336	351	15.0 U	3330	
MERCURY	0.20 U	0.20 U	0.20 U	0.20 U	0.20			0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	
NICKEL	10.0 U	10.0 U	25.2	643	18.5			10.0 U	695	10.0 U	12.0	299	283	10.0 U	281	273	146	10.0 U	43.3	44.0	10.0 U	72.9	
POTASSIUM	5000 U	5000 U	5000 U	5000 U	5000 U			5000 U	8310 J	8990 J	5000 U	8150 J	5000 U	5000 U	5000 U	10200 J	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	
SELENIUM	1.0 U	1.0 U	2.0 J	2.1 J	1.0 U			1.0 U	6.6 J	1.0 U	1.0 U	1.3 J	6.1 J	1.0 U	3.9	1.0 U	9.3	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
SILVER	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U			3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	
SODIUM	5000 U	5000 U	59800 J	103000 J	11800 J			19900	184000 J	39900 J	24000 J	88100 J	185000 J	13200 J	118000	24800	252000	15700 J	11000 J	11700 J	6870 J	18400 J	
THALLIUM	1.0 U	1.0 U	1.0 U	1.2	1.0 U			1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	
TIN	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U			10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	
VANADIUM	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U			2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	
ZINC	10.0 U	10.0 U	39.9	1660	17.7			10.0 U	397	10.0 U	11.6	291	315	10.0 U	290	275	139	10.0 U	70.0	69.7	10.0 U	67.9	
Filtered Metals UG/L																							
ALUMINUM																							200 U
ANTIMONY																							1.0 U
ARSENIC																							1.0 U
BARIUM																							27.5
BERYLLIUM																							1.0 U
CADMIUM																							1.0 U
CALCIUM																							33400
CHROMIUM																							5.0 U
COBALT																							31.3
COPPER																							2.0 U
IRON																							3510
LEAD																							1.0 U
MAGNESIUM																							24800 J
MANGANESE																							3940
MERCURY																							0.20 U
NICKEL																							89.2
POTASSIUM																							5000 U
SELENIUM																							1.0 U
SILVER																							3.0 U
SODIUM																							22400 J
THALLIUM																							1.0 U
TIN																							10.0 U

TABLE E-4-3
SWMU 10 GROUND WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
location	10-02	10-02	10-03	10-16	10-17	10C26	10C26P3	10C31	10C31P3	10C33	10C33P2	10C35	10C35P2	10C37	10C37P3	10C41	10C41P3	10C52	10C55	10C55	10C55P2	10C57	10C57
nsample	10GW0201	10GW0201-D	10GW0301	10GW1601	10GW1701	10GWC2601	10GWC26P301	10GWC3101	10GWC31P301	10GWC3301	10GWC33P201	10GWC3501	10GWC35P201	10GWC3701	10GWC37P301	10GWC4101	10GWC41P301	10GWC5201	10GWC5501	10GWC5501-D	10GWC55P201	10GWC5701	10GWC5701-F
sample	10GW0201	FD01060101	10GW0301	10GW1601	10GW1701	10GWC2601	10GWC26P301	10GWC3101	10GWC31P301	10GWC3301	10GWC33P201	10GWC3501	10GWC35P201	10GWC3701	10GWC37P301	10GWC4101	10GWC41P301	10GWC5201	10GWC5501	FD01210101	10GWC55P201	10GWC5701	10GWC5701-F
matrix	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	01/06/01	01/06/01	01/18/01	01/21/01	01/23/01	01/17/01	01/22/01	01/08/01	01/22/01	01/20/01	01/20/01	01/21/01	01/21/01	01/19/01	01/06/01	01/09/01	01/09/01	01/18/01	01/21/01	01/21/01	01/22/01	01/24/01	01/24/01
VANADIUM																							2.0 U
ZINC																							114
Miscellaneous Parameters																							
CYANIDE UG/L	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U			10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	
NITRATE MG/L	0.30	0.30						0.050							0.050	0.040	0.16						
NITRITE/NITRATE MG/L			0.010 U	0.020 U	0.40				0.040 U	0.090	0.25 U	0.030 U	0.20 U	0.20 U				0.040	0.040 U	0.040 U	0.33	0.020 U	

TABLE E-4-4
SWMU 10 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
location	10SW/SD01	10SW/SD02	10SW/SD03	10SW/SD04	10SW/SD05	10SW/SD06	10SW/SD06	10SW/SD07	10SW/SD08	10SW/SD09	10SW/SD10	10SW/SD11	10SW/SD12	10SW/SD12	10SW/SD01	10SW/SD02	10SW/SD03	10SW/SD04	10SW/SD05
nsample	10SW0101-F	10SW0201-F	10SW0301-F	10SW0401-F	10SW0501-F	10SW0601-F	10SW0601-F-D	10SW0701-F	10SW0801-F	10SW0901-F	10SW1001-F	10SW1101-F	10SW1201-F	10SW1201-F-D	10SW0101	10SW0201	10SW0301	10SW0401	10SW0501
sample	10SW0101-F	10SW0201-F	10SW0301-F	10SW0401-F	10SW0501-F	10SW0601-F	FD12160001-F	10SW0701-F	10SW0801-F	10SW0901-F	10SW1001-F	10SW1101-F	10SW1201-F	FD12170001-F	10SW0101	10SW0201	10SW0301	10SW0401	10SW0501
matrix	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/17/00	12/17/00	12/17/00	12/17/00	12/17/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Energetics (UG/L)																			
1,3,5-TRINITROBENZENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
1,3-DINITROBENZENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
2,4,6-TRINITROTOLUENE															1.1 U	1.2 U	0.82 U	2.6	1.6
2,4-DINITROTOLUENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
2,6-DINITROTOLUENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
2-AMINO-4,6-DINITROTOLUENE															1.1 U	1.2 U	0.82 U	0.41 J	0.36 U
2-NITROTOLUENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
3-NITROTOLUENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
4-AMINO-2,6-DINITROTOLUENE															1.1 U	1.2 U	0.82 U	1.1 J	0.96 J
4-NITROTOLUENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
HMX															1.1 U	1.2 U	0.82 U	19	13
NITROBENZENE															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
NITROGLYCERIN															11 U	12 U	8.2 U	3.5 U	3.6 U
PENTAERYTHRITOL TETRANITRATE															5.4 U	5.7 U	4.0 U	1.7 U	1.8 U
RDX															1.1 U	1.2 U	0.82 U	11	7.5
TETRYL															1.1 U	1.2 U	0.82 U	0.35 U	0.36 U
Inorganics (UG/L)																			
ALUMINUM															260 J	200 U	295 J	488 J	447 J
ANTIMONY															1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ARSENIC															0.24	0.28	0.29	0.42	0.41
BARIUM															41.6	24.1	35.4	32.1	38.6
BERYLLIUM															1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CADMIUM															1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CALCIUM															6540	21300	10200	17000	12000
CHROMIUM															5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
COBALT															3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
COPPER															2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
IRON															278 J	181 J	385 J	615 J	574 J
LEAD															1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MAGNESIUM															5000 U	5000 U	5000 U	5000 U	5000 U
MANGANESE															29.2 J	15.0 U	26.0 J	25.7 J	34.3 J
MERCURY															0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL															10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
POTASSIUM															5000 U	5000 U	5000 U	5000 U	5000 U
SELENIUM															1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SILVER															3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SODIUM															5000 U	14800 J	6650 J	6640 J	8730 J
THALLIUM															1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TIN															10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
VANADIUM															2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
ZINC															10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Filtered Metals (UG/L)																			
ALUMINUM, FILTERED	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U					
ANTIMONY, FILTERED	1.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					
ARSENIC, FILTERED	0.19	0.28	0.21	0.27	0.25	0.17	0.21	0.26	0.23	1.6	0.68	0.40	0.27	0.26					
BARIUM, FILTERED	39.3	23.1	30.7	27.6	31.8	36.5	35.9	25.7	27.6	80.3	39.8	46.7	39.0	41.8					
BERYLLIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					
CADMIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					

TABLE E-4-4
SWMU 10 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
location	10SW/SD01	10SW/SD02	10SW/SD03	10SW/SD04	10SW/SD05	10SW/SD06	10SW/SD06	10SW/SD07	10SW/SD08	10SW/SD09	10SW/SD10	10SW/SD11	10SW/SD12	10SW/SD12	10SW/SD01	10SW/SD02	10SW/SD03	10SW/SD04	10SW/SD05
nsample	10SW0101-F	10SW0201-F	10SW0301-F	10SW0401-F	10SW0501-F	10SW0601-F	10SW0601-F-D	10SW0701-F	10SW0801-F	10SW0901-F	10SW1001-F	10SW1101-F	10SW1201-F	10SW1201-F-D	10SW0101	10SW0201	10SW0301	10SW0401	10SW0501
sample	10SW0101-F	10SW0201-F	10SW0301-F	10SW0401-F	10SW0501-F	10SW0601-F	FD12160001-F	10SW0701-F	10SW0801-F	10SW0901-F	10SW1001-F	10SW1101-F	10SW1201-F	FD12170001-F	10SW0101	10SW0201	10SW0301	10SW0401	10SW0501
matrix	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SF	SW	SW	SW	SW	SW
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/17/00	12/17/00	12/17/00	12/17/00	12/17/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00
CALCIUM, FILTERED	6360	19800	9480	16000	11300	8400	8220	18700	15200	80100	37300	32000	15800	16300					
CHROMIUM, FILTERED	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U					
COBALT, FILTERED	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U					
COPPER, FILTERED	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U					
IRON, FILTERED	141	100 U	111	216	195	116	110	149	209	259	200	962	158	189					
LEAD, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					
MAGNESIUM, FILTERED	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	10400 J	7260 J	5000 U	5000 U	5000 U					
MANGANESE, FILTERED	22.1	15.0 U	15.0 U	15.0 U	16.8	23.8	23.5	15.0 U	97.0	43.4	49.0	139	74.9	77.0					
MERCURY, FILTERED	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U					
NICKEL, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U					
POTASSIUM, FILTERED	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U					
SELENIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					
SILVER, FILTERED	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U					
SODIUM, FILTERED	5000 U	14100 J	6190 J	6390 J	8370 J	5280 J	5220 J.	8290 J	5000 U	106000 J	35200 J	15000 J	7910 J	8260 J					
THALLIUM, FILTERED	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U					
TIN, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U					
VANADIUM, FILTERED	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U					
ZINC, FILTERED	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.3	102	10.0 U	10.0 U	10.0 U	10.0 U					
Miscellaneous Parameters																			
CYANIDE UG/L															10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ
HARDNESS MG/L															27.0	60.0	36.0	52.0	39.0
NITRATE MG/L															0.090	0.41	0.27	0.30	0.28
TOTAL SUSPENDED SOLIDS MG/L															5.00 J	3.00 J	9.00 J	15.0 J	10.0 J

TABLE E-4-4
SWMU 10 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10
location	10SW/SD06	10SW/SD06	10SW/SD07	10SW/SD08	10SW/SD09	10SW/SD10	10SW/SD11	10SW/SD12	10SW/SD12
nsample	10SW0601	10SW0601-D	10SW0701	10SW0801	10SW0901	10SW1001	10SW1101	10SW1201	10SW1201-D
sample	10SW0601	FD12160001	10SW0701	10SW0801	10SW0901	10SW1001	10SW1101	10SW1201	FD12170001
matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/16/00	12/16/00	12/16/00	12/16/00	12/17/00	12/17/00	12/17/00	12/17/00	12/17/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y
Energetics (UG/L)									
1,3,5-TRINITROBENZENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
1,3-DINITROBENZENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
2,4,6-TRINITROTOLUENE	0.99 U	0.86 U	4.4	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
2,4-DINITROTOLUENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
2,6-DINITROTOLUENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
2-AMINO-4,6-DINITROTOLUENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
2-NITROTOLUENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
3-NITROTOLUENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
4-AMINO-2,6-DINITROTOLUENE	0.99 U	0.86 U	1.4	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
4-NITROTOLUENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
HMX	8.4	5.9	22	0.90 U	7.5	0.87 U	18	8.4	8.8
NITROBENZENE	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
NITROGLYCERIN	9.9 U	8.6 U	6.0 U	9.0 U	5.3 U	8.7 U	13 U	10 U	12 U
PENTAERYTHRITOL TETRANITRATE	4.9 U	4.2 U	2.9 U	4.4 U	2.6 U	4.3 U	6.4 U	5.1 U	5.8 U
RDX	2.6	3.1 J	18	0.90 U	2.3 J	0.87 U	5.1	1.9	1.9
TETRYL	0.99 U	0.86 U	0.60 U	0.90 U	0.53 U	0.87 U	1.3 U	1.0 U	1.2 U
Inorganics (UG/L)									
ALUMINUM	357 J	554 J	283 J	837 J	277 J	299 J	341 J	213 J	200 U
ANTIMONY	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ARSENIC	0.30	0.44	0.33	0.53	1.8	0.71	0.44	0.34	0.29
BARIUM	39.5	45.2	27.1	35.4	86.4	43.0	38.7	39.9	39.8
BERYLLIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CADMIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CALCIUM	8590	9100	18500	16300	85900	39400	27600	16300	15900
CHROMIUM	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
COBALT	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
COPPER	2.0 U	2.0 U	2.0 U	2.0 U	2.0	2.0 U	2.0 U	2.0 U	2.0 U
IRON	401 J	674 J	397 J	877 J	547 J	438 J	1120 J	305 J	291 J
LEAD	1.0 U	1.1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MAGNESIUM	5000 U	5000 U	5000 U	5000 U	11100 J	7560 J	5000 U	5000 U	5000 U
MANGANESE	38.6 J	117 J	15.0 U	125 J	49.1 J	57.3 J	112 J	73.6 J	71.6 J
MERCURY	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
NICKEL	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
POTASSIUM	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
SELENIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SILVER	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SODIUM	5100 J	5570 J	8050 J	5000 U	110000 J	35800 J	12000 J	8030 J	7940 J
THALLIUM	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TIN	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
VANADIUM	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
ZINC	10.0 U	10.0 U	10.0 U	11.2	113	10.0 U	10.0 U	10.0 U	10.0 U
Filtered Metals (UG/L)									
ALUMINUM, FILTERED									
ANTIMONY, FILTERED									
ARSENIC, FILTERED									
BARIUM, FILTERED									
BERYLLIUM, FILTERED									
CADMIUM, FILTERED									

TABLE E-4-4
SWMU 10 SURFACE WATER
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA
PAGE 4 OF 4

swmu	10	10	10	10	10	10	10	10	10
location	10SW/SD06	10SW/SD06	10SW/SD07	10SW/SD08	10SW/SD09	10SW/SD10	10SW/SD11	10SW/SD12	10SW/SD12
nsample	10SW0601	10SW0601-D	10SW0701	10SW0801	10SW0901	10SW1001	10SW1101	10SW1201	10SW1201-D
sample	10SW0601	FD12160001	10SW0701	10SW0801	10SW0901	10SW1001	10SW1101	10SW1201	FD12170001
matrix	SW	SW	SW	SW	SW	SW	SW	SW	SW
sacode	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0	0 - 0
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/16/00	12/16/00	12/16/00	12/16/00	12/17/00	12/17/00	12/17/00	12/17/00	12/17/00
CALCIUM, FILTERED									
CHROMIUM, FILTERED									
COBALT, FILTERED									
COPPER, FILTERED									
IRON, FILTERED									
LEAD, FILTERED									
MAGNESIUM, FILTERED									
MANGANESE, FILTERED									
MERCURY, FILTERED									
NICKEL, FILTERED									
POTASSIUM, FILTERED									
SELENIUM, FILTERED									
SILVER, FILTERED									
SODIUM, FILTERED									
THALLIUM, FILTERED									
TIN, FILTERED									
VANADIUM, FILTERED									
ZINC, FILTERED									
Miscellaneous Parameters									
CYANIDE UG/L	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ	10.0 UJ
HARDNESS MG/L	33.0	35.0	53.0	56.0	260	130	87.0	55.0	55.0
NITRATE MG/L	0.26	0.25	0.30	0.18	1.60	0.29	0.54	0.45	0.45
TOTAL SUSPENDED SOLIDS MG/L	26.0 J		8.00 J	13.0 J	50.0 J	2.00 UJ	4.00 J	2.00 UJ	

TABLE E-4-5
SWMU 10 SEDIMENT
SUMMARY OF ANALYTICAL RESULTS
NSWC CRANE, CRANE, INDIANA

swmu	10	10	10	10	10	10	10	10	10	10	10	10	10	10
location	10SW/SD01	10SW/SD02	10SW/SD03	10SW/SD04	10SW/SD05	10SW/SD06	10SW/SD06	10SW/SD07	10SW/SD08	10SW/SD09	10SW/SD10	10SW/SD11	10SW/SD12	10SW/SD12
nsample	10SD010006	10SD020006	10SD030006	10SD040006	10SD050006	10SD060006	10SD060006-D	10SD070006	10SD080006	10SD090006	10SD100006	10SD110006	10SD120006	10SD120006-D
sample	10SD010006	10SD020006	10SD030006	10SD040006	10SD050006	10SD060006	FD12160002	10SD070006	10SD080006	10SD090006	10SD100006	10SD110006	10SD120006	FD12170002
matrix	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD	SD
sacode	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	DUP	DUP
depth_rang	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6	0 - 6
qc_type	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
sample_dat	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/16/00	12/17/00	12/17/00	12/17/00	12/17/00	12/17/00
validated	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Energetics (MG/KG)														
1,3,5-TRINITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-DINITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,4,6-TRINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,4-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-AMINO-4,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
3-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-AMINO-2,6-DINITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
4-NITROTOLUENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
HMX	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	51	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
NITROBENZENE	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
NITROGLYCERIN	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
PENTAERYTHRITOL TETRANITRATE	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
RDX	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
TETRYL	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Inorganics (MG/KG)														
ALUMINUM	8060	4810	5130	7260	6210	4430	4860	6020	9190	8310	7370	6880	6370	5680
ANTIMONY	1.2 U	1.1 U	1.1 U	1.8	2.2	0.98 U	1.2 U	1.1 U	1.4	1.2 U	0.98 U	1.0 U	1.1 U	1.2 U
ARSENIC	10.4 J	3.1 J	6.6 J	34.2 J	15.9 J	6.2 J	6.8 J	4.0 J	22.0 J	7.4 J	6.4 J	8.8 J	18.7 J	10.1 J
BARIUM	155 J	45.2 J	70.3 J	133 J	95.7 J	93.6 J	96.7 J	78.0 J	121 J	67.9 J	65.3 J	82.6 J	276 J	141 J
BERYLLIUM	1.6 J	1.0 U	1.0 U	1.4 J	1.9 J	0.98 U	1.2 U	1.0 U	2.1 J	1.2 U	1.0 U	0.99 U	1.8 J	1.4 J
CADMIUM	1.1 U	1.0 U	1.0 U	1.4 J	2.0 J	0.98 U	1.2 U	2.4 J	1.1 U	1.2 U	1.0 U	0.99 U	1.3 J	1.2 J
CALCIUM	1260	1620	564	1180	1070	773	1250	3840	1330	5920	1660	2160	997	1150
CHROMIUM	25.5 J	9.0 J	13.7 J	65.7 J	45.4 J	13.7 J	12.8 J	9.2 J	32.4 J	11.0 J	10.4 J	12.8 J	32.6 J	29.1 J
COBALT	29.4 J	6.0 J	17.0 J	24.7 J	24.5 J	14.3 J	14.4 J	6.3 J	51.8 J	9.0 J	12.2 J	14.0 J	41.7 J	31.1 J
COPPER	9.7 J	8.0 J	9.6 J	11.9 J	13.4 J	7.5 J	8.5 J	7.7 J	16.9 J	10.4 J	7.5 J	11.2 J	10.3 J	10.3 J
IRON	29800 J	13800 J	20600 J	71100 J	57700 J	19700 J	23500 J	12100 J	52800 J	18300 J	14800 J	20400 J	47100 J	30100 J
LEAD	25.5 J	13.3 J	17.5 J	37.0 J	26.7 J	16.2 J	16.3 J	19.2 J	32.9 J	18.5 J	16.2 J	17.1 J	26.4 J	18.3 J
MAGNESIUM	997	613	696	487 U	607 U	490 U	587 U	1230	805	1590	1010	1020	550 U	621 U
MANGANESE	2360 J	165 J	652 J	2300 J	1970 J	979 J	929 J	445 J	3360 J	625 J	685 J	778 J	3900 J	2540 J
MERCURY	0.06 UJ	0.04 UJ	0.05 UJ	0.05 J	0.07 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.04 J	0.06 UJ	0.05 UJ	0.05 UJ	0.03 UJ	0.05 UJ
NICKEL	44.5 J	8.2 J	17.6 J	15.4 J	29.4 J	18.8 J	20.0 J	7.5 J	44.6 J	7.9 J	15.9 J	9.8 J	32.0 J	29.4 J
POTASSIUM	550 U	500 U	514 U	487 U	607 U	490 U	587 U	515 U	541 U	614 U	511 U	496 U	550 U	621 U
SELENIUM	1.1 U	1.0 U	1.0 U	0.97 U	1.2 U	0.98 U	1.2 U	1.0 U	1.1 U	1.2 U	1.0 U	0.99 U	1.1 U	1.2 U
SILVER	1.1 U	1.0 U	1.0 U	0.97 U	1.2 U	0.98 U	1.2 U	1.0 U	1.1 U	1.2 U	1.0 U	0.99 U	1.1 U	1.2 U
SODIUM	550 U	500 U	514 U	487 U	607 U	490 U	587 U	515 U	541 U	614 U	511 U	496 U	550 U	621 U
THALLIUM	1.1 U	1.0 U	1.0 U	0.97 U	1.2 U	0.98 U	1.2 U	1.0 U	1.1 U	1.2 U	1.0 U	0.99 U	1.1 U	1.2 U
TIN	5.9 U	5.6 U	5.5 U	5.1 U	5.9 U	4.9 U	6.0 U	5.4 U	5.6 U	6.0 U	4.9 U	5.0 U	5.7 U	6.1 U
VANADIUM	30.0 J	13.2 J	18.1 J	63.2 J	40.0 J	15.0 J	15.0 J	15.4 J	42.9 J	21.5 J	20.7 J	21.0 J	39.1 J	27.4 J
ZINC	79.5 J	58.3 J	40.6 J	46.5 J	71.0 J	36.5 J	45.1 J	59.3 J	98.1 J	301 J	62.8 J	40.0 J	90.8 J	81.3 J
Miscellaneous Parameters (MG/KG)														
CYANIDE	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
TOTAL ORGANIC CARBON	22000 J	4000 J	7900 J	5500 J	9300 J	16000 J	20000 J	9700 J	6800 J	18000 J	6900 J	11000 J	13000 J	24000 J

APPENDIX F.5

STATISTICAL METHODOLOGY

F.5.1 SOIL

Soil samples from SWMUs 4, 5, 9, and 10 underwent statistical comparisons to Crane Basewide background data sets as described in the Crane Basewide Background Soil investigation. Samples were evaluated for three specific physical characteristics to determine their appropriate soil grouping: depositional environment (DE), soil grain size, and depth.

The parent material or the origin of the soil and the manner in which it was deposited largely determines the chemical and mineralogical composition of that soil. The mechanism (e.g., water, wind, glaciers, weathering) from which the soil was formed is referred to herein as the depositional environment (DE) of the soil. Because the soil in each DE is derived from various types of parent material, the resulting chemical composition is believed to vary significantly among the soils in each DE. NSWC Crane has been subdivided into four DE classifications: alluvium (stream-derived sediments); loess (wind-blown sediment)/glacial outwash (glacially derived sediments); residual soil derived from Pennsylvanian bedrock/colluvium; and residual soils derived from Mississippian bedrock/colluvium. Within each DE, surface soil and subsurface soil were targeted, because the surface soil's chemical composition is believed to differ significantly from the subsurface soils chemical composition. This physical classification is believed to affect the chemical composition of soil because the parent material of the surface soil is believed, at least in part, to differ from the parent material from the subsurface material. It is also believed that the soil grain size (e.g., clay, silt, and sand) also significantly affects the concentration of inorganics in soil, providing another potential discriminating factor that is not necessarily well correlated to depth. Therefore, grouping of soil grain sizes into gross grain size classifications (e.g., clay, silt, and sand) was necessary to test this expectation.

Depending on these physical characteristics, the samples were compared to one of the nine Crane Basewide background data sets (soil groups). Tables F-1 through F-6 present the summary statistics for the data sets corresponding to SWMUs 4, 5, 9, and 10 soils. The analysis of variance, or the ANOVA technique, is generally the basic approach used to compare data from background and site locations. The ANOVA technique is used to test whether there is statistically significant evidence of contamination associated with site activities.

There are two types of ANOVA: parametric and non-parametric. Parametric ANOVA methods make two important assumptions: the data residuals are normally (or lognormally) distributed, and 2) the group variances are homogeneous. If these assumptions are not met, the parametric ANOVA is a less powerful test than the non-parametric ANOVA. Checking these assumptions requires a good deal of statistical effort (Shapiro-Wilk W Test and Levene's Test of Homogeneous Variance) and typically the assumptions

are not met for a majority of the data sets. The parametric ANOVA is only marginally more powerful than the non-parametric ANOVA, even when these assumptions are met. For these reasons, a non-parametric ANOVA technique was chosen to be employed to compare site and background concentrations.

The Wilcoxon Rank-Sum test (EPA, 1992) (also known as the Mann-Whitney U test) was employed as the non-parametric ANOVA technique. The following equations present a step-by-step procedure for conducting the Wilcoxon Rank-Sum test.

The null hypothesis (H_0) that is tested is

H_O The site concentration IS NOT statistically higher than the background concentration.

The alternate hypothesis (H_A) is

H_A The site concentration IS statistically higher than the background concentration.

If H_O is rejected, then H_A is accepted. If H_0 is not rejected, the data set is consistent with the H_0 hypothesis.

- Step 1. Combine the background and site data and rank the ordered values from 1 to *N*. Assume there are *n* site samples and m background samples so that $N = m + n$.

- Step 2. Compute the Wilcoxon statistic *W*:

$$W = \sum_{i=1}^{n} E_i - \frac{1}{2}n(n+1)$$

where E_i are the ranks of the site samples (Large values of the statistic *W* give evidence of contamination in site locations).

- Step 3. Compute an approximate *Z-score*. To find the critical value of *W*, a normal approximation to its distribution is used. The expected value and standard deviation of *W* under the null hypothesis (i.e., no contamination exists) are given by the formulas:

$$E(W) = \frac{1}{2}mn; \qquad SD(W) = \sqrt{\frac{1}{12}mn(N+1)}$$

An approximate *Z-score* for the Wilcoxon Rank-Sum test may be calculated by the following equations:

$$Z = \frac{W - E(W) - \frac{1}{2}}{SD(W)}$$

The factor of 1/2 in the numerator serves as a continuity correction because the discrete distribution of the statistic W is being approximated by the continuous normal distribution. If *n* or *m* > 10 and ties are present, an adjustment to the approximate *Z-score* must be made:

$$Z_{ADJUSTED} = \frac{W - E(W) - \frac{1}{2}}{S'D(W)}$$

where: $$SD'(W) = \left(\frac{mn}{12} \left[N + 1 - \frac{\sum_{j=1}^{g} t_j(t_j^2 - 1)}{N(N-1)} \right] \right)^{\frac{1}{2}}$$

g = the number of tied groups and t_j is the number of tied data in the jth group.

- Step 4. For a one-tailed 95% confidence level test for H_0 versus the reject H_0 and accept H_A if $Z_{ADJUSTED} > Z_{0.95} = +1.645$, which corresponds to a p-value of 0.05.

F.5.2 GROUND WATER

Wells from the most recent sampling effort were scrutinized for relationship of the wells to the groundwater flow direction using potentiometric surface contour maps. One well from each SWMU was chosen as an upgradient well for that SWMU. The upgradient wells are

SWMU 4:	04-01
SWMU 5:	05-01
SWMU 9:	09-WTP6
SWMU 10:	10C52

It is important to note that the SWMU 10 upgradient well is for the lower Pennsylvanian aquifer only.

Since there was only one concentration for each parameter for each of these wells, no rigorous statistical comparison of site to upgradient to downgradient concentrations could be performed. Instead, the average downgradient concentration was compared to the lone upgradient concentration. If the average downgradient concentration was greater than the upgradient concentration, the alternate hypothesis that the site concentration is statistically higher than the upgradient concentration is accepted. If the average downgradient concentration was less than or equal to the upgradient concentration, the null hypothesis that the site concentration is not statistically higher than the upgradient concentration is accepted.

F.5.3 SURFACE WATER

Locations from the most recent sampling effort were examined to determine which locations were upstream of the various SWMUs. One location from each SWMU was chosen as a background location for that SWMU. The background locations for surface water are

SWMU 4:	04SW01
SWMU 5:	05SW01
SWMU 9:	09SW01
SWMU 10:	No background locations

Since there was only one concentration for each parameter for each of these wells, no rigorous statistical comparison of site to background to downgradient concentrations could be performed. Instead, the average downgradient concentration was compared to the lone background concentration. If the average downgradient concentration was greater than the background concentration, the alternate hypothesis that the site concentration is statistically higher than the background concentration is accepted. If the average downgradient concentration was less than or equal to the background concentration, the null hypothesis that the site concentration is not statistically higher than the background concentration is accepted.

F.5.4 SEDIMENT

Locations from the most recent sampling effort were examined to determine which locations were upstream of the various SWMUs. One location from each SWMU was chosen as a background location for that SWMU. The background locations for sediment are

SWMU 4:	04SD01
SWMU 5:	05SD01
SWMU 9:	09SD01
SWMU 10:	No background locations

Since there was only one concentration for each parameter for each of these wells, no rigorous statistical comparison of site to background to downgradient concentrations could be performed. Instead, the average downgradient concentration was compared to the lone background concentration. If the average downgradient concentration was greater than the background concentration, the alternate hypothesis that the site concentration is statistically higher than the background concentration is accepted. If the average downgradient concentration was less than or equal to the background concentration, the null hypothesis that the site concentration is not statistically higher than the background concentration is accepted.

TABLE F-1
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
COMPLETE BACKGROUND SOIL SAMPLE DATA SET - ALL SOILS
SWMUs 4, 5, 9, AND 10 RFI
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Frequency of Exceedance (2)	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Location of Maximum	Distribution of Data	95% Upper Tolerance Limit	Soil Risk Based Target Level (1)
ALUMINUM	67/67	0/67	5,020	17,400	11,290	11,100	BG1SBP0801	NORMAL	17,400	75,000
ANTIMONY	8/67	8/67	**0.49**	**11.3**	**0.86**	**4.36**	BG1SBP0505	LOGNORMAL	2.88	0.1423
ARSENIC	67/67	67/67	**1.1**	**10.2**	**5.28**	**5.20**	BG3SBM0701	NORMAL	9.60	0.38
BARIUM	67/67	67/67	**24.8**	**155**	**69.7**	**68.8**	BG1SBL0101	LOGNORMAL	147	1.04
BERYLLIUM	14/67	14/67	**0.3**	**0.82**	**0.36**	**0.47**	BG2SBG0401-MAX	LOGNORMAL	0.85	0.10
CADMIUM	34/67	28/67	0.05	**3.6**	**0.36**	**0.62**	BG3SBM0201	LOGNORMAL	2.05	0.18095
CALCIUM	66/67	0/67	53.6	35,300	997	1,010	BG3SBM0601	LOGNORMAL	3,350	NA
CHROMIUM	67/67	67/67	**7.7**	**30.6**	**16.4**	**16.1**	BG3SBM0604	LOGNORMAL	29.1	0.4
COBALT	67/67	67/67	**1.8**	**27.1**	**8.70**	**8.62**	BG3SBM0701	LOGNORMAL	21.7	0.14033
COPPER	67/67	67/67	**3.5**	**23.8**	**10.2**	**10.0**	BG1SBP0305	LOGNORMAL	21.4	0.3132
IRON	67/67	17/67	7,140	40,800	18,100	17,800	BG1SBP0305	LOGNORMAL	34,500	22,000
LEAD	67/67	67/67	**6.4**	**21.5**	**11.9**	**11.7**	BG1SBA0101	LOGNORMAL	19.7	0.45053
LITHIUM	66/66	0/66	7.8	46.6	16.1	15.7	BG1SBP0305	LOGNORMAL	29.4	1,500
MAGNESIUM	67/67	0/67	496	2,870	1,410	1,390	BG1SBP0204	LOGNORMAL	3,060	NA
MANGANESE	67/67	0/67	23.2	3,040	599	590	BG3SBM0701	LOGNORMAL	3,270	3,100
MERCURY	17/67	17/67	**0.04**	**0.14**	**0.033**	**0.062**	BG1SBP0103	LOGNORMAL	0.072	0.0079
NICKEL	67/67	63/67	4.6	**23.7**	**11.9**	**11.7**	BG1SBP0305	NORMAL	18.7	7
POTASSIUM	67/67	0/67	280	1,650	856	833	BG1SBA280304	NORMAL	1,370	NA
SELENIUM	15/67	15/67	**0.28**	**0.88**	**0.33**	**0.53**	BG1SBP0206	LOGNORMAL	0.83	0.02765
SILVER	48/67	0/67	0.04	0.11	0.049	0.055	BG1SBP0401	LOGNORMAL	0.10	2
SODIUM	32/67	0/67	3.7	205	33.0	56.2	BG1SBP0406-MAX	LOGNORMAL	232	NA
STRONTIUM	66/66	0/67	4.2	63.2	12.3	12.1	BG3SBM0601	LOGNORMAL	25.3	45,000
THALLIUM	66/67	66/67	**0.05**	**0.31**	**0.18**	**0.18**	BG1SBL0101	NORMAL	0.29	0.04
TIN	0/67	0/67	NA	NA	0.32 (3)	NA	NA	NA	NA	7.62
THORIUM	66/66	0/66	4.1	11.7	7.24	7.11	BG1SBP0305	LOGNORMAL	10.9	NA
VANADIUM	67/67	67/67	**14.1**	**48.5**	**26.5**	**26.2**	BG1SBP0206	LOGNORMAL	45.8	1.59
ZINC	50/67	50/67	**9.4**	**60.2**	**28.1**	**32.0**	BG3SBM0701	NORMAL	54.0	6.62

Notes:
NA - Not available
Concentrations which exceed soil risk-based target levels (SRBTLs) are bolded.
1 - Value is based on human health and ecological risk-based criteria as presented in Appendix E, Table E-1 of the NSWC Crane Basewide Background Soil Investigation Report dated January 2001.
It is important to note that this information is updated by the appropriate regulatory agencies on a periodic basis.
2 - Exceedances are defined as detected values above the SRBTL.
3 - This value is the average of all detected and non-detected values. Non-detected values were represented by using one half the detection limit.
This value was used for statistical analysis when no detections were encountered.

TABLE F-2
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
SOIL GROUP 1 - LOESS/GLACIAL SURFACE SOIL
SWMUs 4, 5, 9, AND 10 RFI
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Frequency of Exceedance (2)	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Location of Maximum	Distribution of Data	95% Upper Tolerance Limit	Soil Risk Based Target Level (1)
ALUMINUM	5/5	0/5	7,940	14,300	11,900	11,900	BG2SBG0101	NORMAL	22,800	75,000
ANTIMONY	0/5	0/5	NA	NA	**0.23 (3)**	NA	NA	NA	NA	0.1423
ARSENIC	5/5	5/5	**3.6**	**6.8**	**5.24**	**5.24**	BG1SBL0101	NORMAL	10.61	0.38
BARIUM	5/5	5/5	**90.8**	**155**	**119**	**119**	BG1SBL0101	LOGNORMAL	262	1.04
BERYLLIUM	4/5	4/5	**0.48**	**0.74**	**0.61**	**0.62**	BG2SBG0401-MAX	NORMAL	1.03	0.10
CADMIUM	0/5	0/5	NA	NA	0.05 (3)	NA	NA	NA	NA	0.18095
CALCIUM	5/5	0/5	345	1,040	574	574	BG2SBG0401-MAX	LOGNORMAL	3,070	NA
CHROMIUM	5/5	5/5	**9.8**	**15.1**	**13.3**	**13.3**	BG2SBG0101	NORMAL	22.2	0.4
COBALT	5/5	5/5	**9.3**	**17.1**	**14.1**	**14.1**	BG1SBL0101	NORMAL	27.4	0.14033
COPPER	5/5	5/5	**6.5**	**11.3**	**9.00**	**9.00**	BG2SBG0101	NORMAL	17.7	0.3132
IRON	5/5	0/5	10,100	17,400	14,200	14,200	BG2SBG0101	NORMAL	27,100	22,000
LEAD	5/5	5/5	**12**	**17.1**	**14.6**	**14.6**	BG1SBL0101	NORMAL	23.0	0.45053
LITHIUM	5/5	0/5	10	14.5	12.8	12.8	BG1SBL0501	NORMAL	19.9	1,500
MAGNESIUM	5/5	0/5	1,030	1,810	1,350	1,350	BG2SBG0101	LOGNORMAL	3,120	NA
MANGANESE	5/5	0/5	936	1,960	1,440	1,440	BG1SBL0101	LOGNORMAL	5,450	3,100
MERCURY	2/5	2/5	**0.05**	**0.06**	**0.037**	**0.055**	BG2SBG0401-MAX	NORMAL	0.108	0.0079
NICKEL	5/5	5/5	**11**	**17.4**	**15.0**	**15.0**	BG1SBL0101	NORMAL	26.2	7
POTASSIUM	5/5	0/5	525	1,250	896	896	BG2SBG0101	NORMAL	2,000	NA
SELENIUM	0/5	0/5	NA	NA	0.33 (3)	NA	NA	NA	NA	0.02765
SILVER	1/5	0/5	0.05	0.05	0.031	0.050	BG1SBL0101	LOGNORMAL	0.11	2
SODIUM	2/5	0/5	7.2	17.8	11.1	12.5	BG1SBL0501	LOGNORMAL	56	NA
STRONTIUM	5/5	0/5	9.7	17.3	12.9	12.9	BG2SBG0401-MAX	LOGNORMAL	32.7	45,000
THALLIUM	5/5	5/5	**0.22**	**0.31**	**0.27**	**0.27**	BG1SBL0101	NORMAL	0.41	0.04
TIN	0/5	0/5	NA	NA	0.28 (3)	NA	NA	NA	NA	7.62
THORIUM	5/5	0/5	6.4	8.7	7.42	7.42	BG1SBL0501	LOGNORMAL	12.2	NA
VANADIUM	5/5	5/5	**19**	**32.2**	**26.8**	**26.8**	BG2SBG0101	NORMAL	49.7	1.59
ZINC	3/5	3/5	**29.7**	**49.6**	**32.3**	**39.2**	BG2SBG0101	LOGNORMAL	135.2	6.62

Notes:
NA - Not available
Concentrations which exceed soil risk-based target levels (SRBTLs) are bolded.
1 - Value is based on human health and ecological risk-based criteria as presented in Appendix E, Table E-1 of the NSWC Crane Basewide Background Soil Investigation Report dated January 2001.
It is important to note that this information is updated by the appropriate regulatory agencies on a periodic basis.
2 - Exceedances are defined as detected values above the SRBTL.
3 - This value is the average of all detected and non-detected values. Non-detected values were represented by using one half the detection limit.
This value was used for statistical analysis when no detections were encountered.

TABLE F-3
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
SOIL GROUP 2 - LOESS/GLACIAL SUBSURFACE SOIL
SWMUs 4, 5, 9, AND 10 RFI
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Frequency of Exceedance (2)	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Location of Maximum	Distribution of Data	95% Upper Tolerance Limit	Soil Risk Based Target Level (1)
ALUMINUM	13/13	0/13	7,570	16,600	12,900	12,900	BG1SBL0506	NORMAL	19,700	75,000
ANTIMONY	1/13	1/13	**10.8**	**10.8**	**1.18**	**10.8**	BG1SBL0506	LOGNORMAL	10.1	0.1423
ARSENIC	13/13	13/13	**1.1**	**6**	**4.15**	**4.15**	BG2SBG0503	NORMAL	8.57	0.38
BARIUM	13/13	13/13	**41.7**	**94.4**	**60.8**	**60.8**	BG1SBL0305	LOGNORMAL	126	1.04
BERYLLIUM	7/13	7/13	**0.3**	**0.69**	**0.29**	**0.41**	BG1SBL0506	LOGNORMAL	1.32	0.10
CADMIUM	0/13	0/13	NA	NA	0.05 (3)	NA	NA	NA	NA	0.18095
CALCIUM	13/13	0/13	122	710	404	404	BG1SBL0305	NORMAL	884	NA
CHROMIUM	13/13	13/13	**9.2**	**25.5**	**18.0**	**18.0**	BG1SBL0506	NORMAL	32.3	0.4
COBALT	13/13	13/13	**1.8**	**9.2**	**4.98**	**4.98**	BG2SBG0404	LOGNORMAL	14.7	0.14033
COPPER	13/13	13/13	**4.3**	**16.4**	**10.3**	**10.3**	BG1SBL0103	NORMAL	21.0	0.3132
IRON	13/13	3/13	7,140	**27,700**	18,100	18,100	BG1SBL0506	NORMAL	33,500	22,000
LEAD	13/13	13/13	**6.9**	**11.7**	**9.60**	**9.60**	BG1SBL0506, BG1SBL0504-MAX	NORMAL	13.6	0.45053
LITHIUM	13/13	0/13	9.2	28.1	14.6	14.6	BG1SBL0506	LOGNORMAL	31.2	1,500
MAGNESIUM	13/13	0/13	760	2,350	1,550	1,550	BG1SBL0103	NORMAL	2,890	NA
MANGANESE	13/13	0/13	23.2	376	165	165	BG2SBG0104	LOGNORMAL	1,100	3,100
MERCURY	2/13	2/13	**0.05**	**0.07**	**0.028**	**0.060**	BG1SBL0403	LOGNORMAL	0.073	0.0079
NICKEL	13/13	11/13	4.9	**13.1**	**9.80**	**9.80**	BG2SBG0104	NORMAL	16.5	7
POTASSIUM	13/13	0/13	425	1,240	745	745	BG1SBL0103	LOGNORMAL	1,640	NA
SELENIUM	0/13	0/13	NA	NA	**0.16 (3)**	NA	NA	NA	NA	0.02765
SILVER	3/13	0/13	0.04	0.05	0.028	0.043	BG1SBL0105	LOGNORMAL	0.059	2
SODIUM	7/13	0/13	54.1	153	63.5	106	BG1SBL0506	NORMAL	208	NA
STRONTIUM	13/13	0/13	8	17	11.8	11.8	BG1SBL0305, BG1SBL0506	LOGNORMAL	23.2	45,000
THALLIUM	13/13	13/13	**0.13**	**0.27**	**0.18**	**0.18**	BG2SBG0206	LOGNORMAL	0.32	0.04
TIN	0/13	0/13	NA	NA	0.32 (3)	NA	NA	NA	NA	7.62
THORIUM	13/13	0/13	5.2	9.1	7.24	7.24	BG1SBL0506	NORMAL	10.7	NA
VANADIUM	13/13	13/13	**17.1**	**42.4**	**28.5**	**28.5**	BG1SBL0506	NORMAL	47.3	1.59
ZINC	6/13	6/13	**13.6**	**35.3**	**18.9**	**24.0**	BG2SBG0503	LOGNORMAL	54.9	6.62

Notes:
NA - Not available
Concentrations which exceed soil risk-based target levels (SRBTLs) are bolded.
1 - Value is based on human health and ecological risk-based criteria as presented in Appendix E, Table E-1 of the NSWC Crane Basewide Background Soil Investigation Report dated January 2001.
It is important to note that this information is updated by the appropriate regulatory agencies on a periodic basis.
2 - Exceedances are defined as detected values above the SRBTL.
3 - This value is the average of all detected and non-detected values. Non-detected values were represented by using one half the detection limit.
This value was used for statistical analysis when no detections were encountered.

TABLE F-4
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
SOIL GROUP 3 - ALLUVIAL, MISSISSIPPIAN, AND PENNSYLVANIAN SURFACE SOIL
SWMUs 4, 5, 9, AND 10 RFI
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Frequency of Exceedance (2)	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Location of Maximum	Distribution of Data	95% Upper Tolerance Limit	Soil Risk Based Target Level (1)
ALUMINUM	15/15	0/15	6,770	17,400	10,238	10,238	BG1SBP0801	LOGNORMAL	19,900	75,000
ANTIMONY	2/15	2/15	**1.4**	**5.6**	**0.83**	**3.50**	BG3SBM0401	LOGNORMAL	6.9	0.1423
ARSENIC	15/15	15/15	**2.4**	**10.2**	**6.11**	**6.11**	BG3SBM0701	NORMAL	11.83	0.38
BARIUM	15/15	15/15	**46.1**	**153**	**89.0**	**89.0**	BG3SBM0601	LOGNORMAL	211	1.04
BERYLLIUM	1/15	1/15	**0.49**	**0.49**	**0.40**	**0.49**	BG3SBA0101-MAX	LOGNORMAL	0.93	0.10
CADMIUM	10/15	9/15	0.1	**3.6**	**0.63**	**0.88**	BG3SBM0201	LOGNORMAL	6.05	0.18095
CALCIUM	14/15	0/15	115	35,300	2,730	2,920	BG3SBM0601	LOGNORMAL	55,200	NA
CHROMIUM	15/15	15/15	**8.5**	**21.7**	**14.6**	**14.6**	BG1SBA0101	LOGNORMAL	28.7	0.4
COBALT	15/15	15/15	**6**	**27.1**	**12.9**	**12.9**	BG3SBM0701	LOGNORMAL	32.4	0.14033
COPPER	15/15	15/15	**5.4**	**17.1**	**8.85**	**8.85**	BG1SBP0801	LOGNORMAL	17.6	0.3132
IRON	15/15	2/15	10,700	36,200	16,800	16,800	BG1SBA0101	LOGNORMAL	37,400	22,000
LEAD	15/15	15/15	**9.4**	**21.5**	**15.0**	**15.0**	BG1SBA0101	LOGNORMAL	27.0	0.45053
LITHIUM	14/14	0/14	9.1	29.9	14.8	14.8	BG1SBP0901	LOGNORMAL	30.0	1,500
MAGNESIUM	15/15	0/15	620	2,250	1,200	1,200	BG1SBP0801	LOGNORMAL	2,800	NA
MANGANESE	15/15	0/15	268	3,040	1,140	1,140	BG3SBM0701	LOGNORMAL	5,700	3,100
MERCURY	7/15	7/15	**0.04**	**0.07**	**0.037**	**0.051**	BG1SBP0601-MAX	NORMAL	0.077	0.0079
NICKEL	15/15	15/15	**9.2**	**20**	**13.4**	**13.4**	BG1SBA0101	LOGNORMAL	22.1	7
POTASSIUM	15/15	0/15	418	1,490	847	847	BG1SBP0801	LOGNORMAL	1,970	NA
SELENIUM	5/15	5/15	**0.51**	**0.64**	**0.48**	**0.58**	BG1SBP0901	NORMAL	0.81	0.02765
SILVER	15/15	0/15	0.05	0.11	0.065	0.065	BG1SBP0401	LOGNORMAL	0.130	2
SODIUM	6/15	0/15	9.4	23.7	8.11	15.6	BG3SBM0601	NORMAL	28	NA
STRONTIUM	14/14	0/14	7.4	63.2	14.3	14.3	BG3SBM0601	LOGNORMAL	46.4	45,000
THALLIUM	15/15	15/15	**0.1**	**0.27**	**0.19**	**0.19**	BG1SBP0601-MAX	NORMAL	0.31	0.04
TIN	0/15	0/15	NA	NA	0.36 (3)	NA	NA	NA	NA	7.62
THORIUM	14/14	0/14	5.3	8.5	6.86	6.86	BG1SBP0801	LOGNORMAL	10.2	NA
VANADIUM	15/15	15/15	**17.1**	**40**	**25.4**	**25.4**	BG1SBP0801	LOGNORMAL	51.2	1.59
ZINC	14/15	14/15	**24.4**	**60.2**	**37.0**	**38.6**	BG3SBM0701	NORMAL	65.6	6.62

Notes:
NA - Not available
Concentrations which exceed soil risk-based target levels (SRBTLs) are bolded.
1 - Value is based on human health and ecological risk-based criteria as presented in Appendix E, Table E-1 of the NSWC Crane Basewide Background Soil Investigation Report dated January 2001.
It is important to note that this information is updated by the appropriate regulatory agencies on a periodic basis.
2 - Exceedances are defined as detected values above the SRBTL.
3 - This value is the average of all detected and non-detected values. Non-detected values were represented by using one half the detection limit.
This value was used for statistical analysis when no detections were encountered.

TABLE F-5
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
SOIL GROUP 8 - PENNSYLVANIAN SUBSURFACE CLAY AND SILT
SWMUs 4, 5, 9, AND 10 RFI
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Frequency of Exceedance (2)	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Location of Maximum	Distribution of Data	95% Upper Tolerance Limit	Soil Risk Based Target Level (1)
ALUMINUM	9/9	0/9	9,070	16,200	13,019	13,019	BG1SBP0206	NORMAL	20,600	75,000
ANTIMONY	1/9	1/9	**11.3**	**11.3**	**1.83**	**11.30**	BG1SBP0505	LOGNORMAL	40.3	0.1423
ARSENIC	9/9	9/9	**1.4**	**8.5**	**5.51**	**5.51**	BG1SBP0204	NORMAL	12.5	0.38
BARIUM	9/9	9/9	**25.1**	**83.4**	**57.0**	**57.0**	BG1SBP0505	NORMAL	115	1.04
BERYLLIUM	0/9	0/9	NA	NA	**0.36 (3)**	NA	NA	NA	NA	0.10
CADMIUM	8/9	6/9	0.05	**0.64**	**0.26**	**0.28**	BG1SBP0206	NORMAL	0.8	0.18095
CALCIUM	9/9	0/9	85.2	970	470	470	BG1SBP0505	LOGNORMAL	4,640	NA
CHROMIUM	9/9	9/9	**14.2**	**27.1**	**19.9**	**19.9**	BG1SBP0206	NORMAL	33.0	0.4
COBALT	9/9	9/9	**5.2**	**12.5**	**8.32**	**8.32**	BG1SBP0206	LOGNORMAL	21.2	0.14033
COPPER	9/9	9/9	**11**	**23.8**	**15.3**	**15.3**	BG1SBP0305	LOGNORMAL	33.3	0.3132
IRON	9/9	5/9	14,800	**40,800**	**24,422**	**24,422**	BG1SBP0305	LOGNORMAL	60,200	22,000
LEAD	9/9	9/9	**8.6**	**15.2**	**11.8**	**11.8**	BG1SBP0603	NORMAL	19.6	0.45053
LITHIUM	9/9	0/9	13.7	46.6	23.2	23.2	BG1SBP0305	LOGNORMAL	80.0	1,500
MAGNESIUM	9/9	0/9	1,100	2,870	1,958	1,958	BG1SBP0204	NORMAL	3,410	NA
MANGANESE	9/9	0/9	29	457	263	263	BG1SBP0804	NORMAL	704	3,100
MERCURY	1/9	1/9	**0.14**	**0.14**	**0.037**	**0.140**	BG1SBP0103	LOGNORMAL	0.18	0.0079
NICKEL	9/9	9/9	**10**	**23.7**	**13.6**	**13.6**	BG1SBP0305	LOGNORMAL	29.6	7
POTASSIUM	9/9	0/9	718	1290	974	974	BG1SBP0204, BG1SBP0305	LOGNORMAL	1,890	NA
SELENIUM	8/9	8/9	**0.37**	**0.88**	**0.47**	**0.51**	BG1SBP0206	NORMAL	1.07	0.02765
SILVER	8/9	0/9	0.05	0.1	0.053	0.056	BG1SBP0206	LOGNORMAL	0.14	2
SODIUM	6/9	0/9	10	205	64.0	79.1	BG1SBP0406-MAX	LOGNORMAL	1,070	NA
STRONTIUM	9/9	0/9	10	20.3	13.8	13.8	BG1SBP0406-MAX	LOGNORMAL	30.9	45,000
THALLIUM	9/9	0/9	**0.14**	**0.25**	**0.20**	**0.20**	BG1SBP0204, BG1SBP0206	LOGNORMAL	0.33	0.04
TIN	0/9	0/9	NA	NA	0.35 (3)	NA	NA	NA	NA	7.62
THORIUM	9/9	9/9	7.1	11.7	9.02	9.02	BG1SBP0305	NORMAL	14.9	NA
VANADIUM	9/9	9/9	**20.9**	**48.5**	**33.2**	**33.2**	BG1SBP0206	LOGNORMAL	69.1	1.59
ZINC	9/9	9/9	**24.3**	**58.2**	**37.1**	**37.1**	BG1SBP0305	LOGNORMAL	83.3	6.62

Notes:
NA - Not available
Concentrations which exceed soil risk-based target levels (SRBTLs) are bolded.
1 - Value is based on human health and ecological risk-based criteria as presented in Appendix E, Table E-1of the NSWC Crane Basewide Background Soil Investigation Report dated January 2001.
It is important to note that this information is updated by the appropriate regulatory agencies on a periodic basis.
2 - Exceedances are defined as detected values above the SRBTL.
3 - This value is the average of all detected and non-detected values. Non-detected values were represented by using one half the detection limit.
This value was used for statistical analysis when no detections were encountered.

TABLE F-6
STATISTICAL SUMMARY OF ANALYTICAL RESULTS
SOIL GROUP 9 - PENNSYLVANIAN SUBSURFACE SAND
SWMUs 4, 5, 9, AND 10 RFI
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA

Metal (mg/kg)	Frequency of Detection	Frequency of Exceedance (2)	Minimum Detection	Maximum Detection	Average of All Results	Average of Positive Detections	Location of Maximum	Distribution of Data	95% Upper Tolerance Limit	Soil Risk Based Target Level (1)
ALUMINUM	1/1	0/1	5,430	5,430	5,430	5,430	BG1SBP0806	NA	NA	75,000
ANTIMONY	0/1	0/1	NA	NA	0.38 (3)	NA	NA	NA	NA	0.1423
ARSENIC	1/1	1/1	2.9	2.9	2.90	2.90	BG1SBP0806	NA	NA	0.38
BARIUM	1/1	1/1	24.8	24.8	24.8	24.8	BG1SBP0806	NA	NA	1.04
BERYLLIUM	0/1	0/1	NA	NA	0.14 (3)	NA	NA	NA	NA	0.10
CADMIUM	1/1	0/1	0.14	0.14	0.14	0.14	BG1SBP0806	NA	NA	0.18095
CALCIUM	1/1	0/1	53.6	53.6	54	54	BG1SBP0806	NA	NA	NA
CHROMIUM	1/1	1/1	7.7	7.7	7.7	7.7	BG1SBP0806	NA	NA	0.4
COBALT	1/1	1/1	8.8	8.8	8.80	8.80	BG1SBP0806	NA	NA	0.14033
COPPER	1/1	1/1	5.6	5.6	5.6	5.6	BG1SBP0806	NA	NA	0.3132
IRON	1/1	0/1	11,300	11,300	11,300	11,300	BG1SBP0806	NA	NA	22,000
LEAD	1/1	1/1	11.7	11.7	11.7	11.7	BG1SBP0806	NA	NA	0.45053
LITHIUM	1/1	0/1	8.6	8.6	8.6	8.6	BG1SBP0806	NA	NA	1,500
MAGNESIUM	1/1	0/1	654	654	654	654	BG1SBP0806	NA	NA	NA
MANGANESE	1/1	0/1	327	327	327	327	BG1SBP0806	NA	NA	3,100
MERCURY	0/1	0/1	NA	NA	0.02 (3)	NA	NA	NA	NA	0.0079
NICKEL	1/1	0/1	4.6	4.6	4.6	4.6	BG1SBP0806	NA	NA	7
POTASSIUM	1/1	0/1	353	353	353	353	BG1SBP0806	NA	NA	NA
SELENIUM	1/1	1/1	0.28	0.28	0.28	0.28	BG1SBP0806	NA	NA	0.02765
SILVER	1/1	0/1	0.05	0.05	0.050	0.050	BG1SBP0806	NA	NA	2
SODIUM	0/1	0/1	NA	NA	1.15 (3)	NA	NA	NA	NA	NA
STRONTIUM	1/1	0/1	5.4	5.4	5.4	5.4	BG1SBP0806	NA	NA	45,000
THALLIUM	1/1	1/1	0.09	0.09	0.09	0.09	BG1SBP0806	NA	NA	0.04
TIN	0/1	0/1	NA	NA	0.22	NA	NA	NA	NA	7.62
THORIUM	1/1	0/1	4.9	4.9	4.90	4.90	BG1SBP0806	NA	NA	NA
VANADIUM	1/1	1/1	14.1	14.1	14.1	14.1	BG1SBP0806	NA	NA	1.59
ZINC	1/1	1/1	11.4	11.4	11.4	11.4	BG1SBP0806	NA	NA	6.62

Notes:
NA - Not available
Concentrations which exceed soil risk-based target levels (SRBTLs) are bolded.
1 - Value is based on human health and ecological risk-based criteria as presented in Appendix E, Table E-1 of the NSWC Crane Basewide Background Soil Investigation Report dated January 2001. It is important to note that this information is updated by the appropriate regulatory agencies on a periodic basis.
2 - Exceedances are defined as detected values above the SRBTL.
3 - This value is the average of all detected and non-detected values. Non-detected values were represented by using one half the detection limit. This value was used for statistical analysis when no detections were encountered.

APPENDIX G

HEALTH RISK ASSESSMENT CALCULATIONS

APPENDIX G.1

SAMPLE RAGS-PART D TABLES AND RISK ASSESSMENT CALCULATIONS

TABLE 1

SELECTION OF EXPOSURE PATHWAYS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil(1)	Surface Soil	Entire Site	Trespassers	Adolescent	Ingestion	On-site	Quant(2)	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Trespassers	Adult and Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to U.S. EPA Generic SSLs(4) for transfers from soil to air.
	Groundwater	Groundwater/Air	Surficial Aquifer	Trespassers	Adult and Adolescent	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Dermal	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Inhalation	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
	Surface Water	Surface Water	On-Site Streams, Ponded Water and Draingeways	Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	On-Site Streams, Ponded Water and Draingeways	Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-Site Streams, Ponded Water and Draingeways	Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).

TABLE 1

SELECTION OF EXPOSURE PATHWAYS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface/ Subsurface Soil (5)	Surface/ Subsurface Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Excavation/construction activities may occur at the site in the future.
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site in the future.
		Air	Vapors and Particulates in Air - Entire Site	Excavation/Construction Workers	Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to U.S. EPA generic SSLs for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	Maintenance Workers	Adult	Ingestion	On-site	Quant	Although maintenance activities are not currently performed on the site, activities, such as groundkeeping, may occur in the future.
						Dermal	On-site	Quant	Although maintenance activities are not currently performed on the site, activities, such as groundkeeping, may occur in the future.
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to U.S. EPA generic SSLs for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Excavation/Construction and Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Workers		Dermal	On-site	Quant	Excavation/construction activities may occur at the site and workers may be exposed by direct contact with groundwater.
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
						Dermal	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Excavation/Construction/ Maintenance/Occupational Workers and Recreational Users	Adult	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
				Residents	Child and Adult	Inhalation	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.

TABLE 1

SELECTION OF EXPOSURE PATHWAYS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Excavation/Construction and Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Constuction/ Maintenance/Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Excavation/Construction and Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Constuction/ Maintenance/Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low that it is not worth quantifying).

Footnotes:
1 Surface soil is defined as soil collected from 0 to 2 feet below ground surface (bgs).
2 Quantitative.
3 Qualitative.
4 Soil screening levels (U.S. EPA, May 1996).
5 Surface/subsurface soil is defined as soil collected from 0 to 10 feet bgs; no exposure to soil at depths below 10 feet bgs is anticipated.

SWMU 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/14	0.003 - 0.004	0.006	NA	1200	sat	1800	IDEM	No	BSL
67-64-1	ACETONE	0.043		0.043		mg/kg	04SB030102	1/14	0.013 - 0.046	0.043	NA	160	N	3900	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.004	J	mg/kg	04SB120102	1/14	0.003 - 0.005	0.004	NA	9.1	C	120	IDEM	No	BSL
1330-20-7	XYLENES, TOTAL	0.004		0.006		mg/kg	090102, 04SB10	4/14	0.003 - 0.004	0.006	NA	27	N	4800	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/14	0.008 - 6	0.03	NA	370(7)	N	9500(7)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/14	0.008 - 6	0.038	NA	2200	N	47000	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.18		2.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.8	NA	0.62	C	5	IDEM	Yes	ASL
50-32-8	BENZO(A)PYRENE	0.23	J	3	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3	NA	0.062	C	0.5	IDEM	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.65	J	4.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	4.8	NA	0.62	C	5	IDEM	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	3.7	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.7	NA	230(8)	N	5500(8)	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.54		0.54		mg/kg	04SB110002	1/14	0.38 - 6	0.54	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.24		2.9	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.9	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.028	J	0.028	J	mg/kg	04SS010002	1/14	0.008 - 6	0.028	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.28		5.4	J	mg/kg	04SB030002	2/14	0.008 - 5.8	5.4	NA	230	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.12	J	2.2	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.2	NA	0.62	C	5	IDEM	Yes	ASL
91-20-3	NAPHTHALENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.11		3.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.8	NA	230(8)	N	5500(8)	IDEM	No	BSL
129-00-0	PYRENE	0.4	J	6		mg/kg	04SB030002	2/14	0.008 - 5.8	6	NA	230	N	5500	IDEM	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/14	0.0038 - 0.059	0.11	NA	1.7	C	20	IDEM	No	BSL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/14	0.0019 - 0.03	0.0081	NA	37(9)	N	1100(9)	IDEM	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.0083		0.012		mg/kg	04SB100002	2/14	0.0031 - 0.048	0.012	NA	61	N	NA	IDEM	No	BSL
94-75-7	2,4-D	0.007		0.045	J	mg/kg	04SB100002	4/14	0.0031 - 0.048	0.045	NA	69	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0029		0.22		mg/kg	04SB050002	3/12	0.00077 - 0.012	0.22	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	3980	J	9980	J	mg/kg	04SB080002	14/14	---	9980	No	7600	N	NA	IDEM	No	BKG
7440-36-0	ANTIMONY	0.98		0.98		mg/kg	04SB070002	1/14	0.79 - 0.97	0.98	No	3.1	N	140	IDEM	No	BSL,BKG
7440-38-2	ARSENIC	3.5		7.3		mg/kg	04SS010002	14/14	---	7.3	No	0.39	C	3.9	IDEM	No	BKG
7440-39-3	BARIUM	26		15600		mg/kg	04SS010002	14/14	---	15600	No	540	N	23000	IDEM	No	BKG
7440-41-7	BERYLLIUM	0.45		0.61		mg/kg	04SB110002	4/14	0.85 - 0.91	0.61	No	15	N	680	IDEM	No	BSL,BKG
7440-43-9	CADMIUM	0.58		5.8		mg/kg	04SB060002	4/14	0.43 - 0.91	5.8	Yes	3.7	N	12	IDEM	Yes	ASL
7440-70-2	CALCIUM	964		145000	J	mg/kg	04SS010002	4/14	215 - 4570	145000	Yes	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	7.3		16.5		mg/kg	04SB020002	14/14	---	16.5	No	30(10)	C	430(10)	IDEM	No	BSL,BKG
7440-48-4	COBALT	3.9		11.4		mg/kg	04SB090002	14/14	---	11.4	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	6.8		53.2		mg/kg	04SB100002	14/14	---	53.2	Yes	310	N	13000	IDEM	No	BSL
7439-89-6	IRON	10400	J	20800	J	mg/kg	04SB070002	14/14	---	20800	No	2300	N	NA	IDEM	No	BKG
7439-92-1	LEAD	7.5	J	70	J	mg/kg	04SB100002	14/14	---	70	No	400(11)	N	400	IDEM	No	BSL,BKG
7439-95-4	MAGNESIUM	564	J	10400	J	mg/kg	04SS010002	14/14	---	10400	No	NA		NA	IDEM	No	NUT, BKG
7439-96-5	MANGANESE	194		611	J	mg/kg	04SB110002	14/14	---	611	No	180	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	2/14	0.03 - 0.2	0.98	No	2.3(12)	N	55	IDEM	No	BSL,BKG
7440-02-0	NICKEL	7.2		18.3	J	mg/kg	04SB050002	14/14	---	18.3	No	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	4/14	426 - 457	454	No	NA		NA	IDEM	No	NUT, BKG
7440-31-5	TIN	50.8	J	50.8	J	mg/kg	04SB070002	1/14	4 - 4.9	50.8	Yes	4700	N	NA	IDEM	No	BSL
7440-62-2	VANADIUM	11.7		22.2		mg/kg	04SB090002	14/14	---	22.2	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	ZINC	26.2		296		mg/kg	04SB100002	14/14	---	296	Yes	2,300	N	100000	IDEM	No	BSL

SWMU 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	9.8		13		meq/100 g	04SB070002	2/2	---	13	NA	NA	NA	IDEM	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/14	0.6 - 1	37	NA	120 N	3700	IDEM	No	BSL
	PH	5.2	J	5.5	J	S.U.	04SB070002	2/2	---	5.5	NA	NA	NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	5100		6100		mg/kg	04SB070002	2/2	---	6100	NA	NA	NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 . The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Acenaphthene is used as a surrogate for acenaphthylene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Endosulfan is used as a surrogate for Endosulfan I.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Inegrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
S.U. = Standard units.
MEQ/100 g = Milliequivalent per 100 grams.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

04SB090002	04SB020002	04SB070002
04SB090102	04SB020102	04SB070102
04SB100002	04SB030002	04SB080002
04SB100102	04SB030102	04SB080102
04SB110002	04SB040002	04SB120002
04SB110102	04SB040102	04SB120102
04SS020002	04SB050002	04SS010002
04SS020102	04SB050102	04SS010102
04SB010002	04SB060002	
04SB010102	04SB060102	

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/14	0.003 - 0.004	0.006	NA	0.1	N	1200	1.9	No	BSL
67-64-1	ACETONE	0.043		0.043		mg/kg	04SB030102	1/14	0.013 - 0.046	0.043	NA	0.8	N	100000	3.1	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.004	J	mg/kg	04SB120102	1/14	0.003 - 0.005	0.004	NA	0.001	C	13	0.023	Yes	ASL
1330-20-7	XYLENES, TOTAL	0.004		0.006		mg/kg	04SB090102, 04SB100102	4/14	0.003 - 0.004	0.006	NA	10	N	410	190	No	BSL
SEMIVOLATILE ORGANICS																	
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/14	0.008 - 6	0.03	NA	29(8)	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/14	0.008 - 6	0.038	NA	590	N	NA	51	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.18		2.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.8	NA	0.09	C	NA	19	Yes	ASL
50-32-8	BENZO(A)PYRENE	0.23	J	3	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3	NA	0.4	C	NA	8.2	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.65	J	4.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	4.8	NA	0.2	C	NA	57	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	3.7	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.7	NA	210(9)	N	NA	570(9)	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.54		0.54		mg/kg	04SB110002	1/14	0.38 - 6	0.54	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0.24		2.9	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.9	NA	8	C	NA	25	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0	J	0.028	J	mg/kg	04SS010002	1/14	0.008 - 6	0.028	NA	0.08	C	NA	18	No	BSL
206-44-0	FLUORANTHENE	0.28		5.4	J	mg/kg	04SB030002	2/14	0.008 - 5.8	5.4	NA	210	N	NA	880	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.1	J	2.2	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.2	NA	0.7	C	NA	3.1	Yes	ASL
91-20-3	NAPHTHALENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	4	N	NA	0.7	No	BSL
85-01-8	PHENANTHRENE	0		3.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.8	NA	210(9)	N	NA	570(9)	No	BSL
129-00-0	PYRENE	0.4	J	6		mg/kg	04SB030002	2/14	0.008 - 5.8	6	NA	210	N	NA	570	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/14	0.0038 - 0.059	0.11	NA	2	C	NA	260	No	BSL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/14	0.0019 - 0.03	0.0081	NA	0.9(10)	N	NA	20(10)	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.0083		0.012		mg/kg	04SB100002	2/14	0.0031 - 0.048	0.012	NA	NA	N	NA	NA	No	NTX
94-75-7	2,4-D	0.007		0.045	J	mg/kg	04SB100002	4/14	0.0031 - 0.048	0.045	NA	NA	N	NA	NA	No	NTX
87-86-5	PENTACHLOROPHENOL	0.0029		0.22		mg/kg	04SB050002	3/12	0.00077 - 0.012	0.22	NA	0.001	C	NA	0.028	Yes	ASL
INORGANICS																	
7429-90-5	ALUMINUM	3980	J	9980	J	mg/kg	04SB080002	14/14	---	9980	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	ANTIMONY	0.98		0.98		mg/kg	04SB070002	1/14	0.79 - 0.97	0.98	No	0.3	N	NA	5.4	No	BKG
7440-38-2	ARSENIC	3.5		7.3		mg/kg	04SS010002	14/14	---	7.3	No	1	C	750	29	No	BKG
7440-39-3	BARIUM	26		15600		mg/kg	04SS010002	14/14	---	15600	No	82	N	690000	1600	No	BKG
7440-41-7	BERYLLIUM	0.45		0.61		mg/kg	04SB110002	4/14	0.85 - 0.91	0.61	No	3	N	1300	63	No	BSL,BKG
7440-43-9	CADMIUM	0.58		5.8		mg/kg	04SB060002	4/14	0.43 - 0.91	5.8	Yes	0.4	N	1800	7.5	Yes	ASL
7440-70-2	CALCIUM	964		145000	J	mg/kg	04SS010002	4/14	215 - 4570	145000	Yes	NA		NA	NA	No	NUT
7440-47-3	CHROMIUM	7.3		16.5		mg/kg	04SB020002	14/14	---	16.5	No	2	C	270	38	No	BKG
7440-48-4	COBALT	3.9		11.4		mg/kg	04SB090002	14/14	---	11.4	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	6.8		53.2		mg/kg	04SB100002	14/14	---	53.2	Yes	NA	N	NA	580	No	BSL
7439-89-6	IRON	10400	J	20800	J	mg/kg	04SB070002	14/14	---	20800	No	NA	N	NA	NA	No	NTX, BKG
7439-92-1	LEAD	7.5	J	70	J	mg/kg	04SB100002	14/14	---	70	No	NA	N	NA	81	No	BSL,BKG
7439-95-4	MAGNESIUM	564	J	10400	J	mg/kg	04SS010002	14/14	---	10400	No	NA		NA	NA	No	NUT, BKG
7439-96-5	MANGANESE	194		611	J	mg/kg	04SB110002	14/14	---	611	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	2/14	0.03 - 0.2	0.98	No	0.1	N	10	2.1	No	BKG
7440-02-0	NICKEL	7.2		18.3	J	mg/kg	04SB050002	14/14	---	18.3	No	7	N	13000	950	No	BKG
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	4/14	426 - 457	454	No	NA		NA	NA	No	NUT, BKG
7440-31-5	TIN	50.8	J	50.8	J	mg/kg	04SB070002	1/14	4 - 4.9	50.8	Yes	NA	N	NA	NA	No	NTX
7440-62-2	VANADIUM	11.7		22.2		mg/kg	04SB090002	14/14	---	22.2	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	ZINC	26.2		296		mg/kg	04SB100002	14/14	---	296	Yes	620	N	NA	14000	No	BSL

SWMU 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	9.8		13		meq/100 g	04SB070002	2/2	---	13	NA	NA	NA	NA	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/14	0.6 - 1	37	NA	NA	NA	150	No	BSL
	PH	5.2	J	5.5	J	S.U.	04SB070002	2/2	---	5.5	NA	NA	NA	NA	No	NTX
	TOTAL ORGANIC CARBON	5100		6100		mg/kg	04SB070002	2/2	---	6100	NA	NA	NA	NA	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TINUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Endosulfan is used as a surrogate for Endosulfan I.

Associated Samples:

04SB090002	04SB020002	04SB070002
04SB090102	04SB020102	04SB070102
04SB100002	04SB030002	04SB080002
04SB100102	04SB030102	04SB080102
04SB110002	04SB040002	04SB120002
04SB110102	04SB040102	04SB120102
04SS020002	04SB050002	04SS010002
04SS020102	04SB050102	04SS010102
04SB010002	04SB060002	
04SB010102	04SB060102	

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management. Risk Inegrated System of Closure (RISC) residential levels for migration from soil to ground water (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
meq/100 g = Milliequivalent per 100 grams.
S.U. = Standard units.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.

NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 2.3

OCCURRENCE, DISTRIBUTION. AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA
PAGE 1 OF 2

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/26	0.003 - 0.008	0.006	NA	1200	sat	1800	IDEM	No	BSL
67-64-1	ACETONE	0.021		0.063		mg/kg	04SB030406	4/26	0.013 - 0.046	0.063	NA	160	N	3900	IDEM	No	BSL
75-15-0	CARBON DISULFIDE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	36	N	900	IDEM	No	BSL
100-41-4	ETHYLBENZENE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	8.9	C	4600	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.007	J	mg/kg	04SB110810	3/26	0.003 - 0.008	0.007	NA	9.1	C	120	IDEM	No	BSL
108-88-3	TOLUENE	0.005		0.005		mg/kg	04SB110810	1/26	0.003 - 0.008	0.005	NA	520	sat	1700	IDEM	No	BSL
75-69-4	TRICHLOROFLUOROMETHANE	0.004		0.004		mg/kg	04SB110810	1/26	0.003 - 0.008	0.004	NA	39	N	NA	IDEM	No	BSL
1330-20-7	XYLENES, TOTAL	0.004		0.008		mg/kg	04SB110810	7/26	0.003 - 0.008	0.008	NA	27	N	4800	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.047		0.047		mg/kg	04SB020608	1/26	0.008 - 8.1	0.047	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/26	0.008 - 8.1	0.008	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/26	0.008 - 8.1	0.03	NA	370(8)	N	9500(8)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/26	0.008 - 8.1	0.038	NA	2200	N	47000	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.18		4.8	J	mg/kg	04SB030406	3/26	0.008 - 6.8	4.8	NA	0.62	C	5	IDEM	Yes	ASL
50-32-8	BENZO(A)PYRENE	0.23	J	4.5	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.5	NA	0.062	C	0.5	IDEM	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.016	J	6.7	J	mg/kg	04SB030406	5/26	0.008 - 6.8	6.7	NA	0.62	C	5	IDEM	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	4.3	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.3	NA	230(9)	N	5500(9)	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.44		0.54		mg/kg	04SB110002	2/26	0.37 - 6.8	0.54	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.011		4.8	J	mg/kg	04SB030406	5/26	0.008 - 6.8	4.8	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.028	J	0.028	J	mg/kg	04SS010002	1/26	0.008 - 8.1	0.028	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.017		9		mg/kg	04SB030406	5/26	0.008 - 6.8	9	NA	230	N	6300	IDEM	No	BSL
86-73-7	FLUORENE	0.009		0.009		mg/kg	04SB020608	1/26	0.008 - 8.1	0.009	NA	260	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.12	J	3	J	mg/kg	04SB030406	3/26	0.008 - 6.8	3	NA	0.62	C	5	IDEM	Yes	ASL
91-20-3	NAPHTHALENE	0.008		0.01		mg/kg	04SB020608	2/26	0.008 - 8.1	0.01	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.009		4.2	J	mg/kg	04SB030406	6/26	0.008 - 6.8	4.2	NA	230(9)	N	5500(9)	IDEM	No	BSL
129-00-0	PYRENE	0.019		8.9		mg/kg	04SB030406	5/26	0.008 - 6.8	8.9	NA	230	N	5500	IDEM	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/25	0.0037 - 0.08	0.11	NA	1.7	C	20	IDEM	No	BSL
11097-69-1	AROCLOR-1254	2.1		2.1		mg/kg	04SB020608	1/26	0.037 - 0.8	2.1	NA	0.22	C	1.8	IDEM	Yes	ASL
319-86-8	DELTA-BHC	0.0023	J	0.0023	J	mg/kg	04SB120810	1/26	0.0019 - 0.041	0.0023	NA	0.09(10)	C	0.99(10)	IDEM	No	BSL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/26	0.0019 - 0.041	0.0081	NA	37(11)	N	1100(11)	IDEM	No	BSL
1024-57-3	HEPTACHLOR EPOXIDE	0.0076		0.0076		mg/kg	04SB020608	1/26	0.0019 - 0.041	0.0076	NA	0.053	C	0.47	IDEM	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.0048	J	0.012		mg/kg	04SB100002	3/26	0.003 - 0.065	0.012	NA	61	N	NA	IDEM	No	BSL
94-75-7	2,4-D	0.007		0.045	J	mg/kg	04SB100002	5/26	0.003 - 0.065	0.045	NA	69	N	NA	IDEM	No	BSL
88-85-7	DINOSEB	0.005		0.005		mg/kg	04SB060709	1/26	0.003 - 0.065	0.005	NA	6.1	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0029		0.22		mg/kg	04SB050002	6/24	0.00075 - 0.016	0.22	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	2040	J	9980	J	mg/kg	04SB080002	26/26	---	9980	No	7600	N	NA	IDEM	No	BKG
7440-36-0	ANTIMONY	0.98		4.9		mg/kg	04SB040608	5/26	0.79 - 0.97	4.9	Yes	3.1	N	140	IDEM	Yes	ASL
7440-38-2	ARSENIC	2.2		11.6		mg/kg	04SB120810	26/26	---	11.6	Yes	0.39	C	3.9	IDEM	Yes	ASL
7440-39-3	BARIUM	24.5		15600		mg/kg	04SS010002	26/26	---	15600	Yes	540	N	23000	IDEM	Yes	ASL
7440-41-7	BERYLLIUM	0.45		0.81		mg/kg	04SB110810	8/26	0.82 - 1.3	0.81	Yes	15	N	680	IDEM	No	BSL
7440-43-9	CADMIUM	0.44		5.8		mg/kg	04SB060002	9/26	0.43 - 0.94	5.8	Yes	3.7	N	12	IDEM	Yes	ASL
7440-70-2	CALCIUM	303		145000	J	mg/kg	04SS010002	10/26	215 - 4680	145000	Yes	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	5.4		138		mg/kg	04SB020608	26/26	---	138	Yes	30(12)	C	430(12)	IDEM	Yes	ASL
7440-48-4	COBALT	2.6		19.6		mg/kg	04SB120810	26/26	---	19.6	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	6.4		79.4		mg/kg	04SB020608	26/26	---	79.4	Yes	310	N	13000	IDEM	No	BSL
7439-89-6	IRON	5990	J	144000	J	mg/kg	04SB020608	26/26	---	144000	Yes	2300	N	NA	IDEM	Yes	ASL
7439-92-1	LEAD	6.4	J	70	J	mg/kg	04SB100002	26/26	---	70	Yes	400(13)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	521	J	10400	J	mg/kg	04SS010002	26/26	---	10400	Yes	NA		NA	IDEM	No	NUT
7439-96-5	MANGANESE	113		2000		mg/kg	04SB010204	26/26	---	2000	Yes	180	N	NA	IDEM	Yes	ASL
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	5/26	0.03 - 0.2	0.98	Yes	2.3(14)	N	55	IDEM	No	BSL
7440-02-0	NICKEL	7.2		111	J	mg/kg	04SB020608	26/26	---	111	Yes	160	N	6900	IDEM	No	BSL
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	8/26	409 - 630	454	No	NA		NA	IDEM	No	NUT, BKG

SWMU 4 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
7782-49-2	SELENIUM	1.7	J	2.1	J	mg/kg	04SB080810	2/26	0.4 - 1.3	2.1	Yes	39	N	1700	IDEM	No	BSL
7440-31-5	TIN	7.7	J	50.8	J	mg/kg	04SB070002	4/26	4 - 4.9	50.8	Yes	4700	N	NA	IDEM	No	BSL
7440-62-2	VANADIUM	9.4		22.2		mg/kg	04SB090002	26/26	---	22.2	Yes	55	N	NA	IDEM	No	BSL
7440-66-6	ZINC	24.2		296		mg/kg	04SB100002	26/26	---	296	Yes	2,300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	2.8		13		meq/100 g	04SB070002	6/6	---	13	NA	NA		NA	IDEM	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/26	0.6 - 1	37	NA	120	N	3700	IDEM	No	BSL
	PH	5.2	J	7.1	J	S.U.	04SB010204	6/6	---	7.1	NA	NA		NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	1200		7500		mg/kg	04SB010204	5/6	10000	7500	NA	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Alpha-BHC is used as a surrogate for delta-BHC.
11 Endosulfan is used as a surrogate for Endosulfan I.
12 Hexavalent Chromium.
13 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
14 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
CAS = Chemical abstract services.
C = Carcinogen.
COPC = Chemical of potential cxoncern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
meq/100 g = Milliequivalent per 100 grams.
S.U. = Standard units.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Associated Samples:

04SB090002	04SB010002	04SB060002	04SB110810
04SB090102	04SB010102	04SB060102	04SB010204
04SB100002	04SB020002	04SB070002	04SB020608
04SB100102	04SB020102	04SB070102	04SB030406
04SB110002	04SB030002	04SB080002	04SB040608
04SB110102	04SB030102	04SB080102	04SB050204
04SS020002	04SB040002	04SB120002	04SB060709
04SS020102	04SB040102	04SB120102	04SB070507
04SB090810	04SB050002	04SS010002	04SB080810
04SB100608	04SB050102	04SS010102	04SB120810

SWMU 4 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/26	0.003 - 0.008	0.006	NA	0.1	N	1200	1.9	No	BSL
67-64-1	ACETONE	0.021		0.063		mg/kg	04SB030406	4/26	0.013 - 0.046	0.063	NA	0.8	N	100000	3.1	No	BSL
75-15-0	CARBON DISULFIDE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	2	N	720	10	No	BSL
100-41-4	ETHYLBENZENE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	0.7	N	400	13	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.007	J	mg/kg	04SB110810	3/26	0.003 - 0.008	0.007	NA	0.001	C	13	0.023	Yes	ASL
108-88-3	TOLUENE	0.005		0.005		mg/kg	04SB110810	1/26	0.003 - 0.008	0.005	NA	0.6	N	650	12	No	BSL
75-69-4	TRICHLOROFLUOROMETHANE	0.004		0.004		mg/kg	04SB110810	1/26	0.003 - 0.008	0.004	NA	NA	N	NA	NA	No	NTX
1330-20-7	XYLENES, TOTAL	0.004		0.008		mg/kg	04SB110810	7/26	0.003 - 0.008	0.008	NA	10	N	410	190	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.047		0.047		mg/kg	04SB020608	1/26	0.008 - 8.1	0.047	NA	4(8)	N	NA	0.7(8)	No	BSL
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/26	0.008 - 8.1	0.008	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/26	0.008 - 8.1	0.03	NA	29(9)	N	NA	130(9)	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/26	0.008 - 8.1	0.038	NA	590	N	NA	51	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.18		4.8	J	mg/kg	04SB030406	3/26	0.008 - 6.8	4.8	NA	0.08	C	NA	19	Yes	ASL
50-32-8	BENZO(A)PYRENE	0.23	J	4.5	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.5	NA	0.4	C	NA	8.2	Yes	ASL
205-99-2	BENZO(B)FLUORANTHENE	0.016	J	6.7	J	mg/kg	04SB030406	5/26	0.008 - 6.8	6.7	NA	0.2	C	NA	57	Yes	ASL
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	4.3	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.3	NA	210(10)	N	NA	570(10)	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.44		0.54		mg/kg	04SB110002	2/26	0.37 - 6.8	0.54	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0		4.8	J	mg/kg	04SB030406	5/26	0.008 - 6.8	4.8	NA	8	C	NA	25	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.028	J	0.028	J	mg/kg	04SS010002	1/26	0.008 - 8.1	0.028	NA	0.08	C	NA	18	No	BSL
206-44-0	FLUORANTHENE	0.0		9		mg/kg	04SB030406	5/26	0.008 - 6.8	9	NA	210	N	NA	880	No	BSL
86-73-7	FLUORENE	0.009		0.009		mg/kg	04SB020608	1/26	0.008 - 8.1	0.009	NA	28	N	NA	170	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.12	J	3	J	mg/kg	04SB030406	3/26	0.008 - 6.8	3	NA	0.7	C	NA	3.1	Yes	ASL
91-20-3	NAPHTHALENE	0.008		0.01		mg/kg	04SB020608	2/26	0.008 - 8.1	0.01	NA	4	N	NA	0.7	No	BSL
85-01-8	PHENANTHRENE	0		4.2	J	mg/kg	04SB030406	6/26	0.008 - 6.8	4.2	NA	210(10)	N	NA	570(10)	No	BSL
129-00-0	PYRENE	0.019		8.9		mg/kg	04SB030406	5/26	0.008 - 6.8	8.9	NA	210	N	NA	570	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/25	0.0037 - 0.08	0.11	NA	2	C	NA	260	No	BSL
11097-69-1	AROCLOR-1254	2.1		2.1		mg/kg	04SB020608	1/26	0.037 - 0.8	2.1	NA	NA	C	NA	6.2	No	BSL
319-86-8	DELTA-BHC	0.0023	J	0.0023	J	mg/kg	04SB120810	1/26	0.0019 - 0.041	0.0023	NA	0.00003(11)	C	0.8	0.0072	Yes	ASL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/26	0.0019 - 0.041	0.0081	NA	0.9(12)	N	NA	20(12)	No	BSL
1024-57-3	HEPTACHLOR EPOXIDE	0.0076		0.0076		mg/kg	04SB020608	1/26	0.0019 - 0.041	0.0076	NA	0.03	C	5	0.67	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	4.8	J	0.012		mg/kg	04SB100002	3/26	0.003 - 0.065	0.012	NA	NA	N	NA	NA	No	NTX
94-75-7	2,4-D	7		0.045	J	mg/kg	04SB100002	5/26	0.003 - 0.065	0.045	NA	NA	N	NA	NA	No	NTX
88-85-7	DINOSEB	5		0.005		mg/kg	04SB060709	1/26	0.003 - 0.065	0.005	NA	NA	N	NA	NA	No	NTX
87-86-5	PENTACHLOROPHENOL	2.9		0.22		mg/kg	04SB050002	6/24	0.00075 - 0.016	0.22	NA	0.001	C	NA	0.028	Yes	ASL
INORGANICS																	
7429-90-5	ALUMINUM	2040	J	9980	J	mg/kg	04SB080002	26/26	---	9980	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	ANTIMONY	0.98		4.9		mg/kg	04SB040608	5/26	0.79 - 0.97	4.9	Yes	0.3	N	NA	5.4	Yes	ASL
7440-38-2	ARSENIC	2.2		11.6		mg/kg	04SB120810	26/26	---	11.6	Yes	1	C	750	29	Yes	ASL
7440-39-3	BARIUM	24.5		15600		mg/kg	04SS010002	26/26	---	15600	Yes	82	N	690000	1600	Yes	ASL
7440-41-7	BERYLLIUM	0.45		0.81		mg/kg	04SB110810	8/26	0.82 - 1.3	0.81	Yes	3	N	1300	63	No	BSL
7440-43-9	CADMIUM	0.44		5.8		mg/kg	04SB060002	9/26	0.43 - 0.94	5.8	Yes	0.4	N	1800	7.5	Yes	ASL
7440-70-2	CALCIUM	303		145000	J	mg/kg	04SS010002	10/26	215 - 4680	145000	Yes	NA		NA	NA	No	NUT
7440-47-3	CHROMIUM	5.4		138		mg/kg	04SB020608	26/26	---	138	Yes	2	C	270	38	Yes	ASL
7440-48-4	COBALT	2.6		19.6		mg/kg	04SB120810	26/26	---	19.6	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	6.4		79.4		mg/kg	04SB020608	26/26	---	79.4	Yes	NA	N	NA	580	No	BSL
7439-89-6	IRON	5990	J	144000	J	mg/kg	04SB020608	26/26	---	144000	Yes	NA	N	NA	NA	No	NTX
7439-92-1	LEAD	6.4	J	70	J	mg/kg	04SB100002	26/26	---	70	Yes	NA	N	NA	81	No	BSL
7439-95-4	MAGNESIUM	521	J	10400	J	mg/kg	04SS010002	26/26	---	10400	Yes	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	113		2000		mg/kg	04SB010204	26/26	---	2000	Yes	NA	N	NA	NA	No	NTX
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	5/26	0.03 - 0.2	0.98	Yes	0.1	N	10	2.1	Yes	ASL
7440-02-0	NICKEL	7.2		111	J	mg/kg	04SB020608	26/26	---	111	Yes	7	N	13000	950	Yes	ASL

SWMU 4 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA
PAGE 2 OF 2

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	8/26	409 - 630	454	No	NA		NA	NA	No	NUT, BKG
7782-49-2	SELENIUM	1.7	J	2.1	J	mg/kg	04SB080810	2/26	0.4 - 1.3	2.1	Yes	0.3	N	NA	5.2	Yes	ASL
7440-31-5	TIN	7.7	J	50.8	J	mg/kg	04SB070002	4/26	4 - 4.9	50.8	Yes	NA	N	NA	NA	No	NTX
7440-62-2	VANADIUM	9.4		22.2		mg/kg	04SB090002	26/26	---	22.2	Yes	300	N	NA	NA	No	BSL
7440-66-6	ZINC	24.2		296		mg/kg	04SB100002	26/26	---	296	Yes	620	N	NA	14000	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	2.8		13		meq/100 g	04SB070002	6/6	---	13	NA	NA		NA	NA	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/26	0.6 - 1	37	NA	NA		NA	150	No	BSL
	pH	5.2	J	7.1	J	S.U.	04SB010204	6/6	---	7.1	NA	NA		NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1200		7500		mg/kg	04SB010204	5/6	10000 - 10000	7500	NA	NA		NA	NA	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Naphthalene is used as a surrogate for 2-methylnaphthalene.
9 Acenaphthene is used as a surrogate for acenaphthylene.
10 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 Alpha-BHC is used as a surrogate for delta-BHC.
12 Endosulfan is used as a surrogate for Endosulfan I.

Associated Samples:

04SB090002	04SB010002	04SB060002	04SB110810
04SB090102	04SB010102	04SB060102	04SB010204
04SB100002	04SB020002	04SB070002	04SB020608
04SB100102	04SB020102	04SB070102	04SB030406
04SB110002	04SB030002	04SB080002	04SB040608
04SB110102	04SB030102	04SB080102	04SB050204
04SS020002	04SB040002	04SB120002	04SB060709
04SS020102	04SB040102	04SB120102	04SB070507
04SB090810	04SB050002	04SS010002	04SB080810
04SB100608	04SB050102	04SS010102	04SB120810

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
CAS = Chemical abstract services.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to ground water (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
meq/100 g = Milliequivalent per 100 grams.
S.U. = Standard units.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
SEMIVOLATILE ORGANICS																
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	2		2		µg/L	04GWT0301	1/8	2	2	NA	4.8 C	6 6	FED-MCL IDEM	No	BSL
INORGANICS																
7429-90-5	ALUMINUM	513	J	513	J	µg/L	04GWT0201	1/8	200	513	ND	3600 N	50 to 200(7) NA	FED-MCL IDEM	Yes	ASL
7440-38-2	ARSENIC	0.15		3.6		µg/L	04GW0401	7/8	0.1	3.6	0.31	0.045 C	50 50	FED-MCL IDEM	Yes	ASL
7440-39-3	BARIUM	12.2		147		µg/L	04GW0301	8/8	---	147	25.1	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM	21300		67300		µg/L	04GW0501	7/8	5000	67300	26000	NA	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	COBALT	10.1		10.1		µg/L	04GW0401	1/8	3	10.1	ND	73 N	NA NA	FED-MCL IDEM	No	BSL
7439-89-6	IRON	198	J	33300	J	µg/L	04GWT0301	7/8	100	33300	324	1100 N	300(7) NA	FED-MCL IDEM	Yes	ASL
7439-95-4	MAGNESIUM	7060		22400		µg/L	04GW0201	7/8	5000	22400	7400	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	MANGANESE	23.4	J	2000	J	µg/L	04GWT0301	6/8	15	2000	ND	88 N	50(7) NA	FED-MCL IDEM	Yes	ASL
7782-49-2	SELENIUM	1.5		2.3		µg/L	04GW0601	2/8	1	2.3	ND	18 N	50 50	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM	7210		7210		µg/L	04GW0601	1/8	5000	7210	ND	NA	NA NA	FED-MCL IDEM	No	NUT
FILTERED METALS																
7440-38-2	ARSENIC, FILTERED	0.44		0.44		µg/L	04GWT0201-F	1/1	---	0.44	NA	0.045 C	50 50	FED-MCL IDEM	Yes	ASL
7440-39-3	BARIUM, FILTERED	24.1		24.1		µg/L	04GWT0201-F	1/1	---	24.1	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM, FILTERED	29800		29800		µg/L	04GWT0201-F	1/1	---	29800	NA	NA	NA NA	FED-AL IDEM	No	NUT
7439-89-6	IRON, FILTERED	121	J	121	J	µg/L	04GWT0201-F	1/1	---	121	NA	1100 N	300(7)	FED-MCL IDEM	No	BSL
7439-95-4	MAGNESIUM, FILTERED	6680		6680		µg/L	04GWT0201-F	1/1	---	6680	NA	NA	NA NA	FED-MCL IDEM	No	NUT

Footnotes:

1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum ground water concentrations were compared to concentrations in upgradient ground water sample 04GW0101. If the concentration in the site groundwater concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

04GW0201
04GW0301
04GW0401
04GW0501
04GW0601
04GWT0101
04GWT0201
04GWT0201-F
04GWT0301

Definitions:

ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract service.
COPC = Chemical of potential concern.
J = Estimated Value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

ded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been select

SWMU 4 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA
PAGE 1 OF 2

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
SEMIVOLATILE ORGANICS																
117-84-0	DI-N-OCTYL PHTHALATE	5		5		µg/L	04SW0501	1/4	5	5	NA	730 N	NA 20	FED-MCL IDEM	No	BSL
INORGANICS																
7429-90-5	ALUMINUM	561	J	730	J	µg/L	04SW0401	2/4	200	730	203	3600 N	50 to 200(7) NA	FED-MCL IDEM	Yes	ASL
7440-38-2	ARSENIC	0.48	J	0.9	J	µg/L	04SW0401	4/4	---	0.9	0.6	0.045 C	50 50	FED-MCL IDEM	Yes	ASL
7440-39-3	BARIUM	61	J	344		µg/L	04SW0501	4/4	---	344	59.9	260 N	2000 2000	FED-MCL IDEM	Yes	ASL
7440-70-2	CALCIUM	6490		20000		µg/L	04SW0401	4/4	---	20000	20800	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-50-8	COPPER	2.5		2.5		µg/L	04SW0401	1/4	2	2.5	ND	140 N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	IRON	823	J	1240	J	µg/L	04SW0301	4/4	---	1240	1350	1100 N	300(7) NA	FED-MCL IDEM	No	BKG
7439-92-1	LEAD	1		1.1		µg/L	04SW0401	2/4	1	1.1	ND	15	15 NA	FED-AL IDEM	No	BSL
7439-95-4	MAGNESIUM	6150	J	7000	J	µg/L	04SW0401	3/4	5000	7000	6800	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	MANGANESE	64.1		249		µg/L	04SW0401	4/4	---	249	212	88 N	50(7) NA	FED-AL IDEM	Yes	ASL
7440-23-5	SODIUM	6290		6590		µg/L	04SW0301	2/4	5000	6590	6910	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-62-2	VANADIUM	2		2		µg/L	04SW0401	1/4	2	2	ND	26 N	NA NA	FED-MCL IDEM	No	BSL
7440-66-6	ZINC	20.5		20.5		µg/L	04SW0501	1/4	10	20.5	ND	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL
FILTERED METALS																
7429-90-5	ALUMINUM, FILTERED	214	J	214	J	µg/L	04SW0401-F	1/4	200	214	ND	3600 N	50 to 200(7) NA	FED-MCL IDEM	Yes	ASL
7440-38-2	ARSENIC, FILTERED	0.17	J	0.61	J	µg/L	04SW0401-F	4/4	---	0.61	0.46	0.045 C	50 50	FED-MCL IDEM	Yes	ASL
7440-39-3	BARIUM, FILTERED	57.8	J	313		µg/L	04SW0501-F	4/4	---	313	58.2	260 N	2000 2000	FED-MCL IDEM	Yes	ASL
7440-70-2	CALCIUM, FILTERED	6410		22000		µg/L	04SW0401-F	4/4	---	22000	22700	NA	NA NA	FED-MCL IDEM	No	BSL,BKG
7439-89-6	IRON, FILTERED	145	J	912	J	µg/L	04SW0201-F	4/4	---	912	952	1100 N	300(7) NA	FED-MCL IDEM	No	BKG
7439-95-4	MAGNESIUM, FILTERED	6580	J	7610	J	µg/L	04SW0401-F	3/4	5000	7610	7360	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	MANGANESE, FILTERED	47		238		µg/L	04SW0401-F	4/4	---	238	202	88 N	50(7) NA	FED-MCL IDEM	Yes	ASL
7440-23-5	SODIUM, FILTERED	6180		6520		µg/L	04SW0201-F	2/4	5000	6520	7020	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-66-6	ZINC, FILTERED	15.7		15.7		µg/L	04SW0501-F	1/4	10	15.7	ND	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL
MISCELLANEOUS PARAMETERS																
	HARDNESS	16		79		µg/L	04SW0401	4/4	---	79	NA	NA	NA NA	FED-MCL IDEM	No	NTX
	TOTAL SUSPENDED SOLIDS	3		52		µg/L	04SW0501	4/4	---	52	NA	NA	NA NA	FED-MCL IDEM	No	NTX

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Footnotes:

1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum surface water concentrations were compared to concentrations in upgradient surface water sample 04SW0101. If the concentration in the site surface water concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

04SW0201	04SW0201-F
04SW0301	04SW0301-F
04SW0401	04SW0401-F
04SW0501	04SW0501-F

Definitions:

ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed/not applicable.
ND = Not detected
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.
For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 2.7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-09-2	METHYLENE CHLORIDE	0.004	J	0.008	J	mg/kg	04SD030006	3/5	0.004	0.008	NA	9.1	C	120	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
56-55-3	BENZO(A)ANTHRACENE	0.013		0.042		mg/kg	04SD020006	4/5	0.009	0.042	NA	0.62	C	5	IDEM	No	BSL
50-32-8	BENZO(A)PYRENE	0.014	J	0.047		mg/kg	04SD020006	4/5	0.009	0.047	NA	0.062	C	0.5	IDEM	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.015	J	0.05		mg/kg	04SD020006	4/5	0.009	0.05	NA	0.62	C	5	IDEM	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.027	J	0.036	J	mg/kg	04SD020006	2/5	0.009	0.036	NA	230(7)	N	5500(7)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.016	J	0.03		mg/kg	04SD020006	4/5	0.009	0.03	NA	6.2	C	50	IDEM	No	BSL
218-01-9	CHRYSENE	0		0.042		mg/kg	04SD020006	4/5	0.009	0.042	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.011	J	0.014	J	mg/kg	04SD020006	2/5	0.009	0.014	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.0		0.088		mg/kg	04SD020006	4/5	0.009	0.088	NA	230	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.024	J	0.032	J	mg/kg	04SD020006	2/5	0.009	0.032	NA	0.62	C	5	IDEM	No	BSL
85-01-8	PHENANTHRENE	0		0.025		mg/kg	04SD030006	3/5	0.009	0.025	NA	230(7)	N	5500(7)	IDEM	No	BSL
129-00-0	PYRENE	0.022		0.07		mg/kg	04SD020006	4/5	0.009	0.07	NA	230	N	5500	IDEM	No	BSL
HERBICIDES																	
87-86-5	PENTACHLOROPHENOL	0.002	J	0.002	J	mg/kg	04SD060006	1/5	0.0084 - 0.0093	0.002	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	3350	J	6820	J	mg/kg	04SD050006	5/5	---	6820	2650	7600	N	NA	IDEM	No	BSL
7440-36-0	ANTIMONY	1.1	J	1.1	J	mg/kg	04SD050006	1/5	0.94 - 1	1.1	ND	3.1	N	140	IDEM	No	BSL
7440-38-2	ARSENIC	1.7		4.7		mg/kg	04SD050006	5/5	---	4.7	2.8	0.39	C	3.9	IDEM	Yes	ASL
7440-39-3	BARIUM	39.3	J	334		mg/kg	04SD060006, 04SD050006	5/5	---	334	27.1	540	N	23000	IDEM	No	BSL
7440-70-2	CALCIUM	477	J	1330	J	mg/kg	04SD030006	4/5	471	1330	755	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	6.1	J	10.7		mg/kg	04SD050006	5/5	---	10.7	5.7	30(8)	C	430(8)	IDEM	No	BSL
7440-48-4	COBALT	2.6		4.9		mg/kg	04SD050006	5/5	---	4.9	3.3	140	N	NA	IDEM	No	BSL
7440-50-8	COPPER	5.6	J	8.9		mg/kg	04SD050006	5/5	---	8.9	4.6	310	N	13000	IDEM	No	BSL
7439-89-6	IRON	5740	J	12700	J	mg/kg	04SD050006	5/5	---	12700	8540	2300	N	NA	IDEM	Yes	ASL
7439-92-1	LEAD	9.4		10.8		mg/kg	04SD020006	5/5	---	10.8	7.4	400(9)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	547	J	979	J	mg/kg	04SD030006	5/5	---	979	568	NA		NA	IDEM	No	NUT
7439-96-5	MANGANESE	76.9	J	456		mg/kg	04SD060006	5/5	---	456	111	180	N	NA	IDEM	Yes	ASL
7440-02-0	NICKEL	6.3		8.5		mg/kg	04SD030006	5/5	---	8.5	5.8	160	N	6900	IDEM	No	BSL
7440-62-2	VANADIUM	10.3		15.2		mg/kg	04SD050006	5/5	---	15.2	8.3	55	N	NA	IDEM	No	BSL
7440-66-6	ZINC	27.6		65.5		mg/kg	04SD060006	5/5	---	65.5	23.7	2,300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	TOTAL ORGANIC CARBON	5800		19000		mg/kg	04SD040006	5/5	---	19000	6700	NA		NA	IDEM	No	NTX

SWMU 4 - TABLE 2.7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum sediment concentrations were compared to concentrations in upgradient sediment sample 04SD01. If the concentration in the site sediment concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
8 Hexavalent chromium.
9 OSWER soil screening level for residential land use (U.S. EPA, July 1994).

Associated Samples:
04SD020006
04SD030006
04SD040006
04SD050006
04SD060006

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	1.89E-03	NA	4.00E-03	J	mg/kg	2.21E-03	95% UCL-T	W - Test (1)	2.21E-03	95% UCL-T	W - Test (1)
BENZO(A)ANTHRACENE	mg/kg	5.30E-01	NA	2.80E+00	J	mg/kg	2.80E+00	Maximum	W - Test (2)	2.80E+00	Maximum	W - Test (2)
BENZO(A)PYRENE	mg/kg	5.48E-01	NA	3.00E+00	J	mg/kg	3.00E+00	Maximum	W - Test (2)	3.00E+00	Maximum	W - Test (2)
BENZO(B)FLUORANTHENE	mg/kg	7.06E-01	NA	4.80E+00	J	mg/kg	4.80E+00	Maximum	W - Test (2)	4.80E+00	Maximum	W - Test (2)
INDENO(1,2,3-CD)PYRENE	mg/kg	4.83E-01	NA	2.20E+00	J	mg/kg	2.20E+00	Maximum	W - Test (2)	2.20E+00	Maximum	W - Test (2)
PENTACHLOROPHENOL	mg/kg	3.00E-02	NA	2.20E-01		mg/kg	2.20E-01	Maximum	W - Test (2)	2.20E-01	Maximum	W - Test (2)
CADMIUM	mg/kg	9.01E-01	NA	5.80E+00		mg/kg	1.38E+00	Maximum	W - Test (2)	1.38E+00	Maximum	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed

(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

SWMU 4 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface / Subsurface Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	2.15E-03	NA	7.00E-03	J	mg/kg	2.48E-03	95% UCL-T	W - Test (1)	2.48E-03	95% UCL-T	W - Test (1)
BENZO(A)ANTHRACENE	mg/kg	7.18E-01	NA	4.80E+00	J	mg/kg	4.80E+00	Maximum	W - Test (2)	4.80E+00	Maximum	W - Test (2)
BENZO(A)PYRENE	mg/kg	6.54E-01	NA	4.50E+00	J	mg/kg	4.50E+00	Maximum	W - Test (2)	4.50E+00	Maximum	W - Test (2)
BENZO(B)FLUORANTHENE	mg/kg	8.40E-01	NA	6.70E+00	J	mg/kg	6.70E+00	Maximum	W - Test (2)	6.70E+00	Maximum	W - Test (2)
INDENO(1,2,3-CD)PYRENE	mg/kg	6.23E-01	NA	3.00E+00	J	mg/kg	3.00E+00	Maximum	W - Test (2)	3.00E+00	Maximum	W - Test (2)
DELTA-BHC	mg/kg	4.30E-03	NA	2.30E-03	J	mg/kg	2.30E-03	Maximum	W - Test (2)	2.30E-03	Maximum	W - Test (2)
AROCLOR-1254	mg/kg	1.63E-01	NA	2.10E+00		mg/kg	2.69E-01	95% UCL-T	W - Test (2)	2.69E-01	95% UCL-T	W - Test (2)
PENTACHLOROPHENOL	mg/kg	1.73E-02	NA	2.20E-01		mg/kg	6.42E-02	95% UCL-T	W - Test (1)	6.42E-02	95% UCL-T	W - Test (1)
ANTIMONY	mg/kg	8.46E-01	NA	4.90E+00		mg/kg	1.03E+00	95% UCL-T	W - Test (1)	1.03E+00	95% UCL-T	W - Test (1)
ARSENIC	mg/kg	5.78E+00	NA	1.16E+01		mg/kg	6.59E+00	95% UCL-T	W - Test (3)	6.59E+00	95% UCL-T	W - Test (3)
BARIUM	mg/kg	7.66E+02	NA	1.56E+04		mg/kg	5.99E+02	95% UCL-T	W - Test (1)	5.99E+02	95% UCL-T	W - Test (1)
CADMIUM	mg/kg	7.50E-01	NA	5.80E+00		mg/kg	8.93E-01	95% UCL-T	W - Test (1)	8.93E-01	95% UCL-T	W - Test (1)
CHROMIUM	mg/kg	1.55E+01	NA	1.38E+02		mg/kg	1.72E+01	95% UCL-T	W - Test (1)	1.72E+01	95% UCL-T	W - Test (1)
IRON	mg/kg	2.01E+04	NA	1.44E+05	J	mg/kg	2.30E+04	95% UCL-T	W - Test (1)	2.30E+04	95% UCL-T	W - Test (1)
MANGANESE	mg/kg	5.01E+02	NA	2.00E+03		mg/kg	6.46E+02	95% UCL-T	W - Test (3)	6.46E+02	95% UCL-T	W - Test (3)
MERCURY	mg/kg	8.96E-02	NA	9.80E-01		mg/kg	1.24E-01	95% UCL-T	W - Test (1)	1.24E-01	95% UCL-T	W - Test (1)
NICKEL	mg/kg	1.61E+01	NA	1.11E+02		mg/kg	1.83E+01	95% UCL-T	W - Test (1)	1.83E+01	95% UCL-T	W - Test (1)
SELENIUM	mg/kg	4.94E-01	NA	2.10E+00		mg/kg	6.03E-01	95% UCL-T	W - Test (1)	6.03E-01	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.

SWMU 4 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/L	1.46E-01	NA	5.13E-01	J	mg/L	5.13E-01	Maximum	N<10(1)	5.13E-01	Maximum	N<10(1)
ARSENIC	mg/L	8.02E-04	NA	3.60E-03		mg/L	3.60E-03	Maximum	N<10(1)	3.60E-03	Maximum	N<10(1)
IRON	mg/L	4.59E+00	NA	3.33E+01	J	mg/L	3.33E+01	Maximum	N<10(1)	3.33E+01	Maximum	N<10(1)
MANGANESE	mg/L	4.50E-01	NA	2.00E+00	J	mg/L	2.00E+00	Maximum	N<10(1)	2.00E+00	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 groundwater samples collected. Therefore, maximum concentration is used for the exposure point concentration.

SWMU 4 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/L	3.39E-01	NA	7.30E-01	J	mg/L	7.30E-01	Maximum	N<10(1)	7.30E-01	Maximum	N<10(1)
ARSENIC	mg/L	6.30E-04	NA	9.00E-04	J	mg/L	9.00E-04	Maximum	N<10(1)	9.00E-04	Maximum	N<10(1)
BARIUM	mg/L	1.23E-01	NA	3.44E-01		mg/L	3.44E-01	Maximum	N<10(1)	3.44E-01	Maximum	N<10(1)
MANGANESE	mg/L	1.89E-01	NA	2.49E-01		mg/L	2.49E-01	Maximum	N<10(1)	2.49E-01	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface water samples collected. Therefore, maximum concentration is used for the exposure point concentration.

SWMU 4 - TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	mg/kg	3.05E+00	NA	4.70E+00		mg/kg	4.70E+00	Maximum	N<10(1)	4.70E+00	Maximum	N<10(1)
IRON	mg/kg	9.10E+03	NA	1.27E+04	J	mg/kg	1.27E+04	Maximum	N<10(1)	1.27E+04	Maximum	N<10(1)
MANGANESE	mg/kg	1.77E+02	NA	4.56E+02		mg/kg	4.56E+02	Maximum	N<10(1)	4.56E+02	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 5.1
NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE, INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal RfD(2)	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD Target Organ	Dates of RfD Target Organ(3)
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	11/20/01
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day		NA	NCEA	09/25/01
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood	NA	HEAST	07/97
Methylene Chloride	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	11/20/01
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS	NA	NCEA	09/25/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Naphthalene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body Weight	3,000	IRIS	11/20/01
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	11/20/01
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	11/20/01
Pentachlorophenol	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver, Kidney	100	IRIS	11/20/01
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	11/20/01
2,6-Dinitrotoluene	chronic	1.0E-03	mg/kg-day	1	1.00E-03	mg/kg-day	Liver	NA	HEAST	07/97
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	11/20/01
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	11/20/01
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	09/25/01
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	11/20/01
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	11/20/01
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Blood	1,000	IRIS	11/20/01
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	11/20/01
Cadmium (diet)	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Cadmium (water)	chronic	5.0E-04	mg/kg-day	0.05	2.50E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	11/20/01
Cobalt	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological	NA	NCEA	09/25/01
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day		NA	HEAST	07/97
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract	NA	NCEA	09/25/01
Manganese (soil)	chronic	7.0E-02	mg/kg-day	0.04	2.80E-03	mg/kg-day	CNS	1	IRIS	11/20/01
Manganese (water)	chronic	2.4E-02	mg/kg-day	0.04	9.60E-04	mg/kg-day	CNS	1	IRIS	11/20/01
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	11/20/01
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	11/20/01
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	11/20/01
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	11/20/01
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	11/20/01
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	500	IRIS	11/20/01

(1) USEPA, 2000 .
(2) RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA Region 3 RBC Table, September 2001)
NA = Not applicable/Not Available
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver	NA	NCEA	9/25/2001
cis-1,2-Dichloroethene	Chronic	3.5E+01	$\mu g/m^3$	1.0E-02	mg/kg-day	Blood	NA	IRIS	11/20/2001
Vinyl Chloride	Chronic	1.0E+02	$\mu g/m^3$	2.9E-02	mg/kg-day	Liver	NA	IRIS	11/20/2001

Notes:

RfC = Reference Concentration

RfD = Reference Dose

IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)

NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA FOR CHEMCIALS OF CONCERN-- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE, INDIANA

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor[1]	Adjusted Dermal Cancer Slope Factor[2]	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date[3]
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	7.5E-03	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl Chloride (adult)	7.5E-01	1	7.50E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl Chloride (early life)	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benzo(a)anthracene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(a)pyrene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(b)fluoranthene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenzo(a,h)anthracene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno(1,2,3-cd)pyrene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Pentachlorophenol	1.2E-01	1	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1248	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
delta-BHC	6.3E+00	1	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001

(1) USEPA, 2000).
(2) CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, September 2001)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animal inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6-2

CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE, INDIANA

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1-Dichloroethene	5.0E-05	$(mg/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	7.8E-06	$(mg/m^3)^{-1}$	3.5E+03	2.73E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	2.3E-05	$(mg/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	4.7E-07	$(mg/m^3)^{-1}$	3.5E+03	1.60E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethylene (PCE)	5.8E-07	$(mg/m^3)^{-1}$	3.5E+03	2.03E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethylene (TCE)	1.7E-06	$(mg/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl chloride (child/adult)	8.8E-06	$(mg/m^3)^{-1}$	3.5E+03	3.08E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl chloride (adult)	4.4E-06	$(mg/m^3)^{-1}$	3.5E+03	1.54E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benz[a]anthracene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[a]pyrene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[b]fluoranthene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenz[ah]anthracene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno[1,2,3-cd]pyrene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Polychlorinated Biphenyls (PCBs)	1.0E-04	$(mg/m^3)^{-1}$	3.5E+03	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	4.6E-03	$(mg/m^3)^{-1}$	3.5E+03	1.61E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
delta-BHC	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Beryllium	2.4E-03	$(mg/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Cadmium	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Chromium VI	1.2E-02	$(mg/m^3)^{-1}$	3.5E+03	4.20E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001

IRIS = Integrated Risk Information System (November 2001)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment (USEPA Region III RBC Table, September 2001)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SWMU 4 - TABLE 4.5
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 4 - TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	3.0E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	5.0E-08
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	6.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	3.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.0E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.0E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.9E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.8E-03
	(total)												**3.8E-03**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.1E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.0E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	7.7E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	6.2E-04
	(total)												**6.3E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.0E-09	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	7.78E-12
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.3E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.60E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.4E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.03E-05
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.3E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.65E-06
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.0E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.54E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.0E-07	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.24E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	6.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-05**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	6.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	7.4E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.2E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	8.7E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	5.5E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.0E-07	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	2.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 7.5a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.5E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.5E-08
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.5E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.0E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.9E-03
	(total)												**1.9E-03**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.8E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.3E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-10	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.6E-05
	(total)												**7.7E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.5a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.5E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.14E-12
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.40E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.1E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.50E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.40E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.5E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.10E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.5E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.81E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-06**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.5E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.7E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.3E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.0E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.8E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**2.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
RESIDENTIAL ADULT - REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SWMU 4 - McCOMISH GORGE
LOCATION: NSWC CRANE, INDIANA
DATE: 04/02/03

REFERENCES: USEPA, 2000

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	FA	DAevent
Aluminum	5.13E-01		i			5.80E-01			1.00E-03			1	2.98E-07
Arsenic	3.60E-03		i			5.80E-01			1.00E-03			1	2.09E-09
Iron	3.33E+01		i			5.80E-01			1.00E-03			1	1.93E-05
Manganese	2.00E+00		i			5.80E-01			1.00E-03			1	1.16E-06

SWMU 4 - TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	1.4E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-02
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	9.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.3E-01
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	9.1E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E+00
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	5.5E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.3E+00
	(total)												**5.7E+00**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	7.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.3E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	5.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-03
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	4.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-02
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	2.9E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.0E-01
	(total)												**3.2E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	4.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	3.4E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-05
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	3.1E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.9E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.1E-05**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	2.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.8E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-07
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	9.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**5.1E-05**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH GROUNDWATER
RESIDENTIAL ADULT - CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SWMU 4 - McCOMISH GORGE
LOCATION: NSWC CRANE, INDIANA
DATE: 04/02/03

REFERENCES: USEPA, 2000

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	FA	DAevent
Aluminum	5.13E-01		i			2.50E-01			1.00E-03			1	1.28E-07
Arsenic	3.60E-03		i			2.50E-01			1.00E-03			1	9.00E-10
Iron	3.33E+01		i			2.50E-01			1.00E-03			1	8.33E-06
Manganese	2.00E+00		i			2.50E-01			1.00E-03			1	5.00E-07

SWMU 4 - TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	9.8E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.8E-03
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	6.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-01
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	6.4E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E+00
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	3.8E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.6E+00
	(total)												**4.0E+00**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	3.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.2E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	2.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.4E-04
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.8E-03
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.2E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-01
	(total)												**1.4E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	9.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	6.9E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-05
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	6.4E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	3.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-05**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	3.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	2.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.0E-05**

SWMU 4 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED / BW x AT
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t^*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations

Ingestion Intake = (IHgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE ADULT RESIDENTS- REASONABLE MAXIMUM EXPOSURE (RME)

SITE NAME: SWMU 4 - McCOMISH GORGE
LOCATION: NSWC CRANE, INDIANA
DATE: 04/02/03

REFERENCES: USEPA, 2000

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	FA	DAevent
Aluminum	7.30E-01		i			4.00E+00			1.00E-03			1	2.92E-06
Arsenic	9.00E-04		i			4.00E+00			1.00E-03			1	3.60E-09
Barium	3.44E-01		i			4.00E+00			1.00E-03			1	1.38E-06
Manganese	2.49E-01		i			4.00E+00			1.00E-03			1	9.96E-07

SWMU 4 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	2.0E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.0E-03
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.5E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.2E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	9.4E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.3E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	6.8E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.8E-02
	(total)												**5.2E-02**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.6E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	4.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.7E-04	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.5E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.2E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-01
	(total)												**1.7E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	8.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-06**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

CALCULATION OF DAevent - EXPOSURES THROUGH DERMAL CONTACT WITH SURFACE WATER
FUTURE ADULT RESIDENTS- CENTRAL TENDENCY EXPOSURE (CTE)

SITE NAME: SWMU 4 - McCOMISH GORGE
LOCATION: NSWC CRANE, INDIANA
DATE: 04/02/03

REFERENCES: USEPA, 2000

DERMAL CONTACT: DAD = (DAevent x EV x ED x EF x A)/(BW x AT)

WHERE: DAD = DERMALLY ABSORBED DOSE (MG/KG/DAY)
DAevent = ABSORBED DOSE PER EVENT (MG/CM^2/EVENT)
A = SKIN SURFACE AREA AVAILABLE FOR CONTACT(CM^2)
EV = EVENT FREQUENCY (EVENTS/DAY)
ED = EXPOSURE DURATION (YEARS)
EF = EXPOSURE FREQUENCY (DAYS/YEAR)
BW = BODY WEIGHT(KG)
AT = AVERAGING TIME (DAYS)

FOR INORGANICS: DAevent = Kp x C x tevent x CF

FOR ORGANICS: IF tevent < t*, DAevent = 2FA x Kp x C x CF x (6T x tevent/3.1416)$^{0.5}$
IF tevent > t*, DAevent = FA x Kp x C x CF x ((tevent/(1 + B)) + (2T x ((1+3B+3B^2)/(1 + B)^2)))

WHERE: FA = FRACTION ABSORBED (DIMENSIONLESS)
Kp = PERMEABILITY COEFFICIENT FROM WATER (CM/HR)
C = CONCENTRATION OF CHEMICAL IN WATER (MG/L)
tevent = DURATION OF EVENT (HR/EVENT)
CF = CONVERSION FACTOR (1L/1000 CM^3)
t* = TIME IT TAKES TO REACH STEADY-STATE (HOUR/EVENT)
T = LAG TIME (HOUR/EVENT)
B = BUNGE MODEL CONSTANT (DIMENSIONLESS)

CHEMICAL	GW CONC. (mg/L)		ORGANIC OR INORGANIC?		t* (HR)	tevent	T (HR)		Kp (CM/HR)		B	FA	DAevent
Aluminum	7.30E-01		i			2.00E+00			1.00E-03			1	1.46E-06
Arsenic	9.00E-04		i			2.00E+00			1.00E-03			1	1.80E-09
Barium	3.44E-01		i			2.00E+00			1.00E-03			1	6.88E-07
Manganese	2.49E-01		i			2.00E+00			1.00E-03			1	4.98E-07

SWMU 4 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.7E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.7E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	8.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.2E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	4.5E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.3E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	9.5E-03
	(total)												**1.7E-02**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.2E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.0E-04
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.7E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.2E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.1E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.3E-02
	(total)												**5.5E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	8.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-07**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

SWMU 4 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[1] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	FI	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[1] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

SWMU 4 - TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-02
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	1.7E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.8E-02
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	6.2E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	8.9E-03
	(total)												**8.8E-02**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	7.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**2.6E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.31E-06
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	6.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-06**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.7E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.2E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	5.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.1E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.0E-03
	(total)												**3.0E-02**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-04
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**2.2E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.23E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	5.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-07**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-09
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.7E-09**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	7.8E-12		0.0E+00	7.8E-12	METHYLENE CHLORIDE	Liver	5.0E-08		0.0E+00	5.0E-08
			BENZO(A)ANTHRACENE	9.6E-07		5.1E-07	1.5E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.0E-05		5.4E-06	1.6E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.6E-06		8.7E-07	2.5E-06	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	7.5E-07		4.0E-07	1.2E-06	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.2E-08		1.3E-08	2.5E-08	PENTACHLOROPHENOL	Liver, Kidney	1.0E-05		1.0E-05	2.0E-05
			CADMIUM					CADMIUM	Kidney	3.8E-03		6.2E-04	4.4E-03
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	2.0E-03		3.6E-04	2.4E-03
			Arsenic	1.3E-06		2.3E-07	1.5E-06	Arsenic	Skin, Vascular	8.2E-03		1.5E-03	9.7E-03
			Barium					Barium	Blood	1.3E-02		3.5E-02	4.8E-02
			Manganese					Manganese	CNS	2.8E-02		1.3E-01	1.6E-01
Sediment	Sediment	Sediment	ARSENIC	3.3E-06		4.0E-07	3.7E-06	ARSENIC	Skin, Vascular	2.1E-02		2.6E-03	2.4E-02
			IRON					IRON	Liver, Blood, GI Tract	5.8E-02		0.0E+00	5.8E-02
			MANGANESE					MANGANESE	CNS	8.9E-03		0.0E+00	8.9E-03
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	1.4E-02		7.3E-05	1.4E-02
			Arsenic	5.1E-05		2.6E-07	5.1E-05	Arsenic	Skin, Vascular	3.3E-01		1.7E-03	3.3E-01
			Iron					Iron	Liver, Blood, GI Tract	3.0E+00		1.6E-02	3.1E+00
			Manganese					Manganese	CNS	2.3E+00		3.0E-01	2.6E+00

Total Risk Across Surface Soil	2.1E-05
Total Risk Across Surface Water	1.5E-06
Total Risk Across Sediment	3.7E-06
Total Risk Across Groundwater	5.1E-05
Total Risk Across All Media and All Exposure Routes	7.7E-05

Total Hazard Index Across All Media and All Exposure Routes	6.3E+00
Total Liver HI =	3.1E+00
Total Kidney HI =	4.4E-03
Total Vascular HI =	3.6E-01
Total GI Tract HI =	3.1E+00
Total Skin HI =	3.6E-01
Total Blood HI =	3.2E+00
Total CNS HI =	2.7E+00
Total Body Weight HI =	1.6E-02
Total Thyroid HI =	0.0E+00

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.1E-12		0.0E+00	1.1E-12	METHYLENE CHLORIDE	Liver	2.5E-08		0.0E+00	2.5E-08
			BENZO(A)ANTHRACENE	1.4E-07		1.8E-08	1.6E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.5E-06		2.0E-07	1.7E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.4E-07		3.1E-08	2.7E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.1E-07		1.4E-08	1.2E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.8E-09		4.5E-10	2.3E-09	PENTACHLOROPHENOL	Liver, Kidney	5.0E-06		1.3E-06	6.3E-06
			CADMIUM					CADMIUM	Kidney	1.9E-03		7.6E-05	2.0E-03
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	6.7E-04		1.2E-04	7.9E-04
			Arsenic	1.2E-07		2.2E-08	1.5E-07	Arsenic	Skin, Vascular	2.7E-03		5.0E-04	3.2E-03
			Barium					Barium	Blood	4.5E-03		1.2E-02	1.6E-02
			Manganese					Manganese	CNS	9.5E-03		4.3E-02	5.3E-02
Sediment	Sediment	Sediment	ARSENIC	3.2E-07		9.7E-09	3.3E-07	ARSENIC	Skin, Vascular	7.2E-03		2.2E-04	7.4E-03
			IRON					IRON	Liver, Blood, GI Tract	1.9E-02		0.0E+00	1.9E-02
			MANGANESE					MANGANESE	CNS	3.0E-03		0.0E+00	3.0E-03
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	9.8E-03		3.2E-05	9.9E-03
			Arsenic	1.0E-05		3.3E-08	1.0E-05	Arsenic	Skin, Vascular	2.3E-01		7.4E-04	2.3E-01
			Iron					Iron	Liver, Blood, GI Tract	2.1E+00		6.8E-03	2.1E+00
			Manganese					Manganese	CNS	1.6E+00		1.3E-01	1.7E+00

Total Risk Across Surface Soil	2.3E-06
Total Risk Across Surface Water	1.5E-07
Total Risk Across Sediment	3.3E-07
Total Risk Across Groundwater	1.0E-05
Total Risk Across All Media and All Exposure Routes	1.3E-05

Total Hazard Index Across All Media and All Exposure Routes	4.2E+00
Total Liver HI =	2.2E+00
Total Kidney HI =	2.0E-03
Total Vascular HI =	2.4E-01
Total GI Tract HI =	2.2E+00
Total Skin HI =	2.4E-01
Total Blood HI =	2.2E+00
Total CNS HI =	1.8E+00
Total Body Weight HI =	1.1E-02
Total Thyroid HI =	0.0E+00

CLIENT: NSWC, CRANE, INDIANA - SWMU 5		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SURFACE WATER ADOLESCENT TRESPASSER		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/26/01

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of surface water by an adolescent trespasser.

EQUATION:

$$IEX = \frac{Csw \times CF \times CRsw \times ET \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Csw	=	exposure point concentration in surface water (ug/L)
CF	=	conversion factor (1.0E-6 kg/mg)
CRsw	=	contact rate (L/hour)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Csw	=	85	ug/L	Vinyl Chloride
CRsw	=	0.01	L/day	
CF	=	1.0E-03	mg/ug	
ET	=	4	hours	
EF	=	26	days/year	
ED	=	11	years	
BW	=	43	kg	
ATc	=	25,550	days	
ATnc	=	4,015	days	
CSFo	=	1.50E+00	$(mg/kg/day)^{-1}$	
RfDo	=	3.00E-03	(mg/kg/day)	

CLIENT: NSWC, CRANE, INDIANA - SWMU 5		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SURFACE WATER ADOLESCENT TRESPASSER		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/26/01

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{85\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 4\ hours \times 26\ days/year \times 11\ years}{43\ kg \times 25550\ days}$$

IEXc = 8.85E-07 mg/kg/day

ICLR = 8.85E-07 mg/kg/day x 1.5 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 1.33E-06

EXAMPLE CARCINOGENIC CALCULATION

$$IEXnc = \frac{85\ ug/L \times 0.001\ mg/ug \times 0.01\ L/day \times 4\ hours \times 26\ days/year \times 11\ years}{43\ kg \times 4015\ days}$$

IEXnc = 5.63E-06 mg/kg/day

HQ = 5.63E-06 mg/kg/day / 0.003 (mg/kg/day) = Hazard Quotient

HQ = 1.88E-03

CLIENT: NSWC, CRANE, INDIANA - SWMU 10		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/26/01

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from ingestion of groundwater by the future adult resident (RME).

EQUATION:

$$IEX = \frac{Cgw \times CF \times IRgw \times EF \times ED}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cgw	=	exposure point concentration in groundwater (µg/L)
CF	=	conversion factor (1.0E-3 mg/µg)
IRgw	=	ingestion rate (L/hour)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cgw	=	1.15E+02	µg/L	RDX
IRgw	=	2	L/day	
CF	=	1.0E-03	mg/µg	
EF	=	350	days/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25,550	days	
ATnc	=	8,760	days	
CSFo	=	1.10E-01	$(mg/kg/day)^{-1}$	
RfDo	=	3.00E-03	(mg/kg/day)	

CLIENT: NSWC, CRANE, INDIANA - SWMU 10		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INGESTION OF GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/26/01

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{114.5671 \text{ mg/L} \times 0.001 \text{ mg/mg} \times 2 \text{ L/day} \times 350 \text{ days/year} \times 24 \text{ years}}{70 \text{ kg} \times 25550 \text{ days}}$$

IEXc = 1.08E-03 mg/kg/day

ICLR = 1.08E-03 mg/kg/day x 0.11 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 1.18E-04

EXAMPLE NONCARCINOGENIC CALCULATION

$$IEXnc = \frac{114.5671 \text{ mg/L} \times 0.001 \text{ mg/mg} \times 2 \text{ L/day} \times 350 \text{ days/year} \times 24 \text{ years}}{70 \text{ kg} \times 8760 \text{ days}}$$

IEXnc = 3.14E-03 mg/kg/day

HQ = 3.14E-03 mg/kg/day / 0.003 (mg/kg/day) = Hazard Quotient

HQ = 1.05E+00

CLIENT: NSWC, CRANE, INDIANA - SWMU 4		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FUTURE CHILD RESIDENT		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/26/01

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from incidental ingestion of surface soil by the future child resident for the Reasonable Maximum Exposure (RME).

EQUATION:

$$IEX = \frac{Cs \times IR \times EF \times ED \times FI \times CF}{BW \times AT}$$

Where:

IEX	=	estimated exposure intake (mg/kg/day)
Cs	=	exposure point concentration in soil/sediment (mg/kg)
IR	=	incidental soil ingestion rate (mg/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
FI	=	fraction ingested from contaminated source (unitless)
CF	=	conversion factor (1.0E-6 kg/mg)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFo (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDo (mg/kg/day)

ASSUMPTIONS:

Cs	=	0.22	mg/kg	Pentachlorophenol
IR	=	200	mg/day	
EF	=	350	days/year	
ED	=	6	years	
FI	=	1		
CF	=	1.0E-06	kg/mg	
BW	=	15	kg	
ATc	=	25550	days	
ATnc	=	2190	days	
CSFo	=	0.12	(mg/kg/day)$^{-1}$	
RfDo	=	3.00E-02	(mg/kg/day)	

CLIENT: NSWC, CRANE, INDIANA - SWMU 4		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INCIDENTAL INGESTION OF SOIL FUTURE CHILD RESIDENT		
BASED ON: USEPA, DEC. 1989		
BY: T. JACKMAN	CHECKED BY:	DATE: 11/26/01

EXAMPLE CARCINOGENIC CALCULATION

$$IEXc = \frac{0.22 \text{ mg/kg} \times 200 \text{ mg/day} \times 350 \text{ days/year} \times 6 \text{ years} \times 0.000001 \text{ kg/mg}}{15 \text{ kg} \times 25550 \text{ days}}$$

IEXc = 2.41E-07 mg/kg/day ✓

ICLR = 2.41E-07 mg/kg/day x 0.12 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 2.89E-08 ✓

EXAMPLE CARCINOGENIC CALCULATION

$$IEXnc = \frac{0.22 \text{ mg/kg} \times 200 \text{ mg/day} \times 350 \text{ days/year} \times 6 \text{ years} \times 0.000001 \text{ kg/mg}}{15 \text{ kg} \times 2190 \text{ days}}$$

IEXnc = 2.81E-06 mg/kg/day ✓

HQ = 2.81E-06 mg/kg/day / 0.03 (mg/kg/day) = Hazard Quotient

HQ = 9.38E-05 ✓

CLIENT: NSWC, CRANE, INDIANA - SWMU 10		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DEC. 1989, 1992		
BY: T.JACKMAN	CHECKED BY:	DATE: 11/26/01

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from dermal contact with groundwater by the future adult resident.

EQUATION:

$$DAD = \frac{DAevent \times EV \times ED \times EF \times A}{BW \times AT}$$

Where:

DAD	=	dermally absorbed dose (mg/kg/day)
DAevent	=	absorbed does per event (mg/cm^2/event)
EV	=	event frequency (events/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
A	=	skin surface available for contact (cm^2)
BW	=	body weight (kg)
AT	=	averaging time (days)
CSFo	=	oral carcinogenic slope factor ((mg/kg/day)$^{-1}$)
RfDo	=	oral noncarcinogenic reference dose (mg/kg/day)

RISKS:

ICLR (Carcinogens) = DAD (mg/kg/day) x CSFd (mg/kg/day)$^{-1}$
HQ (Noncarcinogens) = DAD (mg/kg/day) / RFDd (mg/kg/day)

EQUATIONS for DAevent:

For Inorganics:

$$DA_{event} = (K_p)(C_{gw})(t_{event})$$

For Organics:

$$If\ t_{event} < t^*,\ then:\ DA_{event} = FA(2K_p)(C_{gw})(CF)\left(\sqrt{\frac{6\tau t_{event}}{\pi}}\right)$$

$$If\ t_{event} > t^*,\ then:\ DA_{event} = FA(K_p)(C_{gw})(CF)\left(\frac{t_{event}}{1+B} + 2\tau\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right)$$

CLIENT: NSWC, CRANE, INDIANA - SWMU 10		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DEC. 1989, 1992		
BY: T.JACKMAN	CHECKED BY:	DATE: 11/29/01

Where:

FA	=	fraction absorbed (dimensionless)
Kp	=	permeability coefficient from water (cm/hr)
Cgw	=	concentration of chemical in groundwater (mg/L)
tevent	=	duration of event (hr/event)
CF	=	conversion factor (0.001 L/cm^3)
t*	=	time it takes to reach steady-state (hr/event)
τ	=	lag time (hr/event)
B	=	Bunge Model Constant (dimensionless)

EXAMPLE CALCULATION OF DAevent

ASSUMPTIONS:

Cgw	=	1.61E-02	mg/L	2,4,6-Trinitrotoluene
Kp	=	1.46E-04	cm/hr	
tevent	=	0.58	hr/event	
CF	=	0.001	L/cm^3	
t*	=	4.72E+00	hr/event	
τ	=	1.97E+00	hr/event	
B	=	8.46E-04		
FA	=	1		

tevent < t*, therefore,

$$DAevent = 1 \times (2 \times 0.000146\ cm/hr)\ (0.0161\ mg/L)\ (0.001\ L/cm3) \times \sqrt{\frac{6 \times 1.97\ hr/event \times 0.58\ hr/event}{\pi}}$$

DAevent = 6.94E-09 mg/cm^2-event

RISK CALCULATIONS

ASSUMPTIONS:

A	=	18,000	cm^2/day
EV	=	1	event/day
ED	=	24	years
EF	=	350	days/year
BW	=	70	kg
ATc	=	25550	days
ATnc	=	8760	days
CSFd	=	3.00E-02	(mg/kg/day)$^{-1}$

RfDd = 5.00E-04 (mg/kg/day)

CALCULATION WORKSHEET

CLIENT: NSWC, CRANE, INDIANA - SWMU 10		**JOB NUMBER:** 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM DERMAL CONTACT WITH GROUNDWATER FUTURE ADULT RESIDENT		
BASED ON: USEPA, DEC. 1989, 1992		
BY: T.JACKMAN	**CHECKED BY:**	**DATE:** 11/26/01

EXAMPLE CARCINOGENIC CALCULATION

$$DADc = \frac{6.92E\text{-}09 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 24 \text{ years} \times 350 \text{ days/year} \times 18000 \text{ cm2/day}}{70 \text{ kg} \times 25550 \text{ days}}$$

DADc = 5.8E-07 mg/kg/day

DADc = 5.85E-07 mg/kg/day x 0.03 (mg/kg/day)-1 = Incremental Lifetime Cancer Risk

ICLR = 1.8E-08

EXAMPLE NONCARCINOGENIC CALCULATION

$$DADnc = \frac{6.92E\text{-}09 \text{ mg/cm2-event} \times 1 \text{ event/day} \times 24 \text{ years} \times 350 \text{ days/year} \times 18000 \text{ cm2/day}}{70 \text{ kg} \times 8760 \text{ days}}$$

DADnc = 1.7E-06 mg/kg/day

HQ = 1.71E-06 mg/kg/day / 0.0005 (mg/kg/day) = Hazard Quotient

HQ = 3.4E-03

CLIENT: NSWC, CRANE, INDIANA - SWMU 9		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING BY AN ADULT RESIDENT		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: T. Jackman	CHECKED BY:	DATE: 11/30/01

PURPOSE: To estimate intake, carcinogenic and noncarcinogenic risks from inhalation of volatiles while showering by an adult resident.

EQUATIONS:

$$\text{Intake} = \frac{S \times IRsh \times K \times EF \times ED}{BW \times AT \times Ra \times CF}$$

Where:

$$K = Ds + \frac{\exp(-Ra \times Dt) - \exp[Ra \times (Ds - Dt)]}{Ra}$$

$S = Cwd \times FR/SV$ $\quad$ $Cwd = Cw \times [1-\exp(-Kal \times ts/60d)]$

$Kal = Kl \times [(T1 \times Us)/(Ts \times U1)^{-0.5}$ $\quad$ $Kl = 1/[1/k1 + RT/(H \times kg)]$

$k1 = 20\ cm/hr \times (44/MW)^{0.5}$ $\quad$ $kg = 3000\ cm/hr \times (18/MW)^{0.5}$

RISKS:

ICLR (Carcinogens) = Intake (mg/kg/day) x CSFi $(mg/kg/day)^{-1}$
HQ (Noncarcinogens) = Intake (mg/kg/day) / RFDi (mg/kg/day)

Where:

Intake	=	estimated exposure intake (mg/kg/day)
S	=	volatile chemical generation rate (mg/m3-min - shower)
IRsh	=	inhalation rate (m3/hr)
EF	=	exposure frequency (showers/year)
ED	=	exposure duration (years)
BW	=	body weight (kg)
AT	=	averaging time (days)
Ra	=	air exchange rate (1/min)
Ds	=	shower duration (min)
Dt	=	total time in bathroom (min)
FR	=	shower water flow rate (L/min)
SV	=	shower room air volume (m3)
ts	=	shower droplet drop time (sec)
d	=	shower droplet diameter (mm)
MW	=	molecular weight of compound (g/mole)
H	=	Henry's Law constant (atm-m3/mole)
T1	=	calibration water temperature (K)
Ts	=	shower water temperature (K)
U1	=	water viscosity at T1 (cp)
Us	=	water viscosity at Ts (cp)
CSFi	=	inhalation carcinogenic slope factor ($(mg/kg/day)^{-1}$)
RfDi	=	inhalation noncarcinogenic reference dose (mg/kg/day)

CLIENT: NSWC, CRANE, INDIANA - SWMU 9		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING BY AN ADULT RESIDENT		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: T. Jackman	CHECKED BY:	DATE: 11/30/01

ASSUMPTIONS:

IRsh	=	0.6	m3/hr	
EF	=	350	showers/year	
ED	=	24	years	
BW	=	70	kg	
ATc	=	25550	days	
Atn	=	8760	days	
Ra	=	0.025	1/min	
CF	=	60	min/hr	
Ds	=	15	min	
Dt	=	20	min	
FR	=	10	L/min	
SV	=	12	m3	
Cw	=	0.005833	mg/L	1,1-DCE
ts	=	2	sec	
d	=	1	mm	
MW	=	97	g/mole	
H	=	2.61E-02	atm-m3/mole	
RT	=	2.40E-02	atm-m3/mole	
T1	=	293	K	
Ts	=	320	K	
U1	=	0.982	cp	
Us	=	0.616	cp	
CSFi	=	1.75E-01	(mg/kg/day)-1	
RfDi	=	NA	(mg/kg/day)	

EXAMPLE CALCULATION:

k1 = 20 cm/hr x (44 g/mole / 97 g/mole)^0.5

k1 = **13.5 cm/hr**

kg = 3000 cm/hr x (18 g/mole / 97 g/mole)^0.5

kg = **1292.3 cm/hr**

Kl = 1/[1/13.5 cm/hr + 2.40E-02 atm-m3/mole/(2.61E-02 atm-m3/mole x 1292.3 cm/hr)]

Kl = **1.33E+01 cm/hr**

CLIENT: NSWC, CRANE, INDIANA - SWMU 9		JOB NUMBER: 7141
SUBJECT: CALCULATION OF INTAKE/RISK FROM INHALATION OF VOLATILES WHILE SHOWERING BY AN ADULT RESIDENT		
BASED ON: EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987		
BY: T. Jackman	CHECKED BY:	DATE: 11/30/01

Kal = 1.33E+01 cm/hr x [(293 K x 0.616 cp)/(320 K x 0.982 cp)]^-0.5

Kal = **17.6 cm/hr**

Cwd = 0.005833 mg/L x [1 - exp((-17.6 cm/hr x 2 sec)/(60 x 1 mm))]

Cwd = **2.59E-03 mg/L**

S = 2.59E-03 mg/L x 10 L/min / 12 m3

S = **2.16E-03 mg/m3-min-shower**

$$K = 15\text{ min} + \frac{\exp(-0.025\text{ 1/min} \times 20\text{ min}) - \exp[0.025\text{ 1/min} \times (15\text{ min} - 20\text{ min})]}{0.025\text{ 1/min}}$$

K = **3.96 min**

CARCINOGENIC INTAKE:

$$\text{Intake} = \frac{2.16\text{E-03 mg/m3-min-shower} \times 0.6\text{ m3/hr} \times 3.96\text{ min} \times 350\text{ showers/year} \times 24\text{ years}}{70\text{ kg} \times 25550\text{ days} \times 0.025\text{ 1/min} \times 60\text{ min/hr}}$$

intake = **1.61E-05 mg/kg-day**

Risk = 0.175 (mg/kg/day)-1 x 1.61E-05 mg/kg-day

Risk = **2.81E-06**

NONCARCINOGENIC INTAKE:

$$\text{Intake} = \frac{2.16\text{E-03 mg/m3-min-shower} \times 0.6\text{ m3/hr} \times 3.96\text{ min} \times 350\text{ showers/year} \times 24\text{ years}}{70\text{ kg} \times 8760\text{ days} \times 0.025\text{ 1/min} \times 60\text{ min/hr}}$$

intake = **4.68E-05 mg/kg-day**

HQ = 4.68E-05 mg/kg-day / NA (mg/kg/day)

HQ = **No toxicity values available to calculate HQ.**

SWMU 5

IEUBK CHILD LEAD MODEL AND TRW ADULT LEAD MODEL RESULTS

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: **SWMU 5 - OLD BURN PIT**
LOCATION: **NSWC CRANE, INDIANIA**
RECEPTOR: **CONSTRUCTION WORKER**
DATE: **12/03/01**

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{fetal,\,GM} = R_{fetal/maternal} \times [PbB_{adult,\,0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT]$

and

$PbB_{fetal,\,0.95} = PbB_{fetal,\,GM} \times GSD_{i,\,adult}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\,0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\,0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg)	1710	1710	1710	1710
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	150	150	150	150
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\,adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\,central}$	Calculated central estimate of blood lead concentrations in adult women of child-bearing age from site exposures (ug/dL)	5.07	5.07	5.57	5.57
$PbB_{fetal,\,GM}$	Central estimate of blood lead concentration (ug/dL) for fetuses carried by women who have site exposures to soil lead at concentration, PbS.	4.57	4.57	5.02	5.02
	Probability that $PbB_{fetal,GM}$ exceeds 10 ug/dL.	9.11%	14.53%	12.02%	17.62%
$PbB_{fetal,\,0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	12.01	15.47	13.19	17.00
RBRG	Lead soil concentration corresponding to a 95th percentile 10 ug/dL lead blood level in a fetus (mg/kg).	1280	800	1027	547

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: SWMU 5 - OLD BURN PIT
LOCATION: NSWC CRANE, INDIANIA
RECEPTOR: MAINTENANCE WORKER
DATE: 12/03/01

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{fetal,\,GM} = R_{fetal/maternal} \times [PbB_{adult,\,0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT]$

and

$PbB_{fetal,\,0.95} = PbB_{fetal,\,GM} \times GSD_{i,\,adult}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,,0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\,0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg)	2275	2275	2275	2275
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	24	24	24	24
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\,adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\,central}$	Calculated central estimate of blood lead concentrations in adult women of child-bearing age from site exposures (ug/dL)	2.42	2.42	2.92	2.92
$PbB_{fetal,\,GM}$	Central estimate of blood lead concentration (ug/dL) for fetuses carried by women who have site exposures to soil lead at concentration, PbS.	2.18	2.18	2.63	2.63
	Probability that $PbB_{fetal,GM}$ exceeds 10 ug/dL:	0.47%	1.99%	1.15%	3.58%
$PbB_{fetal,\,0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	5.72	7.37	6.91	8.90
RBRG	Lead soil concentration corresponding to a 95th percentile 10 ug/dL lead blood level in a fetus (mg/kg).	8000	5002	6416	3418

Calculations of 95th Percentile Fetal Blood Lead Concentrations for Adult Exposure to Soil

SITE NAME: **SWMU 5 - OLD BURN PIT**
LOCATION: **NSWC CRANE, INDIANIA**
RECEPTOR: **ADULT RECREATRIONAL USER**
DATE: **12/03/01**

OBJECTIVE: Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women. This spreadsheet calculates a range of 95th percentile fetal blood lead concentrations from central estimates of blood lead concentrations in pregnant adult women using the exposure parameters identified below (U.S. EPA, Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil, December 1996).

RELEVANT EQUATIONS: $PbB_{fetal,\,GM} = R_{fetal/maternal} \times [PbB_{adult,\,0} + (PbS \times BKSF \times IR_s \times AF_s \times EF_s)/AT]$

and

$PbB_{fetal,\,0.95} = PbB_{fetal,\,GM} \times GSD_{i,\,adult}$

Exposure Parameter	Description (units)	GSD_i = 1.8 - 2.1; $PbB_{adult,\,0}$ = 1.7 - 2.2			
		Adult 1	Adult 2	Adult 3	Adult 4
$PbB_{adult,\,0}$	Typical blood lead concentration in adult women of child-bearing age in absence of site exposures (ug/dL)	1.7	1.7	2.2	2.2
PbS	Site-specific soil lead concentration (mg/kg)	2275	2275	2275	2275
BKSF	Biokinetic slope factor (ug/dL per ug/day))	0.4	0.4	0.4	0.4
IR_s	Intake rate of soil, includes outdoor soil and indoor soil-derived dust (g/day)	0.100	0.100	0.100	0.100
AF_s	Absolute gastrointestinal absorption fraction (unitless)	0.12	0.12	0.12	0.12
EF_s	Exposure frequency (days/year)	52	52	52	52
AT	Averaging time (days/year)	365	365	365	365
$GSD_{i,\,adult}$	Estimate of individual geometric standard deviation among adults (unitless)	1.8	2.1	1.8	2.1
$R_{fetal/maternal}$	Constant of proportionality between fetal blood lead concentraiton at birth and maternal blood lead concentration (unitless)	0.9	0.9	0.9	0.9
$PbB_{adult,\,central}$	Calculated central estimate of blood lead concentrations in adult women of child-bearing age from site exposures (ug/dL)	3.26	3.26	3.76	3.76
$PbB_{fetal,\,GM}$	Central estimate of blood lead concentration (ug/dL) for fetuses carried by women who have site exposures to soil lead at concentration, PbS.	2.93	2.93	3.38	3.38
	Probability that $PbB_{fetal,GM}$ exceeds 10 ug/dL.	1.84%	4.90%	3.25%	7.19%
$PbB_{fetal,\,0.95}$	Calculated 95th percentile blood lead concentrations among fetuses born to women having site exposures (ug/dL)	7.71	9.93	8.89	11.45
RBRG	Lead soil concentration corresponding to a 95th percentile 10 ug/dL lead blood level in a fetus (mg/kg).	3693	2309	2961	1577

SWMU 5 - OLD BURN PIT, NSWC CRANE, INDIANA

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	2275.0	1602.5
1-2	2275.0	1602.5
2-3	2275.0	1602.5
3-4	2275.0	1602.5
4-5	2275.0	1602.5
5-6	2275.0	1602.5
6-7	2275.0	1602.5

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.70
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

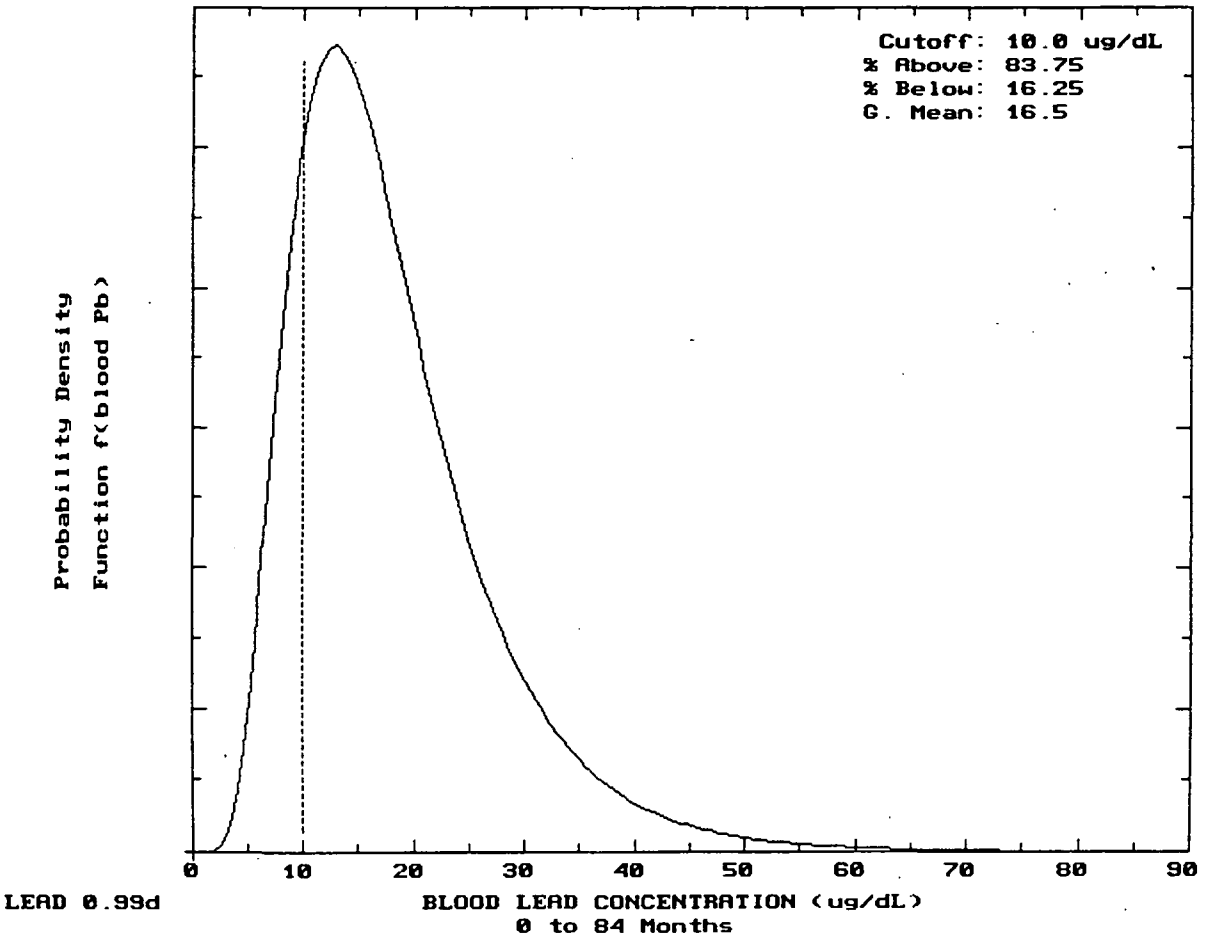
MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	17.5	34.39	32.27
1-2:	20.2	50.85	48.37
2-3:	19.2	53.65	50.77
3-4:	18.8	56.07	53.13
4-5:	16.1	46.96	43.75
5-6:	13.9	44.66	41.11
6-7:	12.4	43.68	39.76

SWMU 5 - OLD BURN PIT, NSWC CRANE, INDIANA

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	1.84	0.27	0.00	0.02
1-2:	1.81	0.63	0.00	0.03
2-3:	2.14	0.68	0.00	0.06
3-4:	2.15	0.73	0.00	0.07
4-5:	2.30	0.84	0.00	0.07
5-6:	2.53	0.93	0.00	0.09
6-7:	2.86	0.97	0.00	0.09



SWMU 5 - IEUBK MODEL

AVG. CONCENTRATION - 2,275 mg/kg

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1.0 ALUMINUM

Aluminum is a silver-white flexible metal with a vast number of uses. It is poorly absorbed and efficiently eliminated; however, when absorption does occur, aluminum is distributed mainly in bone, liver, testes, kidneys, and brain.

1.1 Noncancer Toxicity

Aluminum may be involved in Alzheimer's disease (dialysis dementia) and in Amyotrophic Lateral Sclerosis and Parkinsonism-Dementia Syndromes of Guam (Guam ALS-PD complex). Aluminum content of brain, muscle, and bone increases in Alzheimer's patients. Neurofibrillary tangles (NFTs) are found in patients suffering from aluminum encephalopathy and Alzheimer's disease. Symptoms of "dialysis dementia" include speech disorders, dementia, convulsions, and myoclonus. People of Guam and Rota have an unusually high

incidence of neurodegenerative diseases. The volcanic soil in the region of Guam where the high incidence of ALS-PD occurs contains high levels of aluminum and manganese. Neurological effects have also been observed in rats orally exposed to aluminum compounds.

The respiratory system appears to be the primary target following inhalation exposure to aluminum. Alveolar proteinosis has been observed in guinea pigs, rats, and hamsters exposed to aluminum powders. No decrease in reproductive capacity, hormonal abnormalities, or testicular histopathology was observed in male rats exposed to aluminum in drinking water for 90 days. However, male rats exposed to aluminum (as aluminum chloride) via gavage for 6 months exhibited decreased spermatozoa counts and sperm motility, and testicular histological and histochemical changes.

Subchronic and chronic reference doses and reference concentrations have not been derived for aluminum. However, the EPA's National Center for Environmental Assessment (NCEA) has developed a provisional oral RfD of 1.00 mg/kg/day and an inhalation reference dose of 0.001 mg/kg/day.

1.2 Carcinogenicity

The U.S. EPA has not evaluated aluminum or aluminum compounds for carcinogenicity, and a weight-of-evidence classification is currently not assigned.

2.0 AMINODINITROTOLUENES

Little information regarding the toxicology of aminodinitrotoluenes (2-amino-2,6-dtrinitrotoluene and 4-amino-2,6-dtrinitrotoluene) is available in the literature. These compounds are degradation products of 2,4,6-TNT and other nitrogen-containing explosives and are expected to exhibit toxicological effects similar to these compounds (TOXNET, online, 2001). The U.S. EPA has derived an oral RfD of 6.0E-5 mg/kg/day for the aminodinitrotoluenes and the target organ is considered to be the liver.

3.0 ANTIMONY

3.1 Pharmacokinetics

Ingested antimony is absorbed slowly and incompletely from the gastrointestinal (GI) tract. Within a few days of acute exposure, highest tissue concentrations are found in the liver, kidney, and thyroid. Organs of storage include skin, bones, and teeth. Highest concentrations in deceased smelter workers (inhalation exposure) occurred in the lungs and skeleton. Excretion is largely via the urine or feces, although some is incorporated into the hair.

3.2 Noncancer Toxicity

Acute intoxication from ingestion of large doses of antimony induces GI disturbances, dehydration, and cardiac effects in humans. Chronic effects from occupational exposure include irritation of the respiratory tract, pneumoconiosis, pustular eruptions of the skin called "antimony spots," allergic contact dermatitis, and cardiac effects, including abnormalities of the electrocardiograph (ECG) and myocardial changes. Cardiac effects were also observed in rats and rabbits exposed by inhalation for six weeks and in animals (dogs, and possibly other species) treated by intravenous injection.

Chronic oral exposure studies in laboratory animals include two briefly reported lifetime drinking water studies in rates and mice. The only dose tested, 5 ppm potassium antimony tartrate, resulted in reduced longevity in both species and in reduced mean heart weight in rats. The EPA verified an RfD of 0.0004 mg/kg/day for chronic oral exposure to antimony from the LOAEL of 5 ppm potassium antimony tartrate (0.35 mg/antimony/kg body weight-day) in the lifetime study in rats. An uncertainty factor of 1000 was applied; factors of 10 each for inter- and intraspecies variation were used to estimate an NOAEL from an LOAEL. The heart is considered a likely target organ for chronic oral exposure of humans.

3.3 Carcinogenicity

Data were not located regarding the carcinogenicity of antimony to humans. Antimony fed to rats did not produce an excess of tumors, but a high frequency of lung tumors was observed in rats exposed by inhalation to antimony trioxide for one year. Antimony is classified as EPA cancer weight-of-evidence Group D (not classifiable as a carcinogenicity to humans).

4.0 AROCLOR-1254

Aroclor -1254 is a polychlorinated biphenyl (PCB) mixture containing approximately 21% C12H6Cl4, 48% C12H5Cl5, 23% C12H4Cl6, and 6% C12H3Cl7 with an average chlorine content of 54%. PCBs are inert, thermally and physically stable, and have dielectric properties. In the environment, the behavior of PCB mixtures is directly correlated to the degree of chlorination. PCBs are strongly sorbed to soil and remains immobile when leached with water; however, the mixture is highly mobile in the presence of organic solvents . PCBs are resistant to chemical degradation by oxidation or hydrolysis. However, biodegradation, especially of lower chlorinated PCBs, can occur. PCBs have high bioconcentration factors, and due to lipophilicity, especially of highly chlorinated congeners, tend to accumulate in the fat of fish, birds, mammals, and humans. The use of PCBs in the United States was limited to closed systems in 1974, and in February, 1977, the EPA issued final regulations prohibiting PCB discharge into waterways.

4.1 Pharmacokinetics

PCBs have high bioconcentration factors, and due to lipophilicity, especially of highly chlorinated congeners, tend to accumulate in the fat of fish, birds, mammals, and humans. PCBs are absorbed after oral, inhalation, or dermal exposure and are stored in adipose tissue. The location of the chlorine atoms on the phenyl rings is an important factor in PCB metabolism and excretion. The major route of PCB excretion is in the urine and feces; however, more important is the elimination in human milk. Metabolites are predominately found in urine and bile, while small amounts of the parent compound are found in the feces. Biliary excretion appears to be the source of fecal excretion.

4.2 Noncancer Toxicity

Accidental human poisonings and data from occupational exposure to PCBs suggest initial dermal and mucosal disturbances followed by systemic effects that may manifest themselves several years post-exposure. Initial effects are enlargement and hypersecretion of the Meibomian gland of the eye, swelling of the eyelids, pigmentation of the fingernails and mucous membranes, fatigue, and nausea. These effects were followed by hyperkeratosis, darkening of the skin, acneform eruptions, edema of the arms

and legs, neurological symptoms, such as headache and limb numbness, and liver disturbance. Hepatotoxicity is a prominent effect of Aroclor-1254 that has been well characterized . Effects included hepatic microsomal enzyme induction, increased serum levels of liver-related enzymes indicative of hepatocellular damage, liver enlargement, lipid deposition, fibrosis, and necrosis. Groups of 16 adults (11.1 +/-4.1 years at study initiation) female rhesus monkeys ingested gelatin capsules containing 0, 0.005, 0.02, 0.04, or 0.08 mg/kg/day Aroclor-1254 daily for more than 5 years. Increases in the incidence of inflamed and/or prominent Meibomian glands; increased incidences of ocular exudate; changes in finger and/or toe nails; decreases in antibody levels; decreases in the percent of helper T-lymphocytes; increases in suppressor T-lymphocyte count; a decrease in helper/suppressor ratio; and decreases in reticulocyte count, serum cholesterol, total bilirubin, and alpha-1+ alpha-2-globulins were observed in treated monkeys.

A chronic oral reference dose (RfD) of 2E-05 mg/kg/day for Aroclor-1254 was calculated from a lowest-observed-adverse-effect level (LOAEL) of 0.0005 mg/kg/day derived from the above study.

4.3 Carcinogenicity

Data are suggestive but not conclusive concerning the carcinogenicity of PCBs in humans. The EPA has not determined a weight-of-evidence classification or slope factor for Aroclor-1254 specifically. However, hepatocellular carcinomas in three strains of rats and two strains of mice have led the EPA to classify PCBs as group B2, probable human carcinogen. The carcinogenicity slope factor (q1*) for oral exposure to Aroclor-1254 is 2.0 $(mg/kg/day)^{-1}$.

5.0 AROCLOR –1260 (POLYCHLORINATED BIPHENYLS)

Aroclor-1260 is a polychlorinated biphenyl (PCB) mixture containing approximately 38% $C_{12}H_4Cl_6$, 41% $C_{12}H_3Cl_7$, 8% $C_{12}H_2Cl_8$, and 12% $C_{12}H_5Cl_5$ with an average chlorine content of 60%. PCBs are inert, thermally and physically stable, and have dielectric properties. In the environment, the behavior of PCB mixtures is directly correlated to the degree of chlorination. PCBs are strongly sorbed to soil and remains immobile when leached with water; however, the mixture is highly mobile in the presence of organic solvents. PCBs are resistant to chemical degradation by oxidation or hydrolysis. However, biodegradation, especially of lower chlorinated PCBs, can occur. PCBs have high bioconcentration factors, and due to lipophilicity, especially of highly chlorinated congeners, tend to accumulate in the fat of fish, birds, mammals, and humans. The use of PCBs in the United States was limited to closed systems in 1974, and in February, 1977, the EPA issued final regulations prohibiting PCB discharge into waterways.

5.1 Pharmacokinetics

PCBs are absorbed after oral, inhalation, or dermal exposure and are stored in adipose tissue. The location of the chlorine atoms on the phenyl rings is an important factor in PCB metabolism and excretion. The major route of PCB excretion is in the urine and feces; however, of more importance is elimination in human milk. Metabolites are predominately found in urine and bile, while small amounts of parent compound are found in the feces. Biliary excretion appears to be the source of fecal excretion.

5.2 Noncancer Toxicity

Accidental human poisonings and data from occupational exposure to PCBs suggest initial dermal and mucosal disturbances followed by systemic effects that may manifest themselves several years post-exposure. Initial effects are enlargement and hypersecretion of the Meibomian gland of the eye, swelling of the eyelids, pigmentation of the fingernails and mucous membranes, fatigue, and nausea. These effects were followed by hyperkeratosis, darkening of the skin, acneform eruptions, edema of the arms and legs, neurological symptoms, such as headache and limb numbness, and liver disturbance

Hepatotoxicity is a prominent effect of PCBs, including Aroclor-1260, that has been well characterized. Effects include hepatic microsomal enzyme induction, increased serum levels of liver-related enzymes (indicative of hepatocellular damage), liver enlargement, lipid deposition, fibrosis, and necrosis. Chloracne and Immune function disorders have been observed in humans and several animal species after PCB exposure. Reproductive and developmental effects, including low-birth weight, and decreased gestational time, and decreased reproductive capacity, have been observed in human and animal species. No reference dose (RfD) or reference concentrations (RfC) have been verified for Aroclor-1260.

Target organs for PCBs include the skin, liver, fetus, and neonate.

5.3 Carcinogenicity

Data are suggestive but not conclusive concerning the carcinogenicity of PCBs in humans. The EPA has not determined a weight-of-evidence classification or slope factor for Aroclor-1260 specifically. However, hepatocellular carcinomas in three strains of rats and two strains of mice have led the EPA to classify PCBs as group B2, probable human carcinogen. The EPA has published an oral slope factor of 2.0 $(mg/kg/day)^{-1}$ for upper bound estimates for all PCBs (except Aroclor-1016) based on the linear extrapolation from LED10s (95%lower bounds on ED10, the estimated dose associated with 10% increased incidence of cancer). The EPA has also published a central-estimate slope factor of 1.0 $(mg/kg/day)^{-1}$ for PCBs, also derived from ED10s.

6.0 ARSENIC

6.1 Pharmacokinetics

Several studies confirm that soluble inorganic arsenic compounds and organic arsenic compounds are almost completely (>90 percent) absorbed from the GI tract in both animals and humans. The absorption efficiency of insoluble inorganic arsenic compounds depends on particle size an stomach pH. Initial distribution of absorbed arsenic is to the liver, kidneys, and lungs, flowed by redistribution to hair, nails, teeth, bone, and skin, which are considered tissues of accumulation. Arsenic has a long half-life in the blood of rats, compared with other animals and humans, because of firm binding to the hemoglobin in erythrocytes.

Metabolism of inorganic arsenic includes reversible oxidation-reduction so that both arsenite (valence of 3) and arsenate (valence of 5) are present in the urine of animals treated with arsenic of either valence. Arsenite is subsequently oxidized and methylated by a saturable mechanism to form mono- or dimethylarsenate; the latter is the predominant metabolite in the urine of animals or humans. Organic arsenic compounds (arsenilic acid, cacodylic acid) are not readily converted to inorganic arsenic. Excretion of organic or inorganic arsenic is largely via the urine, but considerable species variation exists. Continuously exposed humans appear to excrete 60 to 70 percent of their daily intake of arsenate or arsenite via the urine.

6.2 Noncancer Toxicity

A lethal dose of arsenic trioxide in humans is 70 to 180 milligrams (approximately 50 to 140 mg arsenic. Acute oral exposure of humans to high doses of arsenic produce liver swelling, skin lesions, disturbed heart function, and neurological effects. The only noncancer effects in humans clearly attributable to chronic oral exposure to arsenic are dermal hyperpigmentation and keratosis, as revealed by studies of several hundred Chinese exposed to naturally occurring arsenic in well water. Similar effects were observed in persons exposed to high levels of arsenic in water in Utah and the northern part of Mexico. Occupational (predominantly inhalation) exposure is also associated with neurological deficits, anemia, and cardiovascular effects, but concomitant exposure to other chemicals cannot be ruled out. The EPA derived an RfD of 0.0003 mg/kg/day for chronic oral exposure, based on an NOAEL of 0.0008 mg/kg/day for skin lesions from Chinese data. The principal target organ for arsenic appears to be the skin. The nervous system and cardiovascular systems appear to be less significant target organs. Inorganic arsenic may be an essential nutrient, exerting beneficial effects on growth, health, and feed conversion efficiency .

6.3 Carcinogenicity

Inorganic arsenic is clearly a carcinogen in humans. Inhalation exposure is associated with increased risk of lung cancer in persons employed as smelter workers, in arsenical pesticide applicators, and in a population residing near a pesticide manufacturing plant. Oral exposure to high levels in well water is associated with increased risk of skin cancer. Extensive animal testing with various forms of arsenic given by many routes of exposure to several species, however, has not demonstrated the carcinogenicity of arsenic. The EPA classifies inorganic arsenic in cancer weight-of-evidence Group A (human carcinogen), and recommends an oral unit risk of 0.00005 ug/L in drinking water, based on the incidence of skin cancer in the Chinese study. The EPA presents a chronic oral slope factor of 1.5 per mg/kg/day based on the same information. The EPA notes that the uncertainties associated with the oral unit risk are considerably less than those for most carcinogens, so that the unit risk might be reduced in order of magnitude. An inhalation unit risk of 0.0043 per mg/m^3 was derived for inorganic arsenic from the incidence of lung cancer in occupationally exposed men, equivalent to 15.1 per mg/kg/day, was derived from the same data assuming an inhalation rate of 20 m^3/day and a body weight of 70 kg for humans.

7.0 BARIUM

7.1 Noncancer Toxicity

The soluble salts of barium, an alkaline earth metal, are toxic in mammalian systems. They are absorbed rapidly from the gastrointestinal tract and are deposited in the muscles, lungs, and bone. Barium is excreted primarily in the feces. At low doses, barium acts as a muscle stimulant and at higher doses affects the nervous system eventually leading to paralysis. Acute and subchronic oral doses of barium cause vomiting and diarrhea, followed by decreased heart rate and elevated blood pressure. Higher doses result in cardiac irregularities, weakness, tremors, anxiety, and dyspnea. Subchronic and chronic oral or inhalation exposure primarily affects the cardiovascular system resulting in elevated blood pressure. Human data were used by the EPA to calculate a chronic and subchronic oral reference dose (RfD) of 0.07 mg/kg/day. Subchronic and chronic inhalation exposure of human populations to barium-containing dust can result in a benign pneumoconiosis called "baritosis." This condition is often accompanied by an elevated blood pressure but does not result in a change in pulmonary function. However, Reproductive and developmental effects and increased fetal mortality in rats were also observed after inhalation exposures. An inhalation reference concentration (RfC) of 0.005 mg/m3 for subchronic and 0.0005 mg/m3 for chronic exposure was calculated by the EPA based on the NOAEL for developmental effects which have not been substantiated in humans.

7.2 Carcinogenicity

Barium has not been evaluated by the EPA for evidence of human carcinogenic potential.

8.0 BENZENE

8.1 Noncancer Toxicity

In humans, short-term inhalation exposure to benzene induced CNS effects such as drowsiness, dizziness, and headaches; long-term exposure induced anemia and oral dosing in animals induced hematopoietic effects. The EPA presents an oral RfD of 0.003 mg/kg/day and an inhalation RfD of 0.00171 mg/kg/day. The CNS and the hematopoietic system are the target organs of benzene.

8.2 Carcinogenicity

The EPA classifies benzene in cancer weight-of-evidence Category A (human carcinogen) based on several studies of increased risk of nonlymphocytic leukemia associated with occupational exposure, supported by an increased incidence of neoplasia in rats and mice exposed by inhalation and gavage. In January 2000, IRIS specified a range of oral slope factors from 0.015 to 0.055 per mg/kg/day and inhalation unit risk range of 2.2E-06 to 7.8E-06 mg/m^3 based on the increased incidence of leukemia in several occupational (inhalation exposure) studies. The inhalation unit risk range is equivalent to 7.7E-03 to 2.7E-02 per mg/kg/day, assuming an inhalation rate of 20 m^3/day and a body weight of 70 kg for humans.

9.0 BENZO (A) ANTHRACENE

9.1 Noncancer Toxicity

The oral and inhalation RfD and RfC are not available at this time.

9.2 Carcinogenicity

Benzo[a]anthracene has a weight of evidence classification of B2, a probable human carcinogen. The classification was based on sufficient data from animal bioassays. Benzo[a]anthracene produced tumors in mice exposed by gavage; intraperitoneal, subcutaneous or intramuscular injection; and topical application. Benzo[a]anthracene produced mutations in bacteria and in mammalian cells, and transformed mammalian cells in culture.

Although there are no human data that specifically link exposure to benzo[a]anthracene to human cancers, benzo[a]anthracene is a component of mixtures that have been associated with human cancer. These include coal tar, soot, coke oven emissions and cigarette smoke.

Benzo[a]anthracene administration caused an increase in the incidence of tumors by gavage; dermal application; and both subcutaneous injection and intraperitoneal injection assays. A group of male mice was exposed to gavage solutions containing 3% benzo[a]anthracene for 5 weeks. There was an increased incidence of pulmonary adenomas and hepatomas.

Supporting data for carcinogenicity include genetic mutations in five different strains of Salmonella typhimurium. Benzo[a]anthracene produced positive results in an assay for mutations in Drosophila melongaster.

The currently used Oral Slope Factor (CSF) for benzo[a]anthracene is 7.3E-01 per (mg/kg)/day which is extrapolated from the CSF for benzo[a]pyrene (BaP), i.e., 0.1 x 7.3 (BaP) = 7.3E-01 per (mg/kg)/day).

10.0 BENZO (A)PYRENE (BAP)

10.1 Pharmacokinetics

Benzo (a)pyrene was readily absorbed across the GI and respiratory epithelia. Benzo(a)pyrene was distributed widely in the tissues of treated rats and mice, but primarily to tissues high in fat, such as adipose tissue and mammary gland.

Studies of the metabolism of benzo(a)pyrene provide information relevant to other PAHs because of the structural similarities of all members of the class. Metabolism involves microsomal mixed function oxidase hydroxylation of one or more of the phenyl rings with the formation of phenols and dihydrodiols, probably via formation of arene oxide intermediates. The dihydrodiols may be further oxidized to diol epoxides, which, for certain members of the class, are known to be the ultimate carcinogens. Conjugation with glutathione or glucuronic acid, and reduction to tetrahydrotetrols are important detoxification pathways.

Excretion of benzo(a)pyrene residue was reported to be rapid, although quantitative data were not located. Excretion occurred mainly via the feces, probably largely due to biliary secretion. The EPA concluded that accumulation in the body tissues of PAHs from chronic low level exposure would be unlikely.

10.2 Noncancer Toxicity

The oral RfD and inhalation RfC are not available at this time.

10.3 Carcinogenicity

The PAHs are ubiquitous, being released to the environment from anthropogenic as well as from natural sources. Benzo (a)pyrene is the most extensively studied member of the class, inducing tumors in multiple tissues of virtually all laboratory species tested by all routes of exposure. Although epidemiology studies suggested that complex mixtures that contain PAHs (coal tar, soots, coke oven emissions, cigarette smoke) are carcinogenic to humans, the carcinogenicity cannot be attributed to PAHs alone because of the presence of other potentially carcinogenic substances in these mixtures. In addition, recent investigations showed that the PAH fraction of roofing tar, cigarette smoke, and coke oven emissions accounted for only 0.1 to 8 percent of the total mutagenic activity of the unfractionated complex mixture in Salmonella. Aromatic amines, nitrogen heterocyclic compounds, highly oxygenated quinones, diones, and nitrooxygenated compounds, none of which would be expected to arise from in vivo metabolism of PAHs, probably accounted for the majority of the mutagenicity of coke oven emissions and cigarette smoke. Coal tar, which contains a mixture of many PAHs, has a long history of use in the clinical treatment of a variety of skin disorders in humans.

Because of the lack of human cancer data, assignment of individual PAHs to EPA cancer weight-of-evidence groups was based largely on the results of animal studies with large doses of purified compound. Frequently, unnatural routes of exposure, including implants of the test chemical in beeswax and trioctanoin in the lungs of female Osborne-Mendel rats, intratracheal instillation, and subcutaneous or intraperitoneal injection, were used. Benzo (a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were classified in Group B2 (probable human carcinogens).

The EPA verified a slope factor for oral exposure to benzo(a)pyrene of 7.3 per mg/kg/day, based on several dietary studies in mice and rats. Neither verified nor provisional quantitative risk estimates were available for the other PAHs in Group B2. The EPA promulgated an ambient water quality criterion for "total carcinogenic PAHs," based on an oral slope factor derived from a study with benzo(a)pyrene, as being sufficiently protective for the class. Largely because of this precedent, the quantitative risk estimates for benzo(a)pyrene were adopted for the other carcinogenic PAHs when quantitative estimates were needed. The EPA has calculated an inhalation slope factor for benzo(a)pyrene of 3.1 per mg/kg/day.

Human data specifically linking benzo(a)pyrene to a carcinogenic effect are lacking. There are, however, multiple animal studies in many species demonstrating benzo(a)pyrene to be carcinogenic following administration by numerous routes. In addition, benzo(a)pyrene has produced positive results in numerous genotoxicity assays.

The data for animal carcinogenicity was sufficient. The animal data consist of dietary, gavage, inhalation, intratracheal instillation, dermal and subcutaneous studies in numerous strains of at least four species of rodents and several primates. Repeated benzo(a)pyrene administration has been associated with increased incidences of total tumors and of tumors at the site of exposure. The tumor types in mice from oral diet studies include forestomach, squamous cell papillomas and carcinomas.

Benzo(a)pyrene has been shown to cause genotoxic effects in a broad range of prokaryotic and mammalian cell assay systems.

11.0 BENZO (B)FLUORANTHENE

11.1 Noncancer Toxicity

Little information is available on benzo (b)fluoranthene. However, based on the similarities of chemical structures, most properties should be similar to benzo (a)pyrene.

11.2 Carcinogenicity

The EPA has classified benzo (b)fluoranthene in cancer weight-of-evidence Group B2 (Probable Human Carcinogen, sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans) based on lung tumors in mice. The currently used Oral Slope Factor (CSF) for benzo(b)fluoranthene is 7.3E-01 per (mg/kg)/day which is extrapolated from the CSF for Benzo[a]pyrene (BaP), i.e., 0.1 x 7.3 (BaP) = 7.3E-01 per (mg/kg)/day).

12.0 BERYLLIUM

Beryllium is present in the earth's crust, in emissions from coal combustion, in surface water and soil, and in house dust, food, drinking water, and cigarette smoke. However, the highest risk for exposure occurs among workers employed in beryllium manufacturing, fabricating, or reclamation industries.

12.1 Noncancer Toxicity

Inhaled beryllium is absorbed slowly and localizes mainly in the lungs, bone, liver and kidneys. Ingested beryllium undergoes limited absorption and localizes in liver, kidneys, lungs, stomach, spleen and the large and small intestines. Significant absorption of beryllium or its compounds through intact skin is unlikely because of its chemical properties. Beryllium per se is not biotransformed, but soluble salts may

be converted to less soluble compounds in the lung. Most orally administered beryllium passes through the
gastrointestinal tract unabsorbed and is excreted in the feces, whereas inhaled water-soluble beryllium salts are excreted mainly by the kidneys. Limited data indicate that the oral toxicity of beryllium is low. The chronic oral RfD for beryllium (0.002 mg/kg/day) is based on small intestinal lesions in a dietary study of dogs.

In contrast, the toxicity of inhaled beryllium is well-documented. Humans inhaling "massive" doses of beryllium compounds (such as the water soluble sulfate, fluoride, chloride, and oxide) may develop acute berylliosis. The severity of acute beryllium toxicity correlates with exposure levels, and the disease is now rarely observed in the United States because of improved industrial hygiene. Humans inhaling beryllium may also develop chronic berylliosis which, in contrast to acute berylliosis, is highly variable in onset, is more likely to be fatal, and can develop a few months to >=20 years after exposure. Chronic beryllium disease is a systemic disease that primarily affects the lungs and is characterized by the development of non-caseating granulomas. The disease most likely results from a hypersensitivity response to beryllium as evidenced by positive patch tests and positive lymphocyte transformation tests in exposed individuals. Granulomas may also appear in the skin, liver, spleen, lymph nodes, myocardium, skeletal muscles, kidney, bone, and salivary glands.

12.2 Carcinogenicity

Epidemiologic studies have suggested that beryllium and its compounds could be human carcinogens. In a study that covered 15 regions of the U.S., a significant correlation was found between cancers of the breast, bone and uterus and the concentration and detection frequency of beryllium in drinking water. However, imperfect analytical and sampling methods used in the study prompted the U.S. EPA to conclude that these results are not proof of cause and effect relationships between cancer and beryllium in drinking water. Studies in workers exposed to beryllium, mostly via inhalation, have shown significant increases in observed over expected lung cancer incidences. The U.S. EPA, in evaluating the total database for the association of lung cancer with occupational exposure to beryllium, noted several limitations, but concluded that the results must be considered to be at least suggestive of a carcinogenic risk to humans.

Based on sufficient evidence for animals and inadequate evidence for humans, beryllium has been placed in the EPA weight-of-evidence classification B2, probable human carcinogen. For inhalation exposure, the unit the cancer slope factor is 8.4 $(mg/kg/day)^{-1}$. The U.S. EPA does not currently publish an oral cancer slope factor for beryllium.

13.0 BIS(2-ETHYLHEXYL)PHTHALATE (DI[2-ETHYLHEXYL]PHTHALATE)

13.1 Noncancer Toxicity

The acute oral toxicity of bis(2-ethylhexyl)phthalate is very low; oral $LD_{50/30}$ (lethal dose to 50 percent of population within 30 days without medical testament) values in rats and mice were 33,800 and 26,300 mg/kg, respectively. Repeated high-dose oral exposures were associated with decreased growth, altered organ weights, testicular degeneration, and developmental effects. The EPA presented a verified chronic oral RfD of 0.02 mg/kg/day based on an LOAEL for increased relative liver weight in guinea pings and an uncertainty factor of 1000. The principal target organs for the toxicity of bis(2-ethylhexyl)phthalate are the liver and testis.

13.2 Carcinogenicity

The EPA classifies bis(2-ethylhexyl)phthalate in cancer weight-of evidence Group B2 (probable human carcinogen), based on inadequate human cancer date (one limited occupational study) and sufficient cancer data in laboratory animals. An oral slope factor of 0.014 per mg/kg/day was based on the increased incidence of liver tumors in a dietary study in male mice. An inhalation slope factor of 0.014 per mg/kg/day was presented by EPA.

14.0 CADMIUM

14.1 Pharmacokinetics

Estimates of cadmium uptake by the respiratory tract range from 10 to 50 percent; uptake is greatest for fumes and small particles and least for large dust particles. GI absorption of ingested cadmium is ordinarily 5 to 8 percent, but may reach 20 percent in cases of serious dietary ion deficiency. Highest tissue levels are normally found in the kidneys followed by the liver, although levels in the liver may exceed those in the kidneys of persons suffering from cadmium-induced renal dysfunction. The half-life of cadmium in the kidneys and liver may be as long as 10-30 years. Fecal and urinary excretion of cadmium are approximately equivalent to normal humans exposed to small amounts. Urinary excretion increases markedly in humans with cadmium-induced renal disease.

14.2 Noncancer Toxicity

Acute inhaltion exposure to fumes or particles of cadmium induces respiratory symptoms, general weakness, and, in severe cases, respiratory insufficiency, shock, and death. Acute oral exposure

induces GI disturbances. Chronic inhalation exposure induces pulmonary emphysema, and chronic exposure by either route consistently produces renal tubular disease in humans and laboratory animals. Proteinuria is a reliable early indicator of cadmium-induced kidney disease. The combination of pulmonary emphysema and renal tubular disease, if severe, may result in early mortality. Painful osteomalacia and osteoporosis may arise from altered metabolism of bone minerals secondary to renal damage. The combination of renal and skeletal damage is called itai-itai disease in Japan. Cadmium exposure has been associated with liver damage, but the liver appears to be less sensitive than the kidney. The kidney is the primary target organ of cadmium toxicity. The EPA derived chronic oral RfD values of 0.0005 mg/kg/day for cadmium ingested in water and 0.001 mg/kg/day for cadmium ingested in food, based on a toxicokinetic model that predicted NOAELs from renal cortical concentration of cadmium. The different RfD values reflect assumed differences in GI absorption of cadmium from water (5 percent) and food (2.5 percent). The EPA currently employs an inhalation reference dose of 5.7E-05 mg/kg/day for cadmium.

14.3 Carcinogenicity

Carcinogenicity data in humans consist of several occupational studies that associate cadmium exposure with lung cancer, but concomitant exposure to other carcinogenic chemicals and smoking were not adequately controlled. Other occupational studies reported significantly increased risk of prostatic cancer, but this effect was not observed in the largest occupational study of workers exposed to high levels. The animal data consist of an inhalation study in rats that showed a significant increase in lung tumors, and several parenteral injection studies that produced injection site tumors. No evidence of carcinogenicity, however, was observed in seven oral studies in rats and mice. The EPA classifies cadmium a cancer weight-of-evidence Group B1 substance for inhalation exposure on the basis of limited evidence of carcinogenicity in humans and sufficient evidence in animals. The data were insufficient to classify cadmium as carcinogenic to humans exposed by the oral route. An inhalation unit risk of 0.0018 mg/m^3, equivalent to 6.3 per mg/kg/day, was derived from an occupational exposure study assuming an inhalation rate of 20 m^3/day and a body weight of 70 kg for humans.

15.0 CHLOROFORM

15.1 Noncancer Toxicity

Oral or inhalation exposure of animals to chloroform was associated with liver and kidney damage. In humans, acute inhalation exposure to high levels induced narcosis, ventricular fibrillation, and death. Limited occupational data associated chronic exposure to chloroform with CNS depression, digestive disturbances, and enlarged livers. The EPA derived a chronic oral RfD of 0.01 mg/kg/day based on an LOAEL for fatty cyst formation in the livers of dogs treated orally for 7.5 years and an uncertainty factor of

1000. The inhalation RfD for chloroform is 8.6E-05 mg/kg/day. Target organs for the toxicity of chloroform include the liver and kidney for oral and inhalation exposure, and the heart and CNS for inhalation exposure.

15.2 Carcinogenicity

Chloroform is classified as a cancer weight-of-evidence group B2 compound (probable human carcinogen), based on increased incidence of several tumor types in rats and liver tumors in mice. Human carcinogenicity data are inadequate. An oral slope factor of 0.0061 per mg/kg/day was derived from the incidence of kidney tumors in rats treated with chloroform in drinking water for two years. An inhalation unit risk of 2.3E-05 per mg/m^3 was based on the incidence of hepatocellular carcinomas in mice treated by gavage for 78 weeks. The inhalation unit risk is equivalent to 0.081 per mg/kg/day, assuming an inhalation rate of 20 m^3/day and a body weight of 70 kg for humans.

16.0 CHROMIUM

16.1 Noncancer Toxicity

In nature, chromium (III) predominates over chromium (VI). Little chromium (VI) exists in biological materials, except shortly after exposure, because reduction to chromium (III) occurs rapidly. Chromium (III) is considered a nutritionally essential trace element and is considerably less toxic than chromium (VI). No effects were observed in rats consuming 5% chromium (III)/kg/day in the diet for over two years. The No-Observed-Effect-Level (NOEL) of 5% Cr_2O_3 was the basis for a verified chronic oral RfD of 1.5 mg/kg/day. The same NOEL and an uncertainty factor of 1000 were the basis for a provisional subchronic oral RfD of 1 mg/kg/day.

Acute oral exposure of humans to high doses of chromium (VI) induced neurological effects, GI hemorrhage and fluid loss, and kidney and liver effects. Parenteral dosing of animals with chromium (VI) is selectively toxic to the kidney tubules. An NOAEL of 2.4 mg chromium (VI) /kg/day in a one-year drinking water study in rats and an uncertainty factor of 500 was the basis of a verified RfD of 0.003 mg/kg/day for chronic oral exposure.

Occupational (inhalation and dermal) exposure to chromium (III) compounds induced dermatitis. Similar exposure to chromium (VI) induced ulcerative and allergic contact dermatitis, irritation of the upper respiratory tract including ulceration of the mucosa and perforation of the nasal septum, and possibly kidney effects. An inhalation RfC values has not been determined for chromium (III), however, EPA has established an inhalation RfD of 3.0E-5 mg/kg/day for chromium (VI).

A target organ was not identified for chromium (III). The kidney appears to be the principal target organ for repeated oral dosing with chromium (VI). Additional target organs for dermal and inhalation exposure include the skin and respiratory tract.

16.2 Carcinogenicity

Data were not located regarding the carcinogenicity of chromium (III). The EPA classifies chromium (VI) in cancer weight-of-evidence Group A (human carcinogen), based on the consistent observation of increased risk of lung cancer in occupational studies of workers in chromate production or the chrome pigment industry. Parenteral dosing of animals with chromium (VI) compounds consistently induced injection-site tumors. There is no evidence that oral exposure to chromium (VI) induces cancer. An inhalation unit risk of 0.012 per mg/m^3, equivalent to 41 per mg/kg/day, assuming humans inhale 20 m^3/day and weigh 70 kg, was based on increased risk of lung cancer deaths in chromate production workers.

17.0 COBALT

Everyone is exposed to low levels of cobalt in air, water, and food. Exposure to higher levels of cobalt occurs in the workplace. Cobalt has both beneficial and harmful effects on health. At low levels, it is part of Vitamin B12, which is essential for good health; at high levels, it may harm the lungs. This chemical has been found in at least 336 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

17.1 Noncarcinogenic Toxicity

Cobalt has both beneficial and harmful effects on human health. Cobalt is beneficial because it is part of Vitamin B12. Cobalt has also been used as a treatment for anemia, because it causes red blood cells to be produced. Exposure to high levels of cobalt can harm your health. Effects on the lungs, including asthma, pneumonia, and wheezing, have been found in workers who breathed high levels of cobalt in the air. In the 1960s, some breweries added cobalt to beer to stabilize the foam. Some people who drank large quantities of the beer experienced nausea, vomiting, and serious effects on the heart. However, effects on the heart were not seen in people with anemia or pregnant women treated with cobalt. Animal studies have found problems with the development of the fetus in animals exposed to high concentrations of cobalt during pregnancy. However, cobalt is also essential for the growth and development of certain animals. The reference dose (RfD) for chronic oral exposures to cobalt is 0.006 mg/kg/day.

17.2 Carcinogenicity

The International Agency for Research on Cancer has determined that cobalt is a possible carcinogen to humans. Studies in animals have shown that cobalt causes cancer when placed directly into the muscle or under the skin. Cobalt did not cause cancer in animals that were exposed to it in the air, in food, or in drinking water. Studies on people are inconclusive regarding cobalt and cancer

18.0 COPPER

Copper occurs naturally in elemental form and as a component of many minerals. Because of its high electrical and thermal conductivity, it is widely used in the manufacture of electrical equipment. Common copper salts, such as the sulfate, carbonate, cyanide, oxide, and sulfide are used as fungicides, as components of ceramics and pyrotechnics, for electroplating, and for numerous other industrial applications. Copper can be absorbed by the oral, inhalation, and dermal routes of exposure. It is an essential nutrient that is normally present in a wide variety of tissues.

18.1 Noncancer Toxicity

In humans, ingestion of gram quantities of copper salts may cause gastrointestinal, hepatic, and renal effects with symptoms such as severe abdominal pain, vomiting, diarrhea, hemolysis, hepatic necrosis, hematuria, proteinuria, hypotension, tachycardia, convulsions, coma, and death. Gastrointestinal disturbances and liver toxicity have also resulted from long-term exposure to drinking water containing 2.2-7.8 mg Cu/L. The chronic toxicity of copper has been characterized in patients with Wilson's disease, a genetic disorder causing copper accumulation in tissues. The clinical manifestations of Wilson's disease include cirrhosis of the liver, hemolytic anemia, neurologic abnormalities, and corneal opacities. In animal studies, oral exposure to copper caused hepatic and renal accumulation of copper, liver and kidney necrosis at doses of >=100 mg/kg/day; and hematological effects at doses of 40 mg/kg/day.

Acute inhalation exposure to copper dust or fumes at concentrations of 0.075-0.12 mg Cu/m^3 may cause metal fume fever with symptoms such as cough, chills and muscle ache. Among the reported effects in workers exposed to copper dust are gastrointestinal disturbances, headache, vertigo, drowsiness. Vineyard workers chronically exposed to Bordeaux mixture (copper sulfate and lime) exhibit degenerative changes of the lungs and liver. Dermal exposure to copper may cause contact dermatitis in some individuals.

The oral reference dose (RfD) for elemental copper of 0.04 has been developed by USEPA National Center for Environmental Assessment (NCEA). The EPA established an action level of 1300 ug/L for drinking water. Data were insufficient to derive a Reference concentration (RfC) for copper.

18.2 Carcinogenicity

No suitable bioassays or epidemiological studies are available to assess the carcinogenicity of copper. Therefore, U.S. EPA has placed copper in weight-of-evidence group D, not classifiable as to human carcinogenicity.

19.0 CYANIDE

Cyanide most commonly occurs as hydrogen cyanide and its salts--sodium and potassium cyanide. Cyanides are both man-made and naturally occurring substances. They are found in several plant species as cyanogenic glycosides and are produced by certain bacteria, fungi, and algae. In very small amounts, cyanide is a necessary requirement in the human diet. Cyanides are released to the environment from industrial sources and car emissions.

19.1 Noncancer Toxicity

Cyanides are readily absorbed by the inhalation, oral, and dermal routes of exposure. The central nervous system (CNS) is the primary target organ for cyanide toxicity. Neurotoxicity has been observed in humans and animals following ingestion and inhalation of cyanides. Cardiac and respiratory effects, possibly CNS-mediated, have also been reported. Short-term exposure to high concentrations produces almost immediate
collapse, respiratory arrest, and death. Symptoms resulting from occupational exposure to lower concentrations include breathing difficulties, nervousness, vertigo, headache, nausea, vomiting, precordial pain, and electrocardiogram (EKG) abnormalities. Thyroid toxicity has been observed in humans and animals following oral and inhalation exposure to cyanides. In animal studies, cyanides have produced fetotoxicity and teratogenic effects, including exencephaly, encephalocele, and rib abnormalities. Reference doses (RfDs) have been calculated for subchronic and chronic oral exposure to cyanide and several cyanide compounds. The values, derived from a single study, are based on a no-observed-adverse-effect level (NOAEL) of 10.8 mg/kg/day for cyanide in a 2-year dietary study with rats. The subchronic and chronic oral RfDs are 0.02 mg/kg/day for cyanide; 0.04 mg/kg/day for sodium cyanide, calcium cyanide, and cyanogen; 0.05 mg/kg/day for potassium cyanide, chlorine cyanide, and zinc cyanide; 0.1 mg/kg/day for silver cyanide; and 0.2 mg/kg/day for potassium silver cyanide. Data were insufficient to derive a reference concentration (RfC) for cyanide.

19.2 Carcinogenicity

No suitable cancer bioassays or epidemiological studies are available to assess the carcinogenicity of cyanide. Therefore, U.S.EPA has placed cyanide in weight-of-evidence group D, not classifiable as to human carcinogenicity.

20.0 DIELDRIN

20.1 Noncancer Toxicity

Dieldrin is an insecticide which from 1950-1970 was a popular pesticide for crops like corn and cotton. Because of concerns about damage to the environment and the potential harm to human health, EPA banned all uses of dieldrin in 1974 except to control termites. In 1987, EPA banned all uses.

Exposure to dieldrin mainly affect the central nervous system. Ingestion of high levels of dieldrin result in convulsions and death. These levels are many thousands of times higher than the average exposure. Ingesting moderate levels of dieldrin over a longer period may also cause convulsions. We don't know the effects of exposure to low levels of dieldrin over a long time. Some workers who made or applied dieldrin had nervous system effects with excitation leading to convulsions. Lesser effects in some workers included headaches, dizziness, vomiting, irritability, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects. The EPA had established an oral RfD of 5E-5 mg/kg-day for dieldrin based on liver lesions in rats from a 2-year rat feeding study with an uncertainty factor of 100. The LOAEL was identified as 0.05 mg/kg/day. At the end of two years the rats had increased liver weights and histopathological examinations revealed liver parenchymal cell changes. These hepatic lesions were considered to be characteristic of exposure to an organochlorine insecticide. The chronic inhalation RfC is not available at this time.

20.2 Carcinogenicity

There is no direct evidence that dieldrin causes cancer in humans. Studies on workers generally show no increase in cancer or deaths due to cancer. Dieldrin is carcinogenic in seven strains of mice when administered orally. Dieldrin is structurally related to compounds (aldrin, chlordane, heptachlor, heptachlor epoxide, and chlorendic acid) which produce tumors in rodents. Mice given high amounts of dieldrin, however, did develop liver cancers. The U.S. EPA classifies dieldrin in cancer weight-of-evidence B2 because it caused tumors in rodents when administered orally.

Human carcinogenicity data is considered inadequate. Two studies of workers exposed to aldrin and to dieldrin reported no increased incidence of cancer. Both studies were limited in their ability to detect an excess of cancer deaths. Animal carcinogenicity data was sufficient. Dieldrin has been shown to be carcinogenic in various strains of mice of both sexes. At different dose levels the effects range from benign liver tumors, to hepatocarcinomas with transplantation confirmation, to pulmonary metastases. Supporting data for carcinogenicty include genotoxicity tests. Dieldrin causes chromosomal aberrations in mouse cells and in human lymphoblastoid cells, mutations in Chinese hamster cells, and unscheduled DNA synthesis in rat and human cells.

EPA has established an Oral Slope Factor of 1.6E+1 per (mg/kg)/day based on a diet study in mice which produced liver carcinomas. The inhalation cancer slope factor of 16 per mg/kg/day is derived from the oral slope factor.

21.0 Delta BHC (using alpha-Hexachlorocyclohexane (alpha-HCH) as a Surrogate

Alpha-HCH has been classified as a B2, probable human carcinogen, by the EPA based on an increased incidence of liver tumors in mice and rats. There is inadequate evidence of alpha-HCH causing cancer in humans.

In animals, dietary alpha-HCH has been shown to cause increased incidences of liver tumors in five mouse strains and in Wistar rats. No data on the genetic toxicology of alpha-HCH are available. The oral slope factor (CSF for alpha-HCH is 6.3E+0 $(mg/kg\text{-}day)^{-1}$ and the inhalation unit risk is 1.8E-3 $(ug/m^3)^{-1}$.

22.0 DIBENZO[A,H]ANTHRACENE

22.1 Noncancer Toxicity

The oral RfD and inhalation RfC are not available.

22.2 Carcinogenicity

The EPA has classified dibenzo(a,h)anthracene in cancer weight-of-evidence group B2 (Probable Human Carcinogen, sufficient evidence of carcinogenicity in animals) based on carcinomas in mice following oral or dermal exposure and injection site tumors in several species following subcutaneous or intramuscular administration. Dibenzo[a,h]anthracene has induced DNA damage and gene mutations in bacteria as well as gene mutations and transformation in several types of mammalian cell cultures.

Although there are no human data that specifically link exposure to dibenzo[a,h]anthracene with human cancers, dibenzo[a]anthracene is a component of mixtures that have been associated with human cancer. These include coal tar, soot, coke oven emissions and cigarette smoke.

Dibenzo[a,h]anthracene has been shown to be carcinogenic when administered to mice by the oral route in a water-olive oil emulsion. Mice developed pulmonary adenomas, pulmonary carcinomas, and mammary carcinomas.

Dibenzo[a,h]anthracene has produced positive results in bacterial DNA damage and mutagenicity assays and in mammalian cell DNA damage, mutagenicity and cell transformation assays.

The currently used Oral Slope Factor (CSF) for Dibenzo[a,h]anthracene is 7.3E+00 per (mg/kg)/day which is extrapolated from the CSF for Benzo[a]pyrene i.e., 1.0 x 7.3 (BaP) = 7.3 per (mg/kg)/day).

23.0 1,1-DICHLOROETHENE

1,1-Dichloroethylene (CAS No. 75-35-4), also known as 1,1-dichloroethene and vinylidine chloride, is a colorless liquid that is used primarily in the production of polyvinylidine chloride (PVC) copolymers and as an intermediate for synthesis of organic chemicals. The major application for PVC copolymers is the production of flexible films for food packaging such as Saran® wrap. 1,1-Dichloroethene does not occur naturally but is found in the environment due to releases associated with its production and transport and with the production of its polymers. Because of its high volatility, releases to the atmosphere are the greatest source of ambient 1,1-dichloroethene. Smaller amounts are released to surface waters and soils. Loss of 1,1-dichloroethene from water and soils is primarily due to volatilization. In the atmosphere, reaction with photochemically generated hydroxyl radicals is expected to be the predominant removal mechanism. Human exposure to 1,1-dichloroethene is potentially highest in workplace settings and in the vicinity of hazardous waste sites where the compound may contaminate environmental media.

23.1 Noncancer Toxicity

The primary effect of acute exposure to high concentrations (approximately 4000 ppm) of 1,1-dichloroethene vapor in humans is central nervous system (CNS) depression which may progress to unconsciousness. Occupational exposure has been reported to cause liver dysfunction in workers . 1,1-Dichloroethene is irritating when applied to the skin and prolonged contact can cause first degree burns. Direct contact with the eyes may cause conjunctivitis and transient corneal injury. In experimental animals, the liver and kidneys are target organs for the toxic effects of 1,1-dichloroethene. Subchronic oral exposure for 90 days to 1,1-dichloroethylene in drinking water produced slight hepatotoxic effects at

200 ppm and chronic oral exposure to drinking water for 2 years produced hepatocellular changes in males at >=100 ppm and in females at >=50 ppm. Gavage administration of 10 mg/kg/day, 5 days/week for 2 years produced chronic inflammation of the kidney in male and female rats and liver necrosis in male and female mice. Exposure by inhalation to 55 ppm 1,1-dichloroethene, 6 hours/day, 5 days/week for up to 1 year produced fatty liver changes in rats and focal degeneration and necrosis in mice. In a three-generation study, no treatment-related effects on reproduction or neonatal development were seen in male and female Sprague-Dawley rats administered up to 200 ppm of 1,1-dichloroethene in the drinking water. However, inhalation exposure during gestation produced increased resorptions and minor skeletal alterations in rodents at concentrations that caused maternal toxicity. These effects were reported in rats and mice at >=15 ppm and in rats and rabbits at >=80 ppm and >=160 ppm, respectively. An oral Reference Dose (RfD) of 9E-3 mg/kg/day was derived for chronic exposure and subchronic exposure to 1,1-dichloroethylene, based on liver lesions seen in rats in a 2-year drinking water study. The oral RfD is currently under review and may be subject to change. An inhalation Reference Concentration (RfC) for 1,1-dichloroethene is under review.

23.2 Carcinogenicity

An epidemiology study using a small cohort found no association between the occurrence of cancer or cancer mortality and exposure to 1,1-dichloroethene. Oral carcinogenicity bioassays (drinking water or gavage exposures) with experimental animals gave generally negative results. In one inhalation study, statistically significant increases in renal adenocarcinomas were noted in male Swiss mice exposed to 25 ppm for 12 months. Also observed were statistically significant increases in mammary gland carcinomas in females and lung tumors in both sexes. Results of other inhalation studies with rats, mice, and hamsters have been negative. Based on EPA guidelines, 1,1-dichloroethene was assigned to weight-of-evidence group C, possible human carcinogen. For oral exposure, the slope factor is 6E-1 $(mg/kg/day)^{-1}$ and the unit risk is 1.7E-5 $(ug/L)^{-1}$. The inhalation slope factor is 0.175 $(mg/kg/day)^{-1}$.

24.0 CIS-1,2-DICHLOROETHENE (CIS-1,2-DICHLOROETHYLENE)

24.1 Noncancer Toxicity

Repeated oral exposure of rats to cis-1,2-dichloroethene was associated with signs of anemia (decreased hematocrit and hemoglobin). Inhalation exposure to isomeric mixtures of 1,2-dichloroethene induced narcosis, and mixed isomers of 1,2-dichloroethene were used as an anesthetic gas. The EPA presented a provisional chronic oral RfD of 0.01 mg/kg/day based on an NOAEL for signs of anemia in rats and an uncertainty factor of 3000. A provisional subchronic oral RfD of 0.1 mg/kg/day was derived from the

same NOAEL and an uncertainty factor of 300. Target organs appear to be the erythrocyte for oral exposure and the CNS for inhalation exposure.

24.2 Carcinogenicity

The EPA classifies cis-1,2-dichloroethene as a cancer weight-of-evidence Group D compound (not classifiable as to carcinogenicity to humans), based on an absence of human or animal cancer data. Quantitative estimates of cancer risk are not derived for Group D chemicals.

25.0 2,6-DINITROTOLUENE

2,6-Dinitrotoluene (2,6-DNT; 2-methyl-1,3-dinitrobenzene; CAS Reg. No. 606-20-2) is a pale yellow crystalline solid and one of six possible chemical forms of dinitrotoluene (DNT). Technical grade DNT (t-DNT) is typically composed of 78% 2,4-DNT, 19% 2,6-DNT, and small amounts of 3,4-DNT, 2,3-DNT, and 2,5-DNT. DNT is primarily used as a chemical intermediate in the manufacture of polyurethanes. It is also used as a component of military and commercial explosives, as an intermediate in dye processes, and as a propellant additive.

25.1 Noncancer Toxicity

The DNTs are absorbed through the gastrointestinal tract, respiratory tract, and skin in most species. Human data regarding potential health effects of 2,6-DNT are very limited. A significant increase in the death rate due to ischemic heart disease has been associated with occupational exposure to t-DNT. The evidence for potential reproductive effects (reduction of sperm counts) in male workers exposed to a mixture of DNT isomers is equivocal. Oral subchronic toxicity studies with rats, mice, and dogs indicate that the blood, liver, and reproductive system are targets affected by 2,6-DNT in all three species. These effects were generally observed at doses of 35 mg/kg/day in rats, 51 mg/kg/day in mice, and 20 mg/kg/day in dogs. The primary hematologic effect in all three species was methemoglobinemia with sequelae such as Heinz bodies, reticulocytosis, anemia, and extramedullary hematopoiesis. Also seen in all three species was bile duct hyperplasia, decreased spermatogenesis and testicular atrophy. In addition, dogs exhibited neurotoxic effects (incoordination, weakness, tremors, and paralysis) as well as inflammatory and degenerative kidney changes. According to EPA, available data are inadequate for the calculation of a Reference Dose (RfD) or Reference Concentration (RfC) for 2,6-DNT. An oral RfD of 0.001 mg/kg/day published in HEAST (HEAST, 1997) is use to quantitate risks from 2,6-DNT in this risk assessment.

25.2 Carcinogenicity

In a 1-year carcinogenesis bioassay, 2,6-DNT at oral doses of 7 and 14 mg/kg/day, respectively, produced hepatocellular carcinomas in 85% and 100% of male rats. t-DNT, containing about 76% 2,4-DNT and 19% 2,6-DNT, also yielded a positive hepatocarcinogenic response. In another study on the effects of t-DNT, dietary doses of 14 mg/kg/day induced hepatocellular carcinomas in rats (CIIT 1982). Initiating and promoting activities of 2,6-DNT in rat liver have been reported. Although the U.S.EPA has not evaluated 2,6-DNT for evidence of human carcinogenic potential, the dinitrotoluene mixture (containing 2,4- and 2,6-DNT) has been classified as a B2 carcinogen, probable human carcinogen. A slope factor of 6.8E-1 $(mg/kg/day)^{-1}$ was calculated for oral exposure to dinitrotoluene mixture. The drinking water unit risk is 1.9E-5 $(\mu g/L)^{-1}$.

26.0 DIOXINS/FURANS

26.1 Noncancer Toxicity

The most noted health effect in people exposed to large amounts of 2,3,7,8-TCDD is chloracne. Chloracne is a severe skin disease with acne-like lesions that occur mainly on the face and upper body. Changes in blood and urine that may indicate liver damage also are seen in people. Exposure to high concentrations of CDDs may induce long-term alterations in glucose metabolism and subtle changes in hormona llevels.

Exposure to lower levels can cause a variety of effects in animals, such as weight loss, liver damage, and disruption of the endocrine system. In many species of animals, 2,3,7,8-TCDD weakens the immune system and causes a decrease in the system's ability to fight bacteria and viruses. In other animal studies, exposure to 2,3,7,8-TCDD has caused reproductive damage and birth defects. Some animal species exposed to CDDs during pregnancy had miscarriages and the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy often had severe birth defects including skeletal deformities, kidney defects, and weakened immune responses.

26.2 Carcinogenicity

Several studies suggest that exposure to 2,3,7,8-TCDD increases the risk of several types of cancer in people. Animal studies have also shown an increased risk of cancer from exposure to 2,3,7,8-TCDD. The EPA and the World Health Organization (WHO) has determined that 2,3,7,8-TCDD is a human carcinogen.

27.0 HMX (OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE)

27.1 Noncancer Toxicity

The oral RfD for HMX (0.05 mg/kg-day) is based on the NOAEL from a subchronic 13-week toxicity study of Fischer rats. HMX was incorporated into the daily diet of 20 Rats for 13 weeks. All HMX-treated animals exhibited significant dose-related reductions in mean body weight gain with concomitant reductions in food consumption in the early part of the study. By week 5, only animals in the two highest dose groups continued to have significantly depressed weight gains until study termination. Histopathological examination revealed a significant incidence of toxic liver changes occurring almost exclusively in males at the highest dose levels and some changes at lower doses. The following changes were observed in clinical pathology parameters in the high-dose animals (clinical pathology was not conducted in the lower doses). Hemoglobin and hematocrit were decreased. Red blood cell counts were also significantly decreased in high-dose females at week 12 when compared with controls. There was a significant increase in serum alkaline phosphatase (AP) in high-dose males at 12 weeks and a marginal increase in high-dose females when compared with controls. There were several organ weight changes in dosed animals. Based on the results of this study, a NOAEL of 50 mg/kg/day for males and 115 mg/kg/day for females can be estimated, together with a LOAEL of 150 mg/kg/day for toxic liver effects in males and 270 mg/kg/day for toxic renal effects in females.

27.2 Carcinogenicity

HMX is classified by the EPA as a Class D carcinogen (not classifiable as to human carcinogenicity)

28.0 INDENO[1,2,3-CD]PYRENE

28.1 Noncancer Toxicity

The chronic oral RfD and chronic inhalation RfC are not available.

28.2 Carcinogenicity

EPA classifies indeno(1,2,3-cd)pyrene as cancer weight-of-evidence B2, probable human carcinogen, based on sufficient data from animal bioassays. Indeno[1,2,3-cd]pyrene produced tumors in mice following lung implants, subcutaneous injection and dermal exposure. Indeno[1,2,3-cd]pyrene tested positive in bacterial gene mutation assays.

Although there are no human data that specifically link exposure to indeno[1,2,3-cd]pyrene to human cancers, indeno[1,2,3-cd]pyrene is a component of mixtures that have been associated with human cancer. These include coal tar, soot, coke oven emissions and cigarette smoke.

In animal carcinogen bioassays indeno[1,2,3-cd]pyrene exposure resulted in increased incidences of epidermoid carcinomas in a lung implantation study, injection site sarcomas in a subcutaneous injection assay and skin tumors in dermal application studies.

Supporting data for carcinogenicity includes genotoxicity studies. Indeno[1,2,3-cd]pyrene produced positive results in mutation assays in Salmonella typhimurium strains.

The currently used Oral Slope Factor (CSF) for Indeno[1,2,3-cd]pyrene is 7.3E-01 per (mg/kg)/day which is extrapolated from the CSF for benzo(a)pyrene, i.e., 0.1 x 7.3 (BaP) = 7.3E-01 per (mg/kg)/day).

29.0 IRON

29.1 Noncancer Toxicity

Iron is potentially toxic in all forms and by all routes of exposure. Inorganic iron is a poison by the intraperitoneal route. The inhalation of large amounts of iron dust may result in iron pneumoconiosis or arc welders lung. Chronic exposure to excess levels of iron (>50-100 mg Iron/day) can result in pathological deposition of iron in tissues. The target organs are the pancreas and liver.

Iron compounds are of varying toxicity. Iron oxides are a potential risk in all industrial settings. In general, ferrous compounds are more toxic than ferric compounds. Acute exposure to excessive levels of ferrous compounds can cause liver and kidney damage, altered respiratory rates and convulsions. An oral RfD of 0.3 mg/kg/day has been published for iron by the EPA based on based on allowable intakes rather than adverse effect levels. No inhalation RfD has been established for iron.

29.2 Carcinogenicity

Some iron compounds are suspected human carcinogens. Iron dust is an experimental neoplastigen and an increased incidence of lung cancer has been associated with exposure to iron dust. Iron oxide is an experimental tumorigen and a suspected human carcinogen. EPA has not published oral or inhalation slope factors for iron.

30.0 LEAD

30.1 Pharmacokinetics

Studies in humans indicate that an average of 10 percent of ingested lead is absorbed, but estimates as high as 40 percent were obtained in some individuals. Nutritional factors have a profound effect on GI absorption efficiency. Children absorb ingested lead more efficiently than adults; absorption efficiencies up to 53 percent were recorded for children three months to eight years of age. Similar results were obtained for laboratory animals; absorption efficiencies of 5 to 10 percent were obtained for adults and 50 percent were obtained for young animals. The deposition rate of inhaled lead averages approximately 30 to 50 percent, depending on particle size, with as much as 60 percent deposition of very small particles near highways. All lead deposited in the lungs is eventually absorbed.

Approximately 95 percent of the lead in the blood is located in the erythrocytes. Lead in the plasma exchanges with several body compartments, including the internal organs, bone, and several excretory pathways. In humans, lead concentrations in bone increase with age. About 90 percent of the body burden of lead is located in the skeleton. Neonatal blood concentrations are about 85 percent of maternal concentrations. Excretion of absorbed lead is principally through the urine, although GI secretion, biliary excretion, and loss through hair, nails, and sweat are also significant.

30.2 Noncancer Toxicity

The noncancer toxicity of lead to humans has been well characterized through decades of medical observation and scientific research. The principal effects of acute oral exposure are colic with diffuse paroxysmal abdominal pain (probably due to vagal irritation), anemia, and, in severe cases, acute encephalopathy, particularly in children. The primary effects of long-term exposure are neurological and hematological. Limited occupational data indicate that long-term exposure to lead may induce kidney damage. The principal target organs of lead toxicity are the erythrocyte and the nervous system. Some of the effects on the blood, particularly changes in levels of certain blood enzymes, and subtle neurobehavioral changes in children, appear to occur at levels so low as to be considered nonthreshold effects.

The EPA has not determined an inhalation RfC for lead.

The EPA determined that it is inappropriate to derive an RfD for oral exposure to lead for several reasons. First, the use of an RfD assumes that a threshold for toxicity exists, below which adverse effects are not expected to occur; however, the most sensitive effects of lead exposure, impaired neurobehavioral development in children and altered blood enzyme levels associated with anemia, may occur at blood lead concentrations so low as to be considered practically nonthreshold in nature. Second, RfD values are

specific for the route of exposure for which they are derived. Lead, however, is ubiquitous, so that exposure occurs from virtually all media and by all pathways simultaneously, making it practically impossible to quantify the contribution to blood lead from any one route of exposure. Finally, the dose-response relationships common to many toxicants, and upon which derivation of an RfD is based, do not hold true for lead. This is because the fate of lead within the body depends, in part, on the amount and rate of previous exposures, the age of the recipient, and the rate of exposure. There is, however, a reasonably good correlation between blood lead concentration and effect. Therefore, blood lead concentration is the appropriate parameter on which to base the regulation of lead.

Because of the absence of published dose-response parameters for lead, the exposure and potential risks associated with lead are addressed through the use of the USEPA IEUBK Model for the child (0-7 years). Adult exposure to lead in soil is addressed by an evaluation of the relationship between the site soil lead concentration and the blood lead concentration in the developing fetuses of adult women presented in the Technical Review Workgroup Lead Model for Adult Exposure. These models are designed to estimate blood lead levels based on either default or site-specific input values.

The EPA IEUBK lead model is an iterated set of equations that estimate blood lead concentration in children aged 0 to 7 years. The biokinetic part of the model describes the movement of lead between the plasma and several body compartments and estimates the resultant blood lead concentration. The rate of the movement of lead between the plasma and each compartment is a function of the transition or residence time (i.e., the mean time for lead to leave the plasma and enter a given compartment, or the mean residence time for lead in that compartment). Compartments modeled include the erythrocytes, liver, kidneys, all the other soft tissue of the body, cortical bone, and trabecular bone. Excretory pathways and their rates are also modeled. These include the mean time for excretion from the plasma to the urine, from the liver to the bile, and from the other soft tissues to the hair, skin, sweat, etc. The model permits the user to adjust the transition and residence times.

EPA guidance established a soil cleanup level for lead of 400 parts per million (ppm) to be applied at Superfund sites. This range is considered by EPA to be protective for direct contact with lead-contaminated soils in residential settings. The guidance adopts recommendations of the Centers for Disease Control and is to be followed when current or predicted land use is residential.

30.3 Carcinogenicity

EPA has classified lead in cancer weight-of-evidence Group B2 (probable human carcinogen), based on inadequate evidence of cancer in humans and sufficient animal evidence. The human data consist of several epidemiologic occupational studies that yielded confusing results. All of the studies lacked quantitative exposure data and failed to control for smoking and concomitant exposure to other possibly

carcinogenic metals. Rat and mouse bioassays showed statistically significant increases in renal tumors following dietary and subcutaneous exposure to several soluble lead salts. Various lead compounds were observed to induce chromosomal alterations in vivo and in vitro, sister chromatid exchange in exposed workers, and cell transformation in Syrian hamster embryo cells; to enhance simian adenovirus induction; and to alter molecular processes that regulate gene expression. EPA declined to estimate risk for oral exposure to lead because many factors (e.g., age, general health, nutritional status, existing body burden and duration of exposure) influence the bioavailability of ingested lead, introducing a great deal of uncertainty into any estimate of risk.

31.0 MANGANESE

31.1 Noncancer Toxicity

Manganese is nutritionally required in humans for normal growth and health. Humans exposed to approximately 0.8 mg manganese/kg/day in drinking water exhibited lethargy, mental disturbances (1/16 committed suicide), and other neurologic effects. The elderly appeared to be more sensitive than children. Oral treatment of laboratory rodents induced biochemical changes in the brain, but rodents did not exhibit the neurological signs exhibited by humans. Occupational exposure to high concentrations in air induced a generally typical spectrum of neurological effects and an increased incidence of pneumonia.

EPA has established an oral RfD of 0.02 mg/kg/day for manganese based on drinking water and an oral RfD of 0.14 mg/kg/day based on food. The EPA presented a verified chronic inhalation RfC based on a LOAEL for impairment of neurobehaviorial function in occupationally exposed humans. The inhalation RfC is equivalent to 1.43E-5 mg/kg/day, assuming humans inhale 20 m^3 of air/day and weigh 70 kg. The CNS and respiratory tract are target organs of inhalation exposure to manganese.

31.2 Carcinogenicity

The EPA classifies manganese in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans). Quantitative cancer risk estimates are not derived from Group D chemicals.

32.0 MERCURY

Mercury is a naturally occurring element existing in multiple forms and in various oxidation states. It is used in a wide variety of products and processes. In the environment, mercury may undergo transformations among its various forms and among its oxidation states. Exposure to mercury may occur in both occupational and environmental settings, the latter primarily involving dietary exposure.

32.1 Noncancer Toxicity

Absorption, distribution, metabolism, and excretion of mercury is dependent upon its form and oxidation state. Organic forms of mercury are more readily absorbed than are inorganic forms. Ingestion of mercury metal is usually without effect. Ingestion of inorganic salts may cause severe gastrointestinal irritation, renal failure, and death with acute lethal doses in humans ranging from 1 to 4 g. Mercuric (divalent) salts are usually more toxic than are mercurous (monovalent) salts. Mercury is also known to induce hypersensitivity reactions such as contact dermatitis and acrodynia (pink disease). Inhalation of mercury vapor may cause irritation of the respiratory tract, renal disorders, central nervous system effects characterized by neurobehavioral changes, peripheral nervous system toxicity, renal toxicity (immunologic glomerular disease), and death. Toxicity resulting from subchronic and chronic exposure to mercury and mercury compounds usually involves the kidneys and/or nervous system, the specific target and effect being dependent on the form of mercury. Organic mercury, especially methyl mercury, rapidly enters the central nervous system resulting in behavioral and neuromotor disorders. The developing central nervous system is especially sensitive to this effect, as documented by the epidemiologic studies in Japan and Iraq where ingestion of methyl mercury-contaminated food resulted in severe toxicity and death in adults and severe central nervous system effects in infants. Blood mercury levels of <10 µg/dL and 300 µg/dL corresponded to mild effects and death, respectively. Teratogenic effects due to organic or inorganic mercury exposure do not appear to be well documented for humans or animals, although some evidence exists for mercury-induced menstrual cycle disturbances and spontaneous abortions. A subchronic and chronic oral RfD of 0.0001 mg/kg/day for methyl mercury is based on a benchmark dose of 1.1 µg/kg/day relative to neurologic developmental abnormalities in human infants. A subchronic and chronic oral RfD of 0.0003 mg/kg/day for mercuric chloride is based on immunologic glomerulonephritis. A subchronic and chronic inhalation RfC of 0.0003 mg Hg/m^3 for inorganic mercury is based on neurological disorders (increased frequency of intention tremors) following long-term occupational exposure to mercury vapor. An inhalation RfC for methyl mercury has not been determined.

32.2 Carcinogenicity

No data were available regarding the carcinogenicity of mercury in humans or animals. EPA has placed inorganic mercury in weight-of-evidence classification D, not classifiable as to human carcinogenicity. Weight-of-evidence classifications of C (possible human carcinogen) have been assigned to mercuric chloride and methyl mercury by EPA based upon limited evidence of carcinogenicity in rodents. No slope factors have been calculated.

33.0 METHYLENE CHLORIDE

Methylene chloride (CH2Cl2, CAS No. 75-09-2), also known as dichloromethane is a colorless volatile liquid with a penetrating ether-like odor. In industry, methylene chloride is widely used as a solvent in paint removers, degreasing agents, and aerosol propellants; as a polyurethane foam-blowing agent; and as a process solvent in the pharmaceutical industry. The compound is also used as an extraction solvent for spice oleoresins, hops, and caffeine.

33.1 Noncancer Toxicity

Methylene chloride is readily absorbed from the lungs, the gastrointestinal tract, and to some extent through the skin. Metabolism of methylene chloride produces CO2 and CO, which readily binds with blood hemoglobin to form carboxyhemoglobin (CO-Hb). The primary adverse health effects associated with methylene chloride exposure are central nervous system (CNS) depression and mild liver effects. Neurological symptoms described in individuals occupationally exposed to methylene chloride included headaches, dizziness, nausea, memory loss, paresthesia, tingling hands and feet, and loss of consciousness. Major effects following acute inhalation exposure include fatigue, irritability, analgesia, narcosis, and death. CNS effects have also been demonstrated in animals following acute exposure to methylene chloride. Impaired liver function has been associated with occupational exposure to methylene chloride. Liver effects have also been documented in a number of inhalation studies with laboratory animals. Subchronic exposure of rats, mice, dogs, and monkeys caused mild hepatic effects such as cytoplasmic vacuolization and fatty changes. Hepatocellular foci, fatty changes, and necrosis were reported following chronic inhalation exposure of rats and mice. Chronic oral exposure to methylene chloride via drinking water resulted in histopathological alterations of the liver in rats and mice. In addition, inhalation exposure of rats caused nonspecific degenerative and regenerative changes in the kidneys. A subchronic and chronic oral reference dose (RfD) of 6E-2 mg/kg/day and reference air concentration (RfC) of 3E+0 mg/m3 for methylene chloride has been calculated by U.S. EPA.

33.2 Carcinogenicity

Studies of workers exposed to methylene chloride have not recorded a significant increase in cancer cases above the number of cases expected for nonexposed workers. However, long-term inhalation studies with rats and mice demonstrated that methylene chloride causes cancer in laboratory animals. Mice exposed via inhalation to high concentrations of methylene chloride (2000 or 4000 ppm) exhibited a significant increase of malignant liver and lung tumors compared with nonexposed controls. Rats of both sexes exposed to concentrations of methylene chloride ranging from 500 to 4000 ppm showed increases of benign mammary tumors. An inhalation study with rats and hamsters revealed sarcomas of the salivary

gland in male rats, but not in female rats or hamsters. Liver tumors observed in rats and mice that ingested methylene chloride in drinking water for 2 years provided suggestive evidence of carcinogenicity. Based on inadequate evidence of carcinogenicity in humans and on sufficient evidence in animals, U.S. EPA has placed methylene chloride in weight-of-evidence group B2, probable human carcinogen. A slope factor and unit risk of 7.5E-3 $(mg/kg/day)^{-1}$ and 2.1E-7 $(ug/L)^{-1}$, respectively, were derived for oral exposure to methylene chloride. The inhalation slope factor is 1.65E-3 $(mg/kg/day)^{-1}$.

34.0 NAPTHALENE AND 2-METHYLNAPHTHALENE

Naphthalene (CAS Reg. No. 91-20-3), a white solid with a characteristic odor of mothballs, is a polycyclic aromatic hydrocarbon composed of two fused benzene rings. The principal end use of naphthalene is as a raw material for the production of phthalic anhydride. It is also used as an intermediate for synthetic resins, celluloid, lampblack, smokeless powder, solvents, and lubricants. Naphthalene is used directly as a moth repellant, insecticide, anthelmintic, and intestinal antiseptic.

34.1 Noncancer Toxicity

Naphthalene can be absorbed by the oral, inhalation, and dermal routes of exposure and can cross the placenta in amounts sufficient to cause fetal toxicity. The most commonly observed effect of naphthalene toxicity following acute oral or inhalation exposure in humans is hemolytic anemia associated with decreased hemoglobin and hematocrit values, increased reticulocyte counts, presence of Heinz bodies, and increased serum bilirubin levels. Hemolytic anemia has been observed in an infant dermally exposed to naphthalene and in infants whose mothers were exposed to naphthalene during pregnancy. Infants and individuals having a congenital deficiency of erythrocyte glucose-6-phosphate dehydrogenase are especially susceptible to naphthalene-induced hemolytic anemia. Acute oral and subchronic inhalation xposure of humans to naphthalene has resulted in neurotoxic effects (confusion, lethargy, listlessness, vertigo), gastrointestinal distress, hepatic effects (jaundice, hepatomegaly, elevated serum enzyme levels), renal effects, and ocular effects (cataracts, optical atrophy). Cataracts have been reported in individuals occupationally exposed to naphthalene and in rabbits and rats exposed orally to naphthalene. A number of deaths have been reported following intentional ingestion of naphthalene-containing mothballs. The estimated lethal dose of naphthalene is 5-15 g for adults and 2-3 g for children. Naphthalene is a primary skin irritant and is acutely irritating to the eyes of humans. Increased mortality, clinical signs of toxicity, kidney and thymus lesions, and signs of anemia were observed in rats treated by gavage with 400 mg/kg of naphthalene for 13 weeks. No adverse effects occurred at 50 mg/kg. Transient clinical signs of toxicity were seen in mice exposed by gavage to 53 mg/kg for 13 weeks. Subchronic oral exposure to 133 mg/kg/day for 90 days produced decreased spleen weights in female mice. Reduced

numbers of pups/litter were observed when naphthalene was administered orally to pregnant mice. Negative results in a two-year feeding study with rats receiving 10-20 mg naphthalene/kg/day and equivocal results in a mouse lung tumor bioassay suggest that naphthalene is not a potential carcinogen.

A chronic oral reference dose (RfD) of 2E-2 mg/kg/day for naphthalene has been calculated by U.S. EPA. The inhalation reference dose (RfD) for chronic inhalation exposure to naphthalene is 9E-4 mg/kg/day.

34.2 Carcinogenicity

Available cancer bioassays were insufficient to assess the carcinogenicity of naphthalene. Therefore, U.S. EPA (1991, 1992) has placed naphthalene in weight-of-evidence group D, not classifiable as to human carcinogenicity.

35.0 NICKEL AND NICKEL COMPOUNDS

35.1 Noncancer Toxicity

Nickel is a naturally occurring element that may exist in various mineral forms. It is used in a wide variety of applications including metallurgical processes and electrical components, such as batteries. Some evidence suggests that nickel may be an essential trace element for mammals. The absorption of nickel is dependent on its physicochemical form, with watersoluble forms being more readily absorbed. The metabolism of nickel involves conversion to various Chemical forms and binding to various ligands. Nickel is excreted in the urine and feces with relative amounts for each route being dependent on the route of exposure and chemical form. Most nickel enters the body via food and water consumption, although inhalation exposure in occupational settings is a primary route for nickel-induced toxicity. In large doses (>0.5 g), some forms of nickel may be acutely toxic to humans when taken orally. Oral LD50 values for rats range from 67 mg nickel/kg (nickel sulfate hexahydrate) to >9000 mg nickel/kg (nickel powder). Toxic effects of oral exposure to nickel usually involve the kidneys with some evidence from animal studies showing a possible developmental/reproductive toxicity effect.

Inhalation exposure to some nickel compounds will cause toxic effects in the respiratory tract and immune system. Inhalation LC50 values for animals range from 0.97 mg nickel/m^3 for rats (6-hour exposure) to 15 mg nickel/m^3 for guinea pigs (time not specified). Acute inhalation exposure of humans to nickel may produce headache, nausea,respiratory disorders, and death. Asthmatic conditions have also been documented for inhalation exposure to nickel. Soluble nickel compounds tend to be more toxic than insoluble compounds. In addition, nickel carbonyl is known to be extremely toxic to humans upon acute

inhalation exposure. Data on nickel-induced reproductive/developmental effects in humans following inhalation exposure are equivocal. No clinical evidence of developmental or reproductive toxicity were reported for women working in a nickel refinery, possible reproductive and developmental effects in humans of occupational exposure to nickel (0.13-0.2 mg nickel/m^3)have been reported. Furthermore, sensitivity reactions to nickel are well documented and usually involve contact dermatitis reactions resulting from contact with nickel-containing items such as cooking utensils, jewelry, coins, etc.

A chronic and subchronic oral reference dose (RfD) of 0.02 mg/kg/day for soluble nickel salts is based on changes in organ and body weights of rats receiving dietary nickel sulfate hexahydrate (5 mg/kg/day) for 2 years. A no-observed-adverse-effect level (NOAEL) and lowest-observed-adverse-effects level (LOAEL) of 5 mg/kg/day and 50 mg/kg/day, respectively, were reported in the key study. An uncertainty factor of 300 reflects interspecies extrapolation uncertainty, protection of sensitive populations, and a modifying factor of 3 for a database deficient in reproductive/developmental studies. An inhalation reference concentration (RfC) for soluble nickel salts is under review by the RfD/RfC Work Group and currently is not available.

35.2 Carcinogenicity

The primary target organs for nickel-induced systemic toxicity are the lungs and upper respiratory tract for inhalation exposure and the kidneys for oral exposure. Other target organs include the cardiovascular system, immune system, and the blood.

Epidemiologic studies have shown that occupational inhalation exposure to nickel dust (primarily nickel subsulfate) at refineries has resulted in increased incidences of pulmonary and nasal cancer. Inhalation studies using rats have also shown nickel subsulfate or nickel carbonyl to be carcinogenic. Based on these data, the EPA has classified nickel subsulfate and nickel refinery dust in weight-of-evidence group A, human carcinogen. Carcinogenicity slope factors of 1.7E+0 and 8.4E-01$(mg/kg/day)^{-1}$ have been calculated for nickel subsulfide and nickel refinery dust, respectively

36.0 PENTACHLOROPHENOL

Pentachlorophenol, a man-made organic biocide, is often contaminated with other toxic organic chemicals such as chlorinated phenols, dioxins, and dibenzofurans. Pentachlorophenol is readily absorbed following oral or inhalation exposure and is widely and rapidly distributed throughout the body. Human and animal studies have provided evidence indicating that pentachlorophenol is metabolized to various conjugated metabolites. Both the parent compound and the conjugates are excreted in the urine.

36.1 Noncancer Toxicity

Assessing the potential toxicity of technical (commercial) grade pentachlorophenol is complicated by the presence of the toxic impurities that are usually present, and the effects resulting from occupational exposure are often difficult to attribute to a specific route of exposure. The effects in humans following acute oral exposure include increased heart and respiratory rates, elevated temperature, increased basal metabolic rate, and death (29 and 401 mg/kg). Human fatalities and toxic effects including tachycardia, jaundice, and other hematologic alterations have been reported for acute and subchronic occupational (e.g., sawmill workers, herbicide sprayers) inhalation exposures to pentachlorophenol. Upper respiratory tract inflammation and bronchitis were reported for sawmill workers chronically exposed to pentachlorophenol. However, dose-terms for these exposures were not available, and concurrent exposures to other chemicals make definitive assessments impossible.

Data regarding the dermal exposure of humans to pentachlorophenol are anecdotal or equivocal, lack dose terms, and are compromised by concurrent exposures to other chemicals including the known contaminants in technical-grade pentachlorophenol. Acute exposure to 0.4% pentachlorophenol produced localized irritation, and subchronic exposures have caused chloracne and possibly renal damage. Dermal lesions have been reported for humans chronically exposed to pentachlorophenol-treated wood. There currently are no definitive data regarding reproductive toxicity in humans exposed to pentachlorophenol. Acute oral exposure of animals to pentachlorophenol affects the liver, kidneys, cardiovascular system, and the peripheral and central nervous system. Oral LD50 values for laboratory animals range from 27 to 230 mg/kg. Definitive data regarding the effects of subchronic or chronic oral exposure of humans to pentachlorophenol are not available. However, subchronic exposure (1 to 8 months) of rats to pentachlorophenol at doses ranging from 5 to 40 mg/kg/day has produced cardiovascular, hematotoxic, renal, hepatic, and immunologic responses. Evidence of reproductive/developmental toxicity (increased resorptions, embryolethality, embryotoxicity, and teratogenicity) have also been observed in rats given pentachlorophenol during gestation. Because the most significant acute toxic effect of pentachlorophenol is elevated metabolism, a specific target organ or tissue is difficult to identify. However, for subchronic and chronic exposures, toxicity data indicate that the liver, kidney, and cardiovascular system are targets for some of the toxic effects of pentachlorophenol.

Both the chronic and subchronic RfDs for pentachlorophenol are 3.00E-02 mg/kg/day based on a NOAEL of 3 mg/kg/day and a LOAEL of 10 mg/kg/day for histopathologic findings in the liver and kidneys of rats given pentachlorophenol in the diet for 2 years. The RfC for pentachlorophenol is under review.

36.2 Carcinogenicity

Based upon increased incidences of hepatocellular adenomas and carcinomas and malignant pheochromocytomas in mice, pentachlorophenol is classified by the EPA as a probable human carcinogen (Weight of Evidence Category B2) and has an oral slope factor of 1.2E-01 $(mg/kg/day)^{-1}$ and an oral unit risk of 3.0E-06 $(g/L)^{-1}$. The potential carcinogenicity of pentachlorophenol following inhalation exposure has not been evaluated.

37.0 POLYAROMATIC HYDROCARBONs

PAHs are a large class of ubiquitous natural and anthropogenic chemicals, all with similar chemical structures.

37.1 Pharmacokinetics

Although quantitative absorption data for the PAHs were not located, benzo(a)pyrene was readily absorbed across the GI and respiratory epithelia. The high lipophilicity of other compounds in this class suggests the other PAHs also would be readily absorbed across GI and respiratory epithelia.

Benzo(a) pyrene was distributed widely in the tissues of treated rats and mice, but primarily to tissues high in fat, such as adipose tissue and mammary gland. Patterns of tissue distribution of other PAHs would be expected to be similar because of the high lipophilicity of the members of this class.

Studies of the metabolism of benzo(a)pyrene provide information relevant to other PAHs because of the structural similarities of all members of the class. Metabolism involves microsomal mixed function oxidase hydroxylation of one or more of the phenyl rings with the formation of phenols and dihydrodiols, probably via formation of arene oxide intermediates. The dihydrodiols may be further oxidized to diol epoxides, which, for certain members of the class, are known to be the ultimate carcinogens. Conjugation with glutathione or glucuronic acid, and reduction to tetrahydrotetrols are important detoxification pathways. Metabolism of naphthalene resulted in the formation of 1,2-naphthoquinone, which induced cataract formation and retinal damage in rats and rabbits.

Excretion of benzo(a)pyrene or dibenzo(a,h)anthracene residues were reported to be rapid, although quantitative data were not located. Excretion occurred mainly via the feces, probably largely due to biliary secretion. The EPA concluded that accumulation in the body tissues of PAHs from chronic low level exposure would be unlikely.

37.2 Noncancer Toxicity

The oral and inhalation noncancer toxicity data for naphthlene are used as surrogates for the noncarcinogenic PAHs considered COPCs at OU2, namely, benzo(g,h,i)perylene and phenathrene. A chronic oral reference dose (RfD) of 2E-2 mg/kg/day for naphthalene has been calculated by U.S. EPA. The chronic inhalation reference dose (RfD) for naphthalene is 9E-4 mg/kg/day.

37.3 Carcinogenicity

The PAHs are ubiquitous, being released to the environment from anthropogenic as well as from natural sources. Benzo(a)pyrene is the most extensively studied member of the class, inducing tumors in multiple tissues of virtually all laboratory species tested by all routes of exposure. Although epidemiology studies suggested that complex mixtures that contain PAHs (coal tat, soots, coke oven emissions, cigarette smoke) are carcinogenic to humans, the carcinogenicity cannot be attributed to PAHs alone because of the presence of other potentially carcinogenic substances in these mixtures. In addition, recent investigations showed that the PAH fraction of roofing tar, cigarette smoke, and coke oven emissions accounted for only 0.1 to 8 percent of the total mutagenic activity of the unfractionated complex mixture in Salmonella. Aromatic amines, nitrogen heterocyclic compounds, highly oxygenated quinones, diones, and nitrooxygenated compounds, none of which would be expected to arise from in vivo metabolism of PAHs, probably accounted for the majority of the mutagenicity of coke oven emissions and cigarette smoke. Furthermore, coal tar, which contains a mixture of many PAHs, has a long history of use in the clinical treatment of a variety of skin disorders in humans.

Because of the lack of human cancer data, assignment of individual PAHs to EPA cancer weight-of-evidence groups was based largely on the results of animal studies with large doses of purified compound. Frequently, unnatural routes of exposure, including implants of the test chemical in beeswax and trioctanoin in the lungs of female Osborne-Mendel rats, intratracheal instillation, and subcutaneous or intraperitoneal injection, were used.

The EPA verified a slope factor for oral exposure to benzo(a)pyrene of 7.3 per mg/kg/day, based on several dietary studies in mice and rats. Neither verified nor provisional quantitative risk estimates were available for the other PAHs in Group B2. In 1980, the EPA promulgated an ambient water quality criterion for "total carcinogenic PAHs," based on an oral slope factor derived from a study with benzo(a)pyrene, as being sufficiently protective for the class. Largely because of this precedent, the quantitative risk estimates for benzo(a)pyrene were adopted for the other carcinogenic PAHs when quantitative estimates were needed.

Recent reevaluations of the carcinogenity and mutagenicity of the Group B2 PAHS suggest that there are large differences between individual PAHs in cancer potency. Based on the available cancer and mutagenicity data, and assuming that there is a constant relative potency between different carcinogens across different bioassay systems and that the PAHs under consideration have similar dose-response curves, the EPA derived relative potency values for several PAHs. This relative potency (RPF) scheme for the Group B2 PAHs was based on well conducted studies using a standard, easily comparable endpoint well-known to be associated with exposure to PAHs; namely, complete carcinogenesis after repeated exposure to mouse skin.

38.0 RDX (ROYAL DEMOLITION EXPLOSIVE; HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE)

38.1 Pharmacokinetics

Although RDX is not readily absorbed through the skin, oral exposure studies indicate that RDX is rapidly absorbed. According to observed ingestion and inhalation exposures, evidence exists that this man-made compound is absorbed in the GI tract and may be absorbed in the lungs. However, GI absorption of RDX is regarded as poor.

Limited studies are available concerning the distribution, metabolites, and excretion of RDX. RDX is metabolized by the liver and excreted in the urine. According to one study, RDX was detected in the urine 48 hours after oral exposure and in the feces 96 hours after exposure.

38.2 Noncancer Toxicity

RDX has been found to cause nausea, irritability, convulsions, unconsciousness, and amnesia in humans following oral and inhalation occupational exposure. The U.S. EPA derived a chronic oral RfD of 0.003 mg/kg/day for RDX from a NOEL of 0.3 mg/kg/day and an uncertainty factor of 100 (for extrapolation of animal doses to humans and uncertainty in the threshold for sensitive humans). This value is based on a 2-year rat feeding study performed by the U.S. DOD where notable critical effects were inflammation of the prostate and increased pigment in the spleen of male rats. Several chronic effects were observed for rats exposed to high doses of RDX. They included increased mortality, hepatoxicity, increased incidences of cataracts in female rats, and behavioral hypersensitivity and renal toxicity in male rats. At a dose of 8 mg/kg/day, increased kidney weights were noted for both male and female rats. Embryonic and maternal toxicity was observed in rats exposed to RDX in developmental toxicity studies.

38.3 Carcinogenicity

The U.S. EPA has classified RDX in the cancer weight-of-evidence Group C (possible human carcinogen). Although no epidemiological studies have been conducted on humans, data does exists which indicates that RDX is carcinogenic in animals. Hepatocellular adenomas and carcinomas were observed in female rats exposed to RDX in their diet. A drinking water unit risk of 0.0000031 per µg/L and an slope factor of 0.11 kg/day/mg was developed based on a U.S. DOD study. It should be noted that this slope factor may not be applicable at water concentrations exceeding 3,000 mg/L.

39.0 SELENIUM

Selenium is an essential trace element important in many biochemical and physiological processes. Recommended human dietary allowances (average daily intake) for selenium are as follows: infants up to 1 year, 10-15 g; children 1-10 years, 20-30 g; adult males 11-51+ years, 40-70 g; adult females 11-51+ years, 45-55 g; pregnant or lactating women, 65-75 g. There appears to be a relatively narrow range between levels of selenium intake resulting in deficiency and those causing toxicity.

39.1 Noncancer Toxicity

Toxicity of selenium varies with valence state and water solubility of the compound in which it occurs. The latter can affect gastrointestinal absorption rates. Gastrointestinal absorption in animals and humans for various selenium compounds ranges from about 44% to 95% of the ingested dose. Selenium is found in all tissues of the body; highest concentrations occur in the kidney, liver, spleen, and pancreas. In humans, acute oral exposures can result in excessive salivation, garlic odor to the breath, shallow breathing, diarrhea, pulmonary edema, and death. Other reported signs and symptoms of acute selenosis include tachycardia, nausea, vomiting, abdominal pain, abnormal liver function, muscle aches and pains, irritability, chills, and tremors. General signs and symptoms of chronic selenosis in humans include loss of hair and nails, acropachia (clubbing of the fingers), skin lesions (redness, swelling, blistering, and ulcerations), tooth decay (mottling, erosion and pitting), and nervous system abnormalities attributed to polyneuritis (peripheral anesthesia, acroparaethesia, pain in the extremities, hyperreflexia of the tendon, numbness, convulsions, paralysis, motor disturbances, and hemiplegia). Selenium is teratogenic in birds and possibly also in domesticated animals (pigs, sheep, and cattle), but evidence of teratogenicity in humans and laboratory animals is lacking. However, adverse reproductive and developmental effects (decreased rates of conception, increased rates of fetal resorption, and reduced fetal body weights) have been reported for domesticated and laboratory animals. The Reference Dose (RfD) for chronic oral exposures is 0.005 mg/kg/day for both selenium and selenious acid.

39.2 Carcinogenicity

EPA has placed selenium and selenious acid in Group D, not classifiable as to carcinogenicity in humans while selenium sulfide is placed in Group B2, probable human carcinogen. Quantitative data are, however, insufficient to derive a slope factor for selenium sulfide.

40.0 TETRACHLOROETHENE (PCE)

Tetrachloroethylene (CAS No. 127-18-4) is a halogenated aliphatic hydrocarbon with a vapor pressure of 17.8 mm Hg at 25C. The chemical is used primarily as a solvent in industry and, less frequently, in commercial dry-cleaning operations.

40.1 Noncancer Toxicity

Occupational exposure to tetrachloroethylene occurs via inhalation, resulting in systemic effects, and via dermal contact, resulting in local effects. Exposure to the general population can occur through contaminated air, food and water .The respiratory tract is the primary route of entry for tetrachloroethene. The chemical is rapidly absorbed by this route and reaches an equilibrium in the blood within 3 hours after the initiation of exposure. Tetrachloroethene is also significantly absorbed by the gastrointestinal (g.i.) tract, but not through the skin. The chemical accumulates in tissues with high lipid content, where the half-life is estimated to be 55 hours, and has been identified in perirenal fat, brain, liver, placentofetal tissue, and amniotic fluid.

The main targets of tetrachloroethylene toxicity are the liver and kidney by both oral and inhalation exposure, and the central nervous system by inhalation exposure. Acute exposure to high concentrations of the chemical (estimated to be greater than 1,500 ppm for a 30-minute exposure) may be fatal to humans. Chronic exposure causes respiratory tract irritation, headache, nausea, sleeplessness, abdominal pains, constipation, cirrhosis of the liver, hepatitis, and nephritis in humans; and microscopic changes in renal tubular cells, squamous metaplasia of the nasal epithelium, necrosis of the liver, and congestion of the lungs in animals. Some epidemiology studies have found an association between inhalation exposure to tetrachloroethylene and an increased risk for spontaneous abortion, idiopathic infertility, and sperm abnormalities among dry-cleaning workers, but others have not found similar effects. The adverse effects in humans are supported in part by the results of animal studies in which tetrachloroethylene induced fetotoxicity (but did not cause malformations) in the offspring of treated dams.

Reference doses (RfDs) for subchronic and chronic oral exposure to tetrachloroethylene are 1E-1 mg/kg/day and 1E-2 mg/kg/day, respectively. These values are based on hepatotoxicity observed in mice

given 100 mg tetrachloroethylene/kg body weight for 6 weeks and a no-observed-adverse effect level (NOAEL) of 20 mg/kg. EPA-NCEA has developed an inhalation RfD of 0.14 mg/kg-day for PCE.

40.2 Carcinogenicity

Epidemiology studies of dry cleaning and laundry workers have demonstrated excesses in mortality due to various types of cancer, including liver cancer, but the data are regarded as inconclusive because of various confounding factors. The tenuous finding of an excess of liver tumors in humans is strengthened by the results of carcinogenicity bioassays in which tetrachloroethylene, administered either orally or by inhalation, induced hepatocellular tumors in mice. The chemical also induced mononuclear cell leukemia and renal tubular cell tumors in rats. Tetrachloroethylene was negative for tumor initiation in a dermal study and for tumor induction in a pulmonary tumor assay. Although U.S. EPA's Science Advisory Board recommended a weight-of-evidence classification of C-B2 continuum (C = possible human carcinogen; B2 = probable human carcinogen), the agency has not adopted a current position on the weight-of-evidence classification. In an earlier evaluation, tetrachloroethylene was assigned to weight-of-evidence Group B2, probable human carcinogen, based on sufficient evidence from oral and inhalation studies for carcinogenicity in animals and no or inadequate evidence for carcinogenicity to humans. The unit risk and slope factor values for tetrachloroethylene have been withdrawn from IRIS and HEAST. Upper bound risk estimates provided by EPA-NCEA are as follows: for oral exposure, the slope factor is 5.2E-2 $(mg/kg/day)^{-1}$; for inhalation exposure, the slope factor is 2.0E-3 $(mg/kg/day)^{-1}$.

41.0 THALLIUM

41.1 Noncancer Toxicity

Thallium is highly toxic; acute ingestion by humans or laboratory animals induced gastroenteritis, neurological dysfunction, and renal and liver damage. Chronic ingestion of more moderate doses characteristically caused alopecia. Thallium was used medicinally to induce alopecia in cases of ringworm of the scalp, sometimes with disastrous results. In industrial (inhalation, oral, dermal) exposure, neurologic signs preceded alopecia, suggesting that the nervous system is more sensitive than the hair follicle. The EPA presented verified chronic oral RfD values for several thallium compounds (thallium acetate, thallium acetate, thallium carbonate, thallium chloride, thallium nitrate, thallium sulfate, and thallic oxide) based on increased incidence of alopecia and increased serum levels of liver enzymes indicative of hepatocellular damage in rats treated with thallium sulfate for 90 days. Risks from exposure to thallium in the OU2 risk assessment are evaluated using the chronic oral RfD for thallium, 7.0E-5 mg/kg/day, listed in the EPA Region III RBC tables published in October 2000.

41.2 Carcinogenicity

No information was located regarding the carcinogenicity of thallium.

42.0 TRICHLOROETHENE

Trichloroethene (TCE) is an industrial solvent used primarily in metal degreasing and cleaning operations. TCE can be absorbed through the lungs, mucous membranes, gastrointestinal tract, and the skin.

42.1 Pharmacokinetics

TCE is extensively metabolized in humans to trichloroacetic acid and trichloroethanol, as well as to several minor metabolites, with most of the absorbed dose excreted in urine.

42.2 Noncancer Toxicity

Human and animal data indicate that exposure to TCE can result in toxic effects on a number of organs and systems, including the liver, kidney, blood, skin, immune system, reproductive system, nervous system, and cardiovascular system. In humans, acute inhalation exposure to TCE causes central nervous system symptoms such as headache, dizziness, nausea, and unconsciousness. Among the reported effects from occupational exposure studies are fatigue, light-headedness, sleepiness, vision distortion, abnormal reflexes, tremors, ataxia, nystagmus, increased respiration, as well as neurobehavioral or psychological changes. Cardiovascular effects include tachycardia, extrasystoles, EKG abnormalities, and precordial pain. The use of TCE as an anesthetic has been associated with cardiac arrhythmias. Cases of severe liver and kidney damage, including necrosis, have been reported in humans following acute exposure to TCE, but these effects generally are not associated with long-term occupational exposures. In animals, TCE has produced liver enlargement with hepatic biochemical and/or histological changes and kidney enlargement, renal tubular alterations and/or toxic nephropathy. Also observed in animals were hematological effects and immunosuppression. Inhalation studies with rats indicate that TCE is a developmental toxicant causing skeletal ossification anomalies and other effects consistent with delayed maturation. TCE may cause dermatitis and dermographism.

Reference Doses (RfDs) and Reference Concentrations (RfCs) for subchronic and chronic oral and inhalation exposure to TCE are presently under review by EPA. However, EPA-NCEA has published an oral RfD of 0.006 mg/kg-day for TCE.

42.3 Carcinogenicity

Epidemiologic studies have been inadequate to determine if a correlation exists between exposure to TCE and increased cancer risk. Chronic oral exposure to TCE increased the incidences of hepatocellular carcinomas in mice and renal adenocarcinomas and leukemia in rats. Chronic inhalation exposure induced lung and liver tumors in mice and testicular Leydig cell tumors in rats. Although U.S. EPA's Science Advisory Board recommended a weight-of-evidence classification of C-B2 continuum (C = possible human carcinogen; B2 = probable human carcinogen), the agency has not adopted a current position on the weight-of-evidence classification. In an earlier evaluation, TCE was assigned to weight-of-evidence Group B2, probable human carcinogen, based on tumorigenic responses in rats and mice for both oral and inhalation exposure and on inadequate data in humans. Carcinogen slope factors are 1.1E-2 $(mg/kg/day)^{-1}$ and 6.0E-3 $(mg/kg/day)^{-1}$ for oral and inhalation exposure, respectively. The corresponding unit risks are 3.2E-7 $(\mu g/L)^{-1}$ and 1.7E-6 $(\mu g/m^3)^{-1}$, respectively.

43.0 2,4,6-TRINITROTOLUENE

2,4,6-Trinitrotoluene (TNT) is used as a high explosive in military armaments and as a chemical intermediate in the manufacture of dyestuffs and photographic chemicals. TNT is likely to enter the environment in wastewater effluents from production facilities and from leachates at waste disposal sites. Mobility in soil may be limited by strong adsorption to soil particles.

43.1 Noncancer Toxicity

TNT is absorbed through the gastrointestinal tract, skin, and lungs; is distributed primarily to the liver, kidneys, lungs, and fat; and is excreted mainly in the urine and bile. In animals, signs of acute toxicity to TNT include ataxia, tremors, and mild convulsions. Splenic hemosiderosis, leukopenia, thrombocytosis, slight hepatomegaly, and increase in kidney weight occurred in mice fed a dietary level equivalent to 700 mg TNT/kg/day for 28 days. The primary target organs for TNT toxicity in experimental animals following subchronic and chronic oral exposures are (1) liver (hepatocytomegaly and cirrhosis), (2) blood (hemolytic anemia with secondary alterations in the spleen), and (3) testes (degeneration of the germinal epithelium lining the seminiferous tubules. Chronic oral toxicity studies on rats have also demonstrated TNT-induced anemia and hepatotoxicity, as well as adverse effects on the kidney.

The reference dose (RfD) for chronic oral exposures, 0.0005 mg/kg/day, is based on a LOAEL of 0.5 mg/kg/day for liver effects in dogs. An inhalation reference concentration (RfC) for TNT has not been derived.

43.2 Carcinogenicity

No epidemiological evidence is available showing an association between chronic TNT exposure and tumorigenicity in humans. In animal carcinogenicity studies, a significant increase in urinary bladder papillomas and carcinomas was seen in female rats dosed with 50 mg TNT/kg/day for 24 months. This study was used by EPA to calculate a slope factor of 0.03 $(mg/kg/day)^{-1}$. TNT is classified in weight-of-evidence Group C, possible human carcinogen.

44.0 VANADIUM

44.1 Noncancer Toxicity

The oral toxicity of vanadium compounds to humans is very low probably because little vanadium is absorbed from the GI tract. Effects in humans exposed by inhalation include upper and lower respiratory tract irritation. A provisional subchronic and chronic oral RfD of 0.007 mg/kg/day was derived from an NOEL of 5 ppm in rats in a lifetime drinking water study with vanadyl sulfate and an uncertainty factor of 100. A target organ could not be identified for oral exposure. The respiratory tract is the target organ for inhalation exposure.

44.2 Carcinogenicity

No information was located regarding the carcinogenicity of vanadium.

45.0 VINYL CHLORIDE

Vinyl chloride (CAS Reg. No. 75-01-4), a colorless gas, is a halogenated aliphatic hydrocarbon with the empirical formula of C2H3Cl. It is used primarily as an intermediate in the manufacture of polyvinyl chloride (PVC); limited quantities are used as a refrigerant and as an intermediate in the production of chlorinated compounds.

45.1 Noncancer Toxicity

Vinyl chloride is rapidly absorbed from the gastrointestinal tract and lungs. Metabolism of vinyl chloride occurs primarily in the liver via oxidation by hepatic microsomal enzymes to polar compounds which can be conjugated with glutathione and/or cysteine. These covalently bound metabolites are then excreted in the urine. In humans and animals, vinyl chloride is a CNS depressant, inducing narcosis and anesthesia at high concentrations. Nonneoplastic toxic effects observed in workers exposed by inhalation to vinyl

chloride include hepatotoxicity, acroosteolysis and scleroderma, and Raynaud's syndrome, a vascular disorder of the extremities. Also reported were abnormalities of CNS function, high blood pressure, and occasional pulmonary effects. The evidence for potential developmental effects in humans (increased fetal loss and birth defects) is equivocal. Occupational exposure to vinyl chloride has been associated with reduced sexual function in both sexes and gynecological effects in women. For the oral route of exposure, the primary target organ of vinyl chloride toxicity in animals is the liver. Chronic oral administration of 1.7-14.1 mg/kg/day of vinyl chloride induced dose-related increases in nonneoplastic lesions of the liver of rats. In addition to the CNS, target organs for inhalation exposure include the liver, kidneys, lungs, spleen, and testes. Subchronic inhalation studies with rodents documented hepatic effects at concentrations as low as 50 ppm and degenerative changes of the liver and kidneys at >= 500 ppm. Exposure to higher concentrations caused proliferative changes in the lungs of mice, extensive liver and kidney damage in rats and guinea pigs, cerebral and cerebellar nephrosis in rats, and degeneration of the spleen in guinea pigs. Subchronic exposure of rats to 100 ppm vinyl chloride produced significantly decreased testes weights and testicular regeneration. Evidence of developmental toxicity was seen in rats exposed to vinyl chloride during the first trimester of gestation. The U.S. EPA has derived an oral reference dose (RfD) of 0.003 mg/kg/day and an inhalation reference concentration (RfC) of 0.1 mg/m^3 for vinyl chloride.

45.2 Carcinogenicity

The carcinogenicity of vinyl chloride in humans has been demonstrated in a number of epidemiological studies and case reports, many of which associated occupational exposure to vinyl chloride to the development of angiosarcomas of the liver. In addition to liver cancer, exposure to vinyl chloride also has been linked to an increased risk of lung, brain, hematopoietic, and digestive tract cancers. Vinyl chloride has been shown to be carcinogenic in numerous animal studies. Inhalation exposure to vinyl chloride induced an increased incidence of liver angiosarcomas; kidney nephroblastomas; and lung, brain, and forestomach tumors in rodents. Oral administration of vinyl chloride induced liver, lung, and kidney tumors in rodents. Angiosarcomas observed in offspring of rats exposed by inhalation during gestation indicates that vinyl chloride has the potential to initiate cancer in utero. EPA has classified vinyl chloride as a Group A chemical, human carcinogen. Oral slope factors of 0.72 $(mg/kg/day)^{-1}$ and 1.5 $(mg/kg/day)^{-1}$ have been derived for continuous lifetime exposure during adulthood and exposure from birth, respectively. Inhalation unit risks corresponding to inhalation slope factors of 0.016 $(mg/kg/day)^{-1}$ and 0.031 $(mg/kg/day)^{-1}$ have been derived for adulthood and exposure from birth, respectively

46.0 ZINC

46.1 Pharmacokinetics

Zinc is a nutritionally required trace element. Estimates of the efficiency of GI absorption of zinc in animals range from <10 to 90 percent. Estimates in normal humans range from approximately 20 to 77 percent. The net absorption of zinc appears to be homeostatically controlled, but it is unclear whether GI absorption, intestinal secretion, or both are regulated. Distribution of absorbed zinc is primarily to the liver, with subsequent redistribution to bone, muscle, and kidney. Highest tissue concentrations are found in the prostate. Excretion appears to be principally through the feces, in part from biliary secretion, but the relative importance of fecal and urinary excretion is species-dependent. The half-life of zinc absorbed from the GI tracts of humans in normal zinc homeostasis is approximately 162 to 500 days.

46.2 Noncancer Toxicity

Humans exposed to high concentrations of aerosols of zinc compounds may experience severe pulmonary damage and death. The usual occupational exposure is to freshly formed fumes of zinc, which can induce a reversible syndrome known as metal fume fever. Orally, zinc exhibits a low order of acute toxicity. Animals dosed with 100 times dietary requirement showed no evidence of toxicity. In humans, acute poisoning from foods or beverages prepared in galvanized containers is characterized by GI upset. Chronic oral toxicity in animals is associated with poor growth, GI inflammation, arthritis, lameness, and a microcytic, hypochromic anemia, possibly secondary to copper deficiency. The EPA calculated an RfD of 0.3 mg/kg/day for chronic oral exposure to zinc, based on anemia in humans.

46.3 Carcinogenicity

The EPA classifies zinc in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans) based on inadequate evidence for carcinogenicity in humans and animals. The human data consist largely of occupational exposure studies not designed to detect a carcinogenic response, and of reports that prostatic zinc concentrations were lower in cancerous than in noncancerous tissue. The animal data consist of several dietary, drinking water, and zinc injection studies, none of which provided convincing data for a carcinogenic response.

SOURCES

The information contained in the Toxicological Profiles has been extracted from the following sources:

Agency for Toxic Substances and Disease Registry, ToxFAQs (Online), http://www.atsdr.cdc.gov.toxfaq.html, November 2001.

Hazardous Substance Data Base (HSDB), Online, http://toxnet.nlm.nih/gov/cgi/sis, November 2001.

U.S. EPA (U.S. Environmental Protection Agency). November 2001. Integrated Risk Information System (IRIS) - On-Line Database, http://www.epa.gov/ngispgm3/iris/subst/index.html.

U.S. Department of Energy, November 2001. Toxicity Profiles (Summary), Risk Assessment Information System (RAIS), Office of Environmental Management, Oak Ridge Operations (ORO), http://risk.lsd.ornl.gov/rap_hp.shtml.

U.S. Environmental Protection Agency (USEPA), Region IX, November 2000. "Region 9 Preliminary Remediation Goals (PRGs) 2000", EPA Region IX, 75 Hawthorne Street, San Francisco, California, 94105.

U.S. Environmental Protection Agency (USEPA), Region III, October 2001. Risk-Based Concentration Table. EPA Region III, 841 Chestnut Street, Philadelphia, Pennsylvania 19107.

USEPA, July 1997, Health Effects Assessment Summary Tables (HEAST)

APPENDIX G.3

SWMUs 4, 5, 9, AND 10
RISK CALCULATIONS AND RAGS-PART D TABLES

A complete copy of the Heath Risk Assessment Calculations is provided on the CD-ROM

CONTENTS OF HUMAN HEALTH RISK CD

The files contain the RAGS-Part D tables used in the risk assessments performed for SWMUs 4, 5, 9, and 10, NSWC Crane, Indiana. Each folder on the CD contains the complete set of RAGS-Part D tables (in Excel spreadsheets) for the respective SWMUs. Lists of the RAGS-Part D Excel files are contained in the files labeled filelist4.xls, filelist5.xls, filelist9.xls, and filelist10.xls. The RAGS-Part D tables, in general, provide the following information:

- Table 1 (Selection of Exposure Pathways) presents the possible receptors, exposure routes, exposure pathways for each site. This table also presents the rationales for the selection or exclusion of each exposure pathway.

- Table 2 (Occurrence, Distribution, And Selection Of Chemicals Of Potential Concern) provides a summary of the COPC selection process for each medium evalucated at a site.

- Table 3 (Medium-Specific Exposure Point Concentration Summary) presents the exposure point concentrations used in risk assessment calculations.

- Table 4 (Values of Daily Intake Calculations) presents the exposure factors (such as exposure duration) used in risks assessment calculations.

- Table 5 presents the toxicity information for noncarcinogens selected as COPCs.

- Table 6 presents the toxicity information for carcinogens selected as COPCs.

- Table 7 (Calculation of Non-Cancer Hazards) presents risk assessment calculations for noncarcinogenic COPCs for each receptor in a given medium.

- Table 8 (Calculation of Cancer Risks) presents risk assessment calculations for carcinogenic COPCs for each receptor in a given medium.

- Table 9 (Summary of Receptor Risks and Hazards for COPCs) summarizes the results of the risk assessment calculations for each receptor for exposure pathway. Table 9 also presents target organ information for noncarcinogenic health effects.

Note that Table 4, Table 7, and Table 8 are contained within the same spreadsheet (on different sheets). Table 4 is included with Tables 7 and 8 because the calculations performed in Tables 7 and 8 make use of and are linked to the exposure factor data in Table 4.

RAGS - PART D TABLES FOR SWMU 4

Selection of Exposure Pathways

SWMU4Table1.xls

COPC Selection

SWMU4Table2.1.xls - Surface Soil - Direct Contact
SWMU4Table2.2.xls - Surface Soil - Migration Pathways
SWMU4Table2.3.xls - Surface/Subsurface Soil - Direct Contact
SWMU4Table2.4.xls - Surface/Subsurface Soil - Migration Pathways
SWMU4Table2.5.xls - Groundwater
SWMU4Table2.6.xls - Surface Water
SWMU4Table2.7.xls - Sediment

Exposure Point Concentration Summary

SWMU4Table3.1.xls - Surface Soil
SWMU4Table3.2.xls - Surface/Subsurface Soil
SWMU4Table3.3.xls - Groundwater
SWMU4Table3.4.xls - Surface Water
SWMU4Table3.5.xls - Sediment

COPC Toxicity Information

Table5.1.xls - Noncancer - Oral/Dermal
Table5.2.xls - Noncancer - Inhalation
Table6.1.xls - Cancer - Oral/Dermal
Table6.2.xls - Cancer - Inhalation

The following files contain RAGS-Part D Tables 4, 7, and 8.

Risk Assessment Calculations for Surface Soil

SWMU4SSAdultRes.xls
SWMU4SSAdultResCTE.xls
SWMU4SSChildRes.xls
SWMU4SSChildResCTE.xls
SWMU4SSMainW.xls
SWMU4SSMainWCTE.xls
SWMU4SSRecrUser.xls
SWMU4SSRecrUserCTE.xls
SWMU4SSTresp.xls
SWMU4SSTrespCTE.xls

Risk Assessment Calculations for Surface/subsurface Soil

SWMU4SOConstW.xls
SWMU4SOConstWCTE.xls

Risk Assessment Calculations for Groundwater

SWMU4GWAdultRes.xls
SWMU4GWAdultResCTE.xls
SWMU4GWChildRes.xls
SWMU4GWChildResCTE.xls
SWMU4GWConstW.xls

SWMU4GWConstWCTE.xls

Risk Assessment Calculations for Surface Water

SWMU4SWAdultRes.xls
SWMU4SWAdultResCTE.xls
SWMU4SWChildRes.xls
SWMU4SWChildResCTE.xls
SWMU4SWRecrUser.xls
SWMU4SWRecrUserCTE.xls
SWMU4SWTresp.xls
SWMU4SWTrespCTE.xls

Risk Assessment Calculations for Sediment

SWMU4SedAdultRes.xls
SWMU4SedAdultResCTE.xls
SWMU4SedChildRes.xls
SWMU4SedChildResCTE.xls
SWMU4SedRecrUser.xls
SWMU4SedRecrUserCTE.xls
SWMU4SedTresp.xls
SWMU4SedTrespCTE.xls

Risk Assessment Summary

SWMU4Tbl9s.xls
SWMU4Tbl9sCTE.xls

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			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - TABLE 8.1	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 4 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - TABLE 7.1a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 4 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 4 - TABLE 8.1a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 4 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 4 - TABLE 4.2		MAINTENANCE WORKERS TO SURFACE SOIL	SWMU 4 - TABLE 4.2
SWMU 4 - TABLE 7.2	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 4 - TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
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TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil(1)	Surface Soil	Entire Site	Trespassers	Adolescent	Ingestion	On-site	Quant(2)	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air -	Trespassers	Adult and Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to U.S. EPA Generic SSLs(4) for transfers from soil to air.
	Groundwater	Groundwater/Air	Surficial Aquifer	Trespassers	Adult and Adolescent	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Dermal	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Inhalation	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
	Surface Water	Surface Water	On-Site Streams, Ponded Water and	Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	On-Site Streams, Ponded Water and	Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-Site Streams, Ponded Water and	Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base, access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air -	Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface/ Subsurface Soil (5)	Surface/ Subsurface Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Excavation/construction activities may occur at the site in the future.
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site in the future.
		Air	Vapors and Particulates in Air -	Excavation/Construction Workers	Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to U.S. EPA generic SSLs for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	Maintenance Workers	Adult	Ingestion	On-site	Quant	Although maintenance activities are not currently performed on the site, activities, such as groundkeeping, may occur in the future.
						Dermal	On-site	Quant	Although maintenance activities are not currently performed on the site, activities, such as groundkeeping, may occur in the future.
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Occupational	Child and Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to U.S. EPA generic SSLs for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Excavation/Construction and Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site and workers may be exposed by direct contact with groundwater.
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
						Dermal	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Excavation/Construction/ Maintenance/Occupational	Adult	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
				Residents	Child and Adult	Inhalation	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	On-site Streams, Ponded Water and	Excavation/Construction and Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Construction/ Maintenance/Occupational	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and	Excavation/Construction and Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low that it is not worth quantifying).
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Construction/ Maintenance/Occupational	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low that it is not worth quantifying).

Footnotes:
1 Surface soil is defined as soil collected from 0 to 2 feet below ground surface (bgs).
2 Quantitative.
3 Qualitative.
4 Soil screening levels (U.S. EPA, May 1996).
5 Surface/subsurface soil is defined as soil collected from 0 to 10 feet bgs; no exposure to soil at depths below 10 feet bgs is anticipated.

SWMU 4 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/14	0.003 - 0.004	0.006	NA	1200	sat	1800	IDEM	No	BSL
67-64-1	ACETONE	0.043		0.043		mg/kg	04SB030102	1/14	0.013 - 0.046	0.043	NA	160	N	3900	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.004	J	mg/kg	04SB120102	1/14	0.003 - 0.005	0.004	NA	9.1	C	120	IDEM	No	BSL
1330-20-7	XYLENES, TOTAL	0.004		0.006		mg/kg	4090102, 04SB10	4/14	0.003 - 0.004	0.006	NA	27	N	4800	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/14	0.008 - 6	0.03	NA	370(7)	N	9500(7)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/14	0.008 - 6	0.038	NA	2200	N	47000	IDEM	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.18		2.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.8	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.23	J	3	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3	NA	**0.062**	C	**0.5**	IDEM	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.65	J	4.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	4.8	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	3.7	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.7	NA	230(8)	N	5500(8)	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.54		0.54		mg/kg	04SB110002	1/14	0.38 - 6	0.54	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.24		2.9	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.9	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.028	J	0.028	J	mg/kg	04SS010002	1/14	0.008 - 6	0.028	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.28		5.4	J	mg/kg	04SB030002	2/14	0.008 - 5.8	5.4	NA	230	N	6300	IDEM	No	BSL
193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.12	J	2.2	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.2	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
91-20-3	NAPHTHALENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.11		3.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.8	NA	230(8)	N	5500(8)	IDEM	No	BSL
129-00-0	PYRENE	0.4	J	6		mg/kg	04SB030002	2/14	0.008 - 5.8	6	NA	230	N	5500	IDEM	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/14	0.0038 - 0.059	0.11	NA	1.7	C	20	IDEM	No	BSL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/14	0.0019 - 0.03	0.0081	NA	37(9)	N	1100(9)	IDEM	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.0083		0.012		mg/kg	04SB100002	2/14	0.0031 - 0.048	0.012	NA	61	N	NA	IDEM	No	BSL
94-75-7	2,4-D	0.007		0.045	J	mg/kg	04SB100002	4/14	0.0031 - 0.048	0.045	NA	69	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0029		0.22		mg/kg	04SB050002	3/12	0.00077 - 0.012	0.22	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	3980	J	9980	J	mg/kg	04SB080002	14/14	---	9980	No	**7600**	N	NA	IDEM	No	BKG
7440-36-0	ANTIMONY	0.98		0.98		mg/kg	04SB070002	1/14	0.79 - 0.97	0.98	No	3.1	N	140	IDEM	No	BSL,BKG
7440-38-2	ARSENIC	3.5		7.3		mg/kg	04SS010002	14/14	---	7.3	No	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	BARIUM	26		15600		mg/kg	04SS010002	14/14	---	15600	No	**540**	N	23000	IDEM	No	BKG
7440-41-7	BERYLLIUM	0.45		0.61		mg/kg	04SB110002	4/14	0.85 - 0.91	0.61	No	15	N	680	IDEM	No	BSL,BKG
7440-43-9	**CADMIUM**	0.58		5.8		mg/kg	04SB060002	4/14	0.43 - 0.91	5.8	Yes	**3.7**	N	12	IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	964		145000	J	mg/kg	04SS010002	4/14	215 - 4570	145000	Yes	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	7.3		16.5		mg/kg	04SB020002	14/14	---	16.5	No	30(10)	C	430(10)	IDEM	No	BSL,BKG
7440-48-4	COBALT	3.9		11.4		mg/kg	04SB090002	14/14	---	11.4	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	6.8		53.2		mg/kg	04SB100002	14/14	---	53.2	Yes	310	N	13000	IDEM	No	BSL
7439-89-6	IRON	10400	J	20800	J	mg/kg	04SB070002	14/14	---	20800	No	**2300**	N	NA	IDEM	No	BKG
7439-92-1	LEAD	7.5	J	70	J	mg/kg	04SB100002	14/14	---	70	No	400(11)	N	400	IDEM	No	BSL,BKG
7439-95-4	MAGNESIUM	564	J	10400	J	mg/kg	04SS010002	14/14	---	10400	No	NA		NA	IDEM	No	NUT, BKG
7439-96-5	MANGANESE	194		611	J	mg/kg	04SB110002	14/14	---	611	No	**180**	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	2/14	0.03 - 0.2	0.98	No	2.3(12)	N	55	IDEM	No	BSL,BKG
7440-02-0	NICKEL	7.2		18.3	J	mg/kg	04SB050002	14/14	---	18.3	No	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	4/14	426 - 457	454	No	NA		NA	IDEM	No	NUT, BKG
7440-31-5	TIN	50.8	J	50.8	J	mg/kg	04SB070002	1/14	4 - 4.9	50.8	Yes	4700	N	NA	IDEM	No	BSL
7440-62-2	VANADIUM	11.7		22.2		mg/kg	04SB090002	14/14	---	22.2	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	ZINC	26.2		296		mg/kg	04SB100002	14/14	---	296	Yes	2,300	N	100000	IDEM	No	BSL

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	9.8		13		meq/100 g	04SB070002	2/2	---	13	NA	NA	NA	IDEM	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/14	0.6 - 1	37	NA	120 N	3700	IDEM	No	BSL
	PH	5.2	J	5.5	J	S.U.	04SB070002	2/2	---	5.5	NA	NA	NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	5100		6100		mg/kg	04SB070002	2/2	---	6100	NA	NA	NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Acenaphthene is used as a surrogate for acenaphthylene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Endosulfan is used as a surrogate for Endosulfan I.
10 Hexavalent Chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Inegrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
S.U. = Standard units.
MEQ/100 g = Milliequivalent per 100 grams.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

04SB090002	04SB020002	04SB070002
04SB090102	04SB020102	04SB070102
04SB100002	04SB030002	04SB080002
04SB100102	04SB030102	04SB080102
04SB110002	04SB040002	04SB120002
04SB110102	04SB040102	04SB120102
04SS020002	04SB050002	04SS010002
04SS020102	04SB050102	04SS010102
04SB010002	04SB060002	
04SB010102	04SB060102	

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/14	0.003 - 0.004	0.006	NA	0.1	N	1200	1.9	No	BSL
67-64-1	ACETONE	0.043		0.043		mg/kg	04SB030102	1/14	0.013 - 0.046	0.043	NA	0.8	N	100000	3.1	No	BSL
75-09-2	**METHYLENE CHLORIDE**	0.004	J	0.004	J	mg/kg	04SB120102	1/14	0.003 - 0.005	0.004	NA	**0.001**	C	13	0.023	**Yes**	**ASL**
1330-20-7	XYLENES, TOTAL	0.004		0.006		mg/kg	04SB090102, 04SB100102	4/14	0.003 - 0.004	0.006	NA	10	N	410	190	No	BSL
SEMIVOLATILE ORGANICS																	
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/14	0.008 - 6	0.03	NA	29(8)	N	NA	NA	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/14	0.008 - 6	0.038	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.18		2.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.8	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.23	J	3	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3	NA	**0.4**	C	NA	8.2	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.65	J	4.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	4.8	NA	**0.2**	C	NA	57	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	3.7	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.7	NA	210(9)	N	NA	570(9)	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.54		0.54		mg/kg	04SB110002	1/14	0.38 - 6	0.54	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0.24		2.9	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.9	NA	8	C	NA	25	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0	J	0.028	J	mg/kg	04SS010002	1/14	0.008 - 6	0.028	NA	0.08	C	NA	18	No	BSL
206-44-0	FLUORANTHENE	0.28		5.4	J	mg/kg	04SB030002	2/14	0.008 - 5.8	5.4	NA	210	N	NA	880	No	BSL
193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.1	J	2.2	J	mg/kg	04SB030002	2/14	0.008 - 5.8	2.2	NA	**0.7**	C	NA	3.1	**Yes**	**ASL**
91-20-3	NAPHTHALENE	0.008		0.008		mg/kg	04SS010002	1/14	0.008 - 6	0.008	NA	4	N	NA	0.7	No	BSL
85-01-8	PHENANTHRENE	0		3.8	J	mg/kg	04SB030002	2/14	0.008 - 5.8	3.8	NA	210(9)	N	NA	570(9)	No	BSL
129-00-0	PYRENE	0.4	J	6		mg/kg	04SB030002	2/14	0.008 - 5.8	6	NA	210	N	NA	570	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/14	0.0038 - 0.059	0.11	NA	2	C	NA	260	No	BSL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/14	0.0019 - 0.03	0.0081	NA	0.9(10)	N	NA	20(10)	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.0083		0.012		mg/kg	04SB100002	2/14	0.0031 - 0.048	0.012	NA	NA	N	NA	NA	No	NTX
94-75-7	2,4-D	0.007		0.045	J	mg/kg	04SB100002	4/14	0.0031 - 0.048	0.045	NA	NA	N	NA	NA	No	NTX
87-86-5	**PENTACHLOROPHENOL**	0.0029		0.22		mg/kg	04SB050002	3/12	0.00077 - 0.012	0.22	NA	**0.001**	C	NA	**0.028**	**Yes**	**ASL**
INORGANICS																	
7429-90-5	ALUMINUM	3980	J	9980	J	mg/kg	04SB080002	14/14	---	9980	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	ANTIMONY	0.98		0.98		mg/kg	04SB070002	1/14	0.79 - 0.97	0.98	No	**0.3**	N	NA	5.4	No	BKG
7440-38-2	ARSENIC	3.5		7.3		mg/kg	04SS010002	14/14	---	7.3	No	**1**	C	750	29	No	BKG
7440-39-3	BARIUM	26		15600		mg/kg	04SS010002	14/14	---	15600	No	**82**	N	690000	**1600**	No	BKG
7440-41-7	BERYLLIUM	0.45		0.61		mg/kg	04SB110002	4/14	0.85 - 0.91	0.61	No	3	N	1300	63	No	BSL,BKG
7440-43-9	**CADMIUM**	0.58		5.8		mg/kg	04SB060002	4/14	0.43 - 0.91	5.8	Yes	**0.4**	N	1800	7.5	**Yes**	**ASL**
7440-70-2	CALCIUM	964		145000	J	mg/kg	04SS010002	4/14	215 - 4570	145000	Yes	NA		NA	NA	No	NUT
7440-47-3	CHROMIUM	7.3		16.5		mg/kg	04SB020002	14/14	---	16.5	No	**2**	C	270	38	No	BKG
7440-48-4	COBALT	3.9		11.4		mg/kg	04SB090002	14/14	---	11.4	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	6.8		53.2		mg/kg	04SB100002	14/14	---	53.2	Yes	NA	N	NA	580	No	BSL
7439-89-6	IRON	10400	J	20800	J	mg/kg	04SB070002	14/14	---	20800	No	NA	N	NA	NA	No	NTX, BKG
7439-92-1	LEAD	7.5	J	70	J	mg/kg	04SB100002	14/14	---	70	No	NA	N	NA	81	No	BSL,BKG
7439-95-4	MAGNESIUM	564	J	10400	J	mg/kg	04SS010002	14/14	---	10400	No	NA		NA	NA	No	NUT, BKG
7439-96-5	MANGANESE	194		611	J	mg/kg	04SB110002	14/14	---	611	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	2/14	0.03 - 0.2	0.98	No	**0.1**	N	10	2.1	No	BKG
7440-02-0	NICKEL	7.2		18.3	J	mg/kg	04SB050002	14/14	---	18.3	No	**7**	N	13000	950	No	BKG
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	4/14	426 - 457	454	No	NA		NA	NA	No	NUT, BKG
7440-31-5	TIN	50.8	J	50.8	J	mg/kg	04SB070002	1/14	4 - 4.9	50.8	Yes	NA	N	NA	NA	No	NTX
7440-62-2	VANADIUM	11.7		22.2		mg/kg	04SB090002	14/14	---	22.2	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	ZINC	26.2		296		mg/kg	04SB100002	14/14	---	296	Yes	620	N	NA	14000	No	BSL

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	9.8		13		meq/100 g	04SB070002	2/2	---	13	NA	NA	NA	NA	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/14	0.6 - 1	37	NA	NA	NA	150	No	BSL
	PH	5.2	J	5.5	J	S.U.	04SB070002	2/2	---	5.5	NA	NA	NA	NA	No	NTX
	TOTAL ORGANIC CARBON	5100		6100		mg/kg	04SB070002	2/2	---	6100	NA	NA	NA	NA	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Endosulfan is used as a surrogate for Endosulfan I.

Associated Samples:

04SB090002	04SB020002	04SB070002
04SB090102	04SB020102	04SB070102
04SB100002	04SB030002	04SB080002
04SB100102	04SB030102	04SB080102
04SB110002	04SB040002	04SB120002
04SB110102	04SB040102	04SB120102
04SS020002	04SB050002	04SS010002
04SS020102	04SB050102	04SS010102
04SB010002	04SB060002	
04SB010102	04SB060102	

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Inegrated System of Closure (RISC) residential levels for migration from soil to ground water (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
meq/100 g = Milliequivalent per 100 grams.
S.U. = Standard units.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.

NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/26	0.003 - 0.008	0.006	NA	1200	sat	1800	IDEM	No	BSL
67-64-1	ACETONE	0.021		0.063		mg/kg	04SB030406	4/26	0.013 - 0.046	0.063	NA	160	N	3900	IDEM	No	BSL
75-15-0	CARBON DISULFIDE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	36	N	900	IDEM	No	BSL
100-41-4	ETHYLBENZENE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	8.9	C	4600	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.007	J	mg/kg	04SB110810	3/26	0.003 - 0.008	0.007	NA	9.1	C	120	IDEM	No	BSL
108-88-3	TOLUENE	0.005		0.005		mg/kg	04SB110810	1/26	0.003 - 0.008	0.005	NA	520	sat	1700	IDEM	No	BSL
75-69-4	TRICHLOROFLUOROMETHANE	0.004		0.004		mg/kg	04SB110810	1/26	0.003 - 0.008	0.004	NA	39	N	NA	IDEM	No	BSL
1330-20-7	XYLENES, TOTAL	0.004		0.008		mg/kg	04SB110810	7/26	0.003 - 0.008	0.008	NA	27	N	4800	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.047		0.047		mg/kg	04SB020608	1/26	0.008 - 8.1	0.047	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/26	0.008 - 8.1	0.008	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/26	0.008 - 8.1	0.03	NA	370(8)	N	9500(8)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/26	0.008 - 8.1	0.038	NA	2200	N	47000	IDEM	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.18		4.8	J	mg/kg	04SB030406	3/26	0.008 - 6.8	4.8	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.23	J	4.5	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.5	NA	**0.062**	C	**0.5**	IDEM	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.016	J	6.7	J	mg/kg	04SB030406	5/26	0.008 - 6.8	6.7	NA	**0.62**	C	**5**	IDEM	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	4.3	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.3	NA	230(9)	N	5500(9)	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.44		0.54		mg/kg	04SB110002	2/26	0.37 - 6.8	0.54	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.011		4.8	J	mg/kg	04SB030406	5/26	0.008 - 6.8	4.8	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.028	J	0.028	J	mg/kg	04SS010002	1/26	0.008 - 8.1	0.028	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.017		9		mg/kg	04SB030406	5/26	0.008 - 6.8	9	NA	230	N	6300	IDEM	No	BSL
86-73-7	FLUORENE	0.009		0.009		mg/kg	04SB020608	1/26	0.008 - 8.1	0.009	NA	260	N	6300	IDEM	No	BSL
193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.12	J	3	J	mg/kg	04SB030406	3/26	0.008 - 6.8	3	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
91-20-3	NAPHTHALENE	0.008		0.01		mg/kg	04SB020608	2/26	0.008 - 8.1	0.01	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.009		4.2	J	mg/kg	04SB030406	6/26	0.008 - 6.8	4.2	NA	230(9)	N	5500(9)	IDEM	No	BSL
129-00-0	PYRENE	0.019		8.9		mg/kg	04SB030406	5/26	0.008 - 6.8	8.9	NA	230	N	5500	IDEM	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/25	0.0037 - 0.08	0.11	NA	1.7	C	20	IDEM	No	BSL
11097-69-1	**AROCLOR-1254**	2.1		2.1		mg/kg	04SB020608	1/26	0.037 - 0.8	2.1	NA	**0.22**	C	**1.8**	IDEM	**Yes**	**ASL**
319-86-8	DELTA-BHC	0.0023	J	0.0023	J	mg/kg	04SB120810	1/26	0.0019 - 0.041	0.0023	NA	0.09(10)	C	0.99(10)	IDEM	No	BSL
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/26	0.0019 - 0.041	0.0081	NA	37(11)	N	1100(11)	IDEM	No	BSL
1024-57-3	HEPTACHLOR EPOXIDE	0.0076		0.0076		mg/kg	04SB020608	1/26	0.0019 - 0.041	0.0076	NA	0.053	C	0.47	IDEM	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.0048	J	0.012		mg/kg	04SB100002	3/26	0.003 - 0.065	0.012	NA	61	N	NA	IDEM	No	BSL
94-75-7	2,4-D	0.007		0.045	J	mg/kg	04SB100002	5/26	0.003 - 0.065	0.045	NA	69	N	NA	IDEM	No	BSL
88-85-7	DINOSEB	0.005		0.005		mg/kg	04SB060709	1/26	0.003 - 0.065	0.005	NA	6.1	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0029		0.22		mg/kg	04SB050002	6/24	0.00075 - 0.016	0.22	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	2040	J	9980	J	mg/kg	04SB080002	26/26	---	9980	No	**7600**	N	NA	IDEM	No	BKG
7440-36-0	**ANTIMONY**	0.98		4.9		mg/kg	04SB040608	5/26	0.79 - 0.97	4.9	Yes	**3.1**	N	140	IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	2.2		11.6		mg/kg	04SB120810	26/26	---	11.6	Yes	**0.39**	C	**3.9**	IDEM	**Yes**	**ASL**
7440-39-3	**BARIUM**	24.5		15600		mg/kg	04SS010002	26/26	---	15600	Yes	**540**	N	23000	IDEM	**Yes**	**ASL**
7440-41-7	BERYLLIUM	0.45		0.81		mg/kg	04SB110810	8/26	0.82 - 1.3	0.81	Yes	15	N	680	IDEM	No	BSL
7440-43-9	**CADMIUM**	0.44		5.8		mg/kg	04SB060002	9/26	0.43 - 0.94	5.8	Yes	**3.7**	N	12	IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	303		145000	J	mg/kg	04SS010002	10/26	215 - 4680	145000	Yes	NA		NA	IDEM	No	NUT
7440-47-3	**CHROMIUM**	5.4		138		mg/kg	04SB020608	26/26	---	138	Yes	**30(12)**	C	430(12)	IDEM	**Yes**	**ASL**
7440-48-4	COBALT	2.6		19.6		mg/kg	04SB120810	26/26	---	19.6	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	6.4		79.4		mg/kg	04SB020608	26/26	---	79.4	Yes	310	N	13000	IDEM	No	BSL
7439-89-6	**IRON**	5990	J	144000	J	mg/kg	04SB020608	26/26	---	144000	Yes	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	LEAD	6.4	J	70	J	mg/kg	04SB100002	26/26	---	70	Yes	400(13)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	521	J	10400	J	mg/kg	04SS010002	26/26	---	10400	Yes	NA		NA	IDEM	No	NUT
7439-96-5	**MANGANESE**	113		2000		mg/kg	04SB010204	26/26	---	2000	Yes	**180**	N	NA	IDEM	**Yes**	**ASL**
7439-97-6	MERCURY	0.04		0.98		mg/kg	04SB120002	5/26	0.03 - 0.2	0.98	Yes	2.3(14)	N	55	IDEM	No	BSL
7440-02-0	NICKEL	7.2		111	J	mg/kg	04SB020608	26/26	---	111	Yes	160	N	6900	IDEM	No	BSL
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	8/26	409 - 630	454	No	NA		NA	IDEM	No	NUT, BKG
7782-49-2	SELENIUM	1.7	J	2.1	J	mg/kg	04SB080810	2/26	0.4 - 1.3	2.1	Yes	39	N	1700	IDEM	No	BSL
7440-31-5	TIN	7.7	J	50.8	J	mg/kg	04SB070002	4/26	4 - 4.9	50.8	Yes	4700	N	NA	IDEM	No	BSL
7440-62-2	VANADIUM	9.4		22.2		mg/kg	04SB090002	26/26	---	22.2	Yes	55	N	NA	IDEM	No	BSL
7440-66-6	ZINC	24.2		296		mg/kg	04SB100002	26/26	---	296	Yes	2,300	N	100000	IDEM	No	BSL

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	2.8		13		meq/100 g	04SB070002	6/6	---	13	NA	NA	NA	IDEM	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/26	0.6 - 1	37	NA	120 N	3700	IDEM	No	BSL
	PH	5.2	J	7.1	J	S.U.	04SB010204	6/6	---	7.1	NA	NA	NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	1200		7500		mg/kg	04SB010204	5/6	10000	7500	NA	NA	NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Alpha-BHC is used as a surrogate for delta-BHC.
11 Endosulfan is used as a surrogate for Endosulfan I.
12 Hexavalent Chromium.
13 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
14 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
CAS = Chemical abstract services.
C = Carcinogen.
COPC = Chemical of potential cxoncern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
meq/100 g = Milliequivalent per 100 grams.
S.U. = Standard units.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Associated Samples:

04SB090002	04SB010002	04SB060002	04SB110810
04SB090102	04SB010102	04SB060102	04SB010204
04SB100002	04SB020002	04SB070002	04SB020608
04SB100102	04SB020102	04SB070102	04SB030406
04SB110002	04SB030002	04SB080002	04SB040608
04SB110102	04SB030102	04SB080102	04SB050204
04SS020002	04SB040002	04SB120002	04SB060709
04SS020102	04SB040102	04SB120102	04SB070507
04SB090810	04SB050002	04SS010002	04SB080810
04SB100608	04SB050102	04SS010102	04SB120810

SWMU 4 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	0.006	J	0.006	J	mg/kg	04SB120102	1/26	0.003 - 0.008	0.006	NA	0.1	N	1200	1.9	No	BSL
67-64-1	ACETONE	0.021		0.063		mg/kg	04SB030406	4/26	0.013 - 0.046	0.063	NA	0.8	N	100000	3.1	No	BSL
75-15-0	CARBON DISULFIDE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	2	N	720	10	No	BSL
100-41-4	ETHYLBENZENE	0.01		0.01		mg/kg	04SB030406	1/26	0.003 - 0.004	0.01	NA	0.7	N	400	13	No	BSL
75-09-2	**METHYLENE CHLORIDE**	0.004	J	0.007	J	mg/kg	04SB110810	3/26	0.003 - 0.008	0.007	NA	**0.001**	C	13	0.023	**Yes**	**ASL**
108-88-3	TOLUENE	0.005		0.005		mg/kg	04SB110810	1/26	0.003 - 0.008	0.005	NA	0.6	N	650	12	No	BSL
75-69-4	TRICHLOROFLUOROMETHANE	0.004		0.004		mg/kg	04SB110810	1/26	0.003 - 0.008	0.004	NA	NA	N	NA	NA	No	NTX
1330-20-7	XYLENES, TOTAL	0.004		0.008		mg/kg	04SB110810	7/26	0.003 - 0.008	0.008	NA	10	N	410	190	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.047		0.047		mg/kg	04SB020608	1/26	0.008 - 8.1	0.047	NA	4(8)	N	NA	0.7(8)	No	BSL
83-32-9	ACENAPHTHENE	0.008		0.008		mg/kg	04SS010002	1/26	0.008 - 8.1	0.008	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.03		0.03		mg/kg	04SS010002	1/26	0.008 - 8.1	0.03	NA	29(9)	N	NA	130(9)	No	BSL
120-12-7	ANTHRACENE	0.038		0.038		mg/kg	04SS010002	1/26	0.008 - 8.1	0.038	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.18		4.8	J	mg/kg	04SB030406	3/26	0.008 - 6.8	4.8	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.23	J	4.5	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.5	NA	**0.4**	C	NA	8.2	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.016	J	6.7	J	mg/kg	04SB030406	5/26	0.008 - 6.8	6.7	NA	**0.2**	C	NA	57	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.14	J	4.3	J	mg/kg	04SB030406	4/26	0.008 - 6.8	4.3	NA	210(10)	N	NA	570(10)	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.44		0.54		mg/kg	04SB110002	2/26	0.37 - 6.8	0.54	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0		4.8	J	mg/kg	04SB030406	5/26	0.008 - 6.8	4.8	NA	8	C	NA	25	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.028	J	0.028	J	mg/kg	04SS010002	1/26	0.008 - 8.1	0.028	NA	0.08	C	NA	18	No	BSL
206-44-0	FLUORANTHENE	0.0		9		mg/kg	04SB030406	5/26	0.008 - 6.8	9	NA	210	N	NA	880	No	BSL
86-73-7	FLUORENE	0.009		0.009		mg/kg	04SB020608	1/26	0.008 - 8.1	0.009	NA	28	N	NA	170	No	BSL
193-39-5	**INDENO(1,2,3-CD)PYRENE**	0.12	J	3	J	mg/kg	04SB030406	3/26	0.008 - 6.8	3	NA	**0.7**	C	NA	3.1	**Yes**	**ASL**
91-20-3	NAPHTHALENE	0.008		0.01		mg/kg	04SB020608	2/26	0.008 - 8.1	0.01	NA	4	N	NA	0.7	No	BSL
85-01-8	PHENANTHRENE	0		4.2	J	mg/kg	04SB030406	6/26	0.008 - 6.8	4.2	NA	210(10)	N	NA	570(10)	No	BSL
129-00-0	PYRENE	0.019		8.9		mg/kg	04SB030406	5/26	0.008 - 6.8	8.9	NA	210	N	NA	570	No	BSL
PESTICIDES																	
50-29-3	4,4'-DDT	0.008		0.11		mg/kg	04SB050002	2/25	0.0037 - 0.08	0.11	NA	2	C	NA	260	No	BSL
11097-69-1	AROCLOR-1254	2.1		2.1		mg/kg	04SB020608	1/26	0.037 - 0.8	2.1	NA	NA	C	NA	6.2	No	BSL
319-86-8	**DELTA-BHC**	0.0023	J	0.0023	J	mg/kg	04SB120810	1/26	0.0019 - 0.041	0.0023	NA	**0.00003(11)**	C	0.8	0.0072	**Yes**	**ASL**
959-98-8	ENDOSULFAN I	0.0073		0.0081		mg/kg	04SB090002	2/26	0.0019 - 0.041	0.0081	NA	0.9(12)	N	NA	20(12)	No	BSL
1024-57-3	HEPTACHLOR EPOXIDE	0.0076		0.0076		mg/kg	04SB020608	1/26	0.0019 - 0.041	0.0076	NA	0.03	C	5	0.67	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	4.8	J	0.012		mg/kg	04SB100002	3/26	0.003 - 0.065	0.012	NA	NA	N	NA	NA	No	NTX
94-75-7	2,4-D	7		0.045	J	mg/kg	04SB100002	5/26	0.003 - 0.065	0.045	NA	NA	N	NA	NA	No	NTX
88-85-7	DINOSEB	5		0.005		mg/kg	04SB060709	1/26	0.003 - 0.065	0.005	NA	NA	N	NA	NA	No	NTX
87-86-5	**PENTACHLOROPHENOL**	2.9		0.22		mg/kg	04SB050002	6/24	0.00075 - 0.016	0.22	NA	**0.001**	C	NA	**0.028**	**Yes**	**ASL**
INORGANICS																	
7429-90-5	ALUMINUM	2040	J	9980	J	mg/kg	04SB080002	26/26	---	9980	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	**ANTIMONY**	0.98		4.9		mg/kg	04SB040608	5/26	0.79 - 0.97	4.9	Yes	**0.3**	N	NA	5.4	**Yes**	**ASL**
7440-38-2	**ARSENIC**	2.2		11.6		mg/kg	04SB120810	26/26	---	11.6	Yes	**1**	C	750	29	**Yes**	**ASL**
7440-39-3	**BARIUM**	24.5		15600		mg/kg	04SS010002	26/26	---	15600	Yes	**82**	N	690000	**1600**	**Yes**	**ASL**
7440-41-7	BERYLLIUM	0.45		0.81		mg/kg	04SB110810	8/26	0.82 - 1.3	0.81	Yes	3	N	1300	63	No	BSL
7440-43-9	**CADMIUM**	0.44		5.8		mg/kg	04SB060002	9/26	0.43 - 0.94	5.8	Yes	**0.4**	N	1800	7.5	**Yes**	**ASL**
7440-70-2	CALCIUM	303		145000	J	mg/kg	04SS010002	10/26	215 - 4680	145000	Yes	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	5.4		138		mg/kg	04SB020608	26/26	---	138	Yes	**2**	C	270	**38**	**Yes**	**ASL**
7440-48-4	COBALT	2.6		19.6		mg/kg	04SB120810	26/26	---	19.6	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	6.4		79.4		mg/kg	04SB020608	26/26	---	79.4	Yes	NA	N	NA	580	No	BSL
7439-89-6	IRON	5990	J	144000	J	mg/kg	04SB020608	26/26	---	144000	Yes	NA	N	NA	NA	No	NTX
7439-92-1	LEAD	6.4	J	70	J	mg/kg	04SB100002	26/26	---	70	Yes	NA	N	NA	81	No	BSL
7439-95-4	MAGNESIUM	521	J	10400	J	mg/kg	04SS010002	26/26	---	10400	Yes	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	113		2000		mg/kg	04SB010204	26/26	---	2000	Yes	NA	N	NA	NA	No	NTX
7439-97-6	**MERCURY**	0.04		0.98		mg/kg	04SB120002	5/26	0.03 - 0.2	0.98	Yes	**0.1**	N	10	2.1	**Yes**	**ASL**

SWMU 4 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
7440-02-0	**NICKEL**	7.2		111	J	mg/kg	04SB020608	26/26	---	111	Yes	**7**	N	13000	950	**Yes**	**ASL**
7440-09-7	POTASSIUM	244	J	454	J	mg/kg	04SB100002	8/26	409 - 630	454	No	NA		NA	NA	No	NUT, BKG
7782-49-2	**SELENIUM**	1.7	J	2.1	J	mg/kg	04SB080810	2/26	0.4 - 1.3	2.1	Yes	**0.3**	N	NA	5.2	**Yes**	**ASL**
7440-31-5	TIN	7.7	J	50.8	J	mg/kg	04SB070002	4/26	4 - 4.9	50.8	Yes	NA	N	NA	NA	No	NTX
7440-62-2	VANADIUM	9.4		22.2		mg/kg	04SB090002	26/26	---	22.2	Yes	300	N	NA	NA	No	BSL
7440-66-6	ZINC	24.2		296		mg/kg	04SB100002	26/26	---	296	Yes	620	N	NA	14000	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	2.8		13		meq/100 g	04SB070002	6/6	---	13	NA	NA		NA	NA	No	NTX
57-12-5	CYANIDE	1.3		37	J	mg/kg	04SS010002	2/26	0.6 - 1	37	NA	NA		NA	150	No	BSL
	pH	5.2	J	7.1	J	S.U.	04SB010204	6/6	---	7.1	NA	NA		NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1200		7500		mg/kg	04SB010204	5/6	10000 - 10000	7500	NA	NA		NA	NA	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Naphthalene is used as a surrogate for 2-methylnaphthalene.
9 Acenaphthene is used as a surrogate for acenaphthylene.
10 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
11 Alpha-BHC is used as a surrogate for delta-BHC.
12 Endosulfan is used as a surrogate for Endosulfan I.

Associated Samples:

04SB090002	04SB010002	04SB060002	04SB110810
04SB090102	04SB010102	04SB060102	04SB010204
04SB100002	04SB020002	04SB070002	04SB020608
04SB100102	04SB020102	04SB070102	04SB030406
04SB110002	04SB030002	04SB080002	04SB040608
04SB110102	04SB030102	04SB080102	04SB050204
04SS020002	04SB040002	04SB120002	04SB060709
04SS020102	04SB040102	04SB120102	04SB070507
04SB090810	04SB050002	04SS010002	04SB080810
04SB100608	04SB050102	04SS010102	04SB120810

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
CAS = Chemical abstract services.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to ground water (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
meq/100 g = Milliequivalent per 100 grams.
S.U. = Standard units.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 4 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
SEMIVOLATILE ORGANICS																
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	2		2		µg/L	04GWT0301	1/8	2	2	NA	4.8 C	6 6	FED-MCL IDEM	No	BSL
INORGANICS																
7429-90-5	**ALUMINUM**	513	J	513	J	µg/L	04GWT0201	1/8	200	513	ND	3600 N	**50 to 200(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.15		3.6		µg/L	04GW0401	7/8	0.1	3.6	**0.31**	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	12.2		147		µg/L	04GW0301	8/8	---	147	**25.1**	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM	21300		67300		µg/L	04GW0501	7/8	5000	67300	**26000**	NA	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	COBALT	10.1		10.1		µg/L	04GW0401	1/8	3	10.1	ND	73 N	NA NA	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	198	J	33300	J	µg/L	04GWT0301	7/8	100	33300	**324**	**1100** N	**300(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM	7060		22400		µg/L	04GW0201	7/8	5000	22400	**7400**	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	23.4	J	2000	J	µg/L	04GWT0301	6/8	15	2000	ND	**88** N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7782-49-2	SELENIUM	1.5		2.3		µg/L	04GW0601	2/8	1	2.3	ND	18 N	50 50	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM	7210		7210		µg/L	04GW0601	1/8	5000	7210	ND	NA	NA NA	FED-MCL IDEM	No	NUT
FILTERED METALS																
7440-38-2	**ARSENIC, FILTERED**	0.44		0.44		µg/L	04GWT0201-F	1/1	---	0.44	NA	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM, FILTERED	24.1		24.1		µg/L	04GWT0201-F	1/1	---	24.1	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM, FILTERED	29800		29800		µg/L	04GWT0201-F	1/1	---	29800	NA	NA	NA NA	FED-AL IDEM	No	NUT
7439-89-6	IRON, FILTERED	121	J	121	J	µg/L	04GWT0201-F	1/1	---	121	NA	1100 N	300(7)	FED-MCL IDEM	No	BSL
7439-95-4	MAGNESIUM, FILTERED	6680		6680		µg/L	04GWT0201-F	1/1	---	6680	NA	NA	NA NA	FED-MCL IDEM	No	NUT

Footnotes:

1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum ground water concentrations were compared to concentrations in upgradient ground water sample 04GW0101. If the concentration in the site groundwater concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

	04GWT0101
04GW0201	04GWT0201
04GW0301	04GWT0201-F
04GW0401	04GWT0301
04GW0501	
04GW0601	

Definitions:

ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract service.
COPC = Chemical of potential concern.
J = Estimated Value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a CO

SWMU 4 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
SEMIVOLATILE ORGANICS																
117-84-0	DI-N-OCTYL PHTHALATE	5		5		µg/L	04SW0501	1/4	5	5	NA	730 N	NA 20	FED-MCL IDEM	No	BSL
INORGANICS																
7429-90-5	**ALUMINUM**	561	J	730	J	µg/L	04SW0401	2/4	200	730	**203**	3600 N	**50 to 200(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.48	J	0.9	J	µg/L	04SW0401	4/4	---	0.9	**0.6**	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	**BARIUM**	61	J	344		µg/L	04SW0501	4/4	---	344	**59.9**	**260** N	2000 2000	FED-MCL IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	6490		20000		µg/L	04SW0401	4/4	---	20000	20800	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-50-8	COPPER	2.5		2.5		µg/L	04SW0401	1/4	2	2.5	ND	140 N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	IRON	823	J	1240	J	µg/L	04SW0301	4/4	---	1240	1350	**1100** N	**300(7)** NA	FED-MCL IDEM	No	BKG
7439-92-1	LEAD	1		1.1		µg/L	04SW0401	2/4	1	1.1	ND	15	15 NA	FED-AL IDEM	No	BSL
7439-95-4	MAGNESIUM	6150	J	7000	J	µg/L	04SW0401	3/4	5000	7000	**6800**	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	64.1		249		µg/L	04SW0401	4/4	---	249	**212**	**88** N	**50(7)** NA	FED-AL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM	6290		6590		µg/L	04SW0301	2/4	5000	6590	6910	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-62-2	VANADIUM	2		2		µg/L	04SW0401	1/4	2	2	ND	26 N	NA NA	FED-MCL IDEM	No	BSL
7440-66-6	ZINC	20.5		20.5		µg/L	04SW0501	1/4	10	20.5	ND	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL
FILTERED METALS																
7429-90-5	**ALUMINUM, FILTERED**	214	J	214	J	µg/L	04SW0401-F	1/4	200	214	ND	3600 N	**50 to 200(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC, FILTERED**	0.17	J	0.61	J	µg/L	04SW0401-F	4/4	---	0.61	**0.46**	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	**BARIUM, FILTERED**	57.8	J	313		µg/L	04SW0501-F	4/4	---	313	**58.2**	**260** N	2000 2000	FED-MCL IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM, FILTERED	6410		22000		µg/L	04SW0401-F	4/4	---	22000	22700	NA	NA NA	FED-MCL IDEM	No	BSL,BKG
7439-89-6	IRON, FILTERED	145	J	912	J	µg/L	04SW0201-F	4/4	---	912	952	1100 N	**300(7)** NA	FED-MCL IDEM	No	BKG
7439-95-4	MAGNESIUM, FILTERED	6580	J	7610	J	µg/L	04SW0401-F	3/4	5000	7610	**7360**	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE, FILTERED**	47		238		µg/L	04SW0401-F	4/4	---	238	**202**	**88** N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM, FILTERED	6180		6520		µg/L	04SW0201-F	2/4	5000	6520	7020	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-66-6	ZINC, FILTERED	15.7		15.7		µg/L	04SW0501-F	1/4	10	15.7	ND	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL
MISCELLANEOUS PARAMETERS																
	HARDNESS	16		79		µg/L	04SW0401	4/4	---	79	NA	NA	NA NA	FED-MCL IDEM	No	NTX
	TOTAL SUSPENDED SOLIDS	3		52		µg/L	04SW0501	4/4	---	52	NA	NA	NA NA	FED-MCL IDEM	No	NTX

SWMU 4 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Footnotes:

1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum surface water concentrations were compared to concentrations in upgradient surface water sample 04SW0101. If the concentration in the site surface water concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target hazard quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

04SW0201	04SW0201-F
04SW0301	04SW0301-F
04SW0401	04SW0401-F
04SW0501	04SW0501-F

Definitions:

ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed/not applicable,
ND = Not detected
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.
For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 4, McCOMISH GORGE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-09-2	METHYLENE CHLORIDE	0.004	J	0.008	J	mg/kg	04SD030006	3/5	0.004	0.008	NA	9.1	C	120	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
56-55-3	BENZO(A)ANTHRACENE	0.013		0.042		mg/kg	04SD020006	4/5	0.009	0.042	NA	0.62	C	5	IDEM	No	BSL
50-32-8	BENZO(A)PYRENE	0.014	J	0.047		mg/kg	04SD020006	4/5	0.009	0.047	NA	0.062	C	0.5	IDEM	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.015	J	0.05		mg/kg	04SD020006	4/5	0.009	0.05	NA	0.62	C	5	IDEM	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.027	J	0.036	J	mg/kg	04SD020006	2/5	0.009	0.036	NA	230(7)	N	5500(7)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.016	J	0.03		mg/kg	04SD020006	4/5	0.009	0.03	NA	6.2	C	50	IDEM	No	BSL
218-01-9	CHRYSENE	0		0.042		mg/kg	04SD020006	4/5	0.009	0.042	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.011	J	0.014	J	mg/kg	04SD020006	2/5	0.009	0.014	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.0		0.088		mg/kg	04SD020006	4/5	0.009	0.088	NA	230	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.024	J	0.032	J	mg/kg	04SD020006	2/5	0.009	0.032	NA	0.62	C	5	IDEM	No	BSL
85-01-8	PHENANTHRENE	0		0.025		mg/kg	04SD030006	3/5	0.009	0.025	NA	230(7)	N	5500(7)	IDEM	No	BSL
129-00-0	PYRENE	0.022		0.07		mg/kg	04SD020006	4/5	0.009	0.07	NA	230	N	5500	IDEM	No	BSL
HERBICIDES																	
87-86-5	PENTACHLOROPHENOL	0.002	J	0.002	J	mg/kg	04SD060006	1/5	0.0084 - 0.0093	0.002	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	3350	J	6820	J	mg/kg	04SD050006	5/5	---	6820	**2650**	7600	N	NA	IDEM	No	BSL
7440-36-0	ANTIMONY	1.1	J	1.1	J	mg/kg	04SD050006	1/5	0.94 - 1	1.1	ND	3.1	N	140	IDEM	No	BSL
7440-38-2	**ARSENIC**	1.7		4.7		mg/kg	04SD050006	5/5	---	4.7	**2.8**	**0.39**	C	**3.9**	IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	39.3	J	334		mg/kg	04SD060006, 04SD050006	5/5	---	334	**27.1**	540	N	23000	IDEM	No	BSL
7440-70-2	CALCIUM	477	J	1330	J	mg/kg	04SD030006	4/5	471	1330	**755**	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	6.1	J	10.7		mg/kg	04SD050006	5/5	---	10.7	**5.7**	30(8)	C	430(8)	IDEM	No	BSL
7440-48-4	COBALT	2.6		4.9		mg/kg	04SD050006	5/5	---	4.9	**3.3**	140	N	NA	IDEM	No	BSL
7440-50-8	COPPER	5.6	J	8.9		mg/kg	04SD050006	5/5	---	8.9	**4.6**	310	N	13000	IDEM	No	BSL
7439-89-6	**IRON**	5740	J	12700	J	mg/kg	04SD050006	5/5	---	12700	**8540**	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	LEAD	9.4		10.8		mg/kg	04SD020006	5/5	---	10.8	**7.4**	400(9)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	547	J	979	J	mg/kg	04SD030006	5/5	---	979	**568**	NA		NA	IDEM	No	NUT
7439-96-5	**MANGANESE**	76.9	J	456		mg/kg	04SD060006	5/5	---	456	**111**	**180**	N	NA	IDEM	**Yes**	**ASL**
7440-02-0	NICKEL	6.3		8.5		mg/kg	04SD030006	5/5	---	8.5	**5.8**	160	N	6900	IDEM	No	BSL
7440-62-2	VANADIUM	10.3		15.2		mg/kg	04SD050006	5/5	---	15.2	**8.3**	55	N	NA	IDEM	No	BSL
7440-66-6	ZINC	27.6		65.5		mg/kg	04SD060006	5/5	---	65.5	**23.7**	2,300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	TOTAL ORGANIC CARBON	5800		19000		mg/kg	04SD040006	5/5	---	19000	6700	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicte samples was considered for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum sediment concentrations were compared to concentrations in upgradient sediment sample 04SD01. If the concentration in the site sediment concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
8 Hexavalent chromium.
9 OSWER soil screening level for residential land use (U.S. EPA, July 1994).

Associated Samples:
04SD020006
04SD030006
04SD040006
04SD050006
04SD060006

Definitions:
ARAR/TBC = Applicable or relevant and appropriate requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

SWMU 4 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	1.89E-03	NA	4.00E-03	J	mg/kg	2.21E-03	95% UCL-T	W - Test (1)	2.21E-03	95% UCL-T	W - Test (1)
BENZO(A)ANTHRACENE	mg/kg	5.30E-01	NA	2.80E+00	J	mg/kg	2.80E+00	Maximum	W - Test (2)	2.80E+00	Maximum	W - Test (2)
BENZO(A)PYRENE	mg/kg	5.48E-01	NA	3.00E+00	J	mg/kg	3.00E+00	Maximum	W - Test (2)	3.00E+00	Maximum	W - Test (2)
BENZO(B)FLUORANTHENE	mg/kg	7.06E-01	NA	4.80E+00	J	mg/kg	4.80E+00	Maximum	W - Test (2)	4.80E+00	Maximum	W - Test (2)
INDENO(1,2,3-CD)PYRENE	mg/kg	4.83E-01	NA	2.20E+00	J	mg/kg	2.20E+00	Maximum	W - Test (2)	2.20E+00	Maximum	W - Test (2)
PENTACHLOROPHENOL	mg/kg	3.00E-02	NA	2.20E-01		mg/kg	2.20E-01	Maximum	W - Test (2)	2.20E-01	Maximum	W - Test (2)
CADMIUM	mg/kg	9.01E-01	NA	5.80E+00		mg/kg	1.38E+00	Maximum	W - Test (2)	1.38E+00	Maximum	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are log-normally distributed

(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

SWMU 4 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface / Subsurface Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	2.15E-03	NA	7.00E-03	J	mg/kg	2.48E-03	95% UCL-T	W - Test (1)	2.48E-03	95% UCL-T	W - Test (1)
BENZO(A)ANTHRACENE	mg/kg	7.18E-01	NA	4.80E+00	J	mg/kg	4.80E+00	Maximum	W - Test (2)	4.80E+00	Maximum	W - Test (2)
BENZO(A)PYRENE	mg/kg	6.54E-01	NA	4.50E+00	J	mg/kg	4.50E+00	Maximum	W - Test (2)	4.50E+00	Maximum	W - Test (2)
BENZO(B)FLUORANTHENE	mg/kg	8.40E-01	NA	6.70E+00	J	mg/kg	6.70E+00	Maximum	W - Test (2)	6.70E+00	Maximum	W - Test (2)
INDENO(1,2,3-CD)PYRENE	mg/kg	6.23E-01	NA	3.00E+00	J	mg/kg	3.00E+00	Maximum	W - Test (2)	3.00E+00	Maximum	W - Test (2)
DELTA-BHC	mg/kg	4.30E-03	NA	2.30E-03	J	mg/kg	2.30E-03	Maximum	W - Test (2)	2.30E-03	Maximum	W - Test (2)
AROCLOR-1254	mg/kg	1.63E-01	NA	2.10E+00		mg/kg	2.69E-01	95% UCL-T	W - Test (2)	2.69E-01	95% UCL-T	W - Test (2)
PENTACHLOROPHENOL	mg/kg	1.73E-02	NA	2.20E-01		mg/kg	6.42E-02	95% UCL-T	W - Test (1)	6.42E-02	95% UCL-T	W - Test (1)
ANTIMONY	mg/kg	8.46E-01	NA	4.90E+00		mg/kg	1.03E+00	95% UCL-T	W - Test (1)	1.03E+00	95% UCL-T	W - Test (1)
ARSENIC	mg/kg	5.78E+00	NA	1.16E+01		mg/kg	6.59E+00	95% UCL-T	W - Test (3)	6.59E+00	95% UCL-T	W - Test (3)
BARIUM	mg/kg	7.66E+02	NA	1.56E+04		mg/kg	5.99E+02	95% UCL-T	W - Test (1)	5.99E+02	95% UCL-T	W - Test (1)
CADMIUM	mg/kg	7.50E-01	NA	5.80E+00		mg/kg	8.93E-01	95% UCL-T	W - Test (1)	8.93E-01	95% UCL-T	W - Test (1)
CHROMIUM	mg/kg	1.55E+01	NA	1.38E+02		mg/kg	1.72E+01	95% UCL-T	W - Test (1)	1.72E+01	95% UCL-T	W - Test (1)
IRON	mg/kg	2.01E+04	NA	1.44E+05	J	mg/kg	2.30E+04	95% UCL-T	W - Test (1)	2.30E+04	95% UCL-T	W - Test (1)
MANGANESE	mg/kg	5.01E+02	NA	2.00E+03		mg/kg	6.46E+02	95% UCL-T	W - Test (3)	6.46E+02	95% UCL-T	W - Test (3)
MERCURY	mg/kg	8.96E-02	NA	9.80E-01		mg/kg	1.24E-01	95% UCL-T	W - Test (1)	1.24E-01	95% UCL-T	W - Test (1)
NICKEL	mg/kg	1.61E+01	NA	1.11E+02		mg/kg	1.83E+01	95% UCL-T	W - Test (1)	1.83E+01	95% UCL-T	W - Test (1)
SELENIUM	mg/kg	4.94E-01	NA	2.10E+00		mg/kg	6.03E-01	95% UCL-T	W - Test (1)	6.03E-01	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.

SWMU 4 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/L	1.46E-01	NA	5.13E-01	J	mg/L	5.13E-01	Maximum	N<10(1)	5.13E-01	Maximum	N<10(1)
ARSENIC	mg/L	8.02E-04	NA	3.60E-03		mg/L	3.60E-03	Maximum	N<10(1)	3.60E-03	Maximum	N<10(1)
IRON	mg/L	4.59E+00	NA	3.33E+01	J	mg/L	3.33E+01	Maximum	N<10(1)	3.33E+01	Maximum	N<10(1)
MANGANESE	mg/L	4.50E-01	NA	2.00E+00	J	mg/L	2.00E+00	Maximum	N<10(1)	2.00E+00	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 groundwater samples collected. Therefore, maximum concentration is used for the exposure point concentration.

SWMU 4 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/L	3.39E-01	NA	7.30E-01	J	mg/L	7.30E-01	Maximum	N<10(1)	7.30E-01	Maximum	N<10(1)
ARSENIC	mg/L	6.30E-04	NA	9.00E-04	J	mg/L	9.00E-04	Maximum	N<10(1)	9.00E-04	Maximum	N<10(1)
BARIUM	mg/L	1.23E-01	NA	3.44E-01		mg/L	3.44E-01	Maximum	N<10(1)	3.44E-01	Maximum	N<10(1)
MANGANESE	mg/L	1.89E-01	NA	2.49E-01		mg/L	2.49E-01	Maximum	N<10(1)	2.49E-01	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface water samples collected. Therefore, maximum concentration is used for the exposure point concentration.

SWMU 4 - TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	mg/kg	3.05E+00	NA	4.70E+00		mg/kg	4.70E+00	Maximum	N<10(1)	4.70E+00	Maximum	N<10(1)
IRON	mg/kg	9.10E+03	NA	1.27E+04	J	mg/kg	1.27E+04	Maximum	N<10(1)	1.27E+04	Maximum	N<10(1)
MANGANESE	mg/kg	1.77E+02	NA	4.56E+02		mg/kg	4.56E+02	Maximum	N<10(1)	4.56E+02	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 5.1
NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal RfD(2)	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ(3)
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	11/20/01
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day		NA	NCEA	09/25/01
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood	NA	HEAST	07/97
Methylene Chloride	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	11/20/01
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS	NA	NCEA	09/25/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Naphthalene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body Weight	3,000	IRIS	11/20/01
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	11/20/01
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	11/20/01
Pentachlorophenol	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver, Kidney	100	IRIS	11/20/01
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	11/20/01
2,6-Dinitrotoluene	chronic	1.0E-03	mg/kg-day	1	1.00E-03	mg/kg-day	Liver	NA	HEAST	07/97
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	11/20/01
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	11/20/01
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	09/25/01
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	11/20/01
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	11/20/01
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Blood	1,000	IRIS	11/20/01
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	11/20/01
Cadmium (diet)	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Cadmium (water)	chronic	5.0E-04	mg/kg-day	0.05	2.50E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	11/20/01
Cobalt	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological	NA	NCEA	09/25/01
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day		NA	HEAST	07/97
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract	NA	NCEA	09/25/01
Manganese (soil)	chronic	7.0E-02	mg/kg-day	0.04	2.80E-03	mg/kg-day	CNS	1	IRIS	11/20/01
Manganese (water)	chronic	2.4E-02	mg/kg-day	0.04	9.60E-04	mg/kg-day	CNS	1	IRIS	11/20/01
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	11/20/01
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	11/20/01
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	11/20/01
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	11/20/01
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	11/20/01
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	500	IRIS	11/20/01

(1) USEPA, 2000 .
(2) RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA Region 3 RBC Table, September 2001)
NA = Not applicable/Not Available
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver	NA	NCEA	9/25/2001
cis-1,2-Dichloroethene	Chronic	3.5E+01	$\mu g/m^3$	1.0E-02	mg/kg-day	Blood	NA	IRIS	11/20/2001
Vinyl Chloride	Chronic	1.0E+02	$\mu g/m^3$	2.9E-02	mg/kg-day	Liver	NA	IRIS	11/20/2001

Notes:

RfC = Reference Concentration

RfD = Reference Dose

IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)

NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA FOR CHEMCIALS OF CONCERN-- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal Cancer Slope Factor(2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date(3)
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	7.5E-03	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl Chloride (adult)	7.5E-01	1	7.50E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl Chloride (early life)	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benzo(a)anthracene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(a)pyrene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(b)fluoranthene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenzo(a,h)anthracene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno(1,2,3-cd)pyrene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Pentachlorophenol	1.2E-01	1	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1248	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
delta-BHC	6.3E+00	1	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001

(1) USEPA, 2000).
(2) CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, September 2001)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in anima inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6-2

CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1-Dichloroethene	5.0E-05	$(mg/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	7.8E-06	$(mg/m^3)^{-1}$	3.5E+03	2.73E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	2.3E-05	$(mg/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	4.7E-07	$(mg/m^3)^{-1}$	3.5E+03	1.60E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethylene (PCE)	5.8E-07	$(mg/m^3)^{-1}$	3.5E+03	2.03E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethylene (TCE)	1.7E-06	$(mg/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl chloride (child/adult)	8.8E-06	$(mg/m^3)^{-1}$	3.5E+03	3.08E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl chloride (adult)	4.4E-06	$(mg/m^3)^{-1}$	3.5E+03	1.54E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benz[a]anthracene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[a]pyrene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[b]fluoranthene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenz[ah]anthracene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno[1,2,3-cd]pyrene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Polychlorinated Biphenyls (PCBs)	1.0E-04	$(mg/m^3)^{-1}$	3.5E+03	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	4.6E-03	$(mg/m^3)^{-1}$	3.5E+03	1.61E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
delta-BHC	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Beryllium	2.4E-03	$(mg/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Cadmium	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Chromium VI	1.2E-02	$(mg/m^3)^{-1}$	3.5E+03	4.20E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001

IRIS = Integrated Risk Information System (November 2001)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment (USEPA Region III RBC Table, September 2001)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SWMU 4 - TABLE 4.5
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 4 - TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	3.0E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	5.0E-08
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	6.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	3.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.0E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.0E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.9E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.8E-03
	(total)												**3.8E-03**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.1E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.0E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	7.7E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	6.2E-04
	(total)												**6.3E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.0E-09	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	7.78E-12
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.3E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.60E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.4E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.03E-05
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.3E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.65E-06
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.0E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.54E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.0E-07	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.24E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	6.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-05**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	6.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	7.4E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.2E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	8.7E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	5.5E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.0E-07	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	2.6E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.5
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 4 - TABLE 7.5a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.5E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.5E-08
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.5E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.0E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.9E-03
	(total)												**1.9E-03**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.8E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.3E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-10	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.6E-05
	(total)												**7.7E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.5a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.5E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.14E-12
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.40E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.1E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.50E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.40E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.5E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.10E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.5E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.81E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-06**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.5E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.7E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.3E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.0E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.8E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.5E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**2.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 4 - TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	2.8E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.7E-07
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	3.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	6.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.8E-05	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	2.8E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	9.4E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.8E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.5E-02
	(total)												**3.5E-02**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	9.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.6E-05	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	7.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.4E-06	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	4.7E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	3.5E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.8E-03
	(total)												**2.9E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	2.4E-09	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.82E-11
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.1E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.24E-06
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	3.3E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.40E-05
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	5.3E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.84E-06
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.4E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.76E-06
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	2.4E-07	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.89E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-05**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	8.0E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.8E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	8.5E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.2E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.4E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	6.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.2E-07	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	3.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.3E-06**
										Total Risk Across All Exposure Routes/Pathways	**4.0E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 4 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	9.4E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.6E-07
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.1E-05	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	9.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	9.4E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.1E-05
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	5.9E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.2E-02
	(total)												**1.2E-02**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	8.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.6E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.5E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	4.1E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	3.3E-04
	(total)												**3.4E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	2.7E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	2.02E-12
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.4E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.50E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	3.7E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.67E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	5.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.28E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.7E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.96E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	2.7E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	3.22E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.6E-06**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.1E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	3.3E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	5.3E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	4.7E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	5.6E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.2E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
MAINTENANCE WORKERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.35E-08
Noncancer Ingestion Intake - RME = 9.39E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

SWMU 4 - TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	2.1E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.5E-09
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	2.1E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.9E-07
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.6E-04
	(total)												**2.6E-04**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.4E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.1E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	8.6E-10	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	6.9E-05
	(total)												**7.0E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	7.4E-11	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	5.56E-13
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	9.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	6.86E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.0E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	7.35E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.6E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.18E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	7.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.39E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	7.4E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	8.86E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	4.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.8E-07**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	8.1E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	8.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.3E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.4E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	6.3E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.2E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	3.1E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.4E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.8E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
MAINTENANCE WORKERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.35E-08
Noncancer Ingestion Intake - RME = 9.39E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

SWMU 4 - TABLE 7.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	5.2E-11	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.6E-10
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	6.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	7.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	5.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	5.2E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.7E-07
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	3.3E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.5E-05
	(total)												**6.5E-05**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	8.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.7E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.7E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	4.3E-11	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	3.4E-06
	(total)												**3.5E-06**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.9E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	6.7E-12	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	5.00E-14
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	8.5E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	6.17E-09
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	9.1E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.61E-08
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.06E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	6.6E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.85E-09
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	6.6E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	7.97E-11
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	4.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.8E-08**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.5E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.5E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.1E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	8.3E-10
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	2.2E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-11
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	5.5E-12	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.5E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME Value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	USEPA 1993	26	USEPA 1993	
	ED	Exposure Duration	years	30	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 3.54E-07
Noncancer Dermal Intake - RME = 8.26E-07

Cancer Dermal Intake - CTE = 6.54E-09
Noncancer Dermal Intake - CTE = 5.09E-08

SWMU 4 - TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	4.5E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	7.5E-09
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	5.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	6.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	9.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	4.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	4.5E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.5E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	2.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.6E-04
	(total)												**5.6E-04**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	4.5E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.5E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.1E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	9.1E-05
	(total)												**9.3E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.9E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.45E-12
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.4E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.78E-07
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.6E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.91E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.2E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.06E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.40E-07
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.9E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.30E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-06**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.4E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.4E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.2E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.0E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.4E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.9E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	4.9E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-06**
										Total Risk Across All Exposure Routes/Pathways	**3.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME Value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	USEPA 1993	26	USEPA 1993	
	ED	Exposure Duration	years	30	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 3.54E-07
Noncancer Dermal Intake - RME = 8.26E-07

Cancer Dermal Intake - CTE = 6.54E-09
Noncancer Dermal Intake - CTE = 5.09E-08

SWMU 4 - TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.1E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.9E-09
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.1E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.7E-07
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	7.0E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.4E-04
	(total)												**1.4E-04**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	2.8E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	9.3E-08
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	7.0E-11	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	5.6E-06
	(total)												**5.7E-06**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.4E-11	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.08E-13
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.34E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.0E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.43E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.1E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.29E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.05E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.4E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.73E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-07**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.4E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	4.1E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.9E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.6E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-11
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.1E-12	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.4
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 4 - TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	3.7E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.1E-09
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	5.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	8.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	3.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	3.6E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.2E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	2.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.6E-04
	(total)												**4.6E-04**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	4.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	4.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	7.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	3.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	7.0E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.3E-06
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.8E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.4E-04
	(total)												**1.4E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	5.8E-11	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	4.31E-13
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	7.3E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.32E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	7.8E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.70E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.2E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.12E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	5.7E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.18E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	5.7E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	6.87E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	3.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-07**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	7.2E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	7.8E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.7E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.2E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.1E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	5.7E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.1E-08	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	2.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.5E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.4
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 4 - TABLE 7.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	9.2E-11	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.5E-09
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	9.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	9.1E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.0E-07
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	5.7E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.1E-04
	(total)												**1.1E-04**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	4.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	6.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	2.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	5.6E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.9E-07
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	1.4E-10	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.1E-05
	(total)												**1.2E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M	1.4E-11	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.08E-13
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.33E-08
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	2.0E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.43E-07
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	3.1E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.28E-08
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	1.4E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.05E-08
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	1.4E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.72E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	9.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-07**
Dermal	METHYLENE CHLORIDE	2.21E-03	mg/kg	2.21E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	5.9E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-09
	BENZO(A)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	6.3E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	BENZO(B)FLUORANTHENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.0E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.4E-09
	INDENO(1,2,3-CD)PYRENE	2.20E+00	mg/kg	2.20E+00	mg/kg	M	4.6E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	PENTACHLOROPHENOL	2.20E-01	mg/kg	2.20E-01	mg/kg	M	8.9E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-10
	CADMIUM	1.38E+00	mg/kg	1.38E+00	mg/kg	M	2.2E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.1E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface / subsurface soil is defined as soil collected from depths of 0 to 10 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 4 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M	7.0E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.2E-07
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.4E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	1.3E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	1.9E-05	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	8.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	6.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	7.6E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.8E-02
	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	1.8E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.0E-06
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M	2.9E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	7.2E-03
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	1.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.2E-02
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M	1.7E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.4E-02
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	2.5E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.0E-03
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M	4.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-02
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M	6.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-01
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M	1.8E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.6E-02
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M	3.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M	5.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.6E-03
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M	1.7E-06	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	3.4E-04
	(total)												**4.0E-01**
Dermal	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	6.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	6.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	8.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	4.0E-06	mg/kg-day		mg/kg-day	NA	NA	
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	9.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	3.8E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.9E-02
	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	1.6E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.5E-06
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	2.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.7E-03
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	9.1E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.3E-04
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M		mg/kg-day	8.00E-04	mg/kg-day	NA	NA	
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M		mg/kg-day	5.00E-03	mg/kg-day	NA	NA	
	(total)												**2.7E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M	1.0E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	7.49E-13
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.9E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.41E-07
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	1.8E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.32E-06
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	2.7E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.97E-07
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.2E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	8.82E-08
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	9.3E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	5.83E-10
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	1.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.17E-08
	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	2.6E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	3.10E-10
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M	4.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	2.7E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.98E-07
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	3.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M	6.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M	9.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M	2.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M	5.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M	7.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M	2.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.2E-06**
Dermal	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	9.1E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	6.6E-08
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	8.5E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.2E-07
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	1.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.3E-08
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	5.7E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	1.3E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-11
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	5.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08

	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	2.3E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.8E-10
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	2.9E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-08
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	1.3E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.8E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.0E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface / subsurface soil is defined as soil collected from depths of 0 to 10 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 4 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M	3.5E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	5.8E-08
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	6.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	6.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	9.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	4.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	3.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	3.8E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.9E-02
	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	9.0E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.0E-06
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M	1.4E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.6E-03
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	9.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.1E-02
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M	8.4E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.2E-02
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	1.3E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.5E-03
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M	2.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.1E-03
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M	3.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-01
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M	9.1E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.3E-02
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M	1.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.8E-04
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M	2.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-03
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M	8.5E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.7E-04
	(total)												**2.0E-01**
Dermal	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	1.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	2.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	2.7E-10	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	1.1E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.5E-03
	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	4.7E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.6E-06
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	5.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.9E-03
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	2.6E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.1E-04
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M		mg/kg-day	8.00E-04	mg/kg-day	NA	NA	
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M		mg/kg-day	5.00E-03	mg/kg-day	NA	NA	
	(total)												**7.7E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M	5.0E-11	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	3.75E-13
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	9.7E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.05E-08
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	9.1E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.61E-07
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	1.3E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.84E-08
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	6.0E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.41E-08
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	4.6E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	2.92E-10
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	5.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.08E-08
	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	1.3E-09	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.55E-10
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	1.3E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.99E-07
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	1.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M	3.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M	4.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M	2.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M	3.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M	1.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-06**
Dermal	METHYLENE CHLORIDE	2.48E-03	mg/kg	2.48E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	4.80E+00	mg/kg	4.80E+00	mg/kg	M	2.6E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	BENZO(A)PYRENE	4.50E+00	mg/kg	4.50E+00	mg/kg	M	2.5E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	BENZO(B)FLUORANTHENE	6.70E+00	mg/kg	6.70E+00	mg/kg	M	3.7E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-08
	INDENO(1,2,3-CD)PYRENE	3.00E+00	mg/kg	3.00E+00	mg/kg	M	1.6E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	DELTA-BHC	2.30E-03	mg/kg	2.30E-03	mg/kg	M	3.9E-12	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-11
	AROCLOR-1254	2.69E-01	mg/kg	2.69E-01	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-09

	PENTACHLOROPHENOL	6.42E-02	mg/kg	6.42E-02	mg/kg	M	6.7E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	8.1E-11
	ANTIMONY	1.03E+00	mg/kg	1.03E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.59E+00	mg/kg	6.59E+00	mg/kg	M	8.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	BARIUM	5.99E+02	mg/kg	5.99E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	8.93E-01	mg/kg	8.93E-01	mg/kg	M	3.7E-11	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.72E+01	mg/kg	1.72E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.30E+04	mg/kg	2.30E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.46E+02	mg/kg	6.46E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.24E-01	mg/kg	1.24E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	1.83E+01	mg/kg	1.83E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SELENIUM	6.03E-01	mg/kg	6.03E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 4 - TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	1.4E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-02
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	9.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.3E-01
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	9.1E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E+00
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	5.5E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.3E+00
	(total)												**5.7E+00**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	7.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.3E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	5.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-03
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	4.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-02
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	2.9E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.0E-01
	(total)												**3.2E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	4.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	3.4E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-05
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	3.1E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.9E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.1E-05**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	2.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.8E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-07
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	9.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**5.1E-05**

SWMU 4 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 4 - TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	9.8E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.8E-03
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	6.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.3E-01
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	6.4E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E+00
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	3.8E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.6E+00
	(total)												**4.0E+00**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	3.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.2E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	2.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.4E-04
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.8E-03
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.2E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-01
	(total)												**1.4E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	9.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	6.9E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-05
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	6.4E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	3.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-05**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	3.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	2.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.0E-05**

SWMU 4 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 4 - TABLE 7.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	4.9E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.9E-02
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	3.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E+00
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	3.2E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E+01
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.9E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.0E+00
	(total)												**2.0E+01**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	2.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.2E-04
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.5E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.1E-03
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.4E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E-02
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	8.4E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	8.8E-01
	(total)												**9.3E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	4.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	3.0E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-05
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.7E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.6E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.4E-05**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.3E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	7.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**4.5E-05**

SWMU 4 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 4 - TABLE 7.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	2.2E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.2E-02
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.1E-01
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.4E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E+00
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	8.4E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.5E+00
	(total)												**8.7E+00**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	7.1E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.1E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	5.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-03
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	4.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E-02
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	2.8E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.9E-01
	(total)												**3.1E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.0E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	6.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	4.3E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-06
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	4.0E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	2.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.5E-06**
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	8.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-08**
										Total Risk Across All Exposure Routes/Pathways	**6.5E-06**

SWMU 4 - TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.1 of the text.
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 4 - TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	3.5E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.5E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	2.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.2E-04
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.6E-03
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.4E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.4E-01
	(total)												**1.5E-01**

Total Hazard Index Across All Exposure Routes/Pathways **1.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	5.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	3.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-09
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.3E-09**
										Total Risk Across All Exposure Routes/Pathways	**5.3E-09**

SWMU 4 - TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.1 of the text.
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 4 - TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	2.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.3E-05
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	1.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.3E-04
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	1.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.9E-03
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	8.8E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	9.2E-02
	(total)												**9.7E-02**

Total Hazard Index Across All Exposure Routes/Pathways **9.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Aluminum	5.13E-01	mg/L	5.13E-01	mg/L	M	3.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	3.60E-03	mg/L	3.60E-03	mg/L	M	2.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	Iron	3.33E+01	mg/L	3.33E+01	mg/L	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.00E+00	mg/L	2.00E+00	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.4E-09**
										Total Risk Across All Exposure Routes/Pathways	**3.4E-09**

SWMU 4 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 4 - TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	2.0E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.0E-03
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.5E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.2E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	9.4E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.3E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	6.8E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.8E-02
	(total)												**5.2E-02**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.6E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	4.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.7E-04	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.5E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.2E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-01
	(total)												**1.7E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	8.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-06**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

SWMU 4 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 4 - TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.7E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.7E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	8.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.2E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	4.5E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.3E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	9.5E-03
	(total)												**1.7E-02**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.2E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.0E-04
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.7E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.2E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.1E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.3E-02
	(total)												**5.5E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	8.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-07**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-07**

SWMU 4 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 4 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.9E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.9E-03
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.7E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	8.8E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.3E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	6.4E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.7E-02
	(total)												**4.9E-02**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.7E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.7E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	4.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.8E-04	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.6E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.3E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-01
	(total)												**1.7E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	7.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	5.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.0E-07**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	3.9E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.9E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.6E-07**

SWMU 4 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 4 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	6.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.2E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	7.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	2.9E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	4.2E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.1E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.9E-03
	(total)												**1.6E-02**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.1E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.1E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.5E-04
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.1E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.0E-02
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	3.7E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.9E-02
	(total)												**5.0E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	8.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-08**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	3.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.8E-09
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.8E-09**
										Total Risk Across All Exposure Routes/Pathways	**3.9E-08**

SWMU 4 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 4 - TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.0E-04
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	3.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.4E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.0E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.0E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.2E-03
	(total)												**7.7E-03**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	5.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.4E-05
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	6.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-04
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	2.5E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	5.2E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.8E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.9E-02
	(total)												**2.5E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.6E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	6.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.4E-07**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.8E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	7.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.8E-07**

SWMU 4 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 4 - TABLE 7.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	7.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.4E-05
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	9.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.1E-04
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.5E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.0E-04
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.5E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.9E-03**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.3E-05
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.5E-05
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	6.4E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.3E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.6E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.8E-03
	(total)												**6.2E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**8.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	9.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	4.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	3.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-08**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	8.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	5.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-09**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-08**

SWMU 4 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 4 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	4.8E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.8E-05
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	6.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-04
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	2.3E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.3E-04
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.6E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	6.9E-04
	(total)												**1.3E-03**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.8E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.8E-05
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.3E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.6E-05
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	8.7E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	1.8E-03
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	6.3E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	6.6E-03
	(total)												**8.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	7.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	9.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	3.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-08**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	2.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	3.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.4E-09
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	9.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.4E-09**
										Total Risk Across All Exposure Routes/Pathways	**1.9E-08**

SWMU 4 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 4 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.2E-05
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	1.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.0E-05
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	5.7E-06	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	8.1E-05
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	4.1E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.7E-04
	(total)												**3.2E-04**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	3.7E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.7E-06
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	4.6E-09	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-05
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	1.8E-06	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.6E-04
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	1.3E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.3E-03
	(total)												**1.7E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 4 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	2.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-09
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	9.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	6.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.5E-09**
Dermal	Aluminum	7.30E-01	mg/L	7.30E-01	mg/L	M	5.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.00E-04	mg/L	9.00E-04	mg/L	M	7.3E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Barium	3.44E-01	mg/L	3.44E-01	mg/L	M	2.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.49E-01	mg/L	2.49E-01	mg/L	M	2.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-09**
										Total Risk Across All Exposure Routes/Pathways	**4.6E-09**

SWMU 4 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

TABLE 4.4

SWMU 4 - TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-02
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	1.7E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.8E-02
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	6.2E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	8.9E-03
	(total)												**8.8E-02**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	7.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**2.6E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.31E-06
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	6.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-06**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.7E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

TABLE 4.4

SWMU 4 - TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.2E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	5.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.1E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.0E-03
	(total)												**3.0E-02**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-04
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**2.2E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.23E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	5.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-07**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-09
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.7E-09**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

TABLE 4.4

SWMU 4 - TABLE 7.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	6.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-01
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	1.6E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.4E-01
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	5.8E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	8.3E-02
	(total)												**8.2E-01**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	3.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-02
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**1.2E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**8.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	5.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.73E-06
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	1.4E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	5.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.7E-06**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	3.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**8.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

TABLE 4.4

SWMU 4 - TABLE 7.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.7E-02
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	5.4E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.8E-01
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	1.9E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.8E-02
	(total)												**2.8E-01**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	4.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**1.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	5.7E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.61E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	1.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	5.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.6E-07**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	1.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-08**
										Total Risk Across All Exposure Routes/Pathways	**8.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

TABLE 4.4

SWMU 4 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	9.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.2E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	2.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.6E-03
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	9.3E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.3E-03
	(total)												**1.3E-02**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.7E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**8.7E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	4.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.15E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	1.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	4.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.1E-07**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	1.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.7E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.3E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

TABLE 4.4

SWMU 4 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.0E-04
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	6.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-03
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	2.3E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.3E-04
	(total)												**3.3E-03**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.7E-04
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**8.7E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	3.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.61E-08
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	8.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-08**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	3.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.0E-08**
										Total Risk Across All Exposure Routes/Pathways	**9.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

TABLE 4.4

SWMU 4 - TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	7.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-03
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	2.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E-03
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	7.6E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.1E-03
	(total)												**1.1E-02**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	1.8E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-04
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**5.9E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	1.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.84E-07
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	3.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-07**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.8E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

TABLE 4.4

SWMU 4 - TABLE 7.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	1.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.5E-04
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	5.3E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.8E-03
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	1.9E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.7E-04
	(total)												**2.7E-03**
	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	1.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.8E-05
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**4.8E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 4 - TABLE 8.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	3.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.59E-08
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M	8.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-08**
Dermal	ARSENIC	4.70E+00	mg/kg	4.70E+00	mg/kg	M	2.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	IRON	1.27E+04	mg/kg	1.27E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	4.56E+02	mg/kg	4.56E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.4E-09**
										Total Risk Across All Exposure Routes/Pathways	**4.9E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.8E-11		0.0E+00	1.8E-11	METHYLENE CHLORIDE	Liver	4.7E-07		0.0E+00	4.7E-07
			BENZO(A)ANTHRACENE	2.2E-06		5.8E-07	2.8E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.4E-05		6.2E-06	3.0E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.8E-06		1.0E-06	4.8E-06	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.8E-06		4.6E-07	2.2E-06	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	2.9E-08		1.4E-08	4.3E-08	PENTACHLOROPHENOL	Liver, Kidney	9.4E-05		4.7E-05	1.4E-04
			CADMIUM					CADMIUM	Kidney	3.5E-02		2.8E-03	3.8E-02
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	1.9E-03		3.7E-04	2.2E-03
			Arsenic	3.0E-07		5.9E-08	3.6E-07	Arsenic	Skin, Vascular	7.7E-03		1.5E-03	9.2E-03
			Barium					Barium	Blood	1.3E-02		3.6E-02	4.8E-02
			Manganese					Manganese	CNS	2.7E-02		1.3E-01	1.6E-01
Sediment	Sediment	Sediment	ARSENIC	7.7E-06		4.6E-07	8.2E-06	ARSENIC	Skin, Vascular	2.0E-01		1.2E-02	2.1E-01
			IRON					IRON	Liver, Blood, GI Tract	5.4E-01		0.0E+00	5.4E-01
			MANGANESE					MANGANESE	CNS	8.3E-02		0.0E+00	8.3E-02
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	4.9E-02		2.2E-04	4.9E-02
			Arsenic	4.4E-05		2.0E-07	4.5E-05	Arsenic	Skin, Vascular	1.2E+00		5.1E-03	1.2E+00
			Iron					Iron	Liver, Blood, GI Tract	1.1E+01		4.7E-02	1.1E+01
			Manganese					Manganese	CNS	8.0E+00		8.8E-01	8.9E+00

Total Risk Across Surface Soil	4.0E-05
Total Risk Across Surface Water	3.6E-07
Total Risk Across Sediment	8.2E-06
Total Risk Across Groundwater	4.5E-05
Total Risk Across All Media and All Exposure Routes	9.3E-05

Total Hazard Index Across All Media and All Exposure Routes	2.2E+01
Total Liver HI =	1.1E+01
Total Kidney HI =	3.8E-02
Total Vascular HI =	1.4E+00
Total GI Tract HI =	1.1E+01
Total Skin HI =	1.4E+00
Total Blood HI =	1.1E+01
Total CNS HI =	9.1E+00
Total Body Weight HI =	5.2E-02
Total Thyroid HI =	0.0E+00

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.0E-12		0.0E+00	2.0E-12	METHYLENE CHLORIDE	Liver	1.6E-07		0.0E+00	1.6E-07
			BENZO(A)ANTHRACENE	2.5E-07		2.3E-08	2.7E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.7E-06		2.4E-07	2.9E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.3E-07		3.9E-08	4.7E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	2.0E-07		1.8E-08	2.1E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	3.2E-09		5.6E-10	3.8E-09	PENTACHLOROPHENOL	Liver, Kidney	3.1E-05		5.5E-06	3.7E-05
			CADMIUM					CADMIUM	Kidney	1.2E-02		3.3E-04	1.2E-02
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	6.2E-04		1.1E-04	7.3E-04
			Arsenic	3.3E-08		5.8E-09	3.9E-08	Arsenic	Skin, Vascular	2.6E-03		4.5E-04	3.0E-03
			Barium					Barium	Blood	4.2E-03		1.0E-02	1.5E-02
			Manganese					Manganese	CNS	8.9E-03		3.9E-02	4.8E-02
Sediment	Sediment	Sediment	ARSENIC	8.6E-07		1.8E-08	8.8E-07	ARSENIC	Skin, Vascular	6.7E-02		1.4E-03	6.8E-02
			IRON					IRON	Liver, Blood, GI Tract	1.8E-01		0.0E+00	1.8E-01
			MANGANESE					MANGANESE	CNS	2.8E-02		0.0E+00	2.8E-02
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	2.2E-02		7.1E-05	2.2E-02
			Arsenic	6.5E-06		2.1E-08	6.5E-06	Arsenic	Skin, Vascular	5.1E-01		1.7E-03	5.1E-01
			Iron					Iron	Liver, Blood, GI Tract	4.7E+00		1.5E-02	4.7E+00
			Manganese					Manganese	CNS	3.5E+00		2.9E-01	3.8E+00

Total Risk Across Surface Soil	3.9E-06
Total Risk Across Surface Water	3.9E-08
Total Risk Across Sediment	8.8E-07
Total Risk Across Groundwater	6.5E-06
Total Risk Across All Media and All Exposure Routes	1.1E-05

Total Hazard Index Across All Media and All Exposure Routes	9.4E+00
Total Liver HI =	4.9E+00
Total Kidney HI =	1.2E-02
Total Vascular HI =	5.8E-01
Total GI Tract HI =	4.9E+00
Total Skin HI =	5.8E-01
Total Blood HI =	4.9E+00
Total CNS HI =	3.9E+00
Total Body Weight HI =	2.2E-02
Total Thyroid HI =	0.0E+00

RAGS - PART D TABLES FOR SWMU 5

Selection of Exposure Pathways

SWMU5Table1.xls

COPC Selection

SWMU5Table2.1.xls - Surface Soil - Direct Contact
SWMU5Table2.2.xls - Surface Soil - Migration Pathways
SWMU5Table2.3.xls - Surface/Subsurface Soil - Direct Contact
SWMU5Table2.4.xls - Surface/Subsurface Soil - Migration Pathways
SWMU5Table2.5.xls - Groundwater
SWMU5Table2.6.xls - Surface Water
SWMU5Table2.7.xls - Sediment

Exposure Point Concentration Summary

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SWMU5Table3.2.xls - Surface/Subsurface Soil
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SWMU5Table3.4.xls - Surface Water
SWMU5Table3.5.xls - Sediment

COPC Toxicity Information

Table5.1.xls - Noncancer - Oral/Dermal
Table5.2.xls - Noncancer - Inhalation
Table6.1.xls - Cancer - Oral/Dermal
Table6.2.xls - Cancer - Inhalation

The following files contain RAGS-Part D Tables 4, 7, and 8.

Risk Assessment Calculations for Surface Soil

SWMU5SSAdultRes.xls
SWMU5SSAdultResCTE.xls
SWMU5SSChildRes.xls
SWMU5SSChildResCTE.xls
SWMU5SSMainW.xls
SWMU5SSMainWCTE.xls
SWMU5SSRecrUser.xls
SWMU5SSRecrUserCTE.xls
SWMU5SSTresp.xls
SWMU5SSTrespCTE.xls

Risk Assessment Calculations for Surface/subsurface Soil

SWMU5SOConstW.xls
SWMU5SOConstWCTE.xls

Risk Assessment Calculations for Groundwater

SWMU5GWAdultResCTE.xls
SWMU5GWChildRes.xls
SWMU5GWChildResCTE.xls
SWMU5GWConstW.xls
SWMU5GWConstWCTE.xls

Risk Assessment Calculations for Surface Water

SWMU5SWAdultRes.xls
SWMU5SWAdultResCTE.xls
SWMU5SWChildRes.xls
SWMU5SWChildResCTE.xls
SWMU5SWRecrUser.xls
SWMU5SWRecrUserCTE.xls
SWMU5SWTresp.xls
SWMU5SWTrespCTE.xls

Risk Assessment Calculations for Sediment

SWMU5SedAdultRes.xls
SWMU5SedAdultResCTE.xls
SWMU5SedChildRes.xls
SWMU5SedChildResCTE.xls
SWMU5SedRecrUser.xls
SWMU5SedRecrUserCTE.xls
SWMU5SedTresp.xls
SWMU5SedTrespCTE.xls

Risk Assessment Calculations - Inhalation while Showering

SWMU5ShowerAdultRes.xls
SWMU5ShowerAdultResCTE.xls
SWMU5ShowerChildRes.xls
SWMU5ShowerChildResCTE.xls

Shower Model Calculations

SWMU5Inhalation.xls
SWMU5InhalationCTE.xls
SWMU5Inhalationrisk.xls
SWMU5InhalationriskCTE.xls

Risk Assessment Summary

SWMU5Tbl9s.xls
SWMU5Tbl9sCTE.xls

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SWMU 5 - TABLE 7.19	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 5 - TABLE 7.19 - REASONABLE MAXIMUM EXPOSURE (RM
SWMU 5 - TABLE 8.19	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 5 - TABLE 8.19 - REASONABLE MAXIMUM EXPOSURE (RM
SWMU 5 - TABLE 7.19a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 5 - TABLE 7.19a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 5 - TABLE 8.19a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 5 - TABLE 8.19a - CENTRAL TENDENCY EXPOSURE (CTE)

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil(1)	Surface Soil	Entire Site	Trespassers	Adolescent	Ingestion	On-site	Quant(2)	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Trespassers	Adult and Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs(4) for transfers from soil to air.
	Groundwater	Groundwater/Air	Surficial Aquifer	Trespassers	Adult and Adolescent	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Dermal	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Inhalation	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	On-site Streams, Ponded Water and Draingeways	Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface/ Subsurface Soil (5)	Surface/ Subsurface Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Excavation/construction activities may occur at the site in the future.
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site in the future.
		Air	Vapors and Particulates in Air - Entire Site	Excavation/Construction Workers	Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	Maintenance Workers	Adult	Ingestion	On-site	Quant	Although maintenance activities are not currently performed on the site, activities, such as groundkeeping, may occur in the future.
						Dermal	On-site	Quant	Although maintenance activities are not currently performed on the site, activities, such as groundkeeping, may occur in the future.
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 5, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 5, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance/Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Excavation/Construction and Maintenance Workers Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site and workers may be exposed by direct contact with groundwater.
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
						Dermal	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Excavation/Construction/ Maintenance/Occupational Workers and Recreational Users	Adult	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Residents	Child and Adult	Inhalation	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Excavation/Construction and Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Workers		Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Constuction/ Maintenance/Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Excavation/Construction and Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Workers		Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Occupational Workers	Adult	Ingestion	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
						Dermal	On-site	None	Because of the nature of the Site 4, the site is not likely to be developed for occupational use in the future.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Constuction/ Maintenance/Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).

Footnotes:
1 Surface soil is defined as soil collected from 0 to 2 feet below ground surface (bgs).
2 Quantitative.
3 Qualitative.
4 Soil Screening Levels (USEPA, May 1996).
5 Surface/subsurface soil is defined as soil collected from 0 to 10 feet bgs; no exposure to soil at depths below 10 feet bgs is anticipated.

SWMU 9 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-09-2	METHYLENE CHLORIDE	0.004	J	0.006	J	mg/kg	09SB080102, 09SB090102	5/11	0.003 - 0.004	0.006	NA	9.1	C	120	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.04		1.8		mg/kg	09SB090002	2/11	0.008 - 0.009	1.8	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
83-32-9	ACENAPHTHENE	0.02		0.02		mg/kg	09SB030002	1/11	0.008 - 0.009	0.02	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.018		0.018		mg/kg	09SB030002	1/11	0.008 - 0.009	0.018	NA	370(8)	N	9500(8)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.052		0.052		mg/kg	09SB030002	1/11	0.008 - 0.009	0.052	NA	2200	N	47000	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.018		0.15		mg/kg	09SB030002	4/11	0.008 - 0.009	0.15	NA	0.62	C	5	IDEM	No	BSL
50-32-8	**BENZO(A)PYRENE**	0.022	J	0.13		mg/kg	09SB030002	4/11	0.008 - 0.009	0.13	NA	**0.062**	C	0.5	IDEM	**Yes**	**ASL**
205-99-2	BENZO(B)FLUORANTHENE	0.009		0.12		mg/kg	09SB030002	5/11	0.008 - 0.009	0.12	NA	0.62	C	5	IDEM	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.009		0.057		mg/kg	09SB030002	5/11	0.008 - 0.009	0.057	NA	230(9)	N	5500(9)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.018	J	0.11	J	mg/kg	09SB030002	4/11	0.008 - 0.009	0.11	NA	6.2	C	50	IDEM	No	BSL
218-01-9	CHRYSENE	0.01		0.14		mg/kg	09SB030002	5/11	0.008 - 0.009	0.14	NA	62	C	500	IDEM	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	1.2		1.2		mg/kg	09SB020002	1/11	0.38 - 0.44	1.2	NA	610	N	18000	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.01	J	0.029		mg/kg	09SB030002	3/11	0.008 - 0.009	0.029	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.008		0.3	J	mg/kg	09SB030002	5/11	0.008 - 0.009	0.3	NA	230	N	6300	IDEM	No	BSL
86-73-7	FLUORENE	0.029		0.029		mg/kg	09SB030002	1/11	0.008 - 0.009	0.029	NA	260	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.014	J	0.058		mg/kg	09SB030002	4/11	0.008 - 0.009	0.058	NA	0.62	C	5	IDEM	No	BSL
91-20-3	NAPHTHALENE	0.03		0.93		mg/kg	09SB090002	2/11	0.008 - 0.009	0.93	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.013		0.63		mg/kg	09SB090002	4/11	0.008 - 0.009	0.63	NA	230(9)	N	5500(9)	IDEM	No	BSL
129-00-0	PYRENE	0.013		0.23	J	mg/kg	09SB030002	5/11	0.008 - 0.009	0.23	NA	230	N	5500	IDEM	No	BSL
PESTICIDES/PCBs																	
50-29-3	4,4'-DDT	0.0047		0.0047		mg/kg	09SB090002	1/11	0.0038 - 0.0043	0.0047	NA	1.7	C	20	IDEM	No	BSL
72-43-5	METHOXYCHLOR	0.025	J	0.025	J	mg/kg	09SB090002	1/11	0.02 - 0.022	0.025	NA	31	N	910	IDEM	No	BSL
HERBICIDES																	
94-75-7	2,4-D	0.02	J	0.02	J	mg/kg	09SB040002	1/6	0.0031 - 0.0033	0.02	NA	69	N	NA	IDEM	No	BSL
88-85-7	DINOSEB	0.014	J	0.014	J	mg/kg	09SB080002	1/9	0.0031 - 0.0035	0.014	NA	6.1	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0012	J	0.0035		mg/kg	09SB020002	3/9	0.00077 - 0.00088	0.0035	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	ALUMINUM	5040		12900		mg/kg	09SB080002	11/11	---	12900	No	**7600**	N	NA	IDEM	No	BKG
7440-36-0	ANTIMONY	0.97		3.1	J	mg/kg	09SB060002	2/11	0.89 - 1	3.1	**Yes**	3.1	N	140	IDEM	No	BSL
7440-38-2	ARSENIC	2.9	J	9.6	J	mg/kg	09SB090002	11/11	---	9.6	No	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	BARIUM	49.6	J	106	J	mg/kg	09SB090002	11/11	---	106	No	540	N	23000	IDEM	No	BSL,BKG
7440-43-9	CADMIUM	0.96	J	0.96	J	mg/kg	09SB100002	1/11	0.82 - 1	0.96	No	3.7	N	12	IDEM	No	BSL,BKG
7440-70-2	CALCIUM	843	J	175000	J	mg/kg	09SB110002	11/11	---	175000	**Yes**	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	7.6	J	13.7	J	mg/kg	09SB080002	11/11	---	13.7	No	30(10)	C	430(10)	IDEM	No	BSL,BKG
7440-48-4	COBALT	4.8	J	23		mg/kg	09SB040002	11/11	---	23	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	7.6	J	20.1	J	mg/kg	09SB100002	11/11	---	20.1	**Yes**	310	N	13000	IDEM	No	BSL
7439-89-6	IRON	8840		20100		mg/kg	09SB080002	11/11	---	20100	No	**2300**	N	NA	IDEM	No	BKG
7439-92-1	LEAD	8.6	J	34.9	J	mg/kg	09SB100002	11/11	---	34.9	**Yes**	400(11)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	731	J	32500	J	mg/kg	09SB110002	11/11	---	32500	**Yes**	NA		NA	IDEM	No	NUT
7439-96-5	MANGANESE	135	J	1060	J	mg/kg	09SB040002	11/11	---	1060	No	**180**	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.04		0.06		mg/kg	09SB040002, 09SB090002	5/11	0.04 - 0.05	0.06	No	2.3(12)	N	55	IDEM	No	BSL,BKG
7440-02-0	NICKEL	9.5	J	18.3	J	mg/kg	09SB100002	11/11	---	18.3	No	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	464	J	618	J	mg/kg	09SB080002	6/11	409 - 466	618	No	NA		NA	IDEM	No	NUT, BKG
7440-62-2	VANADIUM	14.5	J	29.3	J	mg/kg	09SB090002	11/11	---	29.3	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	ZINC	30.3	J	120	J	mg/kg	09SB060002	11/11	---	120	**Yes**	2300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	8.4	J	11	J	meq/100 g	09SB040002	3/3	---	11	NA	NA		NA	IDEM	No	NTX
	pH	6.9	J	8	J	S.U.	09SB070002	3/3	---	8	NA	NA		NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	5700		8500		mg/kg	09SB040002	3/3	---	8500	NA	NA		NA	IDEM	No	NTX

SWMU 9 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994).
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001).

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

09SB010002	09SB040102	09SB080002
09SB010102	09SB050002	09SB080102
09SB020002	09SB050102	09SB090002
09SB020102	09SB060002	09SB090102
09SB030002	09SB060102	09SB100002
09SB030102	09SB070002	09SB100102
09SB040002	09SB070102	09SB110002
		09SB110102

Shaded cells indicate that the specificd criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 5 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 5, OLD BURN PIT
NWSC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS														1			
75-35-4	**1,1-DICHLOROETHENE**	0.013	J	0.013	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.013	NA	**0.003**	C	0.07	0.058	**Yes**	**ASL**
71-43-2	**BENZENE**	0.005	J	0.005	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.005	NA	**0.002**	C	0.8	0.034	**Yes**	**ASL**
156-59-2	**CIS-1,2-DICHLOROETHENE**	0.008		2.8	J	mg/kg	05SB060102	2/8	0.003 - 0.004	2.8	NA	**0.02**	N	1200	**0.4**	**Yes**	**ASL**
75-09-2	**METHYLENE CHLORIDE**	0.004	J	0.004	J	mg/kg	05SB030102, 05SB080102, 05SB020102	3/8	0.003 - 0.004	0.004	NA	**0.001**	C	13	0.023	**Yes**	**ASL**
127-18-4	**TETRACHLOROETHENE**	0.003		0.007	J	mg/kg	05SB060102	2/8	0.003 - 0.004	0.007	NA	**0.003**	C	11	0.058	**Yes**	**ASL**
156-60-5	TRANS-1,2-DICHLOROETHENE	0.029	J	0.029	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.029	NA	0.03	N	3100	0.68	No	BSL
79-01-6	**TRICHLOROETHENE**	0.004		5.1	J	mg/kg	05SB060102	5/8	0.003 - 0.003	5.1	NA	**0.003**	C	**5**	**0.057**	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	0.005	J	0.005	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.005	NA	**0.0007**	C	0.03	0.013	**Yes**	**ASL**
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.012		0.065		mg/kg	05SB060002	5/8	0.008 - 0.033	0.065	NA	4(8)	N	NA	0.7(8)	No	BSL
83-32-9	ACENAPHTHENE	0.03		0.12		mg/kg	05SB010002	3/8	0.008 - 0.033	0.12	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.016		0.016		mg/kg	05SB030002	1/8	0.008 - 0.033	0.016	NA	29(9)	N	NA	130(9)	No	BSL
120-12-7	ANTHRACENE	0.009		0.34	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.34	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.031		0.95	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.95	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.031		0.82	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.82	NA	**0.4**	C	NA	8.2	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.008		0.79	J	mg/kg	05SB050002	7/8	0.008 - 0.008	0.79	NA	**0.2**	C	NA	57	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.017		0.35	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.35	NA	210(10)	N	NA	570(10)	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0		0.67	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.67	NA	2	C	NA	39	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.93		3.4		mg/kg	05SB050002	2/8	0.4 - 0.43	3.4	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0.0		0.91	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.91	NA	8	C	NA	25	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.008		0.18	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.18	NA	**0.08**	C	NA	18	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.011		2.2	J	mg/kg	05SB050002	7/8	0.008 - 0.008	2.2	NA	210	N	NA	880	No	BSL
86-73-7	FLUORENE	0.02		0.11	J	mg/kg	05SB050002	3/8	0.008 - 0.033	0.11	NA	28	N	NA	170	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.015		0.36	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.36	NA	0.7	C	NA	3.1	No	BSL
91-20-3	NAPHTHALENE	0.023		0.1		mg/kg	05SB060002	5/8	0.008 - 0.033	0.1	NA	4	N	NA	0.7	No	BSL
85-01-8	PHENANTHRENE	0		1.7		mg/kg	05SB050002	6/8	0.008 - 0.008	1.7	NA	210(10)	N	NA	570(10)	No	BSL
129-00-0	PYRENE	0.009		2.4		mg/kg	05SB050002	7/8	0.008 - 0.008	2.4	NA	210	N	NA	570	No	BSL
PESTICIDES/PCBS																	
72-55-9	4,4'-DDE	0.0067		0.0067		mg/kg	05SB080002	1/6	3.9 - 4.3	0.0067	NA	3	C	NA	450	No	BSL
11097-69-1	AROCLOR-1254	0.1	J	0.24		mg/kg	05SB080002	4/8	39 - 43	0.24	NA	NA	C	NA	6.2	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.01	J	0.016	J	mg/kg	05SB080002	2/8	0.0032 - 0.0035	0.016	NA	NA	N	NA	NA	No	NTX
87-86-5	**PENTACHLOROPHENOL**	0.0024	J	0.012		mg/kg	05SB050002	5/7	0.0008 - 0.00081	0.012	NA	**0.001**	C	NA	0.028	**Yes**	**ASL**
DIOXINS/FURANS																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	0.000415	J	0.00505	J	mg/kg	05SB080002	8/8	---	0.00505	NA	NA	C	NA	NA	No	NTX
39001-02-0	1,2,3,4,6,7,8,9-OCDF	0.0000085	J	0.000313	J	mg/kg	05SB060002	7/8	0.0000004 - 0.0000004	0.000313	NA	NA	C	NA	NA	No	NTX
35822-46-9	1,2,3,4,6,7,8-HPCDD	0.0000072		0.000359	J	mg/kg	05SB060002	8/8	---	0.000359	NA	NA	C	NA	NA	No	NTX
67562-39-4	1,2,3,4,6,7,8-HPCDF	0.0000121		0.000541	J	mg/kg	05SB060002	7/8	0.00000054 - 0.00000054	0.000541	NA	NA	C	NA	NA	No	NTX
55673-89-7	1,2,3,4,7,8,9-HPCDF	0.00000088	J	0.0000575		mg/kg	05SB060002	6/8	0.0000003 - 0.0000018	0.0000575	NA	NA	C	NA	NA	No	NTX
39227-28-6	1,2,3,4,7,8-HXCDD	0.000001	J	0.0000217		mg/kg	05SB060002	5/8	0.0000002 - 0.0000021	0.0000217	NA	NA	C	NA	NA	No	NTX
70648-26-9	1,2,3,4,7,8-HXCDF	0.0000037		0.000361	J	mg/kg	05SB060002	7/8	0.00000055 - 0.00000055	0.000361	NA	NA	C	NA	NA	No	NTX
57653-85-7	1,2,3,6,7,8-HXCDD	0.0000019	J	0.000053	J	mg/kg	05SB060002	7/8	0.0000003 - 0.0000003	0.000053	NA	NA	C	NA	NA	No	NTX
57117-44-9	1,2,3,6,7,8-HXCDF	0.00000028	J	0.000128		mg/kg	05SB060002	8/8	---	0.000128	NA	NA	C	NA	NA	No	NTX
19408-74-3	1,2,3,7,8,9-HXCDD	0.00000036	J	0.0000691	J	mg/kg	05SB060002	8/8	---	0.0000691	NA	NA	C	NA	NA	No	NTX
72918-21-9	1,2,3,7,8,9-HXCDF	0.00000041	J	0.0000098	J	mg/kg	05SB060002	3/8	0.0000002 - 0.0000032	0.0000098	NA	NA	C	NA	NA	No	NTX
40321-76-4	1,2,3,7,8-PECDD	0.0000014	J	0.0000221		mg/kg	05SB060002	5/8	0.0000003 - 0.0000009	0.0000221	NA	NA	C	NA	NA	No	NTX
57117-41-6	1,2,3,7,8-PECDF	0.0000013	J	0.000105		mg/kg	05SB060002	4/8	0.0000002 - 0.0000304	0.000105	NA	NA	C	NA	NA	No	NTX

SWMU 5 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 5, OLD BURN PIT
NWSC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
60851-34-5	2,3,4,6,7,8-HXCDF	0.0000024	J	0.000146		mg/kg	05SB060002	7/8	0.0000002 - 0.0000002	0.000146	NA	NA	C	NA	NA	No	NTX
57117-31-4	2,3,4,7,8-PECDF	0.0000022	J	0.000143		mg/kg	05SB060002	7/8	0.0000002 - 0.0000002	0.000143	NA	NA	C	NA	NA	No	NTX
1746-01-6	2,3,7,8-TCDD	0.00000049	J	0.0000061		mg/kg	05SB060002	5/8	0.0000003 - 0.00000045	0.0000061	NA	NA	C	NA	NA	No	NTX
51207-31-9	2,3,7,8-TCDF	0.0000028		0.000325		mg/kg	05SB060002	7/8	0.0000002 - 0.0000002	0.000325	NA	NA	C	NA	NA	No	NTX
1746-01-6	2,3,7,8-TCDD TEQ	0.00000068		0.000226		mg/kg	05SB060002	8/8	-	0.000226	NA	NA	C	NA	NA	No	NTX
37871-00-4	TOTAL HPCDD	0.0000151		0.000803	J	mg/kg	05SB060002	8/8	---	0.000803	NA	NA	C	NA	NA	No	NTX
38998-75-3	TOTAL HPCDF	0.0000219	J	0.000792	J	mg/kg	05SB060002	6/8	0.00000054 - 0.000106	0.000792	NA	NA	C	NA	NA	No	NTX
34465-46-8	TOTAL HXCDD	0.0000254	J	0.00089	J	mg/kg	05SB060002	5/8	0.00000065 - 0.0000686	0.00089	NA	NA	C	NA	NA	No	NTX
55684-94-1	TOTAL HXCDF	0.0000254	J	0.0000254	J	mg/kg	05SB020002	1/8	0.0000015 - 0.00139	0.0000254	NA	NA	C	NA	NA	No	NTX
30402-15-4	TOTAL PECDF	0.0000013	J	0.0000013	J	mg/kg	05SB040002	1/8	0.0000312 - 0.00197	0.0000013	NA	NA	C	NA	NA	No	NTX
41903-57-5	TOTAL TCDD	0.000133		0.000404		mg/kg	05SB060002	2/8	0.0000003 - 0.0000661	0.000404	NA	NA	C	NA	NA	No	NTX
55722-27-5	TOTAL TCDF	0.0000524		0.0000524		mg/kg	05SB080002	1/8	0.0000002 - 0.0021	0.0000524	NA	NA	C	NA	NA	No	NTX
INORGANICS																	
7429-90-5	ALUMINUM	3580	J	14800	J	mg/kg	05SB040002	8/8	---	14800	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	**ANTIMONY**	3.2	J	301	J	mg/kg	05SB060002	7/8	0.9 - 0.9	301	**Yes**	**0.3**	N	NA	**5.4**	**Yes**	**ASL**
7440-38-2	ARSENIC	5.1	J	26.8	J	mg/kg	05SB060002	8/8	---	26.8	No	**1**	C	750	29	No	BKG
7440-39-3	**BARIUM**	74.7	J	2020		mg/kg	05SB060002	8/8	---	2020	**Yes**	**82**	N	690000	**1600**	**Yes**	**ASL**
7440-43-9	**CADMIUM**	1.6	J	31.1	J	mg/kg	05SB060002	6/8	0.83 - 0.84	31.1	**Yes**	**0.4**	N	1800	**7.5**	**Yes**	**ASL**
7440-70-2	CALCIUM	685	J	241000	J	mg/kg	05SB050002	7/8	413 - 413	241000	**Yes**	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	10.4		112	J	mg/kg	05SB060002	8/8	---	112	**Yes**	**2**	C	270	**38**	**Yes**	**ASL**
7440-48-4	COBALT	5.8		35.8		mg/kg	05SB060002	8/8	---	35.8	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	**COPPER**	11.7		1520	J	mg/kg	05SB060002	8/8	---	1520	**Yes**	NA	N	NA	**580**	**Yes**	**ASL**
7439-89-6	IRON	15600	J	105000	J	mg/kg	05SB060002	8/8	---	105000	**Yes**	NA	N	NA	NA	No	NTX
7439-92-1	**LEAD**	15.2	J	16900	J	mg/kg	05SB060002	8/8	---	16900	**Yes**	NA	N	NA	**81**	**Yes**	**ASL**
7439-95-4	MAGNESIUM	660	J	4900	J	mg/kg	05SB050002	8/8	---	4900	No	NA		NA	NA	No	NUT, BKG
7439-96-5	MANGANESE	264		1170		mg/kg	05SB040002	8/8	---	1170	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	**MERCURY**	0.04	J	0.43		mg/kg	05SB010002	8/8	---	0.43	**Yes**	**0.1**	N	10	2.1	**Yes**	**ASL**
7440-02-0	NICKEL	12		62.6		mg/kg	05SB060002	8/8	---	62.6	No	**7**	N	13000	950	No	BKG
7440-09-7	POTASSIUM	464	J	1050	J	mg/kg	05SB060002	5/8	413 - 462	1050	No	NA		NA	NA	No	NUT, BKG
7440-22-4	**SILVER**	1.8	J	7.5	J	mg/kg	05SB060002	3/8	0.83 - 0.92	7.5	**Yes**	**2**	N	NA	31	**Yes**	**ASL**
7440-31-5	TIN	13.2	J	849		mg/kg	05SB080002	7/8	4.5 - 4.5	849	**Yes**	NA	N	NA	NA	No	NTX
7440-62-2	VANADIUM	9.9		22.9		mg/kg	05SB040002	8/8	---	22.9	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	**ZINC**	26.6		5110	J	mg/kg	05SB060002	8/8	---	5110	**Yes**	**620**	N	NA	14000	**Yes**	**ASL**
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	13	J	13	J	meq/1	05SB040002	1/1	---	13	NA	NA		NA	NA	No	NTX
	PH	5.1	J	5.1	J	S.U.	05SB040002	1/1	---	5.1	NA	NA		NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1700		1700		mg/kg	05SB040002	1/1	---	1700	NA	NA		NA	NA	No	NTX

SWMU 5 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 5, OLD BURN PIT
NWSC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Naphthalene is used as a surrogate for 2-methylnaphthalene.
9 Acenaphthene is used as a surrogate for acenaphthylene.
10 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Associated Samples:

05SB010002	05SB050002
05SB010102	05SB050102
05SB020002	05SB060002
05SB020102	05SB060102
05SB030002	05SB070002
05SB030102	05SB070102
05SB040002	05SB080002
05SB040102	05SB080102

Shaded cells indicate that the specified criterion or background level hs been exceeded or that the chemical has been selected as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen,
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to ground water (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.

NTX = No toxicity information.
NUT = Essential nutrient.

ASL = Above screening level.
BSL = Below screening level.
CAS = Chemical abstract services.

SWMU 5 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-34-3	1,1-DICHLOROETHANE	0.14		0.14		mg/kg	05SB030507	1/15	0.003 - 0.004	0.14	NA	51	N	1300	IDEM	No	BSL
75-35-4	1,1-DICHLOROETHENE	0.013	J	0.013	J	mg/kg	05SB060102	1/15	0.003 - 0.004	0.013	NA	12	N	0.67	IDEM	No	BSL
67-64-1	ACETONE	0.048		0.054		mg/kg	05SB030507	2/15	0.014 - 0.018	0.054	NA	160	N	3900	IDEM	No	BSL
71-43-2	BENZENE	0.003		0.017		mg/kg	05SB030507	3/15	0.003 - 0.004	0.017	NA	0.6	C	8.2	IDEM	No	BSL
75-00-3	CHLOROETHANE	0.048		0.048		mg/kg	05SB030507	1/15	0.003 - 0.004	0.048	NA	3	C	46	IDEM	No	BSL
156-59-2	CIS-1,2-DICHLOROETHENE	0.005		2.8	J	mg/kg	05SB060102	6/15	0.003 - 0.004	2.8	NA	4.3	N	110	IDEM	No	BSL
100-41-4	ETHYLBENZENE	0.019		0.019		mg/kg	05SB030507	1/15	0.003 - 0.004	0.019	NA	8.9	C	4600	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.042		mg/kg	05SB030507	5/15	0.003 - 0.004	0.042	NA	9.1	C	120	IDEM	No	BSL
127-18-4	TETRACHLOROETHENE	0.003		0.007	J	mg/kg	05SB060102	2/15	0.003 - 0.004	0.007	NA	1.5	C	48	IDEM	No	BSL
108-88-3	TOLUENE	0.027		0.027		mg/kg	05SB030507	1/15	0.003 - 0.004	0.027	NA	520	sat	1700	IDEM	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.007		0.029	J	mg/kg	05SB060102	2/15	0.003 - 0.004	0.029	NA	6.9	N	180	IDEM	No	BSL
79-01-6	**TRICHLOROETHENE**	0.004		5.1	J	mg/kg	05SB060102	8/15	0.003 - 0.004	5.1	NA	**0.053**	C	45	IDEM	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	0.005	J	0.16		mg/kg	05SB060608	5/15	0.003 - 0.004	0.16	NA	**0.079**	C	0.28	IDEM	**Yes**	**ASL**
1330-20-7	XYLENES, TOTAL	0.01		0.061		mg/kg	05SB030507	2/15	0.003 - 0.004	0.061	NA	27	N	4800	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.012		2.5	J	mg/kg	05SB030507	10/15	0.007 - 0.033	2.5	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
106-44-5	4-METHYLPHENOL	0.46		0.77	J	mg/kg	05SB060608	2/15	0.36 - 5.9	0.77	NA	31	N	910	IDEM	No	BSL
83-32-9	ACENAPHTHENE	0.01		0.12		mg/kg	05SB010002	6/15	0.007 - 5.9	0.12	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.009		0.052	J	mg/kg	05SB050608	5/15	0.007 - 5.9	0.052	NA	370(8)	N	9500(8)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.009		0.34	J	mg/kg	05SB050002	9/15	0.007 - 5.9	0.34	NA	2200	N	47000	IDEM	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.031		0.95	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.95	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.031		0.82	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.82	NA	**0.062**	C	**0.5**	IDEM	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.008		0.96		mg/kg	05SB070608	12/15	0.008 - 5.9	0.96	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.017		0.35	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.35	NA	230(9)	N	5500(9)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.028		0.67	J	mg/kg	05SB050002	8/15	0.007 - 5.9	0.67	NA	6.2	C	50	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.93		3.4		mg/kg	05SB050002	6/15	0.36 - 0.43	3.4	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.035		1.5	J	mg/kg	05SB030507	11/15	0.007 - 0.008	1.5	NA	62	C	500	IDEM	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.008		0.18	J	mg/kg	05SB050002	7/15	0.007 - 5.9	0.18	NA	**0.062**	C	0.5	IDEM	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.01		2.2	J	mg/kg	05SB050002	12/15	0.008 - 5.9	2.2	NA	230	N	6300	IDEM	No	BSL
86-73-7	FLUORENE	0.02		0.11	J	mg/kg	05SB050002	6/15	0.007 - 5.9	0.11	NA	260	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.015		0.36	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.36	NA	0.62	C	5	IDEM	No	BSL
91-20-3	NAPHTHALENE	0.023		1.2	J	mg/kg	05SB030507	10/15	0.007 - 0.033	1.2	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.012		2.8	J	mg/kg	05SB030507	12/15	0.008 - 0.008	2.8	NA	230(9)	N	5500(9)	IDEM	No	BSL
129-00-0	PYRENE	0.009		3.1	J	mg/kg	05SB030507	13/15	0.008 - 0.008	3.1	NA	230	N	5500	IDEM	No	BSL
PESTICIDES/PCBs																	
72-54-8	4,4'-DDD	0.008		0.008		mg/kg	05SB020406	1/14	0.0035 - 0.058	0.008	NA	2.4	C	28	IDEM	No	BSL
72-55-9	4,4'-DDE	0.0067		0.0067		mg/kg	05SB080002	1/12	0.0035 - 0.058	0.0067	NA	1.7	C	20	IDEM	No	BSL
11097-69-1	**AROCLOR-1254**	0.1	J	0.67		mg/kg	05SB060608	6/15	0.035 - 0.58	0.67	NA	**0.22**	C	1.8	IDEM	**Yes**	**ASL**
11096-82-5	**AROCLOR-1260**	0.64		0.64		mg/kg	05SB050608	1/15	0.035 - 0.58	0.64	NA	**0.22**	C	1.8	IDEM	**Yes**	**ASL**
60-57-1	DIELDRIN	0.0074		0.0074		mg/kg	05SB050608	1/15	0.0035 - 0.058	0.0074	NA	0.03	C	0.27	IDEM	No	BSL
72-43-5	METHOXYCHLOR	0.028	J	0.049	J	mg/kg	05SB070608	2/15	0.018 - 0.3	0.049	NA	31	N	910	IDEM	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.01	J	0.016	J	mg/kg	05SB080002	2/15	0.0029 - 0.047	0.016	NA	61	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0015	J	0.012		mg/kg	05SB050002	10/14	0.0008 - 0.012	0.012	NA	3	C	20	IDEM	No	BSL

SWMU 5 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
DIOXINS/FURANS																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	0.0000581	J	0.00505	J	mg/kg	05SB080002	15/15	---	0.00505	NA	0.039	C	NA	IDEM	No	BSL
39001-02-0	1,2,3,4,6,7,8,9-OCDF	0.00000026	J	0.000477	J	mg/kg	05SB070608	14/15	0.0000004 - 0.0000004	0.000477	NA	0.039	C	NA	IDEM	No	BSL
35822-46-9	**1,2,3,4,6,7,8-HPCDD**	0.0000072		0.000736	J	mg/kg	05SB030507	13/15	0.0000057 - 0.000009	0.000736	NA	**0.00039**	C	NA	IDEM	**Yes**	**ASL**
67562-39-4	**1,2,3,4,6,7,8-HPCDF**	0.0000121		0.00159	J	mg/kg	05SB030507	12/15	0.00000054 - 0.0000024	0.00159	NA	**0.00039**	C	NA	IDEM	**Yes**	**ASL**
55673-89-7	1,2,3,4,7,8,9-HPCDF	0.00000049	J	0.0000686		mg/kg	05SB070608	9/15	0.0000001 - 0.0000077	0.0000686	NA	0.00039	C	NA	IDEM	No	BSL
39227-28-6	**1,2,3,4,7,8-HXCDD**	0.00000026	J	0.0000849	J	mg/kg	05SB030507	8/15	0.00000013 - 0.000005	0.0000849	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
70648-26-9	**1,2,3,4,7,8-HXCDF**	0.0000037		0.00101	J	mg/kg	05SB030507	12/15	0.00000055 - 0.0000011	0.00101	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
57653-85-7	**1,2,3,6,7,8-HXCDD**	0.0000019	J	0.000192	J	mg/kg	05SB030507	12/15	0.00000014 - 0.00000062	0.000192	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
57117-44-9	**1,2,3,6,7,8-HXCDF**	0.00000028	J	0.000447	J	mg/kg	05SB030507	14/15	0.0000024 - 0.0000024	0.000447	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
19408-74-3	**1,2,3,7,8,9-HXCDD**	0.00000036	J	0.0000934	J	mg/kg	05SB070608	12/15	0.00000065 - 0.000022	0.0000934	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
72918-21-9	1,2,3,7,8,9-HXCDF	0.00000041	J	0.0000098	J	mg/kg	05SB060002	5/15	0.0000001 - 0.0000038	0.0000098	NA	0.000039	C	NA	IDEM	No	BSL
40321-76-4	**1,2,3,7,8-PECDD**	0.0000014	J	0.0000977	J	mg/kg	05SB030507	9/15	0.0000001 - 0.0000024	0.0000977	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
57117-41-6	**1,2,3,7,8-PECDF**	0.00000032	J	0.000378	J	mg/kg	05SB030507	8/15	0.0000002 - 0.0000304	0.000378	NA	**0.000078**	C	NA	IDEM	**Yes**	**ASL**
60851-34-5	**2,3,4,6,7,8-HXCDF**	0.0000024	J	0.000191		mg/kg	05SB070608	11/15	0.00000014 - 0.0000026	0.000191	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
57117-31-4	**2,3,4,7,8-PECDF**	0.00000022	J	0.000189		mg/kg	05SB070608	13/15	0.0000002 - 0.0000017	0.000189	NA	**0.0000078**	C	NA	IDEM	**Yes**	**ASL**
1746-01-6	**2,3,7,8-TCDD**	0.00000049	J	0.0000335	J	mg/kg	05SB030507	8/15	0.00000006 - 0.0000013	0.0000335	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
51207-31-9	**2,3,7,8-TCDF**	0.00000036	J	0.000453	J	mg/kg	05SB030507	13/15	0.0000002 - 0.0000031	0.000453	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
1746-01-6	**2,3,7,8-TCDD TEQ**	0.00000068		0.000464		mg/kg	05SB030507	15/15	-	0.000464	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
37871-00-4	TOTAL HPCDD	0.0000151		0.00169	J	mg/kg	05SB030507	13/15	0.0000102 - 0.0000174	0.00169	NA	NA	C	NA	IDEM	No	NTX
38998-75-3	TOTAL HPCDF	0.0000219	J	0.00185	J	mg/kg	05SB030507	11/15	0.00000054 - 0.000106	0.00185	NA	NA	C	NA	IDEM	No	NTX
34465-46-8	TOTAL HXCDD	0.000005	J	0.00304	J	mg/kg	05SB030507	8/15	0.00000065 - 0.0000686	0.00304	NA	NA	C	NA	IDEM	No	NTX
55684-94-1	TOTAL HXCDF	0.0000254	J	0.00394	J	mg/kg	05SB030507	4/15	0.0000015 - 0.00201	0.00394	NA	NA	C	NA	IDEM	No	NTX
36088-22-9	TOTAL PECDD	0.00228	J	0.00228	J	mg/kg	05SB030507	1/15	0.0000003 - 0.00084	0.00228	NA	NA	C	NA	IDEM	No	NTX
30402-15-4	TOTAL PECDF	0.0000013	J	0.00574	J	mg/kg	05SB030507	3/15	0.0000027 - 0.00291	0.00574	NA	NA	C	NA	IDEM	No	NTX
41903-57-5	TOTAL TCDD	0.000133		0.000404		mg/kg	05SB060002	2/15	0.00000028 - 0.00176	0.000404	NA	NA	C	NA	IDEM	No	NTX
55722-27-5	TOTAL TCDF	0.0000524		0.03684	J	mg/kg	05SB030507	2/15	0.0000002 - 0.00304	0.03684	NA	NA	C	NA	IDEM	No	NTX
INORGANICS																	
7429-90-5	ALUMINUM	3580	J	15700	J	mg/kg	05SB040204	15/15	---	15700	No	**7600**	N	NA	IDEM	No	BKG
7440-36-0	**ANTIMONY**	0.9	J	301	J	mg/kg	05SB060002	13/15	0.84 - 0.9	301	**Yes**	**3.1**	N	**140**	IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	2.9	J	26.8	J	mg/kg	05SB060002	15/15	---	26.8	**Yes**	**0.39**	C	**3.9**	IDEM	**Yes**	**ASL**
7440-39-3	**BARIUM**	30.3		2020		mg/kg	05SB060002	15/15	---	2020	**Yes**	**540**	N	23000	IDEM	**Yes**	**ASL**
7440-43-9	**CADMIUM**	1.6	J	31.1	J	mg/kg	05SB060002	11/15	0.8 - 0.9	31.1	**Yes**	**3.7**	N	**12**	IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	685	J	241000	J	mg/kg	05SB050002	12/15	399 - 449	241000	**Yes**	NA		NA	IDEM	No	NUT
7440-47-3	**CHROMIUM**	5.7	J	112	J	mg/kg	05SB060002	15/15	---	112	**Yes**	**30(10)**	C	430(10)	IDEM	**Yes**	**ASL**
7440-48-4	COBALT	5.5		35.8		mg/kg	05SB060002	15/15	---	35.8	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	**COPPER**	8.1	J	6370	J	mg/kg	05SB060608	15/15	---	6370	**Yes**	**310**	N	13000	IDEM	**Yes**	**ASL**
7439-89-6	**IRON**	11400	J	105000	J	mg/kg	05SB060002	15/15	---	105000	**Yes**	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	**LEAD**	8.2	J	16900	J	mg/kg	05SB060002	15/15	---	16900	**Yes**	**400(11)**	N	**400**	IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM	496	J	4900	J	mg/kg	05SB050002	15/15	---	4900	No	NA		NA	IDEM	No	NUT
7439-96-5	**MANGANESE**	157	J	1170		mg/kg	05SB040002	15/15	---	1170	**Yes**	**180**	N	NA	IDEM	**Yes**	**ASL**
7439-97-6	**MERCURY**	0.04	J	93.2		mg/kg	05SB050608	13/15	0.04 - 0.04	93.2	**Yes**	**2.3(12)**	N	**55**	IDEM	**Yes**	**ASL**
7440-02-0	NICKEL	8.8		62.6		mg/kg	05SB060002	15/15	---	62.6	**Yes**	160	N	6900	IDEM	No	BSL
7440-09-7	POTASSIUM	464	J	1520	J	mg/kg	05SB060608	10/15	399 - 462	1520	No	NA		NA	IDEM	No	NUT, BKG
7440-22-4	SILVER	1.7	J	16.1	J	mg/kg	05SB030507	7/15	0.8 - 0.92	16.1	**Yes**	39	N	1700	IDEM	No	BSL
7440-23-5	SODIUM	500		1300	J	mg/kg	05SB030507	3/15	399 - 478	1300	**Yes**	NA		NA	IDEM	No	NUT, BKG
7440-31-5	TIN	13.2	J	849		mg/kg	05SB080002	12/15	4.1 - 4.5	849	**Yes**	4700	N	NA	IDEM	No	BSL
7440-62-2	VANADIUM	9.6		22.9		mg/kg	05SB040002	15/15	---	22.9	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	**ZINC**	25.9		5110	J	mg/kg	05SB060002	15/15	---	5110	**Yes**	**2300**	N	100000	IDEM	**Yes**	**ASL**

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	3.2		13	J	meq/100 g	05SB040002	4/4	---	13	NA	NA		NA	IDEM	No	NTX
	pH	5.1	J	7.6	J	S.U.	05SB030507	4/4	---	7.6	NA	NA		NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	1500		72000		mg/kg	05SB030507	4/4	---	72000	NA	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to Base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994).
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001).

Associated Samples:

05SB010002	05SB050002	05SB010810	05SB050608
05SB010102	05SB050102	05SB020406	05SB060608
05SB020002	05SB060002	05SB030507	05SB070608
05SB020102	05SB060102	05SB040204	
05SB030002	05SB070002		
05SB030102	05SB070102		
05SB040002	05SB080002		
05SB040102	05SB080102		

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

ASL = Above screening level.
BSL = Below screening level.
CAS = Chemical abstract services.

Shaded cells indicate that the specified criteriono r background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 5 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS																	
75-34-3	1,1-DICHLOROETHANE	0.14		0.14		mg/kg	05SB030507	1/15	0.003 - 0.004	0.14	NA	1	N	1300	5.6	No	BSL
75-35-4	**1,1-DICHLOROETHENE**	0.013	J	0.013	J	mg/kg	05SB060102	1/15	0.003 - 0.004	0.013	NA	**0.003**	C	0.07	0.058	**Yes**	**ASL**
67-64-1	ACETONE	0.048		0.054		mg/kg	05SB030507	2/15	0.014 - 0.018	0.054	NA	0.8	N	100000	3.1	No	BSL
71-43-2	**BENZENE**	0.003		0.017		mg/kg	05SB030507	3/15	0.003 - 0.004	0.017	NA	**0.002**	C	0.8	0.034	**Yes**	**ASL**
75-00-3	CHLOROETHANE	0.048		0.048		mg/kg	05SB030507	1/15	0.003 - 0.004	0.048	NA	NA	C	NA	0.32	No	BSL
156-59-2	**CIS-1,2-DICHLOROETHENE**	0.005		2.8	J	mg/kg	05SB060102	6/15	0.003 - 0.004	2.8	NA	**0.02**	N	1200	**0.4**	**Yes**	**ASL**
100-41-4	ETHYLBENZENE	0.019		0.019		mg/kg	05SB030507	1/15	0.003 - 0.004	0.019	NA	0.7	N	400	13	No	BSL
75-09-2	**METHYLENE CHLORIDE**	0.004	J	0.042		mg/kg	05SB030507	5/15	0.003 - 0.004	0.042	NA	**0.001**	C	13	**0.023**	**Yes**	**ASL**
127-18-4	**TETRACHLOROETHENE**	0.003		0.007	J	mg/kg	05SB060102	2/15	0.003 - 0.004	0.007	NA	**0.003**	C	11	0.058	**Yes**	**ASL**
108-88-3	TOLUENE	0.027		0.027		mg/kg	05SB030507	1/15	0.003 - 0.004	0.027	NA	0.6	N	650	12	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.007		0.029	J	mg/kg	05SB060102	2/15	0.003 - 0.004	0.029	NA	0.03	N	3100	0.68	No	BSL
79-01-6	**TRICHLOROETHENE**	0.004		5.1	J	mg/kg	05SB060102	8/15	0.003 - 0.004	5.1	NA	**0.003**	C	**5**	**0.057**	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	0.005	J	0.16		mg/kg	05SB060608	5/15	0.003 - 0.004	0.16	NA	**0.0007**	C	**0.03**	**0.013**	**Yes**	**ASL**
1330-20-7	XYLENES, TOTAL	0.01		0.061		mg/kg	05SB030507	2/15	0.003 - 0.004	0.061	NA	10	N	410	190	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	**2-METHYLNAPHTHALENE**	0.012		2.5	J	mg/kg	05SB030507	10/15	0.007 - 0.033	2.5	NA	4(8)	N	NA	**0.7(8)**	**Yes**	**ASL**
106-44-5	4-METHYLPHENOL	0.46		0.77	J	mg/kg	05SB060608	2/15	0.36 - 5.9	0.77	NA	NA	N	NA	1.1	No	BSL
83-32-9	ACENAPHTHENE	0.01		0.12		mg/kg	05SB010002	6/15	0.007 - 5.9	0.12	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.009		0.052	J	mg/kg	05SB050608	5/15	0.007 - 5.9	0.052	NA	29(9)	N	NA	130(9)	No	BSL
120-12-7	ANTHRACENE	0.009		0.34	J	mg/kg	05SB050002	9/15	0.007 - 5.9	0.34	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.031		0.95	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.95	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.031		0.82	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.82	NA	**0.4**	C	NA	8.2	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.008		0.96		mg/kg	05SB070608	12/15	0.008 - 5.9	0.96	NA	**0.2**	C	NA	57	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.017		0.35	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.35	NA	210(10)	N	NA	570(10)	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.028		0.67	J	mg/kg	05SB050002	8/15	0.007 - 5.9	0.67	NA	2	C	NA	39	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.93		3.4		mg/kg	05SB050002	6/15	0.36 - 0.43	3.4	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0.035		1.5	J	mg/kg	05SB030507	11/15	0.007 - 0.008	1.5	NA	8	C	NA	25	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.008		0.18	J	mg/kg	05SB050002	7/15	0.007 - 5.9	0.18	NA	**0.08**	C	NA	18	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.01		2.2	J	mg/kg	05SB050002	12/15	0.008 - 5.9	2.2	NA	210	N	NA	880	No	BSL
86-73-7	FLUORENE	0.02		0.11	J	mg/kg	05SB050002	6/15	0.007 - 5.9	0.11	NA	28	N	NA	170	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.015		0.36	J	mg/kg	05SB050002	10/15	0.007 - 5.9	0.36	NA	0.7	C	NA	3.1	No	BSL
91-20-3	**NAPHTHALENE**	0.023		1.2	J	mg/kg	05SB030507	10/15	0.007 - 0.033	1.2	NA	4	N	NA	**0.7**	**Yes**	**ASL**
85-01-8	PHENANTHRENE	0.012		2.8	J	mg/kg	05SB030507	12/15	0.008 - 0.008	2.8	NA	210(10)	N	NA	570(10)	No	BSL
129-00-0	PYRENE	0.009		3.1	J	mg/kg	05SB030507	13/15	0.008 - 0.008	3.1	NA	210	N	NA	570	No	BSL
PESTICIDES/PCBs																	
72-54-8	4,4'-DDD	0.008		0.008		mg/kg	05SB020406	1/14	0.0035 - 0.058	0.008	NA	0.8	C	NA	140	No	BSL
72-55-9	4,4'-DDE	0.0067		0.0067		mg/kg	05SB080002	1/12	0.0035 - 0.058	0.0067	NA	3	C	NA	450	No	BSL
11097-69-1	AROCLOR-1254	0.1	J	0.67		mg/kg	05SB060608	6/15	0.035 - 0.58	0.67	NA	NA	C	NA	6.2	No	BSL
11096-82-5	AROCLOR-1260	0.64		0.64		mg/kg	05SB050608	1/15	0.035 - 0.58	0.64	NA	NA	C	NA	6.2	No	BSL
60-57-1	**DIELDRIN**	0.0074		0.0074		mg/kg	05SB050608	1/15	0.0035 - 0.058	0.0074	NA	**0.0002**	C	1	0.046	**Yes**	**ASL**
72-43-5	METHOXYCHLOR	0.028	J	0.049	J	mg/kg	05SB070608	2/15	0.018 - 0.3	0.049	NA	8	N	NA	160	No	BSL
HERBICIDES																	
93-76-5	2,4,5-T	0.01	J	0.016	J	mg/kg	05SB080002	2/15	0.0029 - 0.047	0.016	NA	NA	N	NA	NA	No	NTX
87-86-5	**PENTACHLOROPHENOL**	0.0015	J	0.012		mg/kg	05SB050002	10/14	0.0008 - 0.012	0.012	NA	**0.001**	C	NA	0.028	**Yes**	**ASL**

SWMU 5 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
DIOXINS/FURANS																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	0.0000581	J	0.00505	J	mg/kg	05SB080002	15/15	---	0.00505	NA	NA	C	NA	NA	No	NTX
39001-02-0	1,2,3,4,6,7,8,9-OCDF	0.00000026	J	0.000477	J	mg/kg	05SB070608	14/15	0.0000004 - 0.0000004	0.000477	NA	NA	C	NA	NA	No	NTX
35822-46-9	1,2,3,4,6,7,8-HPCDD	0.0000072		0.000736	J	mg/kg	05SB030507	13/15	0.0000057 - 0.000009	0.000736	NA	NA	C	NA	NA	No	NTX
67562-39-4	1,2,3,4,6,7,8-HPCDF	0.0000121		0.00159	J	mg/kg	05SB030507	12/15	0.00000054 - 0.0000024	0.00159	NA	NA	C	NA	NA	No	NTX
55673-89-7	1,2,3,4,7,8,9-HPCDF	0.00000049	J	0.0000686		mg/kg	05SB070608	9/15	0.0000001 - 0.0000077	0.0000686	NA	NA	C	NA	NA	No	NTX
39227-28-6	1,2,3,4,7,8-HXCDD	0.00000026	J	0.0000849	J	mg/kg	05SB030507	8/15	0.00000013 - 0.000005	0.0000849	NA	NA	C	NA	NA	No	NTX
70648-26-9	1,2,3,4,7,8-HXCDF	0.0000037		0.00101	J	mg/kg	05SB030507	12/15	0.00000055 - 0.0000011	0.00101	NA	NA	C	NA	NA	No	NTX
57653-85-7	1,2,3,6,7,8-HXCDD	0.0000019	J	0.000192	J	mg/kg	05SB030507	12/15	0.00000014 - 0.00000062	0.000192	NA	NA	C	NA	NA	No	NTX
57117-44-9	1,2,3,6,7,8-HXCDF	0.00000028	J	0.000447	J	mg/kg	05SB030507	14/15	0.0000024 - 0.0000024	0.000447	NA	NA	C	NA	NA	No	NTX
19408-74-3	1,2,3,7,8,9-HXCDD	0.00000036	J	0.0000934	J	mg/kg	05SB070608	12/15	0.00000065 - 0.000022	0.0000934	NA	NA	C	NA	NA	No	NTX
72918-21-9	1,2,3,7,8,9-HXCDF	0.00000041	J	0.0000098	J	mg/kg	05SB060002	5/15	0.0000001 - 0.0000038	0.0000098	NA	NA	C	NA	NA	No	NTX
40321-76-4	1,2,3,7,8-PECDD	0.0000014	J	0.0000977	J	mg/kg	05SB030507	9/15	0.0000001 - 0.0000024	0.0000977	NA	NA	C	NA	NA	No	NTX
57117-41-6	1,2,3,7,8-PECDF	0.00000032	J	0.000378	J	mg/kg	05SB030507	8/15	0.0000002 - 0.0000304	0.000378	NA	NA	C	NA	NA	No	NTX
60851-34-5	2,3,4,6,7,8-HXCDF	0.0000024	J	0.000191		mg/kg	05SB070608	11/15	0.00000014 - 0.0000026	0.000191	NA	NA	C	NA	NA	No	NTX
57117-31-4	2,3,4,7,8-PECDF	0.00000022	J	0.000189		mg/kg	05SB070608	13/15	0.0000002 - 0.0000017	0.000189	NA	NA	C	NA	NA	No	NTX
1746-01-6	2,3,7,8-TCDD	0.00000049	J	0.0000335	J	mg/kg	05SB030507	8/15	0.00000006 - 0.0000013	0.0000335	NA	NA	C	NA	NA	No	NTX
51207-31-9	2,3,7,8-TCDF	0.00000036	J	0.000453	J	mg/kg	05SB030507	13/15	0.0000002 - 0.0000031	0.000453	NA	NA	C	NA	NA	No	NTX
1746-01-6	2,3,7,8-TCDD TEQ	0.00000068		0.000464		mg/kg	05SB030507	15/15	-	0.000464	NA	NA	C	NA	NA	No	NTX
37871-00-4	TOTAL HPCDD	0.0000151		0.00169	J	mg/kg	05SB030507	13/15	0.0000102 - 0.0000174	0.00169	NA	NA	C	NA	NA	No	NTX
38998-75-3	TOTAL HPCDF	0.0000219	J	0.00185	J	mg/kg	05SB030507	11/15	0.00000054 - 0.000106	0.00185	NA	NA	C	NA	NA	No	NTX
34465-46-8	TOTAL HXCDD	0.000005	J	0.00304	J	mg/kg	05SB030507	8/15	0.00000065 - 0.0000686	0.00304	NA	NA	C	NA	NA	No	NTX
55684-94-1	TOTAL HXCDF	0.0000254	J	0.00394	J	mg/kg	05SB030507	4/15	0.0000015 - 0.00201	0.00394	NA	NA	C	NA	NA	No	NTX
36088-22-9	TOTAL PECDD	0.00228	J	0.00228	J	mg/kg	05SB030507	1/15	0.0000003 - 0.00084	0.00228	NA	NA	C	NA	NA	No	NTX
30402-15-4	TOTAL PECDF	0.0000013	J	0.00574	J	mg/kg	05SB030507	3/15	0.0000027 - 0.00291	0.00574	NA	NA	C	NA	NA	No	NTX
41903-57-5	TOTAL TCDD	0.000133		0.000404		mg/kg	05SB060002	2/15	0.00000028 - 0.00176	0.000404	NA	NA	C	NA	NA	No	NTX
55722-27-5	TOTAL TCDF	0.0000524		0.03684	J	mg/kg	05SB030507	2/15	0.0000002 - 0.00304	0.03684	NA	NA	C	NA	NA	No	NTX
INORGANICS																	
7429-90-5	ALUMINUM	3580	J	15700	J	mg/kg	05SB040204	15/15	---	15700	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	**ANTIMONY**	0.9	J	301	J	mg/kg	05SB060002	13/15	0.84 - 0.9	301	**Yes**	**0.3**	N	NA	**5.4**	**Yes**	**ASL**
7440-38-2	**ARSENIC**	2.9	J	26.8	J	mg/kg	05SB060002	15/15	---	26.8	**Yes**	**1**	C	750	29	**Yes**	**ASL**
7440-39-3	**BARIUM**	30.3		2020		mg/kg	05SB060002	15/15	---	2020	**Yes**	**82**	N	690000	**1600**	**Yes**	**ASL**
7440-43-9	**CADMIUM**	1.6	J	31.1	J	mg/kg	05SB060002	11/15	0.8 - 0.9	31.1	**Yes**	**0.4**	N	1800	**7.5**	**Yes**	**ASL**
7440-70-2	CALCIUM	685	J	241000	J	mg/kg	05SB050002	12/15	399 - 449	241000	**Yes**	NA	0	NA	NA	No	NUT
7440-47-3	**CHROMIUM**	5.7	J	112	J	mg/kg	05SB060002	15/15	---	112	**Yes**	**2**	C	270	**38**	**Yes**	**ASL**
7440-48-4	COBALT	5.5		35.8		mg/kg	05SB060002	15/15	---	35.8	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	**COPPER**	8.1	J	6370	J	mg/kg	05SB060608	15/15	---	6370	**Yes**	NA	N	NA	**580**	**Yes**	**ASL**
7439-89-6	IRON	11400	J	105000	J	mg/kg	05SB060002	15/15	---	105000	**Yes**	NA	N	NA	NA	No	NTX
7439-92-1	**LEAD**	8.2	J	16900	J	mg/kg	05SB060002	15/15	---	16900	**Yes**	NA	N	NA	**81**	**Yes**	**ASL**
7439-95-4	MAGNESIUM	496	J	4900	J	mg/kg	05SB050002	15/15	---	4900	No	NA	0	NA	NA	No	NUT, BKG
7439-96-5	MANGANESE	157	J	1170		mg/kg	05SB040002	15/15	---	1170	**Yes**	NA	N	NA	NA	No	NTX
7439-97-6	**MERCURY**	0.04	J	93.2		mg/kg	05SB050608	13/15	0.04 - 0.04	93.2	**Yes**	**0.1**	N	**10**	**2.1**	**Yes**	**ASL**
7440-02-0	**NICKEL**	8.8		62.6		mg/kg	05SB060002	15/15	---	62.6	**Yes**	**7**	N	13000	950	**Yes**	**ASL**
7440-09-7	POTASSIUM	464	J	1520	J	mg/kg	05SB060608	10/15	399 - 462	1520	No	NA	0	NA	NA	No	NUT, BKG
7440-22-4	**SILVER**	1.7	J	16.1	J	mg/kg	05SB030507	7/15	0.8 - 0.92	16.1	**Yes**	**2**	N	NA	31	**Yes**	**ASL**
7440-23-5	SODIUM	500		1300	J	mg/kg	05SB030507	3/15	399 - 478	1300	**Yes**	NA	0	NA	NA	No	NUT
7440-31-5	TIN	13.2	J	849		mg/kg	05SB080002	12/15	4.1 - 4.5	849	**Yes**	NA	N	NA	NA	No	NTX
7440-62-2	VANADIUM	9.6		22.9		mg/kg	05SB040002	15/15	---	22.9	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	**ZINC**	25.9		5110	J	mg/kg	05SB060002	15/15	---	5110	**Yes**	**620**	N	NA	14000	**Yes**	**ASL**

SWMU 5 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)	USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	3.2		13	J	meq/100 g	05SB040002	4/4	---	13	NA	NA	NA	NA	No	NTX
	pH	5.1	J	7.6	J	S.U.	05SB030507	4/4	---	7.6	NA	NA	NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1500		72000		mg/kg	05SB030507	4/4	---	72000	NA	NA	NA	NA	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Naphthalene is used as a surrogate for 2-methylnaphthalene.
9 Acenaphthene is used as a surrogate for acenaphthylene.
10 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Associated Samples:

05SB010002	05SB050002	05SB010810	05SB050608
05SB010102	05SB050102	05SB020406	05SB060608
05SB020002	05SB060002	05SB030507	05SB070608
05SB020102	05SB060102	05SB040204	
05SB030002	05SB070002		
05SB030102	05SB070102		
05SB040002	05SB080002		
05SB040102	05SB080102		

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to groundwater (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.

NTX = No toxicity information.
NUT = Essential nutrient.

ASL = Above screening level.
BSL = Below screening level.
CAS = Chemical abstract services.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 5 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
VOLATILE ORGANICS																	
67-66-3	**CHLOROFORM**	1		1		µg/L	05GWT0101	1/14	0.3	1	NA	**0.62**	C	80 100	FED-MCL IDEM	**Yes**	**ASL**
156-59-2	CIS-1,2-DICHLOROETHENE	3		3		µg/L	05GW1501	1/14	1	3	NA	6.1	N	70 70	FED-MCL IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
117-81-7	**BIS(2-ETHYLHEXYL)PHTHALATE**	110		110		µg/L	05GW0801	1/14	2 - 4	110	NA	**4.8**	C	**6** **6**	FED-MCL IDEM	**Yes**	**ASL**
DIOXINS / FURANS																	
3268-87-9	OCDD	6.1	J	269	J	pg/L	05GW1301	10/14	3.8 - 54.5	269	NA	4500	C	NA NA	FED-MCL IDEM	No	BSL
39001-02-0	OCDF	6.8	J	6.8	J	pg/L	05GW1301	1/14	1.8 - 39.3	6.8	NA	4500	C	NA NA	FED-MCL IDEM	No	BSL
35822-46-9	1,2,3,4,6,7,8-HPCDD	7.1	J	12.2	J	pg/L	05GW1301	2/14	2 - 31.1	12.2	NA	45	C	NA NA	FED-MCL IDEM	No	BSL
1746-01-6	**2,3,7,8-TCDD**	6.3	J	11.3		pg/L	05GWT0301	2/14	1 - 5.4	11.3	NA	**0.45**	C	30 NA	FED-MCL IDEM	**Yes**	**ASL**
37871-00-4	TOTAL HPCDD	16.2		16.2		pg/L	05GW1501	1/14	2 - 31.1	16.2	NA	NA		NA NA	FED-MCL IDEM	No	BSL
38998-75-3	TOTAL HPCDF	2.4		2.4		pg/L	05GW1301	1/14	1.2 - 16.3	2.4	NA	NA		NA NA	FED-MCL IDEM	No	BSL
41903-57-5	TOTAL TCDD	6.3		11.3		pg/L	05GWT0301	2/14	1 - 5.4	11.3	NA	NA		NA NA	FED-MCL IDEM	No	BSL
	2,3,7,8-TCDD EQUIVALENT	1.71		15.9		pg/L	05GWT0301	10/14	NA	15.9	NA	**0.45**	C	30 NA	FED-MCL IDEM	**Yes**	**ASL**
INORGANICS																	
7429-90-5	**ALUMINUM**	341	J	2320	J	µg/L	05GW0301	2/14	200	2320	ND	3600	N	**50 to 200(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.12		1.6		µg/L	05GW1501	8/14	1	1.6	**0.14**	**0.045**	C	50 50	FED-AL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	36.1		227		µg/L	05GW0701	14/14	---	227	**82.1**	260	N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM	17200		91500		µg/L	05GW0201	13/14	5000	91500	**22900**	NA		NA NA	FED-MCL IDEM	No	NUT
7440-50-8	COPPER	4.9		4.9		µg/L	05GW0301	1/14	2	4.9	ND	150	N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	150		4440		µg/L	05GW0301	13/14	100	4440	**658**	**1100**	N	**300(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-92-1	LEAD	4.1		4.1		µg/L	05GW0301	1/14	1	4.1	ND	15		15 NA	FED-AL IDEM	No	BSL
7439-95-4	MAGNESIUM	5000	J	27600	J	µg/L	05GW0701	12/14	5000	27600	**7000**	NA		NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	18.3		2270	J	µg/L	05GW1501	10/14	15	2270	**182**	**88**	N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7782-49-2	SELENIUM	1.4		1.4		µg/L	05GWT0301	1/14	1	1.4	ND	18	N	50 50	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM	5120		28800	J	µg/L	05GW0701	10/14	5000	28800	ND	NA		NA NA	FED-MCL IDEM	No	NUT
7440-62-2	VANADIUM	4.9		4.9		µg/L	05GW0301	1/14	2	4.9	ND	26	N	NA NA	FED-MCL IDEM	No	BSL
7440-66-6	ZINC	25.5		25.5		µg/L	05GW0301	1/14	10	25.5	41.3	1100	N	5000(7) 11000	FED-MCL IDEM	No	BSL,BKG

SWMU 5 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
FILTERED METALS																
7440-39-3	BARIUM, FILTERED	33.2		61.1		µg/L	05GW0301-F	2/2	---	61.1	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM, FILTERED	5000		61600		µg/L	05GW1301-F	2/2	---	61600	NA	NA	NA NA	FED-MCL IDEM	No	NUT
7439-89-6	IRON, FILTERED	137		137		µg/L	05GW1301-F	1/2	100	137	NA	1100 N	300(7) NA	FED-MCL IDEM	No	BSL
7439-95-4	MAGNESIUM, FILTERED	13200	J	13200	J	µg/L	05GW1301-F	1/2	5000	13200	NA	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE, FILTERED**	15.4		51.2		µg/L	05GW1301-F	2/2	---	51.2	NA	88 N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM, FILTERED	5010	J	5010	J	µg/L	05GW1301-F	1/2	5000	5010	NA	NA	NA NA	FED-MCL IDEM	No	NUT

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum groundwater concentrations were compared to concentrations in upgradient groundwater sample 05GW0101. If the concentration in the site groundwater concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.SEPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

05GW0201	05GW0701	05GW1501
05GW0301	05GW0801	05GW1601
05GW0301-F	05GW0901	05GW1901
05GW0401	05GW1301	05GWT0101
05GW0601	05GW1301-F	05GWT0201
		05GWT0301

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for ground water (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

ASL = Above screening level.
BSL = Below screening level.
CAS = Chemical abstract services.

SWMU 5 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
VOLATILE ORGANICS																	
75-35-4	1,1-DICHLOROETHENE	2		2		µg/L	05SW0201	1/4	1	2	NA	34	N	7 7	FED-MCL IDEM	No	BSL
156-59-2	**CIS-1,2-DICHLOROETHENE**	1		290		µg/L	05SW0201	3/4	1	290	NA	**6.1**	N	**70** **70**	FED-MCL IDEM	**Yes**	**ASL**
156-60-5	TRANS-1,2-DICHLOROETHENE	3		9		µg/L	05SW0201	2/4	1	9	NA	12	N	100 100	FED-MCL IDEM	No	BSL
79-01-6	**TRICHLOROETHENE**	48		120		µg/L	05SW0201	2/4	1	120	NA	**0.028**	C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
75-01-4	**VINYL CHLORIDE**	18		85		µg/L	05SW0201	2/4	1	85	NA	**0.02**	C	**2** **2**	FED-MCL IDEM	**Yes**	**ASL**
SEMIVOLATILE ORGANICS																	
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	2		2		µg/L	05SW0201	1/4	2	2	NA	4.8	C	6 6	FED-MCL IDEM	No	BSL
DIOXINS / FURANS																	
36088-22-9	TOTAL PECDD	9.4		9.4		pg/L	05SW0401	1/4	6.7 - 7.2	9.4	NA	NA	C	NA NA	FED-MCL IDEM	No	BSL
INORGANICS																	
7429-90-5	**ALUMINUM**	204	J	204	J	µg/L	05SW0401	1/4	200	204	ND	3600	N	**50 to 200(7)** NA	FED-AL IDEM	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.3		1.3		µg/L	05SW0501	1/4	1	1.3	ND	1.5	N	6 NA	FED-MCL IDEM	No	NUT
7440-38-2	**ARSENIC**	0.34		0.64		µg/L	05SW0401	4/4	---	0.64	**0.55**	**0.045**	C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	68.3	J	184	J	µg/L	05SW0501	4/4	---	184	**67.7**	260	N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM	7570		72600		µg/L	05SW0501	4/4	---	72600	**29200**	NA		NA NA	FED-MCL IDEM	No	NUT
7440-50-8	COPPER	2.4		2.7		µg/L	05SW0201	2/4	2	2.7	ND	150	N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	337	J	1520	J	µg/L	05SW0401	4/4	---	1520	**284**	**1100**	N	**300(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM	9880	J	11900	J	µg/L	05SW0301	3/4	5000	11900	**6490**	NA		NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	105		315		µg/L	05SW0301	3/4	15	315	**41.4**	**88**	N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM	9330		22800		µg/L	05SW0401	4/4	---	22800	30700	NA		NA NA	FED-MCL IDEM	No	NUT, BKG
7440-66-6	ZINC	19.5		19.9		µg/L	05SW0301	2/4	10	19.9	ND	1100	N	5000(7) 11000	FED-MCL IDEM	No	BSL
FILTERED METALS																	
7440-36-0	ANTIMONY, FILTERED	1.3		1.3		µg/L	05SW0501-F	1/4	1	1.3	ND	1.5	N	6 NA	FED-MCL IDEM	No	BSL
7440-38-2	**ARSENIC, FILTERED**	0.29		0.56		µg/L	05SW0401-F	4/4	---	0.56	**0.51**	**0.045**	C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM, FILTERED	66.1	J	174	J	µg/L	05SW0501-F	4/4	---	174	**68**	260	N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM, FILTERED	7920		74900		µg/L	05SW0501-F	4/4	---	74900	**29500**	NA		NA NA	FED-MCL IDEM	No	NUT
7440-50-8	COPPER, FILTERED	2.1		2.1		µg/L	05SW0501-F	1/4	2	2.1	ND	150	N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON, FILTERED**	209	J	594	J	µg/L	05SW0401-F	4/4	---	594	**103**	1100	N	**300(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM, FILTERED	5140	J	12500	J	µg/L	05SW0301-F	4/4	---	12500	**6960**	NA		NA NA	FED-MCL IDEM	No	NUT

SWMU 5 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7439-96-5	**MANGANESE, FILTERED**	85.8		304		µg/L	05SW0301-F	3/4	15	304	**33.9**	**88** N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM, FILTERED	9150		22800		µg/L	05SW0401-F	4/4	---	22800	27900	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7440-66-6	ZINC, FILTERED	16.9		20		µg/L	05SW0301-F	2/4	10	20	ND	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL
MISCELLANEOUS PARAMETERS																
	HARDNESS	38000		230000		µg/L	05SW0501	4/4	---	230000	99000	NA	NA NA	FED-MCL IDEM	No	NTX
	TOTAL SUSPENDED SOLIDS	2000		52000		µg/L	05SW0201	3/4	2000	52000	5000	NA	NA NA	FED-MCL IDEM	No	NTX

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum surface water concentrations were compared to concentrations in upgradient surface water sample 05SW0101. If the concentration in the site surface water concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (USEPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

05SW0201	05SW0201-F
05SW0301	05SW0301-F
05SW0401	05SW0401-F
05SW0501	05SW0501-F

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for ground water (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.
For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

CAS = Chemical abstract services.

SWMU 5 - TABLE 2.7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
156-59-2	CIS-1,2-DICHLOROETHENE	1		1		mg/kg	05SD020006	1/4	0.004 -0.008	1	NA	4.3	N	110	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.005	J	0.008	J	mg/kg	05SD040006	4/4	---	0.008	NA	9.1	C	120	IDEM	No	BSL
79-01-6	**TRICHLOROETHENE**	0.7		0.7		mg/kg	05SD020006	1/4	0.004 -0.008	0.7	NA	**0.053**	C	45	IDEM	**Yes**	**ASL**
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.024		0.024		mg/kg	05SD050006	1/4	0.010 - 0.014	0.024	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.019		0.026		mg/kg	05SD020006	3/4	0.014	0.026	NA	0.62	C	5	IDEM	No	BSL
50-32-8	BENZO(A)PYRENE	0.022		0.03		mg/kg	05SD050006	3/4	0.014	0.03	NA	0.062	C	0.5	IDEM	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.025		0.045		mg/kg	05SD050006	3/4	0.014	0.045	NA	0.62	C	5	IDEM	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.014		0.045		mg/kg	05SD050006	3/4	0.014	0.045	NA	230(8)	N	5500(8)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.018		0.033		mg/kg	05SD050006	3/4	0.014	0.033	NA	6.2	C	50	IDEM	No	BSL
218-01-9	CHRYSENE	0.025		0.039		mg/kg	05SD050006	3/4	0.014	0.039	NA	62	C	500	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.016		0.016		mg/kg	05SD050006	1/4	0.010 - 0.014	0.016	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.016		0.055		mg/kg	05SD020006	4/4	---	0.055	NA	230	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.012		0.027		mg/kg	05SD050006	3/4	0.014	0.027	NA	0.62	C	5	IDEM	No	BSL
91-20-3	NAPHTHALENE	0.016		0.016		mg/kg	05SD050006	1/4	0.010 - 0.014	0.016	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.022		0.031		mg/kg	05SD020006	3/4	0.014	0.031	NA	230(8)	N	5500(8)	IDEM	No	BSL
129-00-0	PYRENE	0.034		0.047		mg/kg	05SD020006	3/4	0.014	0.047	NA	230	N	5500	IDEM	No	BSL
PESTICIDES/PCBs																	
11096-82-5	AROCLOR-1260	0.17		0.17		mg/kg	05SD050006	1/4	0.049 -0.067	0.17	NA	0.22	C	1.8	IDEM	No	BSL
HERBICIDES																	
70-30-4	HEXACHLOROPHENE	0.0031	J	0.0031	J	mg/kg	05SD040006	1/4	0.00096 -0.001	0.0031	NA	1.8	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.006	J	0.006	J	mg/kg	05SD050006	1/4	1 - 1.4	0.006	NA	3	C	20	IDEM	No	BSL
DIOXINS/FURANS																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	0.00116	J	0.00611	J	mg/kg	05SD020006	4/4	---	0.00611	NA	0.039	C	NA	IDEM	No	BSL
39001-02-0	1,2,3,4,6,7,8,9-OCDF	0.0000022	J	0.000223	J	mg/kg	05SD020006	4/4	---	0.000223	NA	0.039	C	NA	IDEM	No	BSL
35822-46-9	1,2,3,4,6,7,8-HPCDD	0.0000355	J	0.000203	J	mg/kg	05SD020006	4/4	---	0.000203	NA	0.00039	C	NA	IDEM	No	BSL
67562-39-4	1,2,3,4,6,7,8-HPCDF	0.0000045		0.0000861	J	mg/kg	05SD020006	4/4	---	0.0000861	NA	0.00039	C	NA	IDEM	No	BSL
55673-89-7	1,2,3,4,7,8,9-HPCDF	0.0000016	J	0.0000065	J	mg/kg	05SD020006	3/4	0.00000032	0.0000065	NA	0.00039	C	NA	IDEM	No	BSL
39227-28-6	1,2,3,4,7,8-HXCDD	0.0000005	J	0.0000027	J	mg/kg	05SD020006	4/4	---	0.0000027	NA	0.000039	C	NA	IDEM	No	BSL
70648-26-9	1,2,3,4,7,8-HXCDF	0.0000032		0.000021	J	mg/kg	05SD020006	4/4	---	0.000021	NA	0.000039	C	NA	IDEM	No	BSL
57653-85-7	1,2,3,6,7,8-HXCDD	0.00000092	J	0.0000072		mg/kg	05SD020006	4/4	---	0.0000072	NA	0.000039	C	NA	IDEM	No	BSL
57117-44-9	1,2,3,6,7,8-HXCDF	0.0000014	J	0.0000083		mg/kg	05SD020006	4/4	---	0.0000083	NA	0.000039	C	NA	IDEM	No	BSL
19408-74-3	1,2,3,7,8,9-HXCDD	0.0000015	J	0.0000077		mg/kg	05SD020006	4/4	---	0.0000077	NA	0.000039	C	NA	IDEM	No	BSL
72918-21-9	1,2,3,7,8,9-HXCDF	0.00000056	J	0.0000014	J	mg/kg	05SD020006	3/4	0.0000001	0.0000014	NA	0.000039	C	NA	IDEM	No	BSL
40321-76-4	1,2,3,7,8-PECDD	0.00000067	J	0.0000022	J	mg/kg	05SD020006	3/4	0.00000029	0.0000022	NA	0.0000039	C	NA	IDEM	No	BSL
57117-41-6	1,2,3,7,8-PECDF	0.0000016	J	0.0000059	J	mg/kg	05SD020006	3/4	0.000002	0.0000059	NA	0.000078	C	NA	IDEM	No	BSL
60851-34-5	2,3,4,6,7,8-HXCDF	0.000001	J	0.0000107	J	mg/kg	05SD020006	4/4	---	0.0000107	NA	0.000039	C	NA	IDEM	No	BSL
57117-31-4	**2,3,4,7,8-PECDF**	0.0000013	J	0.0000093	J	mg/kg	05SD020006	4/4	---	0.0000093	NA	**0.0000078**	C	NA	IDEM	**Yes**	**ASL**
1746-01-6	2,3,7,8-TCDD	0.00000026	J	0.0000037		mg/kg	05SD050006	4/4	---	0.0000037	NA	0.0000039	C	NA	IDEM	No	BSL
51207-31-9	2,3,7,8-TCDF	0.0000022	J	0.000007		mg/kg	05SD020006	4/4	---	0.000007	NA	0.000039	C	NA	IDEM	No	BSL
1746-01-6	**2,3,7,8-TCDD TEQ**	0.0000025		0.0000183		mg/kg	05SD020006	4/4	-	0.0000183	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
37871-00-4	TOTAL HPCDD	0.000084	J	0.000422		mg/kg	05SD020006	4/4	---	0.000422	NA	NA	C	NA	IDEM	No	NTX
38998-75-3	TOTAL HPCDF	0.000107	J	0.000107	J	mg/kg	05SD050006	1/4	0.0000068 - 0.000259	0.000107	NA	NA	C	NA	IDEM	No	NTX

SWMU 5 - TABLE 2.7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
INORGANICS																	
7429-90-5	**ALUMINUM**	3790	J	7660	J	mg/kg	05SD050006	4/4	---	7660	**5610**	**7600**	N	NA	IDEM	**Yes**	**ASL**
7440-36-0	**ANTIMONY**	1.6		5.8		mg/kg	05SD050006	3/4	1.6	5.8	ND	**3.1**	N	140	IDEM	**Yes**	**ASL**
7440-38-2	ARSENIC	1.9		5.3		mg/kg	05SD050006	4/4	---	5.3	6.1	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	BARIUM	76.6	J	148	J	mg/kg	05SD050006	4/4	---	148	**54.5**	540	N	23000	IDEM	No	BSL
7440-43-9	CADMIUM	2.5	J	2.5	J	mg/kg	05SD050006	1/4	1.1 - 1.6	2.5	ND	3.7	N	12	IDEM	No	BSL
7440-70-2	CALCIUM	1540	J	57300	J	mg/kg	05SD050006	4/4	---	57300	**12400**	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	6.9	J	17.4	J	mg/kg	05SD050006	4/4	---	17.4	**13.4**	30(9)	C	430(9)	IDEM	No	BSL
7440-48-4	COBALT	4		5.9		mg/kg	05SD020006	4/4	---	5.9	9.5	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	9.5	J	37.1	J	mg/kg	05SD050006	4/4	---	37.1	**12**	310	N	13000	IDEM	No	BSL
7439-89-6	IRON	5030	J	14000	J	mg/kg	05SD050006	4/4	---	14000	24400	**2300**	N	NA	IDEM	No	BKG
7439-92-1	LEAD	15.1		130		mg/kg	05SD050006	4/4	---	130	**20.9**	400(10)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	734		4010	J	mg/kg	05SD050006	3/4	788	4010	**1540**	NA		NA	IDEM	No	NUT
7439-96-5	**MANGANESE**	109	J	812	J	mg/kg	05SD030006	4/4	---	812	**346**	**180**	N	NA	IDEM	**Yes**	**ASL**
7439-97-6	MERCURY	0.04		0.09	J	mg/kg	05SD050006	2/4	0.05 - 0.08	0.09	**0.03**	2.3(11)	N	55	IDEM	No	BSL
7440-02-0	NICKEL	9.2		14.5		mg/kg	05SD030006	4/4	---	14.5	22.5	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	648		648		mg/kg	05SD050006	1/4	544 - 788	648	**464**	NA		NA	IDEM	No	NUT
7440-62-2	VANADIUM	10.2		16.7		mg/kg	05SD050006	4/4	---	16.7	**15.1**	55	N	NA	IDEM	No	BSL
7440-66-6	ZINC	31.7		243		mg/kg	05SD050006	4/4	---	243	**53.2**	2300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	TOTAL ORGANIC CARBON	2600		11000		mg/kg	05SD040006	4/4	---	11000	NA	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum sediment concentrations were compared to concentrations in upgradient sediment sample 05SD01. If the concentration in the site sediment concentration was less than the upgradient concentration, that metal was not selcted as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Hexavalent chromium.
10 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
11 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Associated Samples:

05SD020006	05SD040006
05SD030006	05SD050006

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

ASL = Above screening level.
BSL = Below screening level.
CAS = Chemical abstract services.

SWMU 5 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1-DICHLOROETHENE	mg/kg	3.00E-03	NA	1.30E-02	J	mg/kg	1.30E-02	Maximum	N<10(1)	1.30E-02	Maximum	N<10(1)
BENZENE	mg/kg	2.00E-03	NA	5.00E-03	J	mg/kg	5.00E-03	Maximum	N<10(1)	5.00E-03	Maximum	N<10(1)
CIS-1,2-DICHLOROETHENE	mg/kg	3.52E-01	NA	2.80E+00	J	mg/kg	2.80E+00	Maximum	N<10(1)	2.80E+00	Maximum	N<10(1)
METHYLENE CHLORIDE	mg/kg	2.56E-03	NA	4.00E-03	J	mg/kg	4.00E-03	Maximum	N<10(1)	4.00E-03	Maximum	N<10(1)
TETRACHLOROETHENE	mg/kg	2.44E-03	NA	7.00E-03	J	mg/kg	7.00E-03	Maximum	N<10(1)	7.00E-03	Maximum	N<10(1)
TRICHLOROETHENE	mg/kg	8.34E-01	NA	5.10E+00	J	mg/kg	5.10E+00	Maximum	N<10(1)	5.10E+00	Maximum	N<10(1)
VINYL CHLORIDE	mg/kg	2.00E-03	NA	5.00E-03	J	mg/kg	5.00E-03	Maximum	N<10(1)	5.00E-03	Maximum	N<10(1)
BENZO(A)ANTHRACENE	mg/kg	2.80E-01	NA	9.50E-01	J	mg/kg	9.50E-01	Maximum	N<10(1)	9.50E-01	Maximum	N<10(1)
BENZO(A)PYRENE	mg/kg	2.75E-01	NA	8.20E-01	J	mg/kg	8.20E-01	Maximum	N<10(1)	8.20E-01	Maximum	N<10(1)
BENZO(B)FLUORANTHENE	mg/kg	2.76E-01	NA	7.90E-01	J	mg/kg	7.90E-01	Maximum	N<10(1)	7.90E-01	Maximum	N<10(1)
DIBENZO(A,H)ANTHRACENE	mg/kg	6.38E-02	NA	1.80E-01	J	mg/kg	1.80E-01	Maximum	N<10(1)	1.80E-01	Maximum	N<10(1)
AROCLOR-1254	mg/kg	9.89E-02	NA	2.40E-01		mg/kg	2.40E-01	Maximum	N<10(1)	2.40E-01	Maximum	N<10(1)
PENTACHLOROPHENOL	mg/kg	4.03E-03	NA	1.20E-02		mg/kg	1.20E-02	Maximum	N<10(1)	1.20E-02	Maximum	N<10(1)
2,3,7,8-TCDD TEQ	mg/kg	4.04E-05	NA	2.26E-04		mg/kg	2.26E-04	Maximum	N<10(1)	2.26E-04	Maximum	N<10(1)
ANTIMONY	mg/kg	5.53E+01	NA	3.01E+02	J	mg/kg	3.01E+02	Maximum	N<10(1)	3.01E+02	Maximum	N<10(1)
BARIUM	mg/kg	5.15E+02	NA	2.02E+03		mg/kg	2.02E+03	Maximum	N<10(1)	2.02E+03	Maximum	N<10(1)
CADMIUM	mg/kg	6.25E+00	NA	3.11E+01	J	mg/kg	3.11E+01	Maximum	N<10(1)	3.11E+01	Maximum	N<10(1)
CHROMIUM	mg/kg	3.40E+01	NA	1.12E+02	J	mg/kg	1.12E+02	Maximum	N<10(1)	1.12E+02	Maximum	N<10(1)
COPPER	mg/kg	2.69E+02	NA	1.52E+03	J	mg/kg	1.52E+03	Maximum	N<10(1)	1.52E+03	Maximum	N<10(1)
IRON	mg/kg	3.08E+04	NA	1.05E+05	J	mg/kg	1.05E+05	Maximum	N<10(1)	1.05E+05	Maximum	N<10(1)
MERCURY	mg/kg	1.70E-01	NA	4.30E-01	J	mg/kg	4.30E-01	Maximum	N<10(1)	4.30E-01	Maximum	N<10(1)
SILVER	mg/kg	1.78E+00	NA	7.50E+00	J	mg/kg	7.50E+00	Maximum	N<10(1)	7.50E+00	Maximum	N<10(1)
ZINC	mg/kg	9.57E+02	NA	5.11E+03	J	mg/kg	5.11E+03	Maximum	N<10(1)	5.11E+03	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

SWMU 5 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface / Subsurface Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1-DICHLOROETHENE	mg/kg	2.37E-03	NA	1.30E-02	J	mg/kg	2.93E-03	95% UCL-T	W - Test (1)	2.93E-03	95% UCL-T	W - Test (1)
BENZENE	mg/kg	2.93E-03	NA	1.70E-02		mg/kg	3.94E-03	95% UCL-T	W - Test (1)	3.94E-03	95% UCL-T	W - Test (1)
CIS-1,2-DICHLOROETHENE	mg/kg	2.05E-01	NA	2.80E+00	J	mg/kg	2.18E+00	95% UCL-T	W - Test (1)	2.18E+00	95% UCL-T	W - Test (1)
METHYLENE CHLORIDE	mg/kg	4.97E-03	NA	4.20E-02		mg/kg	6.91E-03	95% UCL-T	W - Test (1)	6.91E-03	95% UCL-T	W - Test (1)
TETRACHLOROETHENE	mg/kg	2.07E-03	NA	7.00E-03	J	mg/kg	2.52E-03	95% UCL-T	W - Test (1)	2.52E-03	95% UCL-T	W - Test (1)
TRICHLOROETHENE	mg/kg	4.48E-01	NA	5.10E+00	J	mg/kg	5.10E+00	Maximum	W - Test (3)	5.10E+00	Maximum	W - Test (3)
VINYL CHLORIDE	mg/kg	1.92E-02	NA	1.60E-01		mg/kg	6.70E-02	95% UCL-T	W - Test (1)	6.70E-02	95% UCL-T	W - Test (1)
2-METHYLNAPHTHALENE	mg/kg	2.43E-01	NA	2.50E+00	J	mg/kg	2.09E+00	95% UCL-T	W - Test (2)	2.09E+00	95% UCL-T	W - Test (2)
BENZO(A)ANTHRACENE	mg/kg	4.10E-01	NA	9.50E-01	J	mg/kg	9.50E-01	Maximum	W - Test (3)	9.50E-01	Maximum	W - Test (3)
BENZO(A)PYRENE	mg/kg	4.00E-01	NA	8.20E-01	J	mg/kg	8.20E-01	Maximum	W - Test (3)	8.20E-01	Maximum	W - Test (3)
BENZO(B)FLUORANTHENE	mg/kg	4.28E-01	NA	9.60E-01		mg/kg	9.60E-01	Maximum	W - Test (3)	9.60E-01	Maximum	W - Test (3)
DIBENZO(A,H)ANTHRACENE	mg/kg	2.42E-01	NA	1.80E-01	J	mg/kg	1.80E-01	Maximum	W - Test (3)	1.80E-01	Maximum	W - Test (3)
NAPHTHALENE	mg/kg	1.52E-01	NA	1.20E+00	J	mg/kg	1.20E+00	Maximum	W - Test (3)	1.20E+00	Maximum	W - Test (3)
DIELDRIN	mg/kg	4.15E-03	NA	7.40E-03		mg/kg	5.53E-03	95% UCL-T	W - Test (1)	5.53E-03	95% UCL-T	W - Test (1)
AROCLOR-1254	mg/kg	1.32E-01	NA	6.70E-01		mg/kg	4.39E-01	95% UCL-T	W - Test (1)	4.39E-01	95% UCL-T	W - Test (1)
AROCLOR-1260	mg/kg	7.92E-02	NA	6.40E-01		mg/kg	1.27E-01	95% UCL-T	W - Test (1)	1.27E-01	95% UCL-T	W - Test (1)
PENTACHLOROPHENOL	mg/kg	3.54E-03	NA	1.20E-02		mg/kg	9.95E-03	95% UCL-T	W - Test (1)	9.95E-03	95% UCL-T	W - Test (1)
2,3,7,8-TCDD TEQ	mg/kg	7.73E-05	NA	4.64E-04		mg/kg	4.64E-04	Maximum	W - Test (3)	4.64E-04	Maximum	W - Test (3)
ANTIMONY	mg/kg	5.95E+01	NA	3.01E+02	J	mg/kg	3.01E+02	Maximum	W - Test (3)	3.01E+02	Maximum	W - Test (3)
ARSENIC	mg/kg	8.01E+00	NA	2.68E+01	J	mg/kg	1.05E+01	95% UCL-T	W - Test (2)	1.05E+01	95% UCL-T	W - Test (2)
BARIUM	mg/kg	5.29E+02	NA	2.02E+03		mg/kg	1.62E+03	95% UCL-T	W - Test (2)	1.62E+03	95% UCL-T	W - Test (2)
CADMIUM	mg/kg	7.24E+00	NA	3.11E+01	J	mg/kg	3.11E+01	Maximum	W - Test (3)	3.11E+01	Maximum	W - Test (3)
CHROMIUM	mg/kg	3.54E+01	NA	1.12E+02	J	mg/kg	6.52E+01	95% UCL-T	W - Test (2)	6.52E+01	95% UCL-T	W - Test (2)
COPPER	mg/kg	7.90E+02	NA	6.37E+03	J	mg/kg	6.37E+03	Maximum	W - Test (3)	6.37E+03	Maximum	W - Test (3)
IRON	mg/kg	3.23E+04	NA	1.05E+05	J	mg/kg	4.63E+04	95% UCL-T	W - Test (2)	4.63E+04	95% UCL-T	W - Test (2)
MANGANESE	mg/kg	4.90E+02	NA	1.17E+03		mg/kg	6.76E+02	95% UCL-T	W - Test (2)	6.76E+02	95% UCL-T	W - Test (2)
MERCURY	mg/kg	6.33E+00	NA	9.32E+01		mg/kg	1.25E+01	95% UCL-T	W - Test (1)	1.25E+01	95% UCL-T	W - Test (1)
NICKEL	mg/kg	2.23E+01	NA	6.26E+01		mg/kg	3.03E+01	95% UCL-T	W - Test (2)	3.03E+01	95% UCL-T	W - Test (2)
SILVER	mg/kg	2.66E+00	NA	1.61E+01	J	mg/kg	7.20E+00	95% UCL-T	W - Test (1)	7.20E+00	95% UCL-T	W - Test (1)
ZINC	mg/kg	9.86E+02	NA	5.11E+03	J	mg/kg	5.11E+03	95% UCL-T	W - Test (2)	5.11E+03	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

SWMU 5 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
CHLOROFORM	mg/L	2.11E-04	NA	1.00E-03		mg/L	2.63E-04	95% UCL-T	W - Test (1)	2.63E-04	95% UCL-T	W - Test (1)
BIS(2-ETHYLHEXYL)PHTHALATE	mg/L	8.89E-03	NA	1.10E-01		mg/L	1.02E-02	95% UCL-T	W - Test (1)	1.02E-02	95% UCL-T	W - Test (1)
2,3,7,8-TCDD	mg/L	5.09E-09	NA	1.59E-08		mg/L	8.12E-09	95% UCL-T	W - Test (2)	8.12E-09	95% UCL-T	W - Test (2)
ALUMINUM	mg/L	2.76E-01	NA	2.32E+00	J	mg/L	3.79E-01	95% UCL-T	W - Test (1)	3.79E-01	95% UCL-T	W - Test (1)
ARSENIC	mg/L	5.41E-04	NA	1.60E-03		mg/L	9.34E-04	95% UCL-T	W - Test (2)	9.34E-04	95% UCL-T	W - Test (2)
IRON	mg/L	9.46E-01	NA	4.44E+00		mg/L	3.10E+00	95% UCL-T	W - Test (2)	3.10E+00	95% UCL-T	W - Test (2)
MANGANESE	mg/L	4.55E-01	NA	2.27E+00	J	mg/L	2.27E+00	Maximum	W - Test (3)	2.27E+00	Maximum	W - Test (3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

SWMU 5 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
CIS-1,2-DICHLOROETHEN	mg/L	8.04E-02	NA	2.90E-01		mg/L	2.90E-01	Maximum	N<10(1)	2.90E-01	Maximum	N<10(1)
TRICHLOROETHENE	mg/L	3.39E-02	NA	1.20E-01		mg/L	1.20E-01	Maximum	N<10(1)	1.20E-01	Maximum	N<10(1)
VINYL CHLORIDE	mg/L	2.09E-02	NA	8.50E-02		mg/L	8.50E-02	Maximum	N<10(1)	8.50E-02	Maximum	N<10(1)
ALUMINUM	mg/L	1.21E-01	NA	2.04E-01	J	mg/L	2.04E-01	Maximum	N<10(1)	2.04E-01	Maximum	N<10(1)
ARSENIC	mg/L	4.92E-04	NA	6.40E-04		mg/L	6.40E-04	Maximum	N<10(1)	6.40E-04	Maximum	N<10(1)
IRON	mg/L	6.72E-01	NA	1.52E+00	J	mg/L	1.52E+00	Maximum	N<10(1)	1.52E+00	Maximum	N<10(1)
MANGANESE	mg/L	1.41E-01	NA	3.15E-01		mg/L	3.15E-01	Maximum	N<10(1)	3.15E-01	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

SWMU 5 - TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
TRICHLOROETHENE	mg/kg	1.42E-01	NA	7.00E-01		mg/kg	7.00E-01	Maximum	N<10(1)	7.00E-01	Maximum	N<10(1)
2,3,7,8-TCDD TEQ	mg/kg	8.71E-06	NA	1.83E-05		mg/kg	1.83E-05	Maximum	N<10(1)	1.83E-05	Maximum	N<10(1)
ALUMINUM	mg/kg	5.41E+03	NA	7.66E+03	J	mg/kg	7.66E+03	Maximum	N<10(1)	7.66E+03	Maximum	N<10(1)
ANTIMONY	mg/kg	2.18E+00	NA	5.80E+00		mg/kg	5.80E+00	Maximum	N<10(1)	5.80E+00	Maximum	N<10(1)
MANGANESE	mg/kg	4.61E+02	NA	8.12E+02	J	mg/kg	8.12E+02	Maximum	N<10(1)	8.12E+02	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Dataset consists of less than 10 samples. Therefore, the maximum concentration is used as the EPC.

TABLE 5.1
NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal RfD(2)	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ(3)
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	11/20/01
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day		NA	NCEA	09/25/01
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood	NA	HEAST	07/97
Methylene Chloride	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	11/20/01
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS	NA	NCEA	09/25/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Naphthalene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body Weight	3,000	IRIS	11/20/01
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	11/20/01
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	11/20/01
Pentachlorophenol	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver, Kidney	100	IRIS	11/20/01
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	11/20/01
2,6-Dinitrotoluene	chronic	1.0E-03	mg/kg-day	1	1.00E-03	mg/kg-day	Liver	NA	HEAST	07/97
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	11/20/01
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	11/20/01
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	09/25/01
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	11/20/01
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	11/20/01
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Blood	1,000	IRIS	11/20/01
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	11/20/01
Cadmium (diet)	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Cadmium (water)	chronic	5.0E-04	mg/kg-day	0.05	2.50E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	11/20/01
Cobalt	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological	NA	NCEA	09/25/01
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day		NA	HEAST	07/97
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract	NA	NCEA	09/25/01
Manganese (soil)	chronic	7.0E-02	mg/kg-day	0.04	2.80E-03	mg/kg-day	CNS	1	IRIS	11/20/01
Manganese (water)	chronic	2.4E-02	mg/kg-day	0.04	9.60E-04	mg/kg-day	CNS	1	IRIS	11/20/01
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	11/20/01
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	11/20/01
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	11/20/01
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	11/20/01
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	11/20/01
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	500	IRIS	11/20/01

(1) USEPA, 2000 .
(2) RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA Region 3 RBC Table, September 2001)
NA = Not applicable/Not Available
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver	NA	NCEA	9/25/2001
cis-1,2-Dichloroethene	Chronic	3.5E+01	$\mu g/m^3$	1.0E-02	mg/kg-day	Blood	NA	IRIS	11/20/2001
Vinyl Chloride	Chronic	1.0E+02	$\mu g/m^3$	2.9E-02	mg/kg-day	Liver	NA	IRIS	11/20/2001

Notes:

RfC = Reference Concentration

RfD = Reference Dose

IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)

NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA FOR CHEMCIALS OF CONCERN-- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal Cancer Slope Factor(2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date(3)
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	7.5E-03	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl Chloride (adult)	7.5E-01	1	7.50E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl Chloride (early life)	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benzo(a)anthracene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(a)pyrene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(b)fluoranthene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenzo(a,h)anthracene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno(1,2,3-cd)pyrene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Pentachlorophenol	1.2E-01	1	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1248	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
delta-BHC	6.3E+00	1	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001

(1) USEPA, 2000).
(2) CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, September 2001)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in anima inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6-2

CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1-Dichloroethene	5.0E-05	$(mg/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	7.8E-06	$(mg/m^3)^{-1}$	3.5E+03	2.73E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	2.3E-05	$(mg/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	4.7E-07	$(mg/m^3)^{-1}$	3.5E+03	1.60E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethylene (PCE)	5.8E-07	$(mg/m^3)^{-1}$	3.5E+03	2.03E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethylene (TCE)	1.7E-06	$(mg/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl chloride (child/adult)	8.8E-06	$(mg/m^3)^{-1}$	3.5E+03	3.08E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl chloride (adult)	4.4E-06	$(mg/m^3)^{-1}$	3.5E+03	1.54E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benz[a]anthracene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[a]pyrene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[b]fluoranthene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenz[ah]anthracene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno[1,2,3-cd]pyrene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Polychlorinated Biphenyls (PCBs)	1.0E-04	$(mg/m^3)^{-1}$	3.5E+03	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	4.6E-03	$(mg/m^3)^{-1}$	3.5E+03	1.61E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
delta-BHC	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Beryllium	2.4E-03	$(mg/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Cadmium	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Chromium VI	1.2E-02	$(mg/m^3)^{-1}$	3.5E+03	4.20E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001

IRIS = Integrated Risk Information System (November 2001)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment (USEPA Region III RBC Table, September 2001)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SWMU 5 - TABLE 4.5
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 5 - TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	1.8E-08	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.0E-06
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	6.8E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.3E-06
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.8E-04
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	5.5E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	9.1E-08
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	9.6E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.6E-07
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	7.0E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.2E-03
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	6.8E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.3E-06
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	3.3E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.6E-02
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.6E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.5E-07
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	3.1E-10	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	4.1E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.0E+00
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	2.8E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	4.0E-02
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	4.3E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.5E-02
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	1.5E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.1E-02
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	2.1E-03	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	5.6E-02
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	1.4E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.8E-01
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	1.0E-05	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.1E-03
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	7.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-02
	(total)												**1.8E+00**

SWMU 5 - TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	6.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	5.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	5.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.9E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.3E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.7E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.6E-07
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	3.8E-11	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.7E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.4E-02
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**2.3E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	6.1E-09	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	3.66E-09
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.3E-09	mg/kg-day	5.50E-02	(mg/kg-day)-1	1.29E-10
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.3E-06	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.9E-09	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.41E-11
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	3.3E-09	mg/kg-day	5.20E-02	(mg/kg-day)-1	1.71E-10
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.4E-06	mg/kg-day	1.10E-02	(mg/kg-day)-1	2.63E-08
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.3E-09	mg/kg-day	1.50E+00	(mg/kg-day)-1	3.52E-09
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	4.5E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.26E-07
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.9E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.81E-06
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	3.7E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.71E-07
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	8.5E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	6.17E-07
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.1E-07	mg/kg-day	2.00E+00	(mg/kg-day)-1	2.25E-07
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	5.6E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	6.76E-10
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.1E-10	mg/kg-day	1.50E+05	(mg/kg-day)-1	1.59E-05
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	1.4E-04	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	9.5E-04	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.5E-05	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	5.3E-05	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	7.1E-04	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	4.9E-02	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.0E-07	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	3.5E-06	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	2.4E-03	mg/kg-day		(mg/kg-day)-1	
	(total)										**2.0E-05**

SWMU 5 - TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.4E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.7E-07
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.0E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.5E-06
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.0E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.4E-07
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	4.5E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.3E-07
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	6.4E-08	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.3E-07
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	5.7E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	6.9E-10
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.3E-11	mg/kg-day	1.50E+05	(mg/kg-day)-1	1.9E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	5.9E-08	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**4.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.4E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 5 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	8.9E-09	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	9.9E-07
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.4E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-06
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-04
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.7E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.6E-08
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	4.8E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.8E-07
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.5E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.8E-04
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.4E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.1E-06
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	6.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	5.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.6E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	8.2E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	8.2E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.7E-07
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.5E-10	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	2.1E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	5.2E-01
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.4E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.0E-02
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.1E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.3E-02
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	7.7E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.6E-02
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.0E-03	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	2.8E-02
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	7.2E-02	mg/kg-day	6.00E-01	mg/kg-day	NA	NA	1.2E-01
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.8E-04
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	5.1E-06	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.0E-03
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	3.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-02
	(total)												**7.7E-01**

SWMU 5 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	8.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	7.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	7.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.3E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.2E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.1E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.8E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	4.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.1E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.7E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	6.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**2.9E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	8.9E-10	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	5.34E-10
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.4E-10	mg/kg-day	5.50E-02	(mg/kg-day)-1	1.88E-11
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.9E-07	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.7E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	2.05E-12
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	4.8E-10	mg/kg-day	5.20E-02	(mg/kg-day)-1	2.49E-11
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.5E-07	mg/kg-day	1.10E-02	(mg/kg-day)-1	3.84E-09
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.4E-10	mg/kg-day	1.50E+00	(mg/kg-day)-1	5.14E-10
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	6.5E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	4.75E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	5.6E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	4.10E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	5.4E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.95E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.2E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	9.00E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.6E-08	mg/kg-day	2.00E+00	(mg/kg-day)-1	3.29E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	8.2E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	9.86E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.5E-11	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.32E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	2.1E-05	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.4E-04	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.1E-06	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	7.7E-06	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.0E-04	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	7.2E-03	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.9E-08	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	5.1E-07	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	3.5E-04	mg/kg-day		(mg/kg-day)-1	
	(total)										**2.9E-06**

SWMU 5 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	8.5E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	6.2E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	7.3E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	5.3E-08
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	7.0E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	5.1E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.6E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.2E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.3E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	4.6E-09
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.1E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	2.5E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	4.6E-13	mg/kg-day	1.50E+05	(mg/kg-day)-1	7.0E-08
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.1E-09	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**1.5E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.1E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 5 - TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	1.7E-07	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.8E-05
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	6.4E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.1E-05
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.6E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.6E-03
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	5.1E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.5E-07
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	8.9E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.9E-06
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	6.5E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.1E-02
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	6.4E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.1E-05
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.2E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.0E-05	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	3.1E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.5E-01
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.5E-07	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.1E-06
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	3.8E-03	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	9.6E+00
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	2.6E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.7E-01
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	4.0E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.0E-01
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	1.4E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.8E-01
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.9E-02	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	5.2E-01
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	1.3E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.5E+00
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.5E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-02
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	9.6E-05	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.9E-02
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	6.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-01
	(total)												**1.7E+01**

SWMU 5 - TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	6.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	8.6E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	4.3E-02
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	7.7E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.6E-06
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.7E-10	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	8.0E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	6.4E-02
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**1.1E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	1.4E-08	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	8.55E-09
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	5.5E-09	mg/kg-day	5.50E-02	(mg/kg-day)-1	3.01E-10
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.1E-06	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	4.4E-09	mg/kg-day	7.50E-03	(mg/kg-day)-1	3.29E-11
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	7.7E-09	mg/kg-day	5.20E-02	(mg/kg-day)-1	3.99E-10
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	5.6E-06	mg/kg-day	1.10E-02	(mg/kg-day)-1	6.15E-08
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	5.5E-09	mg/kg-day	1.50E+00	(mg/kg-day)-1	8.22E-09
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.0E-06	mg/kg-day	7.30E-01	(mg/kg-day)-1	7.60E-07
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	9.0E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	6.56E-06
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	8.7E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	6.32E-07
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.0E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.44E-06
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.6E-07	mg/kg-day	2.00E+00	(mg/kg-day)-1	5.26E-07
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.3E-08	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.58E-09
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.5E-10	mg/kg-day	1.50E+05	(mg/kg-day)-1	3.71E-05
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	3.3E-04	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	2.2E-03	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	3.4E-05	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	1.2E-04	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.7E-03	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	1.2E-01	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.7E-07	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	8.2E-06	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	5.6E-03	mg/kg-day		(mg/kg-day)-1	
	(total)										**4.7E-05**

SWMU 5 - TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.7E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.0E-07
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.3E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.7E-06
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.3E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.6E-07
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	5.1E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.7E-07
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	7.4E-08	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.5E-07
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	6.6E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	7.9E-10
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.5E-11	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.2E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	6.8E-08	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**4.8E-06**
										Total Risk Across All Exposure Routes/Pathways	**5.2E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 5 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	5.6E-08	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	6.2E-06
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.1E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.1E-06
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.2E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-03
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.7E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.8E-07
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	3.0E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.0E-06
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.2E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.6E-03
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.1E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.1E-06
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	4.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	3.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	7.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.0E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.1E-02
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	5.1E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.7E-06
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	9.7E-10	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	1.3E-03	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.2E+00
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	8.6E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.2E-01
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.3E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E-01
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	4.8E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-01
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	6.5E-03	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	1.7E-01
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	4.5E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E+00
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.1E-03
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	3.2E-05	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	6.4E-03
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	2.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.3E-02
	(total)												**5.6E+00**

SWMU 5 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	3.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	7.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.0E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.0E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	8.9E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.0E-07
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	9.3E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.4E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**1.2E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.6E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	1.6E-09	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	9.52E-10
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	6.1E-10	mg/kg-day	5.50E-02	(mg/kg-day)-1	3.36E-11
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	3.4E-07	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	4.9E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	3.66E-12
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	8.5E-10	mg/kg-day	5.20E-02	(mg/kg-day)-1	4.44E-11
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	6.2E-07	mg/kg-day	1.10E-02	(mg/kg-day)-1	6.85E-09
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	6.1E-10	mg/kg-day	1.50E+00	(mg/kg-day)-1	9.16E-10
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.2E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	8.47E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.0E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	7.31E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	9.6E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	7.04E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.2E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.60E-07
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.9E-08	mg/kg-day	2.00E+00	(mg/kg-day)-1	5.86E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.5E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.76E-10
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.8E-11	mg/kg-day	1.50E+05	(mg/kg-day)-1	4.14E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	3.7E-05	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	2.5E-04	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	3.8E-06	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	1.4E-05	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.9E-04	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	1.3E-02	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	5.3E-08	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	9.2E-07	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	6.2E-04	mg/kg-day		(mg/kg-day)-1	
	(total)										**5.3E-06**

SWMU 5 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	7.7E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	9.1E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	6.6E-08
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	8.8E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	6.4E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.0E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.5E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.9E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	5.7E-09
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.6E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	3.1E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	5.8E-13	mg/kg-day	1.50E+05	(mg/kg-day)-1	8.7E-08
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.7E-09	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**1.9E-07**
										Total Risk Across All Exposure Routes/Pathways	**5.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.35E-08
Noncancer Ingestion Intake - RME = 9.39E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

SWMU 5 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	1.2E-09	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	1.4E-07
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	4.7E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-07
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.6E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.6E-05
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	3.8E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.3E-09
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	6.6E-10	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.6E-08
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	4.8E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	8.0E-05
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	4.7E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-07
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	8.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	7.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	7.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.3E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.1E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.1E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.8E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.1E-11	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	2.8E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	7.1E-02
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.9E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.7E-03
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.9E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.8E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	1.1E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.5E-03
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.4E-04	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	3.8E-03
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	9.9E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.3E-02
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	4.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-04
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	7.0E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	1.4E-04
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	4.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-03
	(total)												**1.2E-01**

SWMU 5 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	7.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	6.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	6.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.1E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.0E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.9E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.2E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	4.2E-12	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.9E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.5E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**2.6E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	4.4E-10	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	2.62E-10
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.7E-10	mg/kg-day	5.50E-02	(mg/kg-day)-1	9.23E-12
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	9.4E-08	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.3E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.01E-12
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	2.3E-10	mg/kg-day	5.20E-02	(mg/kg-day)-1	1.22E-11
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.7E-07	mg/kg-day	1.10E-02	(mg/kg-day)-1	1.88E-09
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.7E-10	mg/kg-day	1.50E+00	(mg/kg-day)-1	2.52E-10
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.2E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.33E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.8E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.01E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.7E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.93E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	6.0E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	4.41E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	8.1E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.61E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	4.0E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	4.83E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	7.6E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	1.14E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	1.0E-05	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	6.8E-05	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.0E-06	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	3.8E-06	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	5.1E-05	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	3.5E-03	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.4E-08	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	2.5E-07	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.7E-04	mg/kg-day		(mg/kg-day)-1	
	(total)										**1.4E-06**

SWMU 5 - TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.7E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.0E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.4E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.7E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.3E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.7E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	5.2E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.8E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	7.4E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.5E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	6.6E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	8.0E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.5E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.3E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	6.9E-09	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**4.9E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.35E-08
Noncancer Ingestion Intake - RME = 9.39E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

SWMU 5 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	3.1E-10	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	3.4E-08
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.2E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.9E-08
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	6.6E-08	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.6E-06
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	9.4E-11	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.6E-09
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	1.6E-10	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-08
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.2E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.0E-05
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.2E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.9E-08
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	4.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	5.6E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.8E-04
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.8E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	9.4E-09
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	5.3E-12	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	7.1E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.8E-02
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	4.7E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	6.8E-04
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	7.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.5E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	2.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.8E-04
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	3.6E-05	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	9.6E-04
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	2.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.2E-03
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.0E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.4E-05
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	1.8E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	3.5E-05
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.2E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.0E-04
	(total)												**3.1E-02**

SWMU 5 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.8E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	3.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	7.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.0E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.2E-05
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	9.3E-11	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.1E-09
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.1E-13	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	9.6E-10	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.7E-05
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**1.3E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	3.9E-11	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	2.36E-11
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.5E-11	mg/kg-day	5.50E-02	(mg/kg-day)-1	8.30E-13
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	8.5E-09	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.2E-11	mg/kg-day	7.50E-03	(mg/kg-day)-1	9.06E-14
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	2.1E-11	mg/kg-day	5.20E-02	(mg/kg-day)-1	1.10E-12
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.5E-08	mg/kg-day	1.10E-02	(mg/kg-day)-1	1.69E-10
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.5E-11	mg/kg-day	1.50E+00	(mg/kg-day)-1	2.26E-11
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.9E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.09E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.5E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.81E-08
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.4E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.74E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	5.4E-10	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.97E-09
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	7.2E-10	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.45E-09
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	3.6E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	4.35E-12
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	6.8E-13	mg/kg-day	1.50E+05	(mg/kg-day)-1	1.02E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	9.1E-07	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	6.1E-06	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	9.4E-08	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	3.4E-07	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	4.6E-06	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	3.2E-04	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.3E-09	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	2.3E-08	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.5E-05	mg/kg-day		(mg/kg-day)-1	
	(total)										**1.3E-07**

SWMU 5 - TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	4.9E-10	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.6E-10
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	4.2E-10	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.1E-09
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	4.1E-10	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.0E-10
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	9.3E-11	mg/kg-day	7.30E+00	(mg/kg-day)-1	6.8E-10
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.3E-10	mg/kg-day	2.00E+00	(mg/kg-day)-1	2.7E-10
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.2E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.4E-12
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.7E-14	mg/kg-day	1.50E+05	(mg/kg-day)-1	4.1E-09
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.2E-10	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**8.8E-09**
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF / BW x AT
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME Value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED / BW x AT
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	USEPA 1993	26	USEPA 1993	
	ED	Exposure Duration	years	30	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 3.54E-07
Noncancer Dermal Intake - RME = 8.26E-07

Cancer Dermal Intake - CTE = 6.54E-09
Noncancer Dermal Intake - CTE = 5.09E-08

SWMU 5 - TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	2.6E-09	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.9E-07
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.0E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.4E-07
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	5.7E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.7E-05
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	8.1E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.4E-08
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	1.4E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-07
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.0E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.7E-04
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.0E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.4E-07
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.9E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	3.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	4.9E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.4E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.4E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	8.1E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	4.6E-11	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	6.1E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.5E-01
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	4.1E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.9E-03
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	6.3E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.3E-02
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	2.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.6E-03
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	3.1E-04	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	8.3E-03
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	2.1E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.1E-02
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	8.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.9E-04
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	1.5E-06	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	3.1E-04
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.5E-03
	(total)												**2.7E-01**

SWMU 5 - TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	8.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	8.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.8E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.4E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.5E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	8.3E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	5.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.6E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.1E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**3.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	1.1E-09	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	6.80E-10
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	4.4E-10	mg/kg-day	5.50E-02	(mg/kg-day)-1	2.40E-11
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	2.4E-07	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	3.5E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	2.62E-12
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	6.1E-10	mg/kg-day	5.20E-02	(mg/kg-day)-1	3.17E-11
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	4.4E-07	mg/kg-day	1.10E-02	(mg/kg-day)-1	4.89E-09
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	4.4E-10	mg/kg-day	1.50E+00	(mg/kg-day)-1	6.54E-10
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	8.3E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	6.05E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	7.2E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	5.22E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	6.9E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	5.03E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.6E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.15E-07
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.1E-08	mg/kg-day	2.00E+00	(mg/kg-day)-1	4.19E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.0E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.26E-10
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.0E-11	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.96E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	2.6E-05	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.8E-04	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.7E-06	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	9.8E-06	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	1.3E-04	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	9.2E-03	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	3.8E-08	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	6.5E-07	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	4.5E-04	mg/kg-day		(mg/kg-day)-1	
	(total)										**3.8E-06**

SWMU 5 - TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	4.4E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.2E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.8E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.8E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	3.6E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.7E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	8.3E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	6.0E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.2E-08	mg/kg-day	2.00E+00	(mg/kg-day)-1	2.4E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.1E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.3E-10
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	2.4E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	3.6E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.1E-08	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**7.8E-07**
										Total Risk Across All Exposure Routes/Pathways	**4.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME Value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	USEPA 1993	26	USEPA 1993	
	ED	Exposure Duration	years	30	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 3.54E-07
Noncancer Dermal Intake - RME = 8.26E-07

Cancer Dermal Intake - CTE = 6.54E-09
Noncancer Dermal Intake - CTE = 5.09E-08

SWMU 5 - TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	6.6E-10	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	7.3E-08
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.5E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.5E-08
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.4E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-05
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.0E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.4E-09
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	3.6E-10	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.6E-08
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.6E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	4.3E-05
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.5E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.5E-08
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	4.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	4.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	4.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	9.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.2E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	6.1E-04
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	6.1E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.0E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.1E-11	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	1.5E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.8E-02
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.0E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.5E-03
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.6E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.2E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	5.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-03
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	7.7E-05	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	2.1E-03
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	5.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.8E-02
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.3E-05
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	3.8E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	7.6E-05
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	2.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.7E-04
	(total)												**6.6E-02**

SWMU 5 - TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	6.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	5.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	5.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.7E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	8.5E-05
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	1.5E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.1E-09
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	3.4E-13	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.6E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	1.3E-04
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**2.1E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	8.5E-11	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	5.10E-11
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.3E-11	mg/kg-day	5.50E-02	(mg/kg-day)-1	1.80E-12
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.8E-08	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.6E-11	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.96E-13
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	4.6E-11	mg/kg-day	5.20E-02	(mg/kg-day)-1	2.38E-12
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.3E-08	mg/kg-day	1.10E-02	(mg/kg-day)-1	3.67E-10
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.3E-11	mg/kg-day	1.50E+00	(mg/kg-day)-1	4.91E-11
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	6.2E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	4.54E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	5.4E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.92E-08
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	5.2E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.77E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.2E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	8.60E-09
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	3.14E-09
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	7.9E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	9.42E-12
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.5E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.22E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	2.0E-06	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.3E-05	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.0E-07	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	7.3E-07	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	9.9E-06	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	6.9E-04	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.8E-09	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	4.9E-08	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	3.3E-05	mg/kg-day		(mg/kg-day)-1	
	(total)										**2.8E-07**

SWMU 5 - TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	8.1E-10	mg/kg-day	7.30E-01	(mg/kg-day)-1	5.9E-10
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	7.0E-10	mg/kg-day	7.30E+00	(mg/kg-day)-1	5.1E-09
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	6.7E-10	mg/kg-day	7.30E-01	(mg/kg-day)-1	4.9E-10
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.5E-10	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.1E-09
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	2.2E-10	mg/kg-day	2.00E+00	(mg/kg-day)-1	4.4E-10
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.0E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	2.4E-12
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	4.4E-14	mg/kg-day	1.50E+05	(mg/kg-day)-1	6.7E-09
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.0E-10	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**1.4E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.0E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.4
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 5 - TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	2.2E-09	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	2.4E-07
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	8.3E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E-07
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	4.6E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.6E-05
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	6.6E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.1E-08
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	1.2E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-07
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	8.4E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.4E-04
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	8.3E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E-07
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	3.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	4.0E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.0E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	2.0E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.6E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	3.7E-11	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	5.0E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.2E-01
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	3.3E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	4.8E-03
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	5.2E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.0E-02
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	1.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.2E-03
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	2.5E-04	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	6.8E-03
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	1.7E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.8E-02
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	7.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-04
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	1.2E-06	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.5E-04
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	8.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.8E-03
	(total)												**2.2E-01**

SWMU 5 - TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	3.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	4.3E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.1E-03
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	3.8E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.3E-07
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	8.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	3.9E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	3.1E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**5.3E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	3.4E-10	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	2.03E-10
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.3E-10	mg/kg-day	5.50E-02	(mg/kg-day)-1	7.16E-12
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	7.3E-08	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.0E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	7.81E-13
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	1.8E-10	mg/kg-day	5.20E-02	(mg/kg-day)-1	9.48E-12
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.3E-07	mg/kg-day	1.10E-02	(mg/kg-day)-1	1.46E-09
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	1.3E-10	mg/kg-day	1.50E+00	(mg/kg-day)-1	1.95E-10
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.5E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.81E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.1E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.56E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.1E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.50E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	4.7E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.42E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	6.2E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.25E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	3.1E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	3.75E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	5.9E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	8.82E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	7.8E-06	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	5.3E-05	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	8.1E-07	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	2.9E-06	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	4.0E-05	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	2.7E-03	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.1E-08	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	2.0E-07	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.3E-04	mg/kg-day		(mg/kg-day)-1	
	(total)										**1.1E-06**

SWMU 5 - TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.5E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.8E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.1E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.5E-07
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	2.0E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.5E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	4.7E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.4E-08
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	6.7E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.3E-08
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	6.0E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	7.2E-11
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.3E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.0E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	6.2E-09	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**4.4E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.4
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 5 - TABLE 7.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	5.4E-10	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	6.0E-08
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.1E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.9E-08
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.2E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-05
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	1.7E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.8E-09
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	2.9E-10	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.9E-08
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.1E-07	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.5E-05
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	2.1E-10	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.9E-08
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	3.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	7.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	9.9E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.0E-04
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	5.0E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.7E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	9.4E-12	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	1.2E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.1E-02
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	8.4E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.2E-03
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.3E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.6E-03
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	4.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-03
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	6.3E-05	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	1.7E-03
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	4.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-02
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	1.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-05
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	3.1E-07	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	6.2E-05
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	2.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.1E-04
	(total)												**5.4E-02**

SWMU 5 - TABLE 7.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.4E-09	mg/kg-day		mg/kg-day	NA	NA	
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	3.5E-09	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	1.7E-04
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	3.1E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.0E-08
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	7.0E-13	mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	3.2E-09	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.6E-04
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**4.3E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M	8.5E-11	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	5.08E-11
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.3E-11	mg/kg-day	5.50E-02	(mg/kg-day)-1	1.79E-12
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M	1.8E-08	mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M	2.6E-11	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.95E-13
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M	4.6E-11	mg/kg-day	5.20E-02	(mg/kg-day)-1	2.37E-12
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	3.3E-08	mg/kg-day	1.10E-02	(mg/kg-day)-1	3.65E-10
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M	3.3E-11	mg/kg-day	1.50E+00	(mg/kg-day)-1	4.88E-11
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	6.2E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	4.51E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	5.3E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.90E-08
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	5.1E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.75E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	1.2E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	8.55E-09
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	(mg/kg-day)-1	3.12E-09
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	7.8E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	9.37E-12
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.5E-12	mg/kg-day	1.50E+05	(mg/kg-day)-1	2.21E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	2.0E-06	mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M	1.3E-05	mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	2.0E-07	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M	7.3E-07	mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M	9.9E-06	mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M	6.8E-04	mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M	2.8E-09	mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M	4.9E-08	mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	3.3E-05	mg/kg-day		(mg/kg-day)-1	
	(total)										**2.8E-07**

SWMU 5 - TABLE 8.4a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	1.30E-02	mg/kg	1.30E-02	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	5.50E-02	(mg/kg-day)-1	
	CIS-1,2-DICHLOROETHENE	2.80E+00	mg/kg	2.80E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	METHYLENE CHLORIDE	4.00E-03	mg/kg	4.00E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	TETRACHLOROETHENE	7.00E-03	mg/kg	7.00E-03	mg/kg	M		mg/kg-day	5.20E-02	(mg/kg-day)-1	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	(mg/kg-day)-1	
	VINYL CHLORIDE	5.00E-03	mg/kg	5.00E-03	mg/kg	M		mg/kg-day	1.50E+00	(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.0E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.5E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.7E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.3E-08
	BENZO(B)FLUORANTHENE	7.90E-01	mg/kg	7.90E-01	mg/kg	M	1.7E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.2E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	3.8E-10	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.8E-09
	AROCLOR-1254	2.40E-01	mg/kg	2.40E-01	mg/kg	M	5.4E-10	mg/kg-day	2.00E+00	(mg/kg-day)-1	1.1E-09
	PENTACHLOROPHENOL	1.20E-02	mg/kg	1.20E-02	mg/kg	M	4.8E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	5.8E-12
	2,3,7,8-TCDD TEQ	2.26E-04	mg/kg	2.26E-04	mg/kg	M	1.1E-13	mg/kg-day	1.50E+05	(mg/kg-day)-1	1.6E-08
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BARIUM	2.02E+03	mg/kg	2.02E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	5.0E-10	mg/kg-day		(mg/kg-day)-1	
	CHROMIUM	1.12E+02	mg/kg	1.12E+02	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	COPPER	1.52E+03	mg/kg	1.52E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	IRON	1.05E+05	mg/kg	1.05E+05	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	MERCURY	4.30E-01	mg/kg	4.30E-01	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	SILVER	7.50E+00	mg/kg	7.50E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**3.5E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface / subsurface soil is defined as soil collected from depths of 0 to 10 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 5 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M	8.3E-09	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	9.2E-07
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M	1.1E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.7E-06
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M	6.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.2E-04
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M	1.9E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.2E-07
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M	7.1E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.1E-07
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.4E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.4E-03
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M	1.9E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.3E-05
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M	5.9E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.9E-04
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	2.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	5.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	3.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-04
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	1.6E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	3.1E-04
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	1.2E-06	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	6.2E-02
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	3.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	2.8E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	9.3E-07
	2,3,7,8-TCDD TEQ		mg/kg		mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	8.5E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.1E+00
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	3.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.9E-02
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M	4.6E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	6.5E-02
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	8.8E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.8E-01
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M	1.8E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.1E-02
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M	1.8E-02	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	4.8E-01
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M	1.3E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.4E-01
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M	1.9E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.7E-02
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M	3.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-01
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M	8.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.3E-03
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M	2.0E-05	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	4.1E-03
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.4E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.8E-02
	(total)												**3.7E+00**

SWMU 5 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.1E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	1.6E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.0E-05
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	5.6E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.1E-04
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	6.3E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.1E-02
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	2.5E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	8.5E-07
	2,3,7,8-TCDD TEQ		mg/kg		mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	3.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-02
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	3.2E-07	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	2.5E-02
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M		mg/kg-day	8.00E-04	mg/kg-day	NA	NA	
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**6.8E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.8E+00**

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M	1.2E-10	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	7.09E-11
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M	1.6E-10	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	8.72E-12
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M	8.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M	2.8E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	2.09E-12
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M	1.0E-10	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	5.27E-12
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	2.1E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.26E-09
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M	2.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.05E-09
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M	8.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.79E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.3E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.41E-07
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	3.9E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.82E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	7.2E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.29E-08
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	4.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	2.2E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	3.56E-09
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	1.8E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.53E-08
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.1E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.02E-08
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	4.0E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.81E-11
	2,3,7,8-TCDD TEQ	4.64E-04	mg/kg	4.64E-04	mg/kg	M	1.9E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.80E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	4.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.35E-07
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M	6.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M	2.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M	2.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M	1.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M	2.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M	5.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.8E-06**

SWMU 5 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M		mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M		mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M		mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.6E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.8E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	3.4E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	2.3E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	8.1E-11	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	9.0E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	3.6E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.4E-11
	2,3,7,8-TCDD TEQ	4.64E-04	mg/kg	4.64E-04	mg/kg	M	2.0E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	4.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	4.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**4.4E-06**

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface / subsurface soil is defined as soil collected from depths of 0 to 10 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 5 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M	4.1E-09	mg/kg-day	9.00E-03	mg/kg-day	NA	NA	4.6E-07
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M	5.6E-09	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-06
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M	3.1E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.1E-04
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M	9.7E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.6E-07
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M	3.5E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.5E-07
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	7.2E-06	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.2E-03
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M	9.4E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.1E-05
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M	2.9E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-04
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.2E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	2.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	1.7E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	8.5E-05
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	7.8E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.6E-04
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	6.2E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	3.1E-02
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	1.4E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	4.7E-07
	2,3,7,8-TCDD TEQ		mg/kg		mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	4.2E-04	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.1E+00
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	1.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.9E-02
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M	2.3E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.3E-02
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	4.4E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.8E-02
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M	9.2E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.1E-02
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M	9.0E-03	mg/kg-day	3.71E-02	mg/kg-day	NA	NA	2.4E-01
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M	6.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-01
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M	9.5E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.4E-02
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M	1.8E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-02
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M	4.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-03
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M	1.0E-05	mg/kg-day	5.00E-03	mg/kg-day	NA	NA	2.0E-03
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	7.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E-02
	(total)												**1.9E+00**

SWMU 5 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M		mg/kg-day	9.00E-03	mg/kg-day	NA	NA	
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M		mg/kg-day	3.00E-03	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	3.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	3.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	3.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	6.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	4.6E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-05
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	1.6E-09	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	3.2E-05
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	1.8E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	9.0E-03
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	5.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	7.3E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.4E-07
	2,3,7,8-TCDD TEQ		mg/kg		mg/kg	M		mg/kg-day		mg/kg-day	NA	NA	
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	9.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.1E-03
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	9.1E-08	mg/kg-day	1.25E-05	mg/kg-day	NA	NA	7.3E-03
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M		mg/kg-day	3.71E-02	mg/kg-day	NA	NA	
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M		mg/kg-day	2.10E-05	mg/kg-day	NA	NA	
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M		mg/kg-day	8.00E-04	mg/kg-day	NA	NA	
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M		mg/kg-day	2.00E-04	mg/kg-day	NA	NA	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**1.9E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E+00**

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M	5.9E-11	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	3.54E-11
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M	7.9E-11	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	4.36E-12
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M	4.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M	1.4E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.04E-12
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M	5.1E-11	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.63E-12
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M	1.0E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.13E-09
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M	1.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.02E-09
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M	4.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	1.9E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.40E-08
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	1.7E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.20E-07
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.9E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.41E-08
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	3.6E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.64E-08
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	2.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	1.1E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.78E-09
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	8.8E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.77E-08
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	2.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.12E-09
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	2.0E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.40E-11
	2,3,7,8-TCDD TEQ	4.64E-04	mg/kg	4.64E-04	mg/kg	M	9.3E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.40E-06
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	2.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.17E-07
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M	3.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	6.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M	9.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M	6.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M	1.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-06**

SWMU 5 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	1,1-DICHLOROTHENE	2.93E-03	mg/kg	2.93E-03	mg/kg	M		mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	
	BENZENE	3.94E-03	mg/kg	3.94E-03	mg/kg	M		mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	
	CIS-1,2-DICHLOROETHENE	2.18E+00	mg/kg	2.18E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	METHYLENE CHLORIDE	6.91E-03	mg/kg	6.91E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	TETRACHLOROETHENE	2.52E-03	mg/kg	2.52E-03	mg/kg	M		mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	
	TRICHLOROETHENE	5.10E+00	mg/kg	5.10E+00	mg/kg	M		mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	
	VINYL CHLORIDE	6.70E-02	mg/kg	6.70E-02	mg/kg	M		mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	
	2-METHYLNAPHTHALENE	2.09E+00	mg/kg	2.09E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	9.50E-01	mg/kg	9.50E-01	mg/kg	M	5.2E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	BENZO(A)PYRENE	8.20E-01	mg/kg	8.20E-01	mg/kg	M	4.5E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	5.2E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	DIBENZO(A,H)ANTHRACENE	1.80E-01	mg/kg	1.80E-01	mg/kg	M	9.8E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	7.2E-09
	NAPHTHALENE	1.20E+00	mg/kg	1.20E+00	mg/kg	M	6.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	DIELDRIN	5.53E-03	mg/kg	5.53E-03	mg/kg	M	2.3E-11	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	3.7E-10
	AROCLOR-1254	4.39E-01	mg/kg	4.39E-01	mg/kg	M	2.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	AROCLOR-1260	1.27E-01	mg/kg	1.27E-01	mg/kg	M	7.5E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	PENTACHLOROPHENOL	9.95E-03	mg/kg	9.95E-03	mg/kg	M	1.0E-10	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-11
	2,3,7,8-TCDD TEQ	4.64E-04	mg/kg	4.64E-04	mg/kg	M	5.8E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	8.8E-08
	ANTIMONY	3.01E+02	mg/kg	3.01E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.05E+01	mg/kg	1.05E+01	mg/kg	M	1.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	BARIUM	1.62E+03	mg/kg	1.62E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CADMIUM	3.11E+01	mg/kg	3.11E+01	mg/kg	M	1.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	6.52E+01	mg/kg	6.52E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	COPPER	6.37E+03	mg/kg	6.37E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.63E+04	mg/kg	4.63E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	6.76E+02	mg/kg	6.76E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MERCURY	1.25E+01	mg/kg	1.25E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	NICKEL	3.03E+01	mg/kg	3.03E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	SILVER	7.20E+00	mg/kg	7.20E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ZINC	5.11E+03	mg/kg	5.11E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-06**

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 5 - TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	7.2E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.2E-04
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	2.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	2.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.0E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-02
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	2.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.5E-02
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	8.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.8E-01
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	6.2E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.6E+00
	(total)												**3.0E+00**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	6.8E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.8E-05
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	4.6E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	4.9E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	5.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.4E-05
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	1.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.5E-04
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	4.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E-03
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	3.2E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.4E-01
	(total)												**3.6E-01**

Total Hazard Index Across All Exposure Routes/Pathways **3.3E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	2.5E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	9.6E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	7.6E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.1E-05
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	3.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	8.8E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-05
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	2.9E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	2.1E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-05**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	2.3E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.6E-04	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.7E-09	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.5E-04
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	4.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-04**
										Total Risk Across All Exposure Routes/Pathways	**2.8E-04**

SWMU 5 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 5 - TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	5.0E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.0E-04
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	2.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.8E-03
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.6E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	7.3E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.3E-03
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	1.8E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-02
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	5.9E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-01
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	4.4E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.8E+00
	(total)												**2.1E+00**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	4.4E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.4E-05
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	3.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	3.2E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	2.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.3E-05
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	5.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.9E-04
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.4E-04
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.4E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.5E-01
	(total)												**1.6E-01**

Total Hazard Index Across All Exposure Routes/Pathways **2.3E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	5.0E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	2.0E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.6E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.3E-06
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	7.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	1.8E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-06
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	5.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	4.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.3E-06**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	4.4E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	3.0E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	3.2E-10	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	4.8E-05
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	2.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	5.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-09
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.9E-05**
										Total Risk Across All Exposure Routes/Pathways	**5.4E-05**

SWMU 5 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 5 - TABLE 7.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	2.5E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-03
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	9.8E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.9E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	7.8E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	3.6E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-02
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	9.0E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.0E-01
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	3.0E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.9E-01
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	2.2E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	9.1E+00
	(total)												**1.0E+01**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	1.5E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.5E-04
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.2E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.6E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.6E-04
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	3.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-03
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.4E-03
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	9.6E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.0E+00
	(total)												**1.1E+00**

Total Hazard Index Across All Exposure Routes/Pathways **1.2E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	2.2E-06	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	8.4E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	6.7E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.0E-05
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	3.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	7.7E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-05
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	2.5E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.9E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-05**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	1.3E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	8.0E-10
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	8.9E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	9.4E-10	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.4E-04
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	3.4E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	8.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-04**
										Total Risk Across All Exposure Routes/Pathways	**1.7E-04**

SWMU 5 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 5 - TABLE 7.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	1.1E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.1E-03
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	4.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	3.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.6E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.6E-02
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	3.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-01
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.3E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.4E-01
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	9.6E-02	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.0E+00
	(total)												**4.6E+00**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	8.7E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	8.7E-05
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	6.0E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.0E-02
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	6.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	5.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.3E-05
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	1.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.3E-04
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	4.3E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-03
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	3.2E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.3E-01
	(total)												**3.6E-01**

Total Hazard Index Across All Exposure Routes/Pathways **5.0E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	3.2E-07	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.2E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	9.8E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	4.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	1.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	3.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	2.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-06**
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	2.5E-08	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-10
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.7E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.8E-10	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.7E-05
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	3.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-09
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	9.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.7E-05**
										Total Risk Across All Exposure Routes/Pathways	**3.1E-05**

SWMU 5 - TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	of the text.
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 5 - TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	1.9E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-05
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.2E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.9E-03
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.3E-09	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	2.6E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.6E-05
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	6.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.1E-04
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	2.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.0E-04
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.5E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.6E-01
	(total)												**1.7E-01**

Total Hazard Index Across All Exposure Routes/Pathways **1.7E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	2.7E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.7E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.8E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.7E-06
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	3.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	9.1E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-09
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	2.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.7E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.7E-06**

SWMU 5 - TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.1 of the text.
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 5 - TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	1.3E-07	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-05
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	8.9E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.4E-03
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	9.4E-10	mg/kg-day		mg/kg-day	NA	NA	
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	1.7E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.7E-05
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	4.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-04
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.5E-04
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.0E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.0E-01
	(total)												**1.1E-01**

Total Hazard Index Across All Exposure Routes/Pathways **1.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	Chloroform	2.63E-04	mg/L	2.63E-04	mg/L	M	1.9E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-11
	Bis(2-ethylhexyl)phthalate	1.02E-02	mg/L	1.02E-02	mg/L	M	1.3E-06	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	2,3,7,8-TCDD TEQ	8.12E-09	mg/L	8.12E-09	mg/L	M	1.3E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.0E-06
	Aluminum	3.79E-01	mg/L	3.79E-01	mg/L	M	2.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	9.34E-04	mg/L	9.34E-04	mg/L	M	5.9E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.8E-10
	Iron	3.10E+00	mg/L	3.10E+00	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.27E+00	mg/L	2.27E+00	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-06**
										Total Risk Across All Exposure Routes/Pathways	**2.0E-06**

SWMU 5 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 5 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	7.9E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.9E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.3E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E+00
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.3E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.8E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	5.6E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.6E-04
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.8E-03
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	4.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-02
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	8.6E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.6E-02
	(total)												**1.3E+00**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.3E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.3E-01
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	9.1E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.0E+00
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.7E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.0E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-04
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	3.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	7.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.5E-03
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.6E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.6E-01
	(total)												**3.4E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.1E-04	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	4.5E-05
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	8.0E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-04
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	6.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.0E-07
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	3.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.7E-04**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	4.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.1E-04	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-04
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	9.2E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-04
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	5.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-04**
										Total Risk Across All Exposure Routes/Pathways	**4.3E-04**

SWMU 5 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 5 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	2.7E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.7E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.1E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.7E-01
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	7.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.6E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.9E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.9E-04
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	5.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.4E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.6E-03
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	2.9E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.2E-02
	(total)												**4.4E-01**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	5.2E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.2E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.8E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E+00
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.0E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.3E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.4E-05
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-04
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.4E-04
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	5.2E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.5E-02
	(total)												**1.4E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	2.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.1E-05	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	4.4E-06
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	7.8E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-05
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	5.9E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.8E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	2.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.6E-05**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	5.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.8E-05	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.0E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	5.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.0E-05**
										Total Risk Across All Exposure Routes/Pathways	**4.6E-05**

SWMU 5 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 5 - TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	7.4E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.4E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.1E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E+00
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.2E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.2E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	5.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.2E-04
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.6E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.5E-03
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	3.9E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-02
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	8.1E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.4E-02
	(total)												**1.2E+00**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.4E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.4E-01
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	9.3E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.1E+00
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.8E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.2E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-04
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	3.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	7.8E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.6E-03
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.6E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.7E-01
	(total)												**3.5E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	6.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	2.6E-05	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-05
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.9E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-05
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	4.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	3.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	6.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.9E-05**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	8.0E-05	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	3.2E-05
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.4E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-05
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	8.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	2.8E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	6.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.8E-05**
										Total Risk Across All Exposure Routes/Pathways	**1.1E-04**

SWMU 5 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 5 - TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	2.5E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.0E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.4E-01
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	7.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.7E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.7E-04
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	5.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-03
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.3E-03
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	2.7E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.1E-02
	(total)												**4.1E-01**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	4.7E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.7E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.4E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E+00
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	8.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.0E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.0E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.0E-05
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	9.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.2E-04
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.3E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.6E-04
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	4.7E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	4.9E-02
	(total)												**1.3E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	7.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	2.9E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-06
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	5.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	3.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	7.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.3E-06**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	9.7E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-06
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.6E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	8.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	2.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	6.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.7E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.2E-05**

SWMU 5 - TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 5 - TABLE 7.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.2E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	4.9E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.6E-01
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	3.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	8.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.3E-05
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	2.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.7E-04
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	6.2E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-03
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.3E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	5.3E-03
	(total)												**1.9E-01**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	2.0E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.0E-02
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.3E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.5E-01
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	4.0E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.3E-02
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.5E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-05
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	4.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.6E-04
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.7E-04
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	2.3E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.4E-02
	(total)												**5.1E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	5.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	2.1E-05	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-06
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.5E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-05
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	5.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.1E-05**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	8.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	5.8E-05	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-05
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.7E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-05
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	6.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	2.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	4.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.9E-05**
										Total Risk Across All Exposure Routes/Pathways	**8.0E-05**

SWMU 5 - TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 5 - TABLE 7.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	3.0E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.0E-03
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.1E-02
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	8.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.9E-03
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	2.1E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.1E-05
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	6.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-04
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.2E-04
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	3.2E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.3E-03
	(total)												**4.9E-02**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	5.8E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.8E-03
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	4.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-01
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.1E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.7E-03
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.8E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.8E-06
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-05
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.4E-05
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	5.8E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	6.1E-03
	(total)												**1.6E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	3.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.6E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	6.3E-07
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	8.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-06**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	7.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	5.4E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	4.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	3.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	7.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.3E-06**
										Total Risk Across All Exposure Routes/Pathways	**6.6E-06**

SWMU 5 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 5 - TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.9E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.9E-03
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	8.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-02
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	5.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-03
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-05
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	4.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.4E-04
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.0E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.4E-04
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	2.1E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.7E-04
	(total)												**3.2E-02**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	6.8E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.8E-03
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	4.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.5E-01
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.4E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.6E-03
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	5.2E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.2E-06
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.4E-05
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	3.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-04
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	8.0E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	8.3E-03
	(total)												**1.7E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.1E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.2E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	5.0E-07
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	8.9E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	2.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	6.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	3.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-06**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	7.3E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	2.9E-06
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.2E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-06
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	8.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	2.5E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	6.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.1E-06**
										Total Risk Across All Exposure Routes/Pathways	**8.0E-06**

SWMU 5 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 5 - TABLE 7.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	4.8E-06	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.8E-04
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	2.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.6E-03
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	1.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.7E-04
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	3.4E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.4E-06
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-05
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	2.5E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.4E-05
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	5.2E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.2E-04
	(total)												**7.9E-03**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	1.6E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.6E-03
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-02
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	3.1E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.0E-03
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.0E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-06
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	3.3E-09	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-05
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	7.8E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.6E-05
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	1.6E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.7E-03
	(total)												**4.3E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	7.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	3.1E-07	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	2.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	5.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	1.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	4.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	8.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-07**
Dermal	cis-1,2-Dichloroethene	2.90E-01	mg/L	2.90E-01	mg/L	M	2.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Trichloroethene	1.20E-01	mg/L	1.20E-01	mg/L	M	1.8E-06	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	7.3E-07
	Vinyl Chloride	8.50E-02	mg/L	8.50E-02	mg/L	M	4.8E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.3E-07
	Aluminum	2.04E-01	mg/L	2.04E-01	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	6.40E-04	mg/L	6.40E-04	mg/L	M	5.2E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.7E-10
	Iron	1.52E+00	mg/L	1.52E+00	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	3.15E-01	mg/L	3.15E-01	mg/L	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.5E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.9E-06**

SWMU 5 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

SWMU 5 - TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	2.5E-11	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	9.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.2E-03
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	1.0E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-02
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	7.9E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.0E-02
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	1.1E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.6E-02
	(total)												**4.9E-02**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	3.1E-12	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**4.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	8.6E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.29E-06
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	3.3E-07	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.32E-07
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	3.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	3.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-06**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.0E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.6E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

SWMU 5 - TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	8.4E-12	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	3.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	3.5E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.5E-03
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	2.7E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	6.6E-03
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	3.7E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.3E-03
	(total)												**1.7E-02**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	2.5E-13	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**1.7E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	8.4E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.26E-07
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	3.2E-08	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.28E-08
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	3.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	2.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	3.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-07**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	2.5E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.8E-09
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.8E-09**
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 5 - TABLE 7.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	2.3E-10	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	8.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.0E-02
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	9.7E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.7E-02
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	7.4E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.9E-01
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	1.0E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.5E-01
	(total)												**4.6E-01**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.4E-11	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**4.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	2.0E-11	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.01E-06
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	7.7E-07	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	3.07E-07
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	8.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	6.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	8.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-06**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.2E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 5 - TABLE 7.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	7.8E-11	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	3.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E-02
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	3.2E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.2E-02
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	2.5E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	6.2E-02
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	3.5E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.0E-02
	(total)												**1.5E-01**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.6E-12	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	2.2E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	3.36E-07
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	8.5E-08	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	3.42E-08
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	9.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	7.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	9.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.7E-07**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	4.7E-14	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	7.0E-09
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.0E-09**
										Total Risk Across All Exposure Routes/Pathways	**3.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

SWMU 5 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	3.7E-12	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	1.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.7E-04
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	1.5E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-03
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	1.2E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.0E-03
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	1.7E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.4E-03
	(total)												**7.3E-03**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.0E-11	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**7.3E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.6E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.40E-07
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	6.1E-08	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	2.44E-08
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	6.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	5.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	7.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	4.4E-12	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	6.5E-07
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.5E-07**
										Total Risk Across All Exposure Routes/Pathways	**9.2E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

SWMU 5 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	9.3E-13	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	3.6E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-04
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	3.9E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.9E-04
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	3.0E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	7.4E-04
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	4.1E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	5.9E-04
	(total)												**1.8E-03**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.0E-12	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.2E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.80E-08
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	4.6E-09	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.83E-09
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	5.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	3.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	5.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-08**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.3E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.9E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 5 - TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	3.0E-12	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	1.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-04
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	1.3E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.3E-03
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	9.6E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.4E-03
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	1.3E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.9E-03
	(total)												**6.0E-03**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	7.0E-13	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	4.8E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	7.16E-08
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	1.8E-08	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	7.29E-09
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	2.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.9E-08**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.1E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.6E-08**
										Total Risk Across All Exposure Routes/Pathways	**9.5E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 5 - TABLE 7.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	7.6E-13	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	2.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.7E-05
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	3.1E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.1E-04
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	2.4E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	6.0E-04
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	3.4E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	4.8E-04
	(total)												**1.5E-03**
	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	5.6E-14	mg/kg-day		mg/kg-day	NA	NA	
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	3.00E-04	mg/kg-day	NA	NA	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 8.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMUS 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	1.2E-13	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.79E-08
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M	4.6E-09	mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	1.82E-09
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M	4.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M	3.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M	5.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-08**
Dermal	2,3,7,8-TCDD TEQ	1.83E-05	mg/kg	1.83E-05	mg/kg	M	8.9E-15	mg/kg-day	1.50E+05	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	TRICHLOROETHENE	7.00E-01	mg/kg	7.00E-01	mg/kg	M		mg/kg-day	4.00E-01	$(mg/kg\text{-}day)^{-1}$	
	ALUMINUM	7.60E+03	mg/kg	7.60E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	5.80E+00	mg/kg	5.80E+00	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	8.12E+02	mg/kg	8.12E+02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-09**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 5 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993	234	EPA 1993	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/Ra
	ED	Exposure Duration	(years)	24	EPA 1993	7	EPA 1993	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 2000	10	EPA 2000	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

SWMU 5 - TABLE 7.18 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	1.9E-06	mg/kg-day	8.60E-04	mg/kg-day	NA	NA	2.2E-03
													2.2E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**2.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.18 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	6.4E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-08
											5.2E-08
										Total Risk Across All Exposure Routes/Pathways	**5.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SWMU 5 - TABLE 4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993	234	EPA 1993	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/Ra
	ED	Exposure Duration	(years)	24	EPA 1993	7	EPA 1993	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 2000	10	EPA 2000	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	8,760	EPA 1989a	2,555	EPA 1989a	

SWMU 5 - TABLE 7.18a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	6.9E-07	mg/kg-day	8.60E-04	mg/kg-day	NA	NA	8.0E-04
													8.0E-04
												Total Hazard Index Across All Exposure Routes/Pathways	**8.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.18a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE ADULT RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	6.9E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-09
											5.6E-09
										Total Risk Across All Exposure Routes/Pathways	**5.6E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SWMU 5 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993	234	EPA 1993	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/Ra
	ED	Exposure Duration	(years)	6	EPA 1993	2	EPA 1993	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 2000	10	EPA 2000	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

SWMU 5 - TABLE 7.19 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	8.7E-06	mg/kg-day	8.60E-04	mg/kg-day	NA	NA	1.0E-02
													1.0E-02
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.19 - REASONABLE MAXIMUM EXPOSURE (RME)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM GROUNDWATER WHILE SHOWERING
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	7.5E-07	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.0E-08
											6.0E-08
										Total Risk Across All Exposure Routes/Pathways	**6.0E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

SWMU 5 - TABLE 4.19

VALUES USED FOR DAILY INTAKE CALCULATIONS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Inhalation	S	Volatile Chemical Generation Rate	(ug/m^3-min shower)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	Chronic Daily Intake (CDI) (mg/kg-day)=
	IRsh	Inhalation Rate of volatiles in shower	(L/min)	10	EPA 1991	10	EPA 1991	S x IRsh x K x EF x ED / BW x AT x Ra x CF
	EF	Exposure Frequency	(days/year)	350	EPA 1993	234	EPA 1993	
	K	Masss Transfer Coefficient	(min)	Derived	Foster&Chrostowski 1987	Derived	Foster & Chrostowski 1987	K = Ds + exp(-Ra x Dt)/Ra - [exp(Ra) x (Ds-Dt)]/Ra
	ED	Exposure Duration	(years)	6	EPA 1993	2	EPA 1993	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	Ra	Air Exchange Rate	(min^{-1})	0.025	Foster&Chrostowski 1987	0.025	Foster & Chrostowski 1987	
	Ds	Shower Duration	(min)	15	EPA 2000	10	EPA 2000	
	Dt	Total Time in Bathroom	(min)	20	Professional judgement	15	Professional Judgement	
	AT-C	Averaging Time (Cancer)	(days)	25,550	EPA 1989a	25550	EPA 1989a	
	AT-N	Averaging Time (Noncancer)	(days)	2,190	EPA 1989a	730	EPA 1989a	

SWMU 5 - TABLE 7.19a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF NON-CANCER HAZARDS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	3.2E-06	mg/kg-day	8.60E-04	mg/kg-day	NA	NA	3.7E-03
													3.7E-03
												Total Hazard Index Across All Exposure Routes/Pathways	**3.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 5 - TABLE 8.19a - CENTRAL TENDENCY EXPOSURE (CTE)

CALCULATION OF CANCER RISKS
EXPOSURE OF FUTURE CHILD RESIDENTS TO VAPORS FROM GROUNDWATER
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Shower Room
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	Chloroform	2.63E-04	mg/L	8.59E-05	(mg/m^3- min)	R	9.2E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-09
											7.5E-09
										Total Risk Across All Exposure Routes/Pathways	**7.5E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	8.5E-09			8.5E-09	1,1-DICHLOROTHENE	Liver	1.8E-05			1.8E-05
			BENZENE	3.0E-10			3.0E-10	BENZENE		2.1E-05			2.1E-05
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	3.6E-03			3.6E-03
			METHYLENE CHLORIDE	3.3E-11			3.3E-11	METHYLENE CHLORIDE	Liver	8.5E-07			8.5E-07
			TETRACHLOROETHENE	4.0E-10			4.0E-10	TETRACHLOROETHENE	Liver	8.9E-06			8.9E-06
			TRICHLOROETHENE	6.1E-08			6.1E-08	TRICHLOROETHENE	CNS	1.1E-02			1.1E-02
			VINYL CHLORIDE	8.2E-09			8.2E-09	VINYL CHLORIDE	Liver	2.1E-05			2.1E-05
			BENZO(A)ANTHRACENE	7.6E-07		2.0E-07	9.6E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.6E-06		1.7E-06	8.3E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	6.3E-07		1.6E-07	8.0E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.4E-06		3.7E-07	1.8E-06	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	5.3E-07		1.5E-07	6.7E-07	AROCLOR-1254	mmunological, Nails	1.5E-01		4.3E-02	2.0E-01
			PENTACHLOROPHENOL	1.6E-09		7.9E-10	2.4E-09	PENTACHLOROPHENOL	Liver and Kidney	5.1E-06		2.6E-06	7.7E-06
			2,3,7,8-TCDD TEQ	3.7E-05		2.2E-06	3.9E-05	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	9.6E+00			9.6E+00
			BARIUM					BARIUM	Blood	3.7E-01			3.7E-01
			CADMIUM					CADMIUM	Kidney	8.0E-01		6.4E-02	8.6E-01
			CHROMIUM					CHROMIUM	NOAEL	4.8E-01			4.8E-01
			COPPER					COPPER		5.2E-01			5.2E-01
			IRON					IRON	Liver, Blood, GI Trac	4.5E+00			4.5E+00
			MERCURY					MERCURY	CNS	1.8E-02			1.8E-02
			SILVER					SILVER	Argyria	1.9E-02			1.9E-02
			ZINC					ZINC	Blood	2.2E-01			2.2E-01
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	7.4E-02		1.4E-01	2.1E-01
			Trichloroethene	1.1E-05		3.2E-05	4.2564E-05	Trichloroethene	CNS	1.0E+00		3.1E+00	4.1E+00
			Vinyl Chloride	2.8E-05		3.6E-05	6.4E-05	Vinyl Chloride	Liver	7.2E-02		9.2E-02	1.6E-01
			Aluminum					Aluminum	Body Weight	5.2E-04		1.0E-04	6.3E-04
			Arsenic	2.1E-07		4.2E-08	2.5E-07	Arsenic	Skin, Vascular	5.5E-03		1.1E-03	6.5E-03
			Iron					Iron	Liver, Blood, GI Trac	1.3E-02		2.6E-03	1.6E-02
			Manganese					Manganese	CNS	3.4E-02		1.7E-01	2.0E-01

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	3.0E-06		1.8E-07	3.2E-06	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	3.1E-07			3.1E-07	TRICHLOROETHENE	CNS	3.0E-02			3.0E-02
			ALUMINUM					ALUMINUM	Body Weight	9.7E-02			9.7E-02
			ANTIMONY					ANTIMONY	Lifespan	1.9E-01			1.9E-01
			MANGANESE					MANGANESE	CNS	1.5E-01			1.5E-01
Groundwater	Water	Onsite	Chloroform	1.3E-08	6.0E-08	8.0E-10	7.4E-08	Chloroform	Liver	2.5E-03	1.0E-02	1.5E-04	1.3E-02
			Bis(2-ethylhexyl)phthalate	1.2E-06		1.2E-06	2.4E-06	Bis(2-ethylhexyl)phthalate	Liver	4.9E-02		5.2E-02	1.0E-01
			2,3,7,8-TCDD TEQ	1.0E-05		1.4E-04	1.5E-04	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight	3.6E-02		1.6E-04	3.7E-02
			Arsenic	1.2E-05		5.1E-08	1.2E-05	Arsenic	Skin, Vascular	3.0E-01		1.3E-03	3.0E-01
			Iron					Iron	Liver, Blood, GI Tract	9.9E-01		4.4E-03	9.9E-01
			Manganese					Manganese	CNS	9.1E+00		1.0E+00	1.0E+01

Total Risk Across Surface Soil	5.2E-05
Total Risk Across Surface Water	1.1E-04
Total Risk Across Sediment	3.5E-06
Total Risk Across Groundwater	1.7E-04
Total Risk Across All Media and All Exposure Routes	3.3E-04

Total Hazard Index Across All Media and All Exposure Routes	3.4E+01
Total Liver HI =	5.8E+00
Total Kidney HI =	8.6E-01
Total Vascular HI =	3.1E-01
Total GI Tract HI =	5.5E+00
Total Skin HI =	3.1E-01
Total Blood HI =	6.3E+00
Total CNS HI =	1.5E+01
Total Immune System HI =	2.0E-01
Total Body Weight HI =	1.3E-01
Total Lifespan HI =	9.8E+00
Total Agyria HI =	1.9E-02

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	9.5E-10			9.5E-10	1,1-DICHLOROTHENE	Liver	6.2E-06			6.2E-06
			BENZENE	3.4E-11			3.4E-11	BENZENE		7.1E-06			7.1E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.2E-03			1.2E-03
			METHYLENE CHLORIDE	3.7E-12			3.7E-12	METHYLENE CHLORIDE	Liver	2.8E-07			2.8E-07
			TETRACHLOROETHENE	4.4E-11			4.4E-11	TETRACHLOROETHENE	Liver	3.0E-06			3.0E-06
			TRICHLOROETHENE	6.9E-09			6.9E-09	TRICHLOROETHENE	CNS	3.6E-03			3.6E-03
			VINYL CHLORIDE	9.2E-10			9.2E-10	VINYL CHLORIDE	Liver	7.1E-06			7.1E-06
			BENZO(A)ANTHRACENE	8.5E-08		7.7E-09	9.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.3E-07		6.6E-08	8.0E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	7.0E-08		6.4E-09	7.7E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.6E-07		1.5E-08	1.8E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	5.9E-08		5.7E-09	6.4E-08	AROCLOR-1254	Immunological, Nails	5.1E-02		5.0E-03	5.6E-02
			PENTACHLOROPHENOL	1.8E-10		3.1E-11	2.1E-10	PENTACHLOROPHENOL	Liver and Kidney	1.7E-06		3.0E-07	2.0E-06
			2,3,7,8-TCDD TEQ	4.1E-06		8.7E-08	4.2E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	3.2E+00			3.2E+00
			BARIUM					BARIUM	Blood	1.2E-01			1.2E-01
			CADMIUM					CADMIUM	Kidney	2.7E-01		7.4E-03	2.7E-01
			CHROMIUM					CHROMIUM	NOAEL	1.6E-01			1.6E-01
			COPPER					COPPER		1.7E-01			1.7E-01
			IRON					IRON	Liver, Blood, GI Trac	1.5E+00			1.5E+00
			MERCURY					MERCURY	CNS	6.1E-03			6.1E-03
			SILVER					SILVER	Argyria	6.4E-03			6.4E-03
			ZINC					ZINC	Blood	7.3E-02			7.3E-02
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.5E-02		4.7E-02	7.2E-02
			Trichloroethene	1.2E-06		3.9E-06	5.0E-06	Trichloroethene	CNS	3.4E-01		1.1E+00	1.5E+00
			Vinyl Chloride	3.1E-06		3.8E-06	6.9E-06	Vinyl Chloride	Liver	2.4E-02		3.0E-02	5.4E-02
			Aluminum					Aluminum	Body Weight	1.7E-04		3.0E-05	2.0E-04
			Arsenic	2.3E-08		4.1E-09	2.8E-08	Arsenic	Skin, Vascular	1.8E-03		3.2E-04	2.1E-03
			Iron					Iron	Liver, Blood, GI Trac	4.3E-03		7.6E-04	5.1E-03
			Manganese					Manganese	CNS	1.1E-02		4.9E-02	6.0E-02

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	3.4E-07		7.0E-09	3.4E-07	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	3.4E-08			3.4E-08	TRICHLOROETHENE	CNS	1.0E-02			1.0E-02
			ALUMINUM					ALUMINUM	Body Weight	3.2E-02			3.2E-02
			ANTIMONY					ANTIMONY	Lifespan	6.2E-02			6.2E-02
			MANGANESE					MANGANESE	CNS	5.0E-02			5.0E-02
Groundwater	Water	Onsite	Chloroform	1.9E-09	7.5E-09	1.5E-10	9.5E-09	Chloroform	Liver	1.1E-03	3.7E-03	8.7E-05	4.9E-03
			Bis(2-ethylhexyl)phthalate	1.7E-07		2.4E-07	4.1E-07	Bis(2-ethylhexyl)phthalate	Liver	2.1E-02		3.0E-02	5.1E-02
			2,3,7,8-TCDD TEQ	1.5E-06		2.7E-05	2.9E-05	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight	1.6E-02		5.3E-05	1.6E-02
			Arsenic	1.7E-06		5.6E-09	1.7E-06	Arsenic	Skin, Vascular	1.3E-01		4.3E-04	1.3E-01
			Iron					Iron	Liver, Blood, GI Tract	4.4E-01		1.4E-03	4.4E-01
			Manganese					Manganese	CNS	4.0E+00		3.3E-01	4.3E+00

Total Risk Across Surface Soil	5.4E-06
Total Risk Across Surface Water	1.2E-05
Total Risk Across Sediment	3.8E-07
Total Risk Across Groundwater	3.1E-05
Total Risk Across All Media and All Exposure Routes	4.8E-05

Total Hazard Index Across All Media and All Exposure Routes	1.2E+01
Total Liver HI =	2.0E+00
Total Kidney HI =	2.7E-01
Total Vascular HI =	1.3E-01
Total GI Tract HI =	1.9E+00
Total Skin HI =	1.3E-01
Total Blood HI =	2.2E+00
Total CNS HI =	5.9E+00
Total Immune System HI =	5.6E-02
Total Body Weight HI =	4.9E-02
Total Lifespan HI =	3.3E+00
Total Agyria HI =	6.4E-03

RAGS - PART D TABLES FOR SWMU 9

Selection of Exposure Pathways

SWMU4Table1.xls

COPC Selection

SWMU9Table2.1.xls - Surface Soil - Direct Contact
SWMU9Table2.2.xls - Surface Soil - Migration Pathways
SWMU9Table2.3.xls - Surface/Subsurface Soil - Direct Contact
SWMU9Table2.4.xls - Surface/Subsurface Soil - Migration Pathways
SWMU9Table2.5.xls - Groundwater
SWMU9Table2.6.xls - Surface Water
SWMU9Table2.7.xls - Sediment

Exposure Point Concentration Summary

SWMU9Table3.1.xls - Surface Soil
SWMU9Table3.2.xls - Surface/Subsurface Soil
SWMU9Table3.3.xls - Groundwater
SWMU9Table3.4.xls - Surface Water
SWMU9Table3.5.xls - Sediment

COPC Toxicity Information

Table5.1.xls - Noncancer - Oral/Dermal
Table5.2.xls - Noncancer - Inhalation
Table6.1.xls - Cancer - Oral/Dermal
Table6.2.xls - Cancer - Inhalation

The following files contain RAGS-Part D Tables 4, 7, and 8.

Risk Assessment Calculations for Surface Soil

SWMU4SSAdultRes.xls
SWMU4SSAdultResCTE.xls
SWMU4SSChildRes.xls
SWMU4SSChildResCTE.xls
SWMU4SSMainW.xls
SWMU4SSMainWCTE.xls
SWMU4SSRecrUser.xls
SWMU4SSRecrUserCTE.xls
SWMU4SSTresp.xls
SWMU4SSTrespCTE.xls

Risk Assessment Calculations for Surface/subsurface Soil

SWMU4SOConstW.xls
SWMU4SOConstWCTE.xls

Risk Assessment Calculations for Groundwater

SWMU4GWAdultRes.xls
SWMU4GWAdultResCTE.xls
SWMU4GWChildRes.xls
SWMU4GWChildResCTE.xls
SWMU4GWConstW.xls
SWMU4GWConstWCTE.xls

Risk Assessment Calculations for Surface Water

SWMU4SWAdultRes.xls
SWMU4SWAdultResCTE.xls
SWMU4SWChildRes.xls
SWMU4SWChildResCTE.xls
SWMU4SWRecrUser.xls
SWMU4SWRecrUserCTE.xls
SWMU4SWTresp.xls
SWMU4SWTrespCTE.xls

Risk Assessment Calculations for Sediment

SWMU4SedAdultRes.xls
SWMU4SedAdultResCTE.xls
SWMU4SedChildRes.xls
SWMU4SedChildResCTE.xls
SWMU4SedRecrUser.xls
SWMU4SedRecrUserCTE.xls
SWMU4SedTresp.xls
SWMU4SedTrespCTE.xls

Risk Assessment Summary

SWMU4Tbl9s.xls
SWMU4Tbl9sCTE.xls

SWMU 9 - TABLE 4.1		CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL	SWMU 9 - TABLE 4.1
SWMU 9 - TABLE 7.1	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - TABLE 8.1	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - TABLE 7.1a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.1a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.2		MAINTENANCE WORKERS TO SURFACE SOIL	SWMU 9 - TABLE 4.2
SWMU 9 - TABLE 7.2	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - TABLE 8.2	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - TABLE 7.2a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.2a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.2a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.3		OCCUPATIONAL WORKERS TO SURFACE SOIL	SWMU 9 - TABLE 4.3
SWMU 9 - TABLE 7.3	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - TABLE 8.3	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - TABLE 7.3a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.3a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.4		ADULT RECREATIONAL USERS TO SURFACE SOIL	SWMU 9 - TABLE 4.4
SWMU 9 - TABLE 7.4	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.4 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 9 - TABLE 8.4	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.4 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE SOIL
SWMU 9 - TABLE 7.4a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.4a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.4a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.4a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.5		ADOLESCENT TRESPASSERS TO SURFACE SOIL	SWMU 9 - TABLE 4.5
SWMU 9 - TABLE 7.5	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.5 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 9 - TABLE 8.5	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.5 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 9 - TABLE 7.5a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.5a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.5a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.5a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.6		FUTURE ADULT RESIDENTS TO SURFACE SOIL	SWMU 9 - TABLE 4.6
SWMU 9 - TABLE 7.6	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 9 - TABLE 8.6	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 9 - TABLE 7.6a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.6a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.7		FUTURE CHILD RESIDENTS TO SURFACE SOIL	SWMU 9 - TABLE 4.7
SWMU 9 - TABLE 7.7	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - TABLE 8.7	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - TABLE 7.7a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.7a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.8		CONSTRUCTION WORKERS TO GROUNDWATER	SWMU 9 - TABLE 4.8
SWMU 9 - TABLE 7.8	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - TABLE 8.8	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - TABLE 7.8a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.8a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.9		FUTURE ADULT RESIDENTS TO GROUNDWATER	SWMU 9 - TABLE 4.9
SWMU 9 - TABLE 7.9	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.9 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - TABLE 8.9	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.9 - REASONABLE MAXIMUM EXPOSURE (RME)
			CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - TABLE 7.9a	CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.9a - CENTRAL TENDENCY EXPOSURE (CTE)

SWMU 9 - TABLE 8.9a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.9a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.10	FUTURE CHILD RESIDENTS TO GROUNDWATER	SWMU 9 - TABLE 4.10
SWMU 9 - TABLE 7.10 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.10 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - TABLE 8.10 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.10 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - TABLE 7.10a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.10a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.10a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.10a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.11	ADULT RECREATIONAL USERS TO SURFACE WATER	SWMU 9 - TABLE 4.11
SWMU 9 - TABLE 7.11 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 9 - TABLE 8.11 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 9 - TABLE 7.11a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.11a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.11a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.11a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.12	ADOLESCENT TRESPASSERS TO SURFACE WATER	SWMU 9 - TABLE 4.12
SWMU 9 - TABLE 7.12 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - TABLE 8.12 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - TABLE 7.12a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.12a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.13	FUTURE ADULT RESIDENTS TO SURFACE WATER	SWMU 9 - TABLE 4.13
SWMU 9 - TABLE 7.13 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 9 - TABLE 8.13 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 9 - TABLE 7.13a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.13a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)

SWMU 9 - TABLE 4.14	FUTURE CHILD RESIDENTS TO SURFACE WATER	SWMU 9 - TABLE 4.14
SWMU 9 - TABLE 7.14 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - TABLE 8.14 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - TABLE 7.14a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.14a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.15	ADULT RECREATIONAL USERS TO SEDIMENT	SWMU 9 - TABLE 4.15
SWMU 9 - TABLE 7.15 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - TABLE 8.15 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - TABLE 7.15a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.15a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.15a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.15a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.16	ADOLESCENT TRESPASSERS TO SEDIMENT	SWMU 9 - TABLE 4.16
SWMU 9 - TABLE 7.16 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - TABLE 8.16 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - TABLE 7.16a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.16a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.17	FUTURE ADULT RESIDENTS TO SEDIMENT	SWMU 9 - TABLE 4.17
SWMU 9 - TABLE 7.17 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.17 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - TABLE 8.17 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.17 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - TABLE 7.17a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.17a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.17a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.17a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 4.18	FUTURE CHILD RESIDENTS TO SEDIMENT	SWMU 9 - TABLE 4.18
SWMU 9 - TABLE 7.18 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 7.18 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - TABLE 8.18 REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 9 - TABLE 8.18 - REASONABLE MAXIMUM EXPOSURE (RME)
		CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - TABLE 7.18a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 7.18a - CENTRAL TENDENCY EXPOSURE (CTE)
SWMU 9 - TABLE 8.18a CENTRAL TENDENCY EXPOSURE (CTE)		SWMU 9 - TABLE 8.18a - CENTRAL TENDENCY EXPOSURE (CTE)

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil(1)	Surface Soil	Entire Site	Maintenance Workers	Adult	Ingestion	On-site	Quant(2)	NSWC Crane is an active facility and maintenance activities , such as groundskeeping, may be performed at the site.
						Dermal	On-site	Quant	NSWC Crane is an active facility and maintenance activities , such as groundskeeping, may be performed at the site.
				Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	Qual(3)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs(4) for transfers from soil to air.
	Groundwater	Groundwater/Air	Surficial Aquifer	Maintenance Workers and Trespassers	Adult and Adolescent	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Dermal	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Inhalation	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	On-site Streams, Ponded Water and Draingeways	Maintenance Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Maintenance Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespasser	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Maintenance Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
Future	Surface/ Subsurface Soil (5)	Surface/ Subsurface Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Excavation/construction activities may occur at the site in the future.
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site in the future.
		Air	Vapors and Particulates in Air - Entire Site	Excavation/Construction Workers	Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs for transfers from soil to air.
	Surface Soil	Surface Soil	Entire Site	Occupational Workers	Adult	Ingestion	On-site	Quant	Although the site is currently not in use, it could be used in the future for industrial purposes.
						Dermal	On-site	Quant	Although the site is currently not in use, it could be used in the future for industrial purposes.
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors and Particulates in Air - Entire Site	Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Excavation/Construction Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site and workers may be exposed by direct contact with groundwater.
				Occupational Workers	Adult	Ingestion	On-site	None	Direct contact with groundwater is not expected to occur for future workers.
						Dermal	On-site	None	Direct contact with groundwater is not expected to occur for future workers.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future				Recreational Users	Adult	Ingestion	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
						Dermal	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Excavation/Construction/ Occupational Workers and Recreational Users	Adult	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Residents	Child and Adult	Inhalation	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Excavation/Construction and Occupational Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Constuction/ Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Excavation/Construction and Occupational Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Excavation/Constuction/ Occupational Workers, Recreational Users, and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).

SWMU 5 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-35-4	1,1-DICHLOROETHENE	0.013	J	0.013	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.013	NA	12	N	0.67	IDEM	No	BSL
71-43-2	BENZENE	0.005	J	0.005	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.005	NA	0.6	C	8.2	IDEM	No	BSL
156-59-2	CIS-1,2-DICHLOROETHENE	0.008		2.8	J	mg/kg	05SB060102	2/8	0.003 - 0.004	2.8	NA	4.3	N	110	IDEM	No	BSL
75-09-2	METHYLENE CHLORIDE	0.004	J	0.004	J	mg/kg	05SB030102, 05SB080102, 05SB020102	3/8	0.003 - 0.004	0.004	NA	9.1	C	120	IDEM	No	BSL
127-18-4	TETRACHLOROETHENE	0.003		0.007	J	mg/kg	05SB060102	2/8	0.003 - 0.004	0.007	NA	1.5	C	48	IDEM	No	BSL
156-60-5	TRANS-1,2-DICHLOROETHENE	0.029	J	0.029	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.029	NA	6.9	N	180	IDEM	No	BSL
79-01-6	**TRICHLOROETHENE**	0.004		5.1	J	mg/kg	05SB060102	5/8	0.003 - 0.003	5.1	NA	**0.053**	C	45	IDEM	**Yes**	**ASL**
75-01-4	VINYL CHLORIDE	0.005	J	0.005	J	mg/kg	05SB060102	1/8	0.003 - 0.004	0.005	NA	0.079	C	0.28	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.012		0.065		mg/kg	05SB060002	5/8	0.008 - 0.033	0.065	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
83-32-9	ACENAPHTHENE	0.03		0.12		mg/kg	05SB010002	3/8	0.008 - 0.033	0.12	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.016		0.016		mg/kg	05SB030002	1/8	0.008 - 0.033	0.016	NA	370(8)	N	9500(8)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.009		0.34	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.34	NA	2200	N	47000	IDEM	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.031		0.95	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.95	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.031		0.82	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.82	NA	**0.062**	C	**0.5**	IDEM	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.008		0.79	J	mg/kg	05SB050002	7/8	0.008 - 0.008	0.79	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.017		0.35	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.35	NA	230(9)	N	5500(9)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0		0.67	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.67	NA	6.2	C	50	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.93		3.4		mg/kg	05SB050002	2/8	0.4 - 0.43	3.4	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.0		0.91	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.91	NA	62	C	500	IDEM	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.008		0.18	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.18	NA	**0.062**	C	0.5	IDEM	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.011		2.2	J	mg/kg	05SB050002	7/8	0.008 - 0.008	2.2	NA	230	N	6300	IDEM	No	BSL
86-73-7	FLUORENE	0.02		0.11	J	mg/kg	05SB050002	3/8	0.008 - 0.033	0.11	NA	260	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.015		0.36	J	mg/kg	05SB050002	6/8	0.008 - 0.008	0.36	NA	0.62	C	5	IDEM	No	BSL
91-20-3	NAPHTHALENE	0.023		0.1		mg/kg	05SB060002	5/8	0.008 - 0.033	0.1	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0		1.7		mg/kg	05SB050002	6/8	0.008 - 0.008	1.7	NA	230(9)	N	5500(9)	IDEM	No	BSL
129-00-0	PYRENE	0.009		2.4		mg/kg	05SB050002	7/8	0.008 - 0.008	2.4	NA	230	N	5500	IDEM	No	BSL
PESTICIDES/PCBS																	
72-55-9	4,4'-DDE	0.0067		0.0067		mg/kg	05SB080002	1/6	3.9 - 4.3	0.0067	NA	1.7	C	20	IDEM	No	BSL
11097-69-1	**AROCLOR-1254**	0.1	J	0.24		mg/kg	05SB080002	4/8	39 - 43	0.24	NA	**0.22**	C	1.8	IDEM	**Yes**	**ASL**
HERBICIDES																	
93-76-5	2,4,5-T	0.01	J	0.016	J	mg/kg	05SB080002	2/8	0.0032 - 0.0035	0.016	NA	61	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0024	J	0.012		mg/kg	05SB050002	5/7	0.0008 - 0.00081	0.012	NA	3	C	20	IDEM	No	BSL
DIOXINS/FURANS																	
3268-87-9	1,2,3,4,6,7,8,9-OCDD	0.000415	J	0.00505	J	mg/kg	05SB080002	8/8	---	0.00505	NA	0.039	C	NA	IDEM	No	BSL
39001-02-0	1,2,3,4,6,7,8,9-OCDF	0.0000085	J	0.000313	J	mg/kg	05SB060002	7/8	0.0000004 - 0.0000004	0.000313	NA	0.039	C	NA	IDEM	No	BSL
35822-46-9	1,2,3,4,6,7,8-HPCDD	0.0000072		0.000359	J	mg/kg	05SB060002	8/8	---	0.000359	NA	0.00039	C	NA	IDEM	No	BSL
67562-39-4	**1,2,3,4,6,7,8-HPCDF**	0.0000121		0.000541	J	mg/kg	05SB060002	7/8	0.00000054 - 0.00000054	0.000541	NA	**0.00039**	C	NA	IDEM	**Yes**	**ASL**
55673-89-7	1,2,3,4,7,8,9-HPCDF	0.00000088	J	0.0000575		mg/kg	05SB060002	6/8	0.0000003 - 0.0000018	0.0000575	NA	0.00039	C	NA	IDEM	No	BSL
39227-28-6	1,2,3,4,7,8-HXCDD	0.000001	J	0.0000217		mg/kg	05SB060002	5/8	0.0000002 - 0.0000021	0.0000217	NA	0.000039	C	NA	IDEM	No	BSL
70648-26-9	**1,2,3,4,7,8-HXCDF**	0.0000037		0.000361	J	mg/kg	05SB060002	7/8	0.00000055 - 0.00000055	0.000361	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
57653-85-7	**1,2,3,6,7,8-HXCDD**	0.0000019	J	0.000053	J	mg/kg	05SB060002	7/8	0.0000003 - 0.0000003	0.000053	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
57117-44-9	**1,2,3,6,7,8-HXCDF**	0.00000028	J	0.000128		mg/kg	05SB060002	8/8	---	0.000128	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
19408-74-3	**1,2,3,7,8,9-HXCDD**	0.00000036	J	0.0000691	J	mg/kg	05SB060002	8/8	---	0.0000691	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
72918-21-9	1,2,3,7,8,9-HXCDF	0.00000041	J	0.0000098	J	mg/kg	05SB060002	3/8	0.0000002 - 0.0000032	0.0000098	NA	0.000039	C	NA	IDEM	No	BSL
40321-76-4	**1,2,3,7,8-PECDD**	0.0000014	J	0.0000221		mg/kg	05SB060002	5/8	0.0000003 - 0.0000009	0.0000221	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
57117-41-6	**1,2,3,7,8-PECDF**	0.0000013	J	0.000105		mg/kg	05SB060002	4/8	0.0000002 - 0.0000304	0.000105	NA	**0.000078**	C	NA	IDEM	**Yes**	**ASL**

SWMU 5 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
60851-34-5	**2,3,4,6,7,8-HXCDF**	0.0000024	J	0.000146		mg/kg	05SB060002	7/8	0.0000002 - 0.0000002	0.000146	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
57117-31-4	**2,3,4,7,8-PECDF**	0.0000022	J	0.000143		mg/kg	05SB060002	7/8	0.0000002 - 0.0000002	0.000143	NA	**0.0000078**	C	NA	IDEM	**Yes**	**ASL**
1746-01-6	**2,3,7,8-TCDD**	0.00000049	J	0.0000061		mg/kg	05SB060002	5/8	0.0000003 - 0.00000045	0.0000061	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
51207-31-9	**2,3,7,8-TCDF**	0.0000028		0.000325		mg/kg	05SB060002	7/8	0.0000002 - 0.0000002	0.000325	NA	**0.000039**	C	NA	IDEM	**Yes**	**ASL**
1746-01-6	**2,3,7,8-TCDD TEQ**	0.00000068		0.000226		mg/kg	05SB060002	8/8	-	0.000226	NA	**0.0000039**	C	NA	IDEM	**Yes**	**ASL**
37871-00-4	TOTAL HPCDD	0.0000151		0.000803	J	mg/kg	05SB060002	8/8	---	0.000803	NA	NA	C	NA	IDEM	No	NTX
38998-75-3	TOTAL HPCDF	0.0000219	J	0.000792	J	mg/kg	05SB060002	6/8	0.00000054 - 0.000106	0.000792	NA	NA	C	NA	IDEM	No	NTX
34465-46-8	TOTAL HXCDD	0.0000254	J	0.00089	J	mg/kg	05SB060002	5/8	0.00000065 - 0.0000686	0.00089	NA	NA	C	NA	IDEM	No	NTX
55684-94-1	TOTAL HXCDF	0.0000254	J	0.0000254	J	mg/kg	05SB020002	1/8	0.0000015 - 0.00139	0.0000254	NA	NA	C	NA	IDEM	No	NTX
30402-15-4	TOTAL PECDF	0.0000013	J	0.0000013	J	mg/kg	05SB040002	1/8	0.0000312 - 0.00197	0.0000013	NA	NA	C	NA	IDEM	No	NTX
41903-57-5	TOTAL TCDD	0.000133		0.000404		mg/kg	05SB060002	2/8	0.0000003 - 0.0000661	0.000404	NA	NA	C	NA	IDEM	No	NTX
55722-27-5	TOTAL TCDF	0.0000524		0.0000524		mg/kg	05SB080002	1/8	0.0000002 - 0.0021	0.0000524	NA	NA	C	NA	IDEM	No	NTX
INORGANICS																	
7429-90-5	ALUMINUM	3580	J	14800	J	mg/kg	05SB040002	8/8	---	14800	No	**7600**	N	NA	IDEM	No	BKG
7440-36-0	**ANTIMONY**	3.2	J	301	J	mg/kg	05SB060002	7/8	0.9 - 0.9	301	**Yes**	**3.1**	N	**140**	IDEM	**Yes**	**ASL**
7440-38-2	ARSENIC	5.1	J	26.8	J	mg/kg	05SB060002	8/8	---	26.8	No	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	**BARIUM**	74.7	J	2020		mg/kg	05SB060002	8/8	---	2020	**Yes**	**540**	N	23000	IDEM	**Yes**	**ASL**
7440-43-9	**CADMIUM**	1.6	J	31.1	J	mg/kg	05SB060002	6/8	0.83 - 0.84	31.1	**Yes**	**3.7**	N	**12**	IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	685	J	241000	J	mg/kg	05SB050002	7/8	413 - 413	241000	**Yes**	NA		NA	IDEM	No	NUT
7440-47-3	**CHROMIUM**	10.4		112	J	mg/kg	05SB060002	8/8	---	112	**Yes**	**2(10)**	C	430(10)	IDEM	**Yes**	**ASL**
7440-48-4	COBALT	5.8		35.8		mg/kg	05SB060002	8/8	---	35.8	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	**COPPER**	11.7		1520	J	mg/kg	05SB060002	8/8	---	1520	**Yes**	**310**	N	13000	IDEM	**Yes**	**ASL**
7439-89-6	**IRON**	15600	J	105000	J	mg/kg	05SB060002	8/8	---	105000	**Yes**	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	**LEAD**	15.2	J	16900	J	mg/kg	05SB060002	8/8	---	16900	**Yes**	**400(11)**	N	**400**	IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM	660	J	4900	J	mg/kg	05SB050002	8/8	---	4900	No	NA		NA	IDEM	No	NUT, BKG
7439-96-5	MANGANESE	264		1170		mg/kg	05SB040002	8/8	---	1170	No	**180**	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.04	J	0.43		mg/kg	05SB010002	8/8	---	0.43	**Yes**	2.3(12)	N	55	IDEM	No	BSL
7440-02-0	NICKEL	12		62.6		mg/kg	05SB060002	8/8	---	62.6	No	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	464	J	1050	J	mg/kg	05SB060002	5/8	413 - 462	1050	No	NA		NA	IDEM	No	NUT, BKG
7440-22-4	SILVER	1.8	J	7.5	J	mg/kg	05SB060002	3/8	0.83 - 0.92	7.5	**Yes**	39	N	1700	IDEM	No	BSL
7440-31-5	TIN	13.2	J	849		mg/kg	05SB080002	7/8	4.5 - 4.5	849	**Yes**	4700	N	NA	IDEM	No	BSL
7440-62-2	VANADIUM	9.9		22.9		mg/kg	05SB040002	8/8	---	22.9	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	**ZINC**	26.6		5110	J	mg/kg	05SB060002	8/8	---	5110	**Yes**	**2300**	N	100000	IDEM	**Yes**	**ASL**
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	13	J	13	J	meq/100 g	05SB040002	1/1	---	13	NA	NA		NA	IDEM	No	NTX
	pH	5.1	J	5.1	J	S.U.	05SB040002	1/1	---	5.1	NA	NA		NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	1700		1700		mg/kg	05SB040002	1/1	---	1700	NA	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Nocarcinogen.
NA = Not applicable/bot available.
sat = Soil saturation concentration.

SWMU 5 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 5, OLD BURN PIT
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)

6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Associated Samples:

05SB010002	05SB050002
05SB010102	05SB050102
05SB020002	05SB060002
05SB020102	05SB060102
05SB030002	05SB070002
05SB030102	05SB070102
05SB040002	05SB080002
05SB040102	05SB080102

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

BSL = Below screening level
ASL = Above screenng level.
CAS = Chemical abstract services.

SWMU 9 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
VOLATILE ORGANICS																	
75-09-2	**METHYLENE CHLORIDE**	0.004	J	0.006	J	mg/kg	09SB080102, 09SB090102	5/11	0.003 - 0.004	0.006	NA	**0.001**	C	13	0.023	**Yes**	**ASL**
SEMIVOLATILE ORGANICS																	
91-57-6	**2-METHYLNAPHTHALENE**	0.04		1.8		mg/kg	09SB090002	2/11	0.008 - 0.009	1.8	NA	4(8)	N	NA	**0.7(8)**	**Yes**	**ASL**
83-32-9	ACENAPHTHENE	0.02		0.02		mg/kg	09SB030002	1/11	0.008 - 0.009	0.02	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.018		0.018		mg/kg	09SB030002	1/11	0.008 - 0.009	0.018	NA	29(9)	N	NA	130(9)	No	BSL
120-12-7	ANTHRACENE	0.052		0.052		mg/kg	09SB030002	1/11	0.008 - 0.009	0.052	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.018		0.15		mg/kg	09SB030002	4/11	0.008 - 0.009	0.15	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	BENZO(A)PYRENE	0.022	J	0.13		mg/kg	09SB030002	4/11	0.008 - 0.009	0.13	NA	0.4	C	NA	8.2	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.009		0.12		mg/kg	09SB030002	5/11	0.008 - 0.009	0.12	NA	0.2	C	NA	57	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.009		0.057		mg/kg	09SB030002	5/11	0.008 - 0.009	0.057	NA	210(10)	N	NA	570(10)	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.018	J	0.11	J	mg/kg	09SB030002	4/11	0.008 - 0.009	0.11	NA	2	C	NA	39	No	BSL
218-01-9	CHRYSENE	0.01		0.14		mg/kg	09SB030002	5/11	0.008 - 0.009	0.14	NA	8	C	NA	25	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	1.2		1.2		mg/kg	09SB020002	1/11	0.38 - 0.44	1.2	NA	270	N	2300	5000	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.01	J	0.029		mg/kg	09SB030002	3/11	0.008 - 0.009	0.029	NA	0.08	C	NA	18	No	BSL
206-44-0	FLUORANTHENE	0.008		0.3	J	mg/kg	09SB030002	5/11	0.008 - 0.009	0.3	NA	210	N	NA	880	No	BSL
86-73-7	FLUORENE	0.029		0.029		mg/kg	09SB030002	1/11	0.008 - 0.009	0.029	NA	28	N	NA	170	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.014	J	0.058		mg/kg	09SB030002	4/11	0.008 - 0.009	0.058	NA	0.7	C	NA	3.1	No	BSL
91-20-3	**NAPHTHALENE**	0.03		0.93		mg/kg	09SB090002	2/11	0.008 - 0.009	0.93	NA	4	N	NA	**0.7**	**Yes**	**ASL**
85-01-8	PHENANTHRENE	0.013		0.63		mg/kg	09SB090002	4/11	0.008 - 0.009	0.63	NA	210(10)	N	NA	570(10)	No	BSL
129-00-0	PYRENE	0.013		0.23	J	mg/kg	09SB030002	5/11	0.008 - 0.009	0.23	NA	210	N	NA	570	No	BSL
PESTICIDES/PCBs																	
50-29-3	4,4'-DDT	0.0047		0.0047		mg/kg	09SB090002	1/11	0.0038 - 0.0043	0.0047	NA	2	C	NA	260	No	BSL
72-43-5	METHOXYCHLOR	0.025	J	0.025	J	mg/kg	09SB090002	1/11	0.02 - 0.022	0.025	NA	8	N	NA	160	No	BSL
HERBICIDES																	
94-75-7	2,4-D	0.02	J	0.02	J	mg/kg	09SB040002	1/6	0.0031 - 0.0033	0.02	NA	NA	N	NA	NA	No	NTX
88-85-7	DINOSEB	0.014	J	0.014	J	mg/kg	09SB080002	1/9	0.0031 - 0.0035	0.014	NA	NA	N	NA	NA	No	NTX
87-86-5	**PENTACHLOROPHENOL**	0.0012	J	0.0035		mg/kg	09SB020002	3/9	0.00077 - 0.00088	0.0035	NA	**0.001**	C	NA	0.028	**Yes**	**ASL**
INORGANICS																	
7429-90-5	ALUMINUM	5040		12900		mg/kg	09SB080002	11/11	---	12900	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	**ANTIMONY**	0.97		3.1	J	mg/kg	09SB060002	2/11	0.89 - 1	3.1	**Yes**	**0.3**	N	NA	5.4	**Yes**	**ASL**
7440-38-2	ARSENIC	2.9	J	9.6	J	mg/kg	09SB090002	11/11	---	9.6	No	**1**	C	750	29	No	BKG
7440-39-3	BARIUM	49.6	J	106	J	mg/kg	09SB090002	11/11	---	106	No	**82**	N	690000	1600	No	BKG
7440-43-9	CADMIUM	0.96	J	0.96	J	mg/kg	09SB100002	1/11	0.82 - 1	0.96	No	**0.4**	N	1800	7.5	No	BKG
7440-70-2	CALCIUM	843	J	175000	J	mg/kg	09SB110002	11/11	---	175000	**Yes**	NA		NA	NA	No	NUT
7440-47-3	CHROMIUM	7.6	J	13.7	J	mg/kg	09SB080002	11/11	---	13.7	No	**2**	C	270	38	No	BKG
7440-48-4	COBALT	4.8	J	23		mg/kg	09SB040002	11/11	---	23	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	7.6	J	20.1	J	mg/kg	09SB100002	11/11	---	20.1	**Yes**	NA	N	NA	580	No	NTX
7439-89-6	IRON	8840		20100		mg/kg	09SB080002	11/11	---	20100	No	NA	N	NA	NA	No	NTX, BKG
7439-92-1	LEAD	8.6	J	34.9	J	mg/kg	09SB100002	11/11	---	34.9	**Yes**	NA	N	NA	81	No	BSL
7439-95-4	MAGNESIUM	731	J	32500	J	mg/kg	09SB110002	11/11	---	32500	**Yes**	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	135	J	1060	J	mg/kg	09SB040002	11/11	---	1060	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	MERCURY	0.04		0.06		mg/kg	09SB040002, 09SB090002	5/11	0.04 - 0.05	0.06	No	0.1	N	10	2.1	No	BSL,BKG
7440-02-0	NICKEL	9.5	J	18.3	J	mg/kg	09SB100002	11/11	---	18.3	No	**7**	N	13000	950	No	BKG
7440-09-7	POTASSIUM	464	J	618	J	mg/kg	09SB080002	6/11	409 - 466	618	No	NA		NA	NA	No	NUT, BKG
7440-62-2	VANADIUM	14.5	J	29.3	J	mg/kg	09SB090002	11/11	---	29.3	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	ZINC	30.3	J	120	J	mg/kg	09SB060002	11/11	---	120	**Yes**	620	N	NA	14000	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	8.4	J	11	J	meq/100 g	09SB040002	3/3	---	11	NA	NA		NA	NA	No	NTX
	pH	6.9	J	8	J	S.U.	09SB070002	3/3	---	8	NA	NA		NA	NA	No	NTX
	TOTAL ORGANIC CARBON	5700		8500		mg/kg	09SB040002	3/3	---	8500	NA	NA		NA	NA	No	NTX

SWMU 9 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Naphthalene is used as a surrogate for 2-methylnaphthalene.
9 Acenaphthene is used as a surrogate for acenaphthylene.
10 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to groundwater (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

09SB010002	09SB040102	09SB080002
09SB010102	09SB050002	09SB080102
09SB020002	09SB050102	09SB090002
09SB020102	09SB060002	09SB090102
09SB030002	09SB060102	09SB100002
09SB030102	09SB070002	09SB100102
09SB040002	09SB070102	09SB110002
		09SB110102

Shaded cells indicte that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 9 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-09-2	METHYLENE CHLORIDE	0.003	J	0.006	J	mg/kg	09SB100204, 09SB090102, 09SB080102	11/22	0.003 - 0.004	0.006	NA	9.1	C	120	IDEM	No	BSL
127-18-4	TETRACHLOROETHENE	0.004		0.004		mg/kg	09SB070709	1/22	0.003 - 0.004	0.004	NA	1.5	C	48	IDEM	No	BSL
79-01-6	TRICHLOROETHENE	0.018		0.018		mg/kg	09SB070709	1/22	0.003 - 0.004	0.018	NA	0.053	C	45	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
91-57-6	2-METHYLNAPHTHALENE	0.04		1.8		mg/kg	09SB090002	2/22	0.008 - 0.009	1.8	NA	5.6(7)	N	3200(7)	IDEM	No	BSL
83-32-9	ACENAPHTHENE	0.02		0.02		mg/kg	09SB030002	1/22	0.008 - 0.009	0.02	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.018		0.018		mg/kg	09SB030002	1/22	0.008 - 0.009	0.018	NA	370(8)	N	9500(8)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.052		0.052		mg/kg	09SB030002	1/22	0.008 - 0.009	0.052	NA	2200	N	47000	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.018		0.15		mg/kg	09SB030002	4/22	0.008 - 0.009	0.15	NA	0.62	C	5	IDEM	No	BSL
50-32-8	**BENZO(A)PYRENE**	0.022	J	0.13		mg/kg	09SB030002	4/22	0.008 - 0.009	0.13	NA	**0.062**	C	0.5	IDEM	**Yes**	**ASL**
205-99-2	BENZO(B)FLUORANTHENE	0.009		0.12		mg/kg	09SB030002	5/22	0.008 - 0.009	0.12	NA	0.62	C	5	IDEM	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.009		0.057		mg/kg	09SB030002	5/22	0.008 - 0.009	0.057	NA	230(9)	N	5500(9)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.018	J	0.11	J	mg/kg	09SB030002	4/22	0.008 - 0.009	0.11	NA	6.2	C	50	IDEM	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.66		0.66		mg/kg	09SB070709	1/22	0.37 - 0.44	0.66	NA	35	C	300	IDEM	No	BSL
218-01-9	CHRYSENE	0.01		0.14		mg/kg	09SB030002	5/22	0.008 - 0.009	0.14	NA	62	C	500	IDEM	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	1.2		1.2		mg/kg	09SB020002	1/22	0.37 - 0.44	1.2	NA	610	N	18000	IDEM	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.01	J	0.029		mg/kg	09SB030002	3/22	0.008 - 0.009	0.029	NA	0.062	C	0.5	IDEM	No	BSL
206-44-0	FLUORANTHENE	0.008		0.3	J	mg/kg	09SB030002	5/22	0.008 - 0.009	0.3	NA	230	N	6300	IDEM	No	BSL
86-73-7	FLUORENE	0.029		0.029		mg/kg	09SB030002	1/22	0.008 - 0.009	0.029	NA	260	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.014	J	0.058		mg/kg	09SB030002	4/22	0.008 - 0.009	0.058	NA	0.62	C	5	IDEM	No	BSL
91-20-3	NAPHTHALENE	0.03		0.93		mg/kg	09SB090002	2/22	0.008 - 0.009	0.93	NA	5.6	N	3200	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.013		0.63		mg/kg	09SB090002	4/22	0.008 - 0.009	0.63	NA	230(9)	N	5500(9)	IDEM	No	BSL
129-00-0	PYRENE	0.013		0.23	J	mg/kg	09SB030002	5/22	0.008 - 0.009	0.23	NA	230	N	5500	IDEM	No	BSL
PESTICIDES/PCBs																	
50-29-3	4,4'-DDT	0.0047		0.0047		mg/kg	09SB090002	1/22	0.0037 - 0.0043	0.0047	NA	1.7	C	20	IDEM	No	BSL
11097-69-1	**AROCLOR-1254**	0.46		0.46		mg/kg	09SB070709	1/22	0.037 - 0.043	0.46	NA	**0.22**	C	1.8	IDEM	**Yes**	**ASL**
72-43-5	METHOXYCHLOR	0.025	J	0.025	J	mg/kg	09SB090002	1/22	0.019 - 0.022	0.025	NA	31	N	910	IDEM	No	BSL
HERBICIDES																	
94-75-7	2,4-D	0.02	J	0.02	J	mg/kg	09SB040002	1/16	0.003 - 0.0033	0.02	NA	69	N	NA	IDEM	No	BSL
88-85-7	DINOSEB	0.014	J	0.014	J	mg/kg	09SB080002	1/19	0.003 - 0.0035	0.014	NA	6.1	N	NA	IDEM	No	BSL
87-86-5	PENTACHLOROPHENOL	0.0012	J	0.0035		mg/kg	09SB020002	4/20	0.00075 - 0.00088	0.0035	NA	3	C	20	IDEM	No	BSL
INORGANICS																	
7429-90-5	**ALUMINUM**	3280		12900		mg/kg	09SB080002	22/22	---	12900	**Yes**	**7600**	N	NA	IDEM	**Yes**	**ASL**
7440-36-0	ANTIMONY	0.97		3.1	J	mg/kg	09SB060002	4/22	0.83 - 1	3.1	**Yes**	3.1	N	140	IDEM	No	BSL
7440-38-2	ARSENIC	0.26	J	9.6	J	mg/kg	09SB090002	22/22	---	9.6	No	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	BARIUM	15.8	J	108	J	mg/kg	09SB030406	22/22	---	108	**Yes**	540	N	23000	IDEM	No	BSL
7440-41-7	BERYLLIUM	1	J	1	J	mg/kg	09SB020608, 09SB070709	2/22	0.82 - 1	1	**Yes**	15	N	680	IDEM	No	BSL
7440-43-9	CADMIUM	0.96	J	0.96	J	mg/kg	09SB100002	1/22	0.82 - 1	0.96	No	3.7	N	12	IDEM	No	BSL,BKG
7440-70-2	CALCIUM	480	J	175000	J	mg/kg	09SB110002	18/22	409 - 472	175000	**Yes**	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	3	J	13.9		mg/kg	09SB030406	22/22	---	13.9	**Yes**	30(10)	C	430(10)	IDEM	No	BSL
7440-48-4	COBALT	1.4		37		mg/kg	09SB070709	22/22	---	37	**Yes**	140	N	NA	IDEM	No	BSL
7440-50-8	COPPER	2.3	J	20.1	J	mg/kg	09SB100002	22/22	---	20.1	**Yes**	310	N	13000	IDEM	No	BSL
7439-89-6	**IRON**	2610		31900		mg/kg	09SB020608	22/22	---	31900	**Yes**	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	LEAD	6.7	J	34.9	J	mg/kg	09SB100002	22/22	---	34.9	**Yes**	400(11)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	731	J	32500	J	mg/kg	09SB110002	21/22	409 - 409	32500	**Yes**	NA		NA	IDEM	No	NUT
7439-96-5	MANGANESE	4.4	J	1060	J	mg/kg	09SB040002	22/22	---	1060	No	**180**	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.03		0.06		mg/kg	09SB090002, 09SB040002	7/22	0.04 - 0.05	0.06	**Yes**	2.3(12)	N	55	IDEM	No	BSL
7440-02-0	NICKEL	2.7		24.3	J	mg/kg	09SB020608	22/22	---	24.3	No	160	N	6900	IDEM	No	BSL,BKG

SWMU 9 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
7440-09-7	POTASSIUM	464	J	630	J	mg/kg	09SB060810	7/22	409 - 472	630	No	NA		NA	IDEM	No	NUT, BKG
7440-62-2	VANADIUM	2.4	J	29.3	J	mg/kg	09SB090002	22/22	---	29.3	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	ZINC	9.9	J	120	J	mg/kg	09SB060002	22/22	---	120	**Yes**	2300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	7.4	J	13	J	meq/100 g	09SB080406	8/8	---	13	NA	NA		NA	IDEM	No	NTX
	pH	4.3	J	8	J	S.U.	09SB070002	8/8	---	8	NA	NA		NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	1200		8500		mg/kg	09SB040002	7/8	1000 - 1000	8500	NA	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Naphthalene is used as a surrogate for 2-methylnaphthalene.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994).
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001).

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of Potential Concern
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
meq = milliequivalent.
S.U. = Standard unts.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

09SB010002	09SB040002	09SB070002	09SB100002	09SB030406	09SB090810
09SB010102	09SB040102	09SB070102	09SB100102	09SB040406	09SB100204
09SB020002	09SB050002	09SB080002	09SB110002	09SB050406	09SB110406
09SB020102	09SB050102	09SB080102	09SB110102	09SB060810	
09SB030002	09SB060002	09SB090002	09SB010810	09SB070709	
09SB030102	09SB060102	09SB090102	09SB020608	09SB080406	

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 9 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NWSC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
75-09-2	**METHYLENE CHLORIDE**	0.003	J	0.006	J	mg/kg	09SB100204, 09SB090102, 09SB080102	11/22	0.003 - 0.004	0.006	NA	**0.001**	C	13	0.023	**Yes**	**ASL**
127-18-4	**TETRACHLOROETHENE**	0.004		0.004		mg/kg	09SB070709	1/22	0.003 - 0.004	0.004	NA	**0.003**	C	11	0.058	**Yes**	**ASL**
79-01-6	**TRICHLOROETHENE**	0.018		0.018		mg/kg	09SB070709	1/22	0.003 - 0.004	0.018	NA	**0.003**	C	5	0.057	**Yes**	**ASL**
SEMIVOLATILE ORGANICS																	
91-57-6	**2-METHYLNAPHTHALENE**	0.04		1.8		mg/kg	09SB090002	2/22	0.008 - 0.009	1.8	NA	4(8)	N	NA	**0.7(8)**	**Yes**	**ASL**
83-32-9	ACENAPHTHENE	0.02		0.02		mg/kg	09SB030002	1/22	0.008 - 0.009	0.02	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.018		0.018		mg/kg	09SB030002	1/22	0.008 - 0.009	0.018	NA	29(9)	N	NA	130(9)	No	BSL
120-12-7	ANTHRACENE	0.052		0.052		mg/kg	09SB030002	1/22	0.008 - 0.009	0.052	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.018		0.15		mg/kg	09SB030002	4/22	0.008 - 0.009	0.15	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	BENZO(A)PYRENE	0.022	J	0.13		mg/kg	09SB030002	4/22	0.008 - 0.009	0.13	NA	0.4	C	NA	8.2	No	BSL
205-99-2	BENZO(B)FLUORANTHENE	0.009		0.12		mg/kg	09SB030002	5/22	0.008 - 0.009	0.12	NA	0.2	C	NA	57	No	BSL
191-24-2	BENZO(G,H,I)PERYLENE	0.009		0.057		mg/kg	09SB030002	5/22	0.008 - 0.009	0.057	NA	210(10)	N	NA	570(10)	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.018	J	0.11	J	mg/kg	09SB030002	4/22	0.008 - 0.009	0.11	NA	2	C	NA	39	No	BSL
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	0.66		0.66		mg/kg	09SB070709	1/22	0.37 - 0.44	0.66	NA	180	C	31000	3600	No	BSL
218-01-9	CHRYSENE	0.01		0.14		mg/kg	09SB030002	5/22	0.008 - 0.009	0.14	NA	8	C	NA	25	No	BSL
84-74-2	DI-N-BUTYL PHTHALATE	1.2		1.2		mg/kg	09SB020002	1/22	0.37 - 0.44	1.2	NA	270	N	2300	5000	No	BSL
53-70-3	DIBENZO(A,H)ANTHRACENE	0.01	J	0.029		mg/kg	09SB030002	3/22	0.008 - 0.009	0.029	NA	0.08	C	NA	18	No	BSL
206-44-0	FLUORANTHENE	0.008		0.3	J	mg/kg	09SB030002	5/22	0.008 - 0.009	0.3	NA	210	N	NA	880	No	BSL
86-73-7	FLUORENE	0.029		0.029		mg/kg	09SB030002	1/22	0.008 - 0.009	0.029	NA	28	N	NA	170	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.014	J	0.058		mg/kg	09SB030002	4/22	0.008 - 0.009	0.058	NA	0.7	C	NA	3.1	No	BSL
91-20-3	**NAPHTHALENE**	0.03		0.93		mg/kg	09SB090002	2/22	0.008 - 0.009	0.93	NA	4	N	NA	**0.7**	**Yes**	**ASL**
85-01-8	PHENANTHRENE	0.013		0.63		mg/kg	09SB090002	4/22	0.008 - 0.009	0.63	NA	210(10)	N	NA	570(10)	No	BSL
129-00-0	PYRENE	0.013		0.23	J	mg/kg	09SB030002	5/22	0.008 - 0.009	0.23	NA	210	N	NA	570	No	BSL
PESTICIDES/PCBs																	
50-29-3	4,4'-DDT	0.0047		0.0047		mg/kg	09SB090002	1/22	0.0037 - 0.0043	0.0047	NA	2	C	NA	260	No	BSL
11097-69-1	AROCLOR-1254	0.46		0.46		mg/kg	09SB070709	1/22	0.037 - 0.043	0.46	NA	NA	C	NA	6.2	No	BSL
72-43-5	METHOXYCHLOR	0.025	J	0.025	J	mg/kg	09SB090002	1/22	0.019 - 0.022	0.025	NA	8	N	NA	160	No	BSL
HERBICIDES																	
94-75-7	2,4-D	0.02	J	0.02	J	mg/kg	09SB040002	1/16	0.003 - 0.0033	0.02	NA	NA	N	NA	NA	No	NTX
88-85-7	DINOSEB	0.014	J	0.014	J	mg/kg	09SB080002	1/19	0.003 - 0.0035	0.014	NA	NA	N	NA	NA	No	NTX
87-86-5	**PENTACHLOROPHENOL**	0.0012	J	0.0035		mg/kg	09SB020002	4/20	0.00075 - 0.00088	0.0035	NA	**0.001**	C	NA	0.028	**Yes**	**ASL**
INORGANICS																	
7429-90-5	ALUMINUM	3280		12900		mg/kg	09SB080002	22/22	---	12900	**Yes**	NA	N	NA	NA	No	NTX
7440-36-0	**ANTIMONY**	0.97		3.1	J	mg/kg	09SB060002	4/22	0.83 - 1	3.1	**Yes**	**0.3**	N	NA	5.4	**Yes**	**ASL**
7440-38-2	ARSENIC	0.26	J	9.6	J	mg/kg	09SB090002	22/22	---	9.6	No	**1**	C	750	29	No	BKG
7440-39-3	**BARIUM**	15.8	J	108	J	mg/kg	09SB030406	22/22	---	108	**Yes**	**82**	N	690000	1600	**Yes**	**ASL**
7440-41-7	BERYLLIUM	1	J	1	J	mg/kg	09SB020608, 09SB070709	2/22	0.82 - 1	1	**Yes**	3	N	1300	63	No	BSL
7440-43-9	CADMIUM	0.96	J	0.96	J	mg/kg	09SB100002	1/22	0.82 - 1	0.96	No	**0.4**	N	1800	7.5	No	BKG
7440-70-2	CALCIUM	480	J	175000	J	mg/kg	09SB110002	18/22	409 - 472	175000	**Yes**	NA		NA	NA	No	NUT
7440-47-3	**CHROMIUM**	3	J	13.9		mg/kg	09SB030406	22/22	---	13.9	**Yes**	**2**	C	270	38	**Yes**	**ASL**
7440-48-4	COBALT	1.4		37		mg/kg	09SB070709	22/22	---	37	**Yes**	NA	N	NA	NA	No	NTX
7440-50-8	COPPER	2.3	J	20.1	J	mg/kg	09SB100002	22/22	---	20.1	**Yes**	NA	N	NA	580	No	BSL
7439-89-6	IRON	2610		31900		mg/kg	09SB020608	22/22	---	31900	**Yes**	NA	N	NA	NA	No	NTX
7439-92-1	LEAD	6.7	J	34.9	J	mg/kg	09SB100002	22/22	---	34.9	**Yes**	NA	N	NA	81	No	BSL
7439-95-4	MAGNESIUM	731	J	32500	J	mg/kg	09SB110002	21/22	409 - 409	32500	**Yes**	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	4.4	J	1060	J	mg/kg	09SB040002	22/22	---	1060	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	MERCURY	0.03		0.06		mg/kg	09SB090002, 09SB040002	7/22	0.04 - 0.05	0.06	**Yes**	0.1	N	10	2.1	No	BSL
7440-02-0	NICKEL	2.7		24.3	J	mg/kg	09SB020608	22/22	---	24.3	No	**7**	N	13000	950	No	BKG

SWMU 9 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NWSC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater (5)		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
7440-09-7	POTASSIUM	464	J	630	J	mg/kg	09SB060810	7/22	409 - 472	630	No	NA		NA	NA	No	NUT, BKG
7440-62-2	VANADIUM	2.4	J	29.3	J	mg/kg	09SB090002	22/22	---	29.3	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	ZINC	9.9	J	120	J	mg/kg	09SB060002	22/22	---	120	**Yes**	620	N	NA	14000	No	BSL
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	7.4	J	13	J	meq/100 g	09SB080406	8/8	---	13	NA	NA		NA	NA	No	NTX
	pH	4.3	J	8	J	S.U.	09SB070002	8/8	---	8	NA	NA		NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1200		8500		mg/kg	09SB040002	7/8	1000 - 1000	8500	NA	NA		NA	NA	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Naphthalene is used as a surrogate for 2-methylnaphthalene.
9 Acenaphthene is used as a surrogate for acenaphthylene.
10 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Associated Samples:

09SB010002	09SB050002	09SB090002	09SB030406
09SB010102	09SB050102	09SB090102	09SB040406
09SB020002	09SB060002	09SB100002	09SB050406
09SB020102	09SB060102	09SB100102	09SB060810
09SB030002	09SB070002	09SB110002	09SB070709
09SB030102	09SB070102	09SB110102	09SB080406
09SB040002	09SB080002	09SB010810	09SB090810
09SB040102	09SB080102	09SB020608	09SB100204
			09SB110406

Shaded cells indicate that the specified

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to groundwater (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.
meq = milliequivalents.
S.U. = Standard units.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

SWMU 9 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	26		26		µg/L	09GW0301	1/12	1 - 50	26	NA	320	N	200 200	FED-MCL IDEM	No	BSL
75-34-3	1,1-DICHLOROETHANE	14		14		µg/L	09GW0301	1/12	1 - 50	14	NA	81	C	NA 990	FED-MCL IDEM	No	BSL
75-35-4	1,1-DICHLOROETHENE	6.4		6.4		µg/L	09GW0301	1/12	0.5 - 25	6.4	NA	34	N	7 7	FED-MCL IDEM	No	BSL
156-59-2	**CIS-1,2-DICHLOROETHENI**	1.7		130		µg/L	09GW0401	3/12	1	130	NA	**6.1**	N	**70** **70**	FED-MCL IDEM	**Yes**	**ASL**
75-09-2	**METHYLENE CHLORIDE**	58	J	58	J	µg/L	09GW0401	1/12	1	58	NA	**4.3**	C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
79-01-6	**TRICHLOROETHENE**	1		55		µg/L	09GW0301	2/12	1 - 50	55	NA	**0.028**	C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
PESTICIDE/PCBS																	
60-57-1	**DIELDRIN**	0.03		0.03		µg/L	09GWT0101	1/12	0.019 - 0.022	0.03	NA	**0.0042**	N	NA 0.053	FED-MCL IDEM	**Yes**	**ASL**
HERBIDICES																	
93-76-5	2,4,5-T	0.13		0.13		µg/L	09GWT0101	1/12	0.08	0.13	NA	36	C	NA NA	FED-MCL IDEM	No	BSL
93-72-1	2,4,5-TP (SILVEX)	0.17	J	0.17	J	µg/L	09GW1201	1/12	0.08	0.17	NA	29	N	50 NA	FED-MCL IDEM	No	BSL
INORGANICS																	
7429-90-5	**ALUMINUM**	364	J	1290	J	µg/L	09GWT0201	2/12	200	1290	ND	3600	N	**50 to 200(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.29		4.3		µg/L	09GW0201	12/12	---	4.3	ND	**0.045**	N	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	**BARIUM**	6.6		323		µg/L	09GW0201	12/12	---	323	**19.3**	**260**		2000 2000	FED-MCL IDEM	**Yes**	**ASL**
7440-41-7	**BERYLLIUM**	1		4.4		µg/L	09GWT0201	2/12	1	4.4	ND	7.3	N	**4** **4**	FED-AL IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	7950		118000		µg/L	09GW0701	12/12	---	118000	**59300**	NA	N	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	**COBALT**	11.6		109		µg/L	09GWT0201	7/12	3	109	ND	**73**	N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
7440-50-8	COPPER	2		8.4		µg/L	09GWT0201	4/12	2	8.4	ND	150	N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	136		37300		µg/L	09GW0201	11/12	100	37300	**149**	**1100**	N	**300(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-92-1	LEAD	1.1		1.1		µg/L	09GW0401	1/12	1	1.1	ND	15	N	15 NA	FED-AL IDEM	No	BSL
7439-95-4	MAGNESIUM	8360	J	81500	J	µg/L	09GW0701	12/12	---	81500	**19800**	NA		NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	34.8		7920		µg/L	09GW0201	12/12	---	7920	**15**	**88**	N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-02-0	**NICKEL**	16.3		279		µg/L	09GWT0201	6/12	10	279	**10**	**73**	N	NA 730	FED-MCL IDEM	**Yes**	**ASL**
7782-49-2	SELENIUM	1.2		1.7		µg/L	09GWT0201	3/12	1	1.7	**1.1**	18	N	50 50	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM	6730	J	134000	J	µg/L	09GWT0101	11/12	5000	134000	**48900**	NA		NA NA	FED-MCL IDEM	No	NUT
7440-62-2	VANADIUM	2.1		2.1		µg/L	09GWT0101	1/12	2	2.1	ND	26	N	NA NA	FED-MCL IDEM	No	BSL
7440-66-6	ZINC	12.1		166		µg/L	09GWT0201	6/12	10	166	**13.2**	1100	N	5000(7) 11000	FED-MCL IDEM	No	BSL

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum groundwater concentrations were compared to concentrations in upgradient groundwater sample 09GWTP0601. If the concentration in the site groundwater concentration was less than the upgradient concentration, that metal was not selected as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2000).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

09GW0201	09GWT0101
09GW0301	09GWT0201
09GW0401	09GWT0301
09GW0701	09GWT0401
09GW1001	09GWT0501
09GW1201	09GWTP0501

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (USEPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for ground water (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

SWMU 9 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
VOLATILE ORGANICS																	
71-55-6	1,1,1-TRICHLOROETHANE	26		26		µg/L	09GW0301	1/12	1 - 50	26	NA	320	N	200 200	FED-MCL IDEM	No	BSL
75-34-3	1,1-DICHLOROETHANE	14		14		µg/L	09GW0301	1/12	1 - 50	14	NA	81	C	NA 990	FED-MCL IDEM	No	BSL
75-35-4	1,1-DICHLOROETHENE	6.4		6.4		µg/L	09GW0301	1/12	0.5 - 25	6.4	NA	34	N	7 7	FED-MCL IDEM	No	BSL
156-59-2	**CIS-1,2-DICHLOROETHENI**	1.7		130		µg/L	09GW0401	3/12	1	130	NA	**6.1**	N	**70** **70**	FED-MCL IDEM	**Yes**	**ASL**
75-09-2	**METHYLENE CHLORIDE**	58	J	58	J	µg/L	09GW0401	1/12	1	58	NA	**4.3**	C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
79-01-6	**TRICHLOROETHENE**	1		55		µg/L	09GW0301	2/12	1 - 50	55	NA	**0.028**	C	**5** **5**	FED-MCL IDEM	**Yes**	**ASL**
PESTICIDE/PCBS																	
60-57-1	**DIELDRIN**	0.03		0.03		µg/L	09GWT0101	1/12	0.019 - 0.022	0.03	NA	**0.0042**	N	NA 0.053	FED-MCL IDEM	**Yes**	**ASL**
HERBIDICES																	
93-76-5	2,4,5-T	0.13		0.13		µg/L	09GWT0101	1/12	0.08	0.13	NA	36	C	NA NA	FED-MCL IDEM	No	BSL
93-72-1	2,4,5-TP (SILVEX)	0.17	J	0.17	J	µg/L	09GW1201	1/12	0.08	0.17	NA	29	N	50 NA	FED-MCL IDEM	No	BSL
INORGANICS																	
7429-90-5	**ALUMINUM**	364	J	1290	J	µg/L	09GWT0201	2/12	200	1290	ND	3600	N	**50 to 200(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.29		4.3		µg/L	09GW0201	12/12	---	4.3	ND	**0.045**	N	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	**BARIUM**	6.6		323		µg/L	09GW0201	12/12	---	323	**19.3**	**260**		2000 2000	FED-MCL IDEM	**Yes**	**ASL**
7440-41-7	**BERYLLIUM**	1		4.4		µg/L	09GWT0201	2/12	1	4.4	ND	7.3	N	**4** **4**	FED-AL IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	7950		118000		µg/L	09GW0701	12/12	---	118000	**59300**	NA	N	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	**COBALT**	11.6		109		µg/L	09GWT0201	7/12	3	109	ND	**73**	N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
7440-50-8	COPPER	2		8.4		µg/L	09GWT0201	4/12	2	8.4	ND	150	N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	136		37300		µg/L	09GW0201	11/12	100	37300	**149**	**1100**	N	**300(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-92-1	LEAD	1.1		1.1		µg/L	09GW0401	1/12	1	1.1	ND	15	N	15 NA	FED-AL IDEM	No	BSL
7439-95-4	MAGNESIUM	8360	J	81500	J	µg/L	09GW0701	12/12	---	81500	**19800**	NA		NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	34.8		7920		µg/L	09GW0201	12/12	---	7920	**15**	**88**	N	**50(7)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-02-0	**NICKEL**	16.3		279		µg/L	09GWT0201	6/12	10	279	**10**	**73**	N	NA 730	FED-MCL IDEM	**Yes**	**ASL**
7782-49-2	SELENIUM	1.2		1.7		µg/L	09GWT0201	3/12	1	1.7	**1.1**	18	N	50 50	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM	6730	J	134000	J	µg/L	09GWT0101	11/12	5000	134000	**48900**	NA		NA NA	FED-MCL IDEM	No	NUT
7440-62-2	VANADIUM	2.1		2.1		µg/L	09GWT0101	1/12	2	2.1	ND	26	N	NA NA	FED-MCL IDEM	No	BSL
7440-66-6	ZINC	12.1		166		µg/L	09GWT0201	6/12	10	166	**13.2**	1100	N	5000(7) 11000	FED-MCL IDEM	No	BSL

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum groundwater concentrations were compared to concentrations in upgradient groundwater sample 09GWTP0601. If the concentration in the site groundwater concentration was less than the upgradient concentration, that metal was not selected as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2000).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

09GW0201	09GWT0101
09GW0301	09GWT0201
09GW0401	09GWT0301
09GW0701	09GWT0401
09GW1001	09GWT0501
09GW1201	09GWTP0501

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (USEPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for ground water (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

SWMU 9 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
HERBICIDES																
94-75-7	2,4-D	0.18		0.18		µg/L	09SW0201	1/4	0.08	0.18	NA	36 N	70 NA	FED-MCL IDEM	No	BSL
INORGANICS																
7429-90-5	ALUMINUM	220	J	245	J	µg/L	09SW0201	2/4	200	245	5990	3600 N	50 to 200(7) NA	FED-MCL IDEM	No	BKG
7440-36-0	**ANTIMONY**	1.6		1.6		µg/L	09SW0501	1/4	1	1.6	ND	1.5 N	6 NA	FED-MCL IDEM	Yes	ASL
7440-38-2	ARSENIC	0.41	J	1.9	J	µg/L	09SW0501	4/4	---	1.9	4.6	0.045 C	50 50	FED-MCL IDEM	No	BKG
7440-39-3	BARIUM	37.3		72.5		µg/L	09SW0501	4/4	---	72.5	173	260 N	2000 2000	FED-MCL IDEM	No	BSL,BKG
7440-70-2	CALCIUM	17600		57300		µg/L	09SW0501	4/4	---	57300	34800	NA	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	COBALT	5.5		5.5		µg/L	09SW0501	1/4	3	5.5	9.8	73 N	NA NA	FED-MCL IDEM	No	BSL,BKG
7440-50-8	COPPER	12.4		12.4		µg/L	09SW0501	1/4	2	12.4	18.5	150 N	1000(7) 1300	FED-MCL IDEM	No	BSL,BKG
7439-89-6	IRON	288	J	1830	J	µg/L	09SW0501	4/4	---	1830	8390	1100 N	300(7) NA	FED-MCL IDEM	No	BKG
7439-92-1	LEAD	3.6		3.6		µg/L	09SW0501	1/4	1	3.6	21.9	15	15 NA	FED-AL IDEM	No	BSL,BKG
7439-95-4	MAGNESIUM	5960	J	15000	J	µg/L	09SW0201	4/4	---	15000	15400	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7439-96-5	MANGANESE	57.6		583		µg/L	09SW0201	4/4	---	583	637	88 N	50(7) NA	FED-MCL IDEM	No	BKG
7440-09-7	POTASSIUM	5310	J	5310	J	µg/L	09SW0501	1/4	5000	5310	ND	NA	NA NA	FED-MCL IDEM	No	NUT
7440-23-5	SODIUM	12600		175000		µg/L	09SW0501	4/4	---	175000	36000	NA	NA NA	FED-MCL IDEM	No	BSL
7440-62-2	VANADIUM	3.1		3.1		µg/L	09SW0501	1/4	2	3.1	14.3	26 N	NA NA	FED-MCL IDEM	No	BSL,BKG
7440-66-6	ZINC	11.9		11.9		µg/L	09SW0501	1/4	10	11.9	50.4	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL,BKG
FILTERED METALS																
7440-36-0	**ANTIMONY, FILTERED**	1.6		1.6		µg/L	09SW0501-F	1/4	1	1.6	ND	1.5 N	6 NA	FED-MCL IDEM	Yes	ASL
7440-38-2	**ARSENIC, FILTERED**	0.27	J	2.3	J	µg/L	09SW0501-F	4/4	---	2.3	1.1	0.045 C	50 50	FED-MCL IDEM	Yes	ASL
7440-39-3	BARIUM, FILTERED	33.2		71		µg/L	09SW0501-F	4/4	---	71	94.9	260 N	2000 2000	FED-MCL IDEM	No	BSL,BKG
7440-70-2	CALCIUM, FILTERED	17800		57100		µg/L	09SW0501-F	4/4	---	57100	40300	NA	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	COBALT, FILTERED	5.1		5.1		µg/L	09SW0501-F	1/4	3	5.1	ND	220 N	NA NA	FED-MCL IDEM	No	BSL
7440-50-8	COPPER, FILTERED	7.4		7.4		µg/L	09SW0501-F	1/4	2	7.4	ND	150 N	1000(7) 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON, FILTERED**	145	J	1460	J	µg/L	09SW0501-F	3/4	100	1460	138	1100 N	300(7) NA	FED-MCL IDEM	Yes	ASL
7439-92-1	LEAD, FILTERED	2.3		2.3		µg/L	09SW0501-F	1/4	1	2.3	ND	15	15 NA	FED-AL IDEM	No	BSL
7439-95-4	MAGNESIUM, FILTERED	6210	J	14100	J	µg/L	09SW0201-F	4/4	---	14100	17800	NA	NA NA	FED-MCL IDEM	No	NUT, BKG
7439-96-5	**MANGANESE, FILTERED**	18		532		µg/L	09SW0201-F	4/4	---	532	239	88 N	50(7) NA	FED-MCL IDEM	Yes	ASL

SWMU 9 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
7440-09-7	POTASSIUM, FILTERED	5390	J	5390	J	µg/L	09SW0501-F	1/4	5000	5390	ND	NA	NA NA	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM, FILTERED	12700		182000		µg/L	09SW0501-F	4/4	---	182000	43200	NA	NA NA	FED-MCL IDEM	No	NUT
7440-62-2	VANADIUM, FILTERED	3.8		3.8		µg/L	09SW0501-F	1/4	2	3.8	ND	26 N	NA NA	FED-MCL IDEM	No	BSL
7440-66-6	ZINC, FILTERED	10.2		10.2		µg/L	09SW0501-F	1/4	10	10.2	ND	1100 N	5000(7) 11000	FED-MCL IDEM	No	BSL
MISCELLANEOUS PARAMETERS																
	HARDNESS	70		180		µg/L	09SW0501	4/4	---	180	NA	NA	NA NA	FED-MCL IDEM	No	NTX
	TOTAL SUSPENDED SOLIDS	3		10		µg/L	09SW0401	3/4	2	10	NA	NA	NA NA	FED-MCL IDEM	No	NTX

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum surface water concentrations were compared to concentrations in upgradient surface water sample 09SW0101. If the concentration in the site surface water concentration was less than the upgradient concentration, that metal was not selEcted as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Associated Samples:

09SW0201	09SW0201-F
09SW0301	09SW0301-F
09SW0401	09SW0401-F
09SW0501	09SW0501-F

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001)

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.
For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 9 - TABLE 2.7
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
VOLATILE ORGANICS																	
75-09-2	METHYLENE CHLORIDE	0.004	J	0.004	J	mg/kg	09SD030006, 09SD040006	2/4	0.004	0.004	NA	9.1	C	120	IDEM	No	BSL
SEMIVOLATILE ORGANICS																	
206-44-0	FLUORANTHENE	0.01		0.01		mg/kg	09SD030006	1/4	0.009	0.01	NA	230	N	6300	IDEM	No	BSL
PESTICIDES/PCBs																	
12672-29-6	**AROCLOR-1248**	0.38	J	0.38	J	mg/kg	09SD030006	1/4	0.043 - 0.045	0.38	NA	**0.22**	C	1.8	IDEM	**Yes**	**ASL**
INORGANICS																	
7429-90-5	**ALUMINUM**	5470	J	10800	J	mg/kg	09SD050006	4/4	---	10800	**7600**	**7600**	N	NA	IDEM	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.3	J	1.3	J	mg/kg	09SD020006	1/4	0.96 - 1	1.3	ND	3.1	N	140	IDEM	No	BSL
7440-38-2	**ARSENIC**	0.77		6.1		mg/kg	09SD030006	4/4	---	6.1	**3.7**	**0.39**	C	**3.9**	IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	39.3		103		mg/kg	09SD030006	4/4	---	103	**78.1**	540	N	23000	IDEM	No	BSL
7440-70-2	CALCIUM	786	J	1470	J	mg/kg	09SD030006	4/4	---	1470	2120	NA		NA	IDEM	No	NUT, BKG
7440-47-3	CHROMIUM	11.1		13		mg/kg	09SD050006	4/4	---	13	**8.7**	30(7)	C	430(7)	IDEM	No	BSL
7440-48-4	COBALT	4.8		14.5		mg/kg	09SD040006	4/4	---	14.5	**9.2**	140	N	NA	IDEM	No	BSL
7440-50-8	COPPER	9		27.7		mg/kg	09SD050006	4/4	---	27.7	**16**	310	N	13000	IDEM	No	BSL
7439-89-6	**IRON**	15700	J	18600	J	mg/kg	09SD030006	4/4	---	18600	**9620**	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	LEAD	6.6	J	22.7	J	mg/kg	09SD030006	4/4	---	22.7	**22.1**	400(8)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	597	J	1820	J	mg/kg	09SD050006	4/4	---	1820	**1290**	NA		NA	IDEM	No	NUT
7439-96-5	**MANGANESE**	86.8		1300		mg/kg	09SD030006	4/4	---	1300	**350**	**180**	N	NA	IDEM	**Yes**	**ASL**
7440-02-0	NICKEL	7.4		11.6		mg/kg	09SD040006	4/4	---	11.6	12.2	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	913	J	913	J	mg/kg	09SD050006	1/4	411 - 487	913	ND	NA		NA	IDEM	No	NUT
7440-62-2	VANADIUM	12.2		21.2		mg/kg	09SD030006	4/4	---	21.2	**15.2**	55	N	NA	IDEM	No	BSL
7440-66-6	ZINC	27.7		95.3		mg/kg	09SD030006	4/4	---	95.3	**40.9**	2300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	TOTAL ORGANIC CARBON	1600		14000		mg/kg	09SD040006	4/4	---	14000	NA	NA		NA	IDEM	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum sediment concentrations were compared to concentrations in upgradient sediment sample 09SD01. If the concentration in the site sediment concentration was less than the upgradient concentration, that metal was not selEcted as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (U.S. EPA, July 1994).

Associated Samples:

09SD020006
09SD030006
09SD040006
09SD050006

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available..
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 9 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	3.23E-03	NA	6.00E-03	J	mg/kg	5.29E-03	95% UCL-T	W - Test (1)	5.29E-03	95% UCL-T	W - Test (1)
2-METHYLNAPHTHALENE	mg/kg	1.71E-01	NA	1.80E+00		mg/kg	1.02E+00	95% UCL-T	W - Test (1)	1.02E+00	95% UCL-T	W - Test (1)
BENZO(A)ANTHRACENE	mg/kg	3.20E-02	NA	1.50E-01		mg/kg	1.50E-01	Maximum	W - Test (2)	1.50E-01	Maximum	W - Test (2)
BENZO(A)PYRENE	mg/kg	2.81E-02	NA	1.30E-01		mg/kg	1.30E-01	Maximum	W - Test (2)	1.30E-01	Maximum	W - Test (2)
NAPHTHALENE	mg/kg	9.06E-02	NA	9.30E-01		mg/kg	3.62E-01	95% UCL-T	W - Test (1)	3.62E-01	95% UCL-T	W - Test (1)
PENTACHLOROPHENOL	mg/kg	1.01E-03	NA	3.50E-03		mg/kg	2.43E-03	95% UCL-T	W - Test (1)	2.43E-03	95% UCL-T	W - Test (1)
ANTIMONY	mg/kg	7.51E-01	NA	3.10E+00	J	mg/kg	1.09E+00	95% UCL-T	W - Test (1)	1.09E+00	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.

SWMU 9 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface / Subsurface Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
METHYLENE CHLORIDE	mg/kg	2.95E-03	NA	6.00E-03	J	mg/kg	3.79E-03	95% UCL-T	W - Test (1)	3.79E-03	95% UCL-T	W - Test (1)
TETRACHLOROETHENE	mg/kg	1.66E-03	NA	4.00E-03		mg/kg	1.80E-03	95% UCL-T	W - Test (1)	1.80E-03	95% UCL-T	W - Test (1)
TRICHLOROETHENE	mg/kg	2.30E-03	NA	1.80E-02		mg/kg	2.51E-03	95% UCL-T	W - Test (1)	2.51E-03	95% UCL-T	W - Test (1)
2-METHYLNAPHTHALENE	mg/kg	8.73E-02	NA	1.80E+00		mg/kg	3.78E-02	95% UCL-T	W - Test (1)	3.78E-02	95% UCL-T	W - Test (1)
BENZO(A)ANTHRACENE	mg/kg	1.80E-02	NA	1.50E-01		mg/kg	2.50E-02	95% UCL-T	W - Test (1)	2.50E-02	95% UCL-T	W - Test (1)
BENZO(A)PYRENE	mg/kg	1.61E-02	NA	1.30E-01		mg/kg	2.26E-02	95% UCL-T	W - Test (1)	2.26E-02	95% UCL-T	W - Test (1)
NAPHTHALENE	mg/kg	4.73E-02	NA	9.30E-01		mg/kg	2.53E-02	95% UCL-T	W - Test (1)	2.53E-02	95% UCL-T	W - Test (1)
AROCLOR-1254	mg/kg	3.97E-02	NA	4.60E-01		mg/kg	3.91E-02	95% UCL-T	W - Test (1)	3.91E-02	95% UCL-T	W - Test (1)
PENTACHLOROPHENOL	mg/kg	7.22E-04	NA	3.50E-03		mg/kg	9.32E-04	95% UCL-T	W - Test (1)	9.32E-04	95% UCL-T	W - Test (1)
ALUMINUM	mg/kg	8.76E+03	NA	1.29E+04		mg/kg	9.65E+03	95% UCL-T	W - Test (1)	9.65E+03	95% UCL-T	W - Test (1)
ANTIMONY	mg/kg	7.16E-01	NA	3.10E+00	J	mg/kg	8.75E-01	95% UCL-T	W - Test (1)	8.75E-01	95% UCL-T	W - Test (1)
BARIUM	mg/kg	7.33E+01	NA	1.08E+02	J	mg/kg	8.36E+01	95% UCL-T	W - Test (1)	8.36E+01	95% UCL-T	W - Test (1)
CHROMIUM	mg/kg	1.09E+01	NA	1.39E+01		mg/kg	1.27E+01	95% UCL-T	W - Test (1)	1.27E+01	95% UCL-T	W - Test (1)
IRON	mg/kg	1.82E+04	NA	3.19E+04		mg/kg	2.07E+04	95% UCL-T	W - Test (1)	2.07E+04	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.

SWMU 9 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
CIS-1,2-DICHLOROETHEN	mg/L	1.71E-02	NA	1.30E-01		mg/L	1.30E-01	Maximum	W - Test (2)	1.30E-01	Maximum	W - Test (2)
METHYLENE CHLORIDE	mg/L	5.29E-03	NA	5.80E-02	J	mg/L	8.58E-03	95% UCL-T	W - Test (1)	8.58E-03	95% UCL-T	W - Test (1)
TRICHLOROETHENE	mg/L	7.13E-03	NA	5.50E-02		mg/L	3.72E-02	95% UCL-T	W - Test (1)	3.72E-02	95% UCL-T	W - Test (1)
DIELDRIN	mg/L	1.16E-05	NA	3.00E-05		mg/L	1.38E-05	95% UCL-T	W - Test (1)	1.38E-05	95% UCL-T	W - Test (1)
ALUMINUM	mg/L	2.21E-01	NA	1.29E+00	J	mg/L	3.50E-01	95% UCL-T	W - Test (1)	3.50E-01	95% UCL-T	W - Test (1)
ARSENIC	mg/L	1.46E-03	NA	4.30E-03		mg/L	2.79E-03	95% UCL-T	W - Test (3)	2.79E-03	95% UCL-T	W - Test (3)
BARIUM	mg/L	8.33E-02	NA	3.23E-01		mg/L	2.36E-01	95% UCL-T	W - Test (3)	2.36E-01	95% UCL-T	W - Test (3)
BERYLLIUM	mg/L	8.67E-04	NA	4.40E-03		mg/L	1.22E-03	95% UCL-T	W - Test (1)	1.22E-03	95% UCL-T	W - Test (1)
COBALT	mg/L	1.98E-02	NA	1.09E-01		mg/L	1.09E-01	Maximum	W - Test (2)	1.09E-01	Maximum	W - Test (2)
IRON	mg/L	8.37E+00	NA	3.73E+01		mg/L	3.73E+01	Maximum	W - Test (2)	3.73E+01	Maximum	W - Test (2)
MANGANESE	mg/L	2.17E+00	NA	7.92E+00		mg/L	7.92E+00	Maximum	W - Test (2)	7.92E+00	Maximum	W - Test (2)
NICKEL	mg/L	4.83E-02	NA	2.79E-01		mg/L	2.57E-01	95% UCL-T	W - Test (1)	2.57E-01	95% UCL-T	W - Test (1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.

SWMU 9 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ANTIMONY	mg/L	7.75E-04	NA	1.60E-03		mg/L	1.60E-03	Maximum	N<10(1)	1.60E-03	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface soil samples collected. Therefore, maximum concentration is used for the exposure point concentration.

SWMU 9 - TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
AROCLOR-1248	mg/kg	9.44E-02	NA	3.80E-01	J	mg/kg	3.80E-01	Maximum	N<10(1)	3.80E-01	Maximum	N<10(1)
ALUMINUM	mg/kg	8.09E+03	NA	1.08E+04	J	mg/kg	1.08E+04	Maximum	N<10(1)	1.08E+04	Maximum	N<10(1)
ARSENIC	mg/kg	4.09E+00	NA	6.10E+00		mg/kg	6.10E+00	Maximum	N<10(1)	6.10E+00	Maximum	N<10(1)
IRON	mg/kg	1.53E+04	NA	1.86E+04	J	mg/kg	1.86E+04	Maximum	N<10(1)	1.86E+04	Maximum	N<10(1)
MANGANESE	mg/kg	6.42E+02	NA	1.30E+03		mg/kg	1.30E+03	Maximum	N<10(1)	1.30E+03	Maximum	N<10(1)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface soil samples collected. Therefore, maximum concentration is used for the exposure point concentration.

TABLE 5.1
NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal RfD(2)	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ(3)
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	11/20/01
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day		NA	NCEA	09/25/01
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood	NA	HEAST	07/97
Methylene Chloride	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	11/20/01
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS	NA	NCEA	09/25/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Naphthalene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body Weight	3,000	IRIS	11/20/01
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	11/20/01
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	11/20/01
Pentachlorophenol	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver, Kidney	100	IRIS	11/20/01
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	11/20/01
2,6-Dinitrotoluene	chronic	1.0E-03	mg/kg-day	1	1.00E-03	mg/kg-day	Liver	NA	HEAST	07/97
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	11/20/01
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	11/20/01
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	09/25/01
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	11/20/01
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	11/20/01
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Blood	1,000	IRIS	11/20/01
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	11/20/01
Cadmium (diet)	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Cadmium (water)	chronic	5.0E-04	mg/kg-day	0.05	2.50E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	11/20/01
Cobalt	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological	NA	NCEA	09/25/01
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day		NA	HEAST	07/97
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract	NA	NCEA	09/25/01
Manganese (soil)	chronic	7.0E-02	mg/kg-day	0.04	2.80E-03	mg/kg-day	CNS	1	IRIS	11/20/01
Manganese (water)	chronic	2.4E-02	mg/kg-day	0.04	9.60E-04	mg/kg-day	CNS	1	IRIS	11/20/01
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	11/20/01
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	11/20/01
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	11/20/01
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	11/20/01
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	11/20/01
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	500	IRIS	11/20/01

(1) USEPA, 2000 .
(2) RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA Region 3 RBC Table, September 2001)
NA = Not applicable/Not Available
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver	NA	NCEA	9/25/2001
cis-1,2-Dichloroethene	Chronic	3.5E+01	$\mu g/m^3$	1.0E-02	mg/kg-day	Blood	NA	IRIS	11/20/2001
Vinyl Chloride	Chronic	1.0E+02	$\mu g/m^3$	2.9E-02	mg/kg-day	Liver	NA	IRIS	11/20/2001

Notes:

RfC = Reference Concentration

RfD = Reference Dose

IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)

NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA FOR CHEMCIALS OF CONCERN-- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal Cancer Slope Factor(2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date(3)
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	7.5E-03	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl Chloride (adult)	7.5E-01	1	7.50E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl Chloride (early life)	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benzo(a)anthracene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(a)pyrene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(b)fluoranthene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenzo(a,h)anthracene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno(1,2,3-cd)pyrene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Pentachlorophenol	1.2E-01	1	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1248	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
delta-BHC	6.3E+00	1	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001

(1) USEPA, 2000).
(2) CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, September 2001)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in anima inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6-2

CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1-Dichloroethene	5.0E-05	$(mg/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	7.8E-06	$(mg/m^3)^{-1}$	3.5E+03	2.73E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	2.3E-05	$(mg/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	4.7E-07	$(mg/m^3)^{-1}$	3.5E+03	1.60E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethylene (PCE)	5.8E-07	$(mg/m^3)^{-1}$	3.5E+03	2.03E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethylene (TCE)	1.7E-06	$(mg/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl chloride (child/adult)	8.8E-06	$(mg/m^3)^{-1}$	3.5E+03	3.08E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl chloride (adult)	4.4E-06	$(mg/m^3)^{-1}$	3.5E+03	1.54E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benz[a]anthracene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[a]pyrene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[b]fluoranthene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenz[ah]anthracene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno[1,2,3-cd]pyrene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Polychlorinated Biphenyls (PCBs)	1.0E-04	$(mg/m^3)^{-1}$	3.5E+03	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	4.6E-03	$(mg/m^3)^{-1}$	3.5E+03	1.61E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
delta-BHC	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Beryllium	2.4E-03	$(mg/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Cadmium	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Chromium VI	1.2E-02	$(mg/m^3)^{-1}$	3.5E+03	4.20E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001

IRIS = Integrated Risk Information System (November 2001)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment (USEPA Region III RBC Table, September 2001)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SWMU 9 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 9 - TABLE 7.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	7.3E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.2E-07
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	1.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.0E-05
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	2.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	5.0E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.5E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.3E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.1E-07
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	1.5E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.7E-03
	(total)												**3.8E-03**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	9.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	2.6E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.4E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.1E-07
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**1.3E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.6 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	2.5E-09	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.86E-11
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	4.8E-07	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	7.0E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	5.14E-08
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.1E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	4.46E-07
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.7E-07	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.1E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.37E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	5.1E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										**5.0E-07**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	3.7E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.7E-08
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.2E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.4E-07
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	9.0E-08	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.2E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.4E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**2.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**7.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.6
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	350	USEPA 1993	
	ED	Exposure Duration	years	24	USEPA 1989	7	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 6.85E-08
Noncancer Ingestion Intake - CTE = 6.85E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 6.85E-08
Noncancer Dermal Intake - CTE = 6.85E-07

SWMU 9 - TABLE 7.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	3.6E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.0E-08
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	7.0E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-05
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	8.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	2.5E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.7E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.6E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	7.4E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.9E-03
	(total)												**1.9E-03**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	3.2E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.6E-06
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	4.2E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.4E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**1.6E-06**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.6a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	3.6E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	2.72E-12
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	7.0E-08	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.0E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	7.50E-09
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	8.9E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	6.50E-08
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	2.5E-08	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.7E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	2.00E-11
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	7.4E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										**7.3E-08**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.3E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	9.8E-10
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.2E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	8.5E-09
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	3.2E-09	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	4.2E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	5.0E-12
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**9.4E-09**
										Total Risk Across All Exposure Routes/Pathways	**8.2E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 9 - TABLE 7.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	6.8E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.1E-06
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	1.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.5E-04
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	4.6E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-04
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.1E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.0E-06
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	1.4E-05	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.5E-02
	(total)												**3.6E-02**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	5.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	4.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.2E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.0E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.6E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	5.2E-07
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**6.1E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.6E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.7 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	5.8E-09	mg/kg-day	7.50E-03	(mg/kg-day)-1	4.35E-11
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	1.1E-06	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.6E-07	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.20E-07
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.4E-07	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.04E-06
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	4.0E-07	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	2.7E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	3.20E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	1.2E-06	mg/kg-day		(mg/kg-day)-1	
	(total)										**1.2E-06**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	4.3E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.1E-08
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.7E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.7E-07
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.0E-07	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.3E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.6E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**3.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.7
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 9 - TABLE 7.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	2.3E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.8E-07
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	4.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.2E-04
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	6.4E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.5E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.7E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.0E-08	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.5E-07
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	4.6E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.2E-02
	(total)												**1.2E-02**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	5.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.4E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.0E-06
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.8E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.0E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**7.1E-06**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.7a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	6.5E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	4.85E-12
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	1.3E-07	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.8E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.34E-08
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.6E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.16E-07
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	4.4E-08	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.0E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	3.57E-11
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	1.3E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										**1.3E-07**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.7E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.2E-09
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.4E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.1E-08
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	4.0E-09	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	5.2E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	6.2E-12
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**1.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.4E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.35E-08
Noncancer Ingestion Intake - RME = 9.39E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

SWMU 9 - TABLE 7.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	5.0E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.3E-09
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	9.6E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.8E-06
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	3.4E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-06
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	2.3E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	7.6E-09
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	1.0E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.6E-04
	(total)												**2.6E-04**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	2.9E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-06
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.8E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.3E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**1.5E-06**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.6E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.2 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	1.8E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.33E-12
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	3.4E-08	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	5.0E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.67E-09
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	4.4E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.18E-08
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.2E-08	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	8.2E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	9.79E-12
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	3.6E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										**3.6E-08**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	4.3E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.2E-09
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.7E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.7E-08
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.0E-08	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.3E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.6E-11
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**3.0E-08**
										Total Risk Across All Exposure Routes/Pathways	**6.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.2
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	24	Professional Judgment	12	1/2 RME value	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.35E-08
Noncancer Ingestion Intake - RME = 9.39E-08

Cancer Ingestion Intake - CTE = 3.02E-09
Noncancer Ingestion Intake - CTE = 2.35E-08

Cancer Dermal Intake - RME = 2.21E-07
Noncancer Dermal Intake - RME = 6.20E-07

Cancer Dermal Intake - CTE = 3.99E-09
Noncancer Dermal Intake - CTE = 3.10E-08

SWMU 9 - TABLE 7.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	1.2E-10	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.1E-09
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	2.4E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E-06
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	3.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.1E-09	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	8.5E-09	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.3E-07
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	5.7E-11	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.9E-09
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	2.6E-08	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	6.4E-05
	(total)												**6.5E-05**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	6.0E-10	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.2E-10	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.5E-09	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.3E-08
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.9E-11	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	6.3E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**7.4E-08**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.2a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF MAINTENANCE WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	1.6E-11	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.20E-13
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	3.1E-09	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	4.5E-10	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.31E-10
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.9E-10	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.87E-09
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.1E-09	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	7.3E-12	mg/kg-day	1.20E-01	(mg/kg-day)-1	8.82E-13
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	3.3E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										**3.2E-09**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	7.8E-11	mg/kg-day	7.30E-01	(mg/kg-day)-1	5.7E-11
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	6.7E-11	mg/kg-day	7.30E+00	(mg/kg-day)-1	4.9E-10
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.9E-10	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	2.4E-12	mg/kg-day	1.20E-01	(mg/kg-day)-1	2.9E-13
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**5.5E-10**
										Total Risk Across All Exposure Routes/Pathways	**3.7E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	250	USEPA 1993	219	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	250	USEPA 1993	219	USEPA 1993	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.49E-07
Noncancer Ingestion Intake - RME = 9.78E-07

Cancer Ingestion Intake - CTE = 5.51E-08
Noncancer Ingestion Intake - CTE = 4.29E-07

Cancer Dermal Intake - RME = 2.31E-06
Noncancer Dermal Intake - RME = 6.46E-06

Cancer Dermal Intake - CTE = 7.27E-08
Noncancer Dermal Intake - CTE = 5.66E-07

SWMU 9 - TABLE 7.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	5.2E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.6E-08
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	1.0E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.0E-05
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	3.5E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	2.4E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	7.9E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	1.1E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.7E-03
	(total)												**2.7E-03**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.3E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.1E-07	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	3.0E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-05
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.9E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.3E-07
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**1.5E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.3 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	1.8E-09	mg/kg-day	7.50E-03	(mg/kg-day)-1	1.39E-11
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	3.6E-07	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	5.2E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.83E-08
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	4.5E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.32E-07
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.3E-07	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	8.5E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.02E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	3.8E-07	mg/kg-day		(mg/kg-day)-1	
	(total)										**3.7E-07**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	4.5E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.3E-08
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	3.9E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.8E-07
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.1E-07	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.4E-09	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.7E-10
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**3.2E-07**
										Total Risk Across All Exposure Routes/Pathways	**6.9E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.3
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	250	USEPA 1993	219	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	25	USEPA 1991	9	USEPA 1989	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,300	USEPA 1997	3,300	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.02	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	250	USEPA 1993	219	USEPA 1993	
	ED	Exposure Duration	years	25	USEPA 1989	9	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	USEPA 1989	3,285	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 3.49E-07
Noncancer Ingestion Intake - RME = 9.78E-07

Cancer Ingestion Intake - CTE = 5.51E-08
Noncancer Ingestion Intake - CTE = 4.29E-07

Cancer Dermal Intake - RME = 2.31E-06
Noncancer Dermal Intake - RME = 6.46E-06

Cancer Dermal Intake - CTE = 7.27E-08
Noncancer Dermal Intake - CTE = 5.66E-07

SWMU 9 - TABLE 7.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	2.3E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.8E-08
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	4.4E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.2E-05
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	6.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	5.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	1.6E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.8E-06
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.0E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	3.5E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	4.7E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.2E-03
	(total)												**1.2E-03**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.1E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	9.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	2.7E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.3E-06
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	3.4E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	1.1E-08
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	(total)												**1.3E-06**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.3a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF OCCUPATIONAL WORKERS TO SURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site
Receptor Population: Occupational Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M	2.9E-10	mg/kg-day	7.50E-03	(mg/kg-day)-1	2.19E-12
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M	5.6E-08	mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	8.3E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	6.03E-09
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	7.2E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	5.23E-08
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	2.0E-08	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	1.3E-10	mg/kg-day	1.20E-01	(mg/kg-day)-1	1.61E-11
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M	6.0E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										**5.8E-08**
Dermal	METHYLENE CHLORIDE	5.29E-03	mg/kg	5.29E-03	mg/kg	M		mg/kg-day	7.50E-03	(mg/kg-day)-1	
	2-METHYLNAPHTHALENE	1.02E+00	mg/kg	1.02E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	BENZO(A)ANTHRACENE	1.50E-01	mg/kg	1.50E-01	mg/kg	M	1.4E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.0E-09
	BENZO(A)PYRENE	1.30E-01	mg/kg	1.30E-01	mg/kg	M	1.2E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	9.0E-09
	NAPHTHALENE	3.62E-01	mg/kg	3.62E-01	mg/kg	M	3.4E-09	mg/kg-day		(mg/kg-day)-1	
	PENTACHLOROPHENOL	2.43E-03	mg/kg	2.43E-03	mg/kg	M	4.4E-11	mg/kg-day	1.20E-01	(mg/kg-day)-1	5.3E-12
	ANTIMONY	1.09E+00	mg/kg	1.09E+00	mg/kg	M		mg/kg-day		(mg/kg-day)-1	
	(total)										**1.0E-08**
										Total Risk Across All Exposure Routes/Pathways	**6.8E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface / subsurface soil is defined as soil collected from depths of 0 to 10 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 9 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M	1.1E-08	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.8E-07
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M	5.1E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.1E-07
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M	7.1E-09	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.2E-06
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M	1.1E-07	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.3E-06
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	7.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	6.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	7.1E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.6E-06
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	1.1E-07	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	5.5E-03
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	2.6E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	8.8E-08
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M	2.7E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.7E-02
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M	2.5E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	6.2E-03
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M	2.4E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.4E-03
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M	3.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-02
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M	5.8E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-01
	(total)												**2.5E-01**
Dermal	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	3.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	3.0E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	3.4E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.7E-06
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	5.6E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.8E-03
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	2.4E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	7.9E-08
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**2.8E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.5E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M	1.5E-10	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.15E-12
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M	7.2E-11	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	3.76E-12
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M	1.0E-10	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.11E-12
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M	1.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.0E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	7.34E-10
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	9.1E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	6.65E-09
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	1.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	1.6E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.15E-09
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	3.8E-11	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.50E-12
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M	3.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M	3.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M	3.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M	5.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M	8.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-08**
Dermal	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M		mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M		mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	4.7E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-10
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	4.3E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	4.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	8.0E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	3.4E-11	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-12
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.1E-09**
										Total Risk Across All Exposure Routes/Pathways	**1.6E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface / subsurface soil is defined as soil collected from depths of 0 to 10 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 9 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M	5.3E-09	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	8.9E-08
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M	2.5E-09	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-07
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M	3.5E-09	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.9E-07
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M	5.3E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.7E-06
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	3.5E-08	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	3.2E-08	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	3.6E-08	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.8E-06
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	5.5E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	2.8E-03
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	1.3E-09	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	4.4E-08
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M	1.4E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-02
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M	1.2E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.1E-03
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M	1.2E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.7E-03
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M	1.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.0E-03
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M	2.9E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.7E-02
	(total)												**1.2E-01**
Dermal	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M		mg/kg-day	6.00E-02	mg/kg-day	NA	NA	
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M		mg/kg-day	1.00E-02	mg/kg-day	NA	NA	
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M		mg/kg-day	6.00E-03	mg/kg-day	NA	NA	
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M		mg/kg-day	2.00E-02	mg/kg-day	NA	NA	
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	9.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	8.6E-09	mg/kg-day		mg/kg-day	NA	NA	
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	9.7E-09	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.8E-07
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	1.6E-08	mg/kg-day	2.00E-05	mg/kg-day	NA	NA	8.0E-04
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	6.8E-10	mg/kg-day	3.00E-02	mg/kg-day	NA	NA	2.3E-08
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M		mg/kg-day	6.00E-05	mg/kg-day	NA	NA	
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M		mg/kg-day	4.90E-03	mg/kg-day	NA	NA	
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	(total)												**8.0E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.2E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M	7.6E-11	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	5.73E-13
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M	3.6E-11	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.88E-12
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M	5.0E-11	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.55E-13
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M	7.6E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	5.0E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.67E-10
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	4.6E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.32E-09
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	5.1E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	7.9E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.57E-09
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	1.9E-11	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	2.25E-12
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M	1.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M	1.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M	2.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M	4.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.3E-09**
Dermal	METHYLENE CHLORIDE	3.79E-03	mg/kg	3.79E-03	mg/kg	M		mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	
	TETRACHLOROETHENE	1.80E-03	mg/kg	1.80E-03	mg/kg	M		mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	
	TRICHLOROETHENE	2.51E-03	mg/kg	2.51E-03	mg/kg	M		mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	
	2-METHYLNAPHTHALENE	3.78E-02	mg/kg	3.78E-02	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BENZO(A)ANTHRACENE	2.50E-02	mg/kg	2.50E-02	mg/kg	M	1.4E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.9E-11
	BENZO(A)PYRENE	2.26E-02	mg/kg	2.26E-02	mg/kg	M	1.2E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	9.0E-10
	NAPHTHALENE	2.53E-02	mg/kg	2.53E-02	mg/kg	M	1.4E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	AROCLOR-1254	3.91E-02	mg/kg	3.91E-02	mg/kg	M	2.3E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-10
	PENTACHLOROPHENOL	9.32E-04	mg/kg	9.32E-04	mg/kg	M	9.8E-12	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-12
	ALUMINUM	9.65E+03	mg/kg	9.65E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ANTIMONY	8.75E-01	mg/kg	8.75E-01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	BARIUM	8.36E+01	mg/kg	8.36E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	CHROMIUM	1.27E+01	mg/kg	1.27E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	2.07E+04	mg/kg	2.07E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.5E-09**
										Total Risk Across All Exposure Routes/Pathways	**6.7E-09**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 9 - TABLE 7.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	3.6E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.6E-01
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	2.4E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.9E-03
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	1.0E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.7E-01
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	3.8E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	7.6E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	9.6E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.6E-03
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	7.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.5E-01
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	6.5E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	9.2E-02
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	3.4E-05	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	1.7E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	3.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E-01
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.0E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.4E+00
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	2.2E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	9.0E+00
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	7.0E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.5E-01
	(total)												**1.4E+01**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	3.3E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	3.3E-02
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	9.1E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.5E-04
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	1.8E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.0E-02
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	2.9E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.7E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	5.0E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.0E-05
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	4.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-03
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	3.4E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	6.9E-03
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.8E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.3E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	1.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.8E-04
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	5.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.8E-02
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	1.1E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.2E+00
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	7.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	9.2E-03
	(total)												**1.3E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	8.1E-05	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	3.5E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-06
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.3E-07	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	3.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	2.6E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-05
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	2.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	1.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	3.5E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	7.4E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-05**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	3.1E-06	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	6.1E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	6.7E-07
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	9.8E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.6E-06
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	6.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	5.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	3.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.5E-06**
										Total Risk Across All Exposure Routes/Pathways	**4.8E-05**

SWMU 9 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 9 - TABLE 7.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	2.5E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.5E-01
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	1.6E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.7E-03
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	7.1E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.2E-01
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	2.6E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	5.3E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	6.7E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.7E-03
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	5.3E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-01
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	4.5E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	6.5E-02
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	2.3E-05	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	1.2E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	2.1E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-01
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	7.2E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E+00
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	1.5E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	6.3E+00
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	4.9E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.5E-01
	(total)												**9.7E+00**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	2.1E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	2.1E-02
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	6.0E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.0E-04
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	1.2E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	1.9E-02
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.9E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	3.8E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	2.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.2E-05
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.7E-04
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.5E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.0E-03
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	7.5E-08	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	5.4E-03
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	6.7E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.4E-04
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	2.3E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.7E-03
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	4.9E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.1E-01
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	3.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.0E-03
	(total)												**5.7E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.0E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	2.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	1.6E-05	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	7.1E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-07
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	2.6E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	4.2E-07
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	6.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	5.3E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-06
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	4.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	2.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	2.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	7.2E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	1.5E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	4.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.4E-06**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	6.0E-07	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	1.2E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.9E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	2.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	7.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	6.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	2.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	4.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	3.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**9.8E-06**

SWMU 9 - TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 9 - TABLE 7.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.2E-02	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	1.2E+00
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	8.2E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	1.4E-02
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	3.6E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.9E-01
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.3E-06	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	2.6E-02
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	3.4E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.4E-02
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	2.7E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.9E-01
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	2.3E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.2E-01
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.2E-04	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	5.9E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	1.0E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.2E-01
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	3.6E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E+01
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	7.6E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.2E+01
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.5E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.2E+00
	(total)												**4.9E+01**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	7.6E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	7.6E-02
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	2.1E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.6E-04
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	4.0E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	6.7E-02
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	6.4E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.3E-02
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	1.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-04
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-03
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.0E-04	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.0E-02
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	5.2E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	3.7E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	4.6E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-03
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.6E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.2E-02
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	3.3E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.5E+00
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.2E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.7E-02
	(total)												**3.8E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.2E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	7.1E-05	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	5.3E-07
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	3.1E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-06
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.1E-07	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	2.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	2.3E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-05
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	9.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	3.1E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	6.5E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.0E-05**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	6.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	1.8E-06	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	3.4E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	5.5E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	8.8E-07
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	1.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	8.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	4.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	3.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	2.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-06**
										Total Risk Across All Exposure Routes/Pathways	**4.1E-05**

SWMU 9 - TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 9 - TABLE 7.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	5.5E-03	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	5.5E-01
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	3.6E-04	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	6.0E-03
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	1.6E-03	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	2.6E-01
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	5.8E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.2E-02
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	1.5E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-02
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.2E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-01
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.0E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.4E-01
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	5.2E-05	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	2.6E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	4.6E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.3E-01
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.6E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.2E+00
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	3.3E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.4E+01
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	1.1E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	5.4E-01
	(total)												**2.1E+01**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	4.2E-04	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	4.2E-02
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	1.2E-05	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	2.0E-04
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	2.3E-04	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	3.8E-02
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	3.7E-07	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	7.4E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	4.9E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.9E-05
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	3.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-03
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	3.3E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	6.7E-03
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.7E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.2E-02
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	1.5E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	7.6E-04
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	5.2E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.7E-02
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	1.1E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.1E+00
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	7.2E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	8.9E-03
	(total)												**1.3E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.3E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CHILD RESIDENTS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	1.0E-05	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	7.8E-08
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	4.5E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	4.9E-07
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.7E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	4.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	3.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-06
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	2.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	4.5E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	9.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	3.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.9E-06**
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	3.4E-07	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	6.6E-06	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-08
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.1E-08	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	9.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	4.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	4.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
										Total Risk Across All Exposure Routes/Pathways	**6.1E-06**

SWMU 9 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	of the text.
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 9 - TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	9.6E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	9.6E-03
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	2.8E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	4.6E-05
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	4.8E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	8.0E-03
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	7.4E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.5E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	2.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.4E-05
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.3E-04
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.6E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	3.3E-03
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	8.3E-08	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	6.0E-03
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	7.4E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.7E-04
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	2.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.5E-03
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	5.4E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.6E-01
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	3.5E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	4.4E-03
	(total)												**6.0E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.0E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	1.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	4.0E-08	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	6.8E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	1.1E-09	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	3.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	2.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	2.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	1.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	1.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	3.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	7.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	5.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.9E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.9E-08**

SWMU 9 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for for estimating DAevent and the chemical-specific dermally absorbed dose from water (DAD) are provided in Section 6.1 of the text.
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 9 - TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	6.8E-05	mg/kg-day	1.00E-02	mg/kg-day	NA	NA	6.8E-03
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	1.9E-06	mg/kg-day	6.00E-02	mg/kg-day	NA	NA	3.2E-05
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	3.5E-05	mg/kg-day	6.00E-03	mg/kg-day	NA	NA	5.8E-03
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	5.5E-08	mg/kg-day	5.00E-05	mg/kg-day	NA	NA	1.1E-03
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	1.5E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-05
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.1E-04
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.0E-05	mg/kg-day	4.90E-03	mg/kg-day	NA	NA	2.1E-03
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	5.4E-08	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	3.8E-03
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	4.8E-06	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.4E-04
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	1.6E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.5E-03
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	3.5E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.6E-01
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	2.3E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.8E-03
	(total)												**3.9E-01**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	cis-1,2-Dichloroethene	1.30E-01	mg/L	1.30E-01	mg/L	M	9.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Methylene Chloride	8.58E-03	mg/L	8.58E-03	mg/L	M	2.8E-08	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-10
	Trichloroethene	3.72E-02	mg/L	3.72E-02	mg/L	M	5.0E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	Dieldrin	1.38E-05	mg/L	1.38E-05	mg/L	M	7.8E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Aluminum	3.50E-01	mg/L	3.50E-01	mg/L	M	2.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	2.79E-03	mg/L	2.79E-03	mg/L	M	1.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	Barium	2.36E-01	mg/L	2.36E-01	mg/L	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Beryllium	1.22E-03	mg/L	1.22E-03	mg/L	M	7.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	1.09E-01	mg/L	1.09E-01	mg/L	M	6.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	3.73E+01	mg/L	3.73E+01	mg/L	M	2.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	7.92E+00	mg/L	7.92E+00	mg/L	M	5.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	2.57E-01	mg/L	2.57E-01	mg/L	M	3.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-08**

SWMU 9 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 9 - TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADUILT RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	4.4E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.1E-02
	(total)												**1.1E-02**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	8.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	(total)												**1.3E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 9 - TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADUILT RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.5E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.7E-03
	(total)												**3.7E-03**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.7E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.4E-03
	(total)												**4.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**8.1E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 9 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	4.1E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.0E-02
	(total)												**1.0E-02**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	8.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.4E-02
	(total)												**1.4E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	3.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	7.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 9 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.4E-06	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	3.4E-03
	(total)												**3.4E-03**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.4E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.0E-03
	(total)												**4.0E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.4E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	3.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	6.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 9 - TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF RECREATIONAL ADUILT USERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	6.5E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	1.6E-03
	(total)												**1.6E-03**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.0E-03
	(total)												**2.0E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.6E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF RECREATIONAL ADUILT USERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	5.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 9 - TABLE 7.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF RECREATIONAL ADUILT USERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.6E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	4.1E-04
	(total)												**4.1E-04**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	3.0E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.9E-04
	(total)												**4.9E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF RECREATIONAL ADUILT USERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	3.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 9 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.1E-07	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	2.7E-04
	(total)												**2.7E-04**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	4.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.8E-04
	(total)												**6.8E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.4E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	6.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 9 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	2.7E-08	mg/kg-day	4.00E-04	mg/kg-day	NA	NA	6.6E-05
	(total)												**6.6E-05**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	8.2E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.4E-04
	(total)												**1.4E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.0E-04**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 9 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	4.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
Dermal	Antimony	1.60E-03	mg/L	1.60E-03	mg/L	M	1.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**0.0E+00**
										Total Risk Across All Exposure Routes/Pathways	**0.0E+00**

SWMU 9 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

TABLE 4.4

SWMU 9 - TABLE 7.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	5.2E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	1.5E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-02
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	8.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.8E-02
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	2.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.5E-02
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	1.8E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.5E-02
	(total)												**1.5E-01**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.4E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**3.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.8E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.57E-07
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	5.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	2.9E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.30E-06
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	8.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	6.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.7E-06**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.0E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	3.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.2E-07
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.3E-07**
										Total Risk Across All Exposure Routes/Pathways	**5.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

SWMU 9 - TABLE 7.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	4.9E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.9E-03
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	2.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.3E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	8.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.8E-02
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	6.0E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	8.5E-03
	(total)												**5.1E-02**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.4E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	8.4E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.8E-04
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**2.8E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.1E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.7E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.48E-08
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	4.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	2.8E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.19E-07
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	8.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	6.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.5E-07**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.4E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-09
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	8.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.7E-08**
										Total Risk Across All Exposure Routes/Pathways	**4.7E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.18
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 9 - TABLE 7.18 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.9E-06	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	1.4E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-01
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	7.8E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.6E-01
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	2.4E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.9E-01
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	1.7E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.4E-01
	(total)												**1.4E+00**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	4.7E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.6E-02
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**1.6E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.18 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.33E-07
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	1.2E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	6.7E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.00E-05
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	2.0E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	1.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.1E-05**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	4.0E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.0E-07
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.3E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.2E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.18
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 9 - TABLE 7.18a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.6E-06	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	4.6E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.6E-02
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	2.6E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.7E-02
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	7.9E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.6E-01
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	5.6E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	7.9E-02
	(total)												**4.8E-01**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	5.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.8E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**1.8E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.18a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.6E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.28E-08
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	1.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	7.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.12E-06
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	2.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-06**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.1E-09
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.2E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

SWMU 9 - TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	7.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	2.2E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.2E-03
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.2E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.1E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	3.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-02
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	2.6E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.8E-03
	(total)												**2.3E-02**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	9.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	3.4E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-02
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**1.1E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**3.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	3.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.63E-08
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	9.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	5.3E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.98E-07
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	1.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.6E-07**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	4.2E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.4E-07
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.0E-06**
										Total Risk Across All Exposure Routes/Pathways	**3.9E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

SWMU 9 - TABLE 7.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.9E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	5.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.5E-04
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	3.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.0E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	9.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.2E-03
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	6.6E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	9.4E-04
	(total)												**5.7E-03**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	9.8E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	3.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**1.1E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.8E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.97E-09
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	7.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	4.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.99E-08
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	8.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.5E-08**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.3E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	4.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-08
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.0E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.6E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 9 - TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	6.3E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	1.8E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.8E-03
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.4E-03
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	3.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.0E-02
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	2.2E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	3.1E-03
	(total)												**1.9E-02**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	6.7E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	2.3E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.7E-04
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**7.7E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	9.9E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.98E-08
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	2.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.6E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.38E-07
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	4.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	3.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-07**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.1E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	3.6E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-08
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 9 - TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	1.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	4.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.5E-04
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	2.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.4E-04
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	7.7E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.6E-03
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	5.4E-05	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	7.7E-04
	(total)												**4.6E-03**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	5.5E-09	mg/kg-day		mg/kg-day	NA	NA	
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	1.9E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.3E-05
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	(total)												**6.3E-05**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.7E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 9 - TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	2.5E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.95E-09
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M	7.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	4.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.95E-08
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M	8.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.4E-08**
Dermal	AROCLOR-1248	3.80E-01	mg/kg	3.80E-01	mg/kg	M	8.6E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	ALUMINUM	1.08E+04	mg/kg	1.08E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	6.10E+00	mg/kg	6.10E+00	mg/kg	M	3.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-09
	IRON	1.86E+04	mg/kg	1.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	1.30E+03	mg/kg	1.30E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.1E-09**
										Total Risk Across All Exposure Routes/Pathways	**7.1E-08**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

Source: Soil Screening Level User's Guide.

1	2	3	4	5	6	7	8
Chemical	**MW**	**Koc**	**Dair**	**Dwater**	**S**	**H'**	**H**
	g/mole	**L/Kg**	**(cm^2/sec)**	**(cm^2/sec)**	**mg/L**		**(atm-m^3/m**
Acenaphthalene	154	7.08E+03	4.21E-02	7.69E-06	4.24E+00	6.36E-03	1.55E-04
Acetone	58	5.75E+01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.88E-05
Aldrin	365	2.45E+06	1.32E-02	4.86E-06	1.80E-01	6.97E-03	1.70E-04
Anthracene	178	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	6.51E-05
Benzo(a)anthracene	228	3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	3.34E-06
Benzene	78	5.89E+01	8.80E-02	9.80E-06	1.75E+03	2.28E-01	5.56E-03
Benzo(b)fluoranthene	252	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.55E-03	1.11E-04
Benzo(k)fluoranthene	252	1.23E+06	2.26E-02	5.56E-06	8.00E-04	3.40E-05	8.29E-07
Benzoic acid		6.00E-01	5.36E-02	7.97E-06	3.50E+03	6.31E-05	1.54E-06
Benzo(a)pyrene	252	1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	1.13E-06
Bis(2-chloroethyl)ether	143	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.38E-04	1.80E-05
Bis(2-ethylhexyl)phthalate	391	1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.18E-06	1.02E-07
Bromodichloromethane	163.83	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.56E-02	1.60E-03
Bromoform		8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.19E-02	5.34E-04
2-Butanone	72.11		7.80E-02	8.80E-06	2.75E+05	1.91E-03	4.66E-05
Butanol		6.92E+00	8.00E-02	9.30E-06	7.40E+04	3.61E-04	8.80E-06
Butly benzyl phthalate		5.75E+04	1.74E-02	4.83E-06	2.69E+00	5.17E-05	1.26E-06
Carbazole		3.39E+03	3.90E-02	7.03E-06	7.48E+00	6.26E-07	1.53E-08
Carbon disulfide	76	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02
Carbon tetrachloride	154	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02
Chlordane	410	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05
p-Chloraniline		6.61E+01	4.83E-02	1.01E-05	5.30E+03	1.36E-05	3.32E-07
Chlorobenzene	113	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	3.71E-03
Chlorodibromomethane	208	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.21E-02	7.83E-04
Chloroform	119	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03
2-Chlorophenol		3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04
Chloromethane			7.80E-02	1.00E-05		3.62E-01	8.82E-03
Chrysene	228	3.98E+05	2.48E-02	6.21E-06	1.60E-03	3.88E-03	9.46E-05
DDD	320	1.00E+06	1.69E-02	4.76E-06	9.00E-02	1.64E-04	4.00E-06
DDE	318	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.61E-04	2.10E-05
DDT	355	2.62E+06	1.37E-02	4.95E-06	2.50E-02	3.32E-04	8.10E-06
Dibenzo(a,h)anthracene	278	3.80E+06	2.02E-02	5.18E-06	2.49E-03	6.03E-07	1.47E-08
Di-n-butyl phthalate	278	3.39E+04	4.38E-02	7.86E-06	1.12E+01	3.85E-08	9.39E-10
1,2-Dichlorobenzene	147	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.79E-02	1.90E-03
1,3-Dichlorobenzene	147	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03
1,4-Dichlorobenzene	147	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03
3,3-Dichlorobenzidine	253	7.24E+02	1.94E-02	6.74E-06	3.11E+00	1.64E-07	4.00E-09
1,1-Dichloroethane	99	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03
1,2-Dichloroethane	99	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.01E-02	9.78E-04
1,1-Dichloroethylene	97	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.61E-02
1,1-Dichloroethene	97	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.61E-02
cis-1,2-Dichloroethene	97	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03
trans-1,2-Dichloroethene	97	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.85E-01	9.39E-03
1,2-Dichloroethene (total)	97	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03
2,4-Dichlorophenol	163	1.47E+02	3.46E-02	8.77E-06	4.50E+03	1.30E-04	3.17E-06
1,2-Dichloropropane	113	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.80E-03

1,3-Dichloropropene	111	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.26E-01	1.77E-02
Dieldrin	381	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.19E-04	1.51E-05
Diethylphthalate	222	2.88E+02	2.56E-02	6.35E-06	1.08E+03	1.85E-05	4.51E-07
2,4-Dimethylphenol		2.09E+02	5.84E-02	8.69E-06	7.87E+03	8.20E-05	2.00E-06
2,4-Dinitrophenol		1.00E-02	2.73E-02	9.06E-06	2.79E+03	1.82E-05	4.44E-07
2,4-Dintrotoluene		9.55E+01	2.03E-01	7.06E-06	2.70E+02	3.80E-06	9.27E-08
2,6-Dintrotoluene		6.92E+01	3.27E-02	7.26E-06	1.82E+02	3.06E-05	7.46E-07
Di-n-octyl phthalate		8.32E+07	1.51E-02	3.58E-06	2.00E-02	2.74E-03	6.68E-05
Endosulfan	274	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.59E-04	1.12E-05
Endrin		1.23E+04	1.25E-02	4.74E-06	2.50E-01	3.08E-04	7.51E-06
Ethylbenzene	106	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.23E-01	7.88E-03
Fluoranthene	202	1.07E+05	3.02E-02	6.35E-06	2.06E-01	6.60E-04	1.61E-05
Fluorene	116	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.61E-03	6.37E-05
Heptachlor	374	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.07E+01	1.48E+00
Heptachlor epoxide	389	9.32E+04	1.32E-02	4.23E-06	2.00E-01	3.90E-04	9.51E-06
Hexachlorobenzene	285	5.50E+04	5.42E-02	5.91E-06	6.20E+00	5.41E-02	1.32E-03
Hexachloro-1,3-butadiene		5.37E+04	5.61E-02	6.16E-06	3.23E+00	3.34E-01	8.15E-03
alpha-HCH	291	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.35E-04	1.06E-05
beta-HCH	291	1.26E+03	1.42E-02	7.34E-06	2.40E-01	3.05E-05	7.44E-07
Lindane	291	1.07E+03	1.42E-02	7.34E-06	6.80E+00	5.74E-04	1.40E-05
Hexachlorocyclopentadiene	273	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.11E+00	2.71E-02
Hexachloroethane	237	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03
Indeno(1,2,3-cd)pyrene	276	3.47E+06	1.90E-02	5.66E-06	2.20E-05	6.56E-05	1.60E-06
Isophorone	138	4.68E+01	6.23E-02	6.76E-06	1.20E+04	2.72E-04	6.63E-06
Mercury			3.07E-02	6.30E-06		4.67E-01	1.14E-02
Methoxychlor		9.77E+04	1.56E-02	4.46E-06	4.50E-02	6.48E+04	1.58E+03
Methyl bromide		1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.56E-01	6.24E-03
Methylene chloride	50	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.98E-02	2.19E-03
2-Methylphenol		9.12E+01	7.40E-02	8.30E-06	2.60E+04	4.92E-05	1.20E-06
Naphthalene		2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.83E-04
Nitrobenzene	123	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.84E-04	2.40E-05
N-Nitrosodiphenylamine		1.29E+03	3.12E-02	6.35E-06	3.51E+01	2.05E-04	5.00E-06
N-Nitrosodi-n-propylamine		2.40E+01	5.45E-02	8.17E-06	9.89E+03	9.23E-05	2.25E-06
PCBs		3.09E+05			7.00E-01		
Pentachlorophenol	266	5.92E+02	5.60E-02	6.10E-06	1.95E+03	1.00E-06	2.44E-08
Phenol	94	2.88E+01	8.20E-02	9.10E-06	8.28E+04	1.63E-05	3.98E-07
Pyrene	202	1.05E+05	2.72E-02	7.24E-06	1.35E-01	4.51E-04	1.10E-05
Styrene	104	7.66E+02	7.10E-02	8.00E-06	3.10E+02	1.13E-01	2.76E-03
1,1,2,2-Tetrachloroethane	168	9.33E+01	7.10E-02	7.90E-06	2.97E+03	1.41E-02	3.44E-04
Tetrachloroethene	166	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	1.84E-02
Toluene	92	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.63E-03
Toxaphene	414	2.57E+05	1.16E-02	4.34E-06	7.40E-01	2.46E-04	6.00E-06
1,2,4,Trichlorobenzene	181	1.78E+03	3.00E-02	8.23E-06	3.00E+02	5.82E-02	1.42E-03
1,1,1-Trichloroethane	133	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.05E-01	1.72E-02
1,1,2-Trichloroethane	133	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.74E-02	9.12E-04
Trichloroethene	131	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	1.03E-02
2,4,5-Trichlorophenol	197	1.60E+03	2.91E-02	7.03E-06	1.20E+03	1.78E-04	4.34E-06
2,4,6-Trichlorophenol	197	3.81E+02	3.18E-02	6.25E-06	8.00E+02	3.19E-04	7.78E-06
Vinyl acetate		5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.10E-02	5.12E-04
Vinyl chloride	63	1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	2.71E-02
m-Xylene	106	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.01E-02	7.34E-04

o-Xylene	106	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.13E-01	5.20E-03
p-Xylene	106	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.14E-01	7.66E-03
Xylenes, total	106	4.07E+00	7.00E-02	7.80E-06	1.61E+02	3.01E-01	7.34E-03

Derivation of Volatilization Factor
Source: Soil Screening Guidance

Relevant Equations:

$$VF = \frac{Q/C \times (3.14 \times DA \times T)^{1/2} \times 10^{-4} \left(m^2/cm^2\right)}{(2 \times pb \times DA)}$$

where:

$$DA = \frac{\left[\left(\theta^{10/3} \times Di \times H' + \theta^{10/3} \times Dw\right)/n^2\right]}{pb \times Kd + \theta w + \theta a \times H'}$$

$$Csat = \frac{S}{pb} \times (Kd \times pb + \theta w + H' \times \theta a)$$

Parameter	Value	Definition
Q/C = :	68.81	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
T = :	3.2E+07	Exposure interval (seconds).
pb = :	1.5	Dry soil bulk density (g/cm^3).
ps = :	2.65	soil particle density (g/cm^3).
n = :	0.434	Total soil porosity (L_{pore}/L_{soil}).
θw = :	0.15	Water-filled soil porosity (L_{pore}/L_{soil}).
θa = :	0.284	Air-filled soil porosity (L_{air}/L_{soil}).
Di = :	Chemical specific	Diffusivity in air (cm^2/sec).
H' = :	Chemical specific	Dimensionless Henry's Law Constant.
Dw = :	Chemical specific	Diffusivity in water (cm^2/sec).
DA = :	Chemical specific	Apparent diffusivity (cm^2/sec).
Kd = :	Chemical specific	Soil-water partition coefficient (cm^3/g).
Koc = :	Chemical specific	Soil organic carbon partition coefficient (cm^3/g).
foc = :	0.006	Fraction organic carbon in soil (g/g).

Chemical	Cs (mg/kg)	Koc (cm^3/g)	Di (cm^2/sec)	Dw (cm^2/sec)	S (mg/L)	H'	Kd (cm^3/g)	Da (cm^2/sec)	VF (m^3/kg)	Csat (mg/kg)	CaV (mg/m^3)
IR Area											
1,1-Dichloroethene	0.17	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	3.53E-01	7.82E-03	2.58E+02	1.48E+03	6.59E-04
1,2-Dichloroethene (total)	33	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	2.13E-01	1.90E-03	5.24E+02	1.21E+03	6.30E-02
Tetrachloroethene	52	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	9.30E-01	2.47E-03	4.60E+02	2.35E+02	1.13E-01
Trichloroethene	0.025	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	9.96E-01	1.51E-03	5.87E+02	1.29E+03	4.26E-05
Vinyl Chloride	0.94	1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	1.12E-01	1.49E-02	1.87E+02	1.16E+03	5.02E-03
Anthracene	0.498	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	1.77E+02	2.63E-08	1.41E+05	7.69E+00	3.54E-06
Benzo(a)anthracene	1.053	3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	2.39E+03	1.80E-10	1.70E+06	2.24E+01	6.19E-07
Benzo(a)pyrene	0.864	1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	6.12E+03	2.67E-11	4.42E+06	9.91E+00	1.95E-07
Benzo(b)fluoranthene	1.562	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.55E-03	7.38E+03	7.47E-10	8.35E+05	1.11E+01	1.87E-06
Indeno(1,2,3-cd)pyrene	0.673	3.47E+06	1.90E-02	5.55E-06	2.20E-05	6.56E-05	2.08E+04	4.88E-12	1.03E+07	4.58E-01	4.43E-08
Aroclor-1254	16.429	1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.18E-06	9.06E+04	3.43E-13	3.90E+07	3.08E+04	4.21E-07
Copper	79.004										
Chromium	85.3										

Soil Protective of Groundwater
Source: Soil Screening Guidance

Relevant Equation:

$$Ct = Cw \times \left[Koc \times foc + \left(\frac{\theta w + \theta a \times H'}{Pb} \right) \right]$$

Parameter	Value	Definition
Cw	Chemical specific	Target groundwater level (mg/L).
Koc	Chemical specific	Soil organic carbon partition coefficient (cm^3/g).
H'	Chemical specific	Dimensionless Henry's Law Constant.
foc	0.002	Fraction organic carbon in soil (g/g).
θw	0.3	Water-filled soil porosity (L_{pore}/L_{soil}).
Pb	1.5	Dry soil bulk density (kg/L).
Ps	2.65	Soil particle density (kg/L)
n	0.43	Soil porosity (L_{pore}/L_{soil}).
θa	0.1340	Air-filled soil porosity (L_{air}/L_{soil}).
DAF	20	Dilution Attenuation Factor (unitless).

Chemical	Cw (ug/L)	Koc (L/kg)	H'	Ct	
				No Dilution (ug/kg)	Dilution (ug/kg)
2,4,6-Trinitrotoluene	2.2	#N/A	#N/A	#N/A	#N/A
2-Amino-4,6-dinitrotoluene	2	#N/A	#N/A	#N/A	#N/A
HMX	1800	#N/A	#N/A	#N/A	#N/A
RDX	6.1	#N/A	#N/A	#N/A	#N/A
1,3,5-Trinitrobenzene	110	#N/A	#N/A	#N/A	#N/A
4-Nitrotoluene	61	#N/A	#N/A	#N/A	#N/A
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0

Volatilzation from Groundwater to Outdoor Air - RME
Source: ASTM E 1739-95
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
Uair	390	Wind speed above ground in mixing zone (cm/sec)
dair	200	ambient air mixing zone height, (cm)
W	1500	width of source parallel to groundwater flow direction, (cm)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)

RME

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	VF mg/m^3)/(mg/L	Cair (mg/m^3)
1,1-Dichloroethylene		9.00E-02	1.04E-05	2.25E+03	1.07E+00	7.02E-03	1.35E-05	7.28E-04	4.99E-05	
cis-1,2-Dichloroethene	1.30E-01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	1.18E-05	1.53E-06
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Methylene chloride	8.58E-03	1.01E-01	1.17E-05	1.30E+04	8.98E-02	7.88E-03	3.84E-05	1.79E-03	1.03E-05	8.83E-08
Trichloroethene	3.72E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	2.05E-05	7.64E-07

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1-Dichloroethylene	0.00E+00	9.00E-02	1.04E-05	2.25E+03	1.07E+00	7.02E-03	1.35E-05	7.28E-04	7.02E-03	3.52E-05	2.48E-02	0.00E+00
cis-1,2-Dichloroethene	1.30E-01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	5.90E-04
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Methylene chloride	8.58E-03	1.01E-01	1.17E-05	1.30E+04	8.98E-02	7.88E-03	3.84E-05	1.79E-03	7.88E-03	8.64E-05	3.64E-03	3.12E-05
Trichloroethene	3.72E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.57E-04

Volatilization From Showering - RME
Source: Foster & Chrostowski, 1987.
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	15	shower duration, (min)
Dt	20	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	3.96	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
cis-1,2-Dichloroethene	1.30E-01	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	5.55E-02	4.62E-02	5.63E-02
Methylene chloride	8.58E-03	5.00E+01	2.19E-03	1.88E+01	1.80E+03	1.68E+01	2.21E+01	4.48E-03	3.73E-03	6.89E-02
Trichloroethene	3.72E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.46E-02	1.21E-02	5.16E-02

SSLs for Inhalation Volatiles
Source: Soil Screening Guidance

Relevant Equations:

Carcinogens

$$SSL = \frac{TR \times AT \times 365\ days/yr}{URF \times 1000ug/mg \times EF \times ED \times 1/VF}$$

Noncarcinogens

$$SSL = \frac{THQ \times AT \times 365\ days/yr}{EF \times ED \times \left[\frac{1}{RfC} \times \frac{1}{VF}\right]}$$

Volatilzation Factor

$$VF = \frac{Q/C \times (3.14 \times DA \times T)^{1/2} \times 10^{-4}\ (m^2/cm^2)}{(2 \times pb \times DA)}$$

where:

$$DA = \frac{\left[(\theta^{10/3} \times Di \times H' + \theta^{10/3} \times Dw)/n^2\right]}{pb \times Kd + \theta w + \theta a \times H'}$$

$$Csat = \frac{S}{pb} \times (Kd \times pb + \theta w + H' \times \theta a)$$

Parameter	Value	Definition
TR = :	1.00E-06	Target cancer risk (unitless)
THQ = :	1	Target Hazard Quotient (unitless)
EF = :	350	Exposure Frequency (days/yr)
ED = :	30	Exposure duration (yrs)
ATc = :	70	Averaging Time -carcinogens (yrs)
ATn = :	30	Averaging Time -noncarcinogens (yrs)
URF = :	Chemical specific	Inhalation unit risk factor $(ug/m^3)^{-1}$
RfC = :	Chemical specific	Inhalation reference concentration (ug/m^3)
Q/C = :	68.81	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
T = :	9.5E+08	Exposure interval (seconds).
pb = :	1.5	Dry soil bulk density (g/cm^3).
ps = :	2.65	soil particle density (g/cm^3).
n = :	0.434	Total soil porosity (L_{pore}/L_{soil}).
θw = :	0.15	Water-filled soil porosity (L_{pore}/L_{soil}).
θa = :	0.284	Air-filled soil porosity (L_{air}/L_{soil}).
Di = :	Chemical specific	Diffusivity in air (cm^2/sec).
H' = :	Chemical specific	Dimensionless Henry's Law Constant.
Dw = :	Chemical specific	Diffusivity in water (cm^2/sec).
DA = :	Chemical specific	Apparent diffusivity (cm^2/sec).
Kd = :	Chemical specific	Soil-water partition coefficient (cm^3/g).
Koc = :	Chemical specific	Soil organic carbon partition coefficient (cm^3/g).
foc = :	0.006	Fraction organic carbon in soil (g/g).

Chemical	URF $(ug/m^3)^{-1}$	RfC (ug/m^3)	Koc (cm^3/g)	Di (cm^2/sec)	Dw (cm^2/sec)	S (mg/L)	H'	Kd (cm^3/g)	Da (cm^2/sec)	VF (m^3/kg)	SL-carc (mg/kg)	SL-ncarc (mg/kg)	Csat (mg/kg)	SSL (mg/kg)
IR Area														
1,1-Dichloroethene	5.00E-05	NA	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	3.53E-01	7.82E-03	1.41E+03	6.88E-02	NA	1.48E+03	6.88E-02
Toluene	NA	0.4	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	1.09E+00	1.01E-03	3.93E+03	NA	1.64E+03	6.54E+02	6.54E+02
Methylene Chloride	4.70E-07	3	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.98E-02	7.02E-02	2.58E-03	2.46E+03	1.27E+01	7.70E+03	2.43E+03	1.27E+01
1,1-Dichloroethane	NA	0.5	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	1.90E-01	2.73E-03	2.39E+03	NA	1.25E+03	1.69E+03	1.25E+03
Vinyl Chloride	NA		1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	1.12E-01	1.49E-02	1.03E+03	NA	NA	1.16E+03	NA
Anthracene	NA		2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	1.77E+02	2.63E-08	7.71E+05	NA	NA	7.69E+00	NA
Benzo(a)anthracene	NA		3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	2.39E+03	1.80E-10	9.32E+06	NA	NA	2.24E+01	NA
Benzo(a)pyrene	NA		1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	6.12E+03	2.67E-11	2.42E+07	NA	NA	9.91E+00	NA
Benzo(b)fluoranthene	NA		1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.55E-03	7.38E+03	7.47E-10	4.57E+06	NA	NA	1.11E+01	NA
Indeno(1,2,3-cd)pyrene	NA		3.47E+06	1.90E-02	5.55E-06	2.20E-05	6.56E-05	2.08E+04	4.88E-12	5.66E+07	NA	NA	4.58E-01	NA
Aroclor-1254	NA		1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.18E-06	9.06E+04	3.43E-13	2.14E+08	NA	NA	3.08E+04	NA
Copper														

SSLs for Inhalation Volatiles
Source: Soil Screening Guidance

Relevant Equations:
Carcinogens

$$SSL = \frac{TR \times AT \times 365\ days/yr}{URF \times 1000ug/mg \times EF \times ED \times 1/PEF}$$

Noncarcinogens

$$SSL = \frac{THQ \times AT \times 365\ days/yr}{EF \times ED \times \left[\frac{1}{RfC} \times \frac{1}{PEF}\right]}$$

where

$$PEF = Q/C \times \frac{3600 sec/hr}{0.036 \times (1-V) \times (Um/Ut)^3 \times F(x)}$$

Parameter	Value	Definition
TR = :	1.00E-06	Target cancer risk (unitless)
THQ = :	1	Target Hazard Quotient (unitless)
EF = :	350	Exposure Frequency (days/yr)
ED = :	30	Exposure duration (yrs)
ATc = :	70	Averaging Time -carcinogens (yrs)
ATn = :	30	Averaging Time -noncarcinogens (yrs)
URF = :	Chemical specific	Inhalation unit risk factor $(ug/m^3)^{-1}$
RfC = :	Chemical specific	Inhalation reference concentration (ug/m^3)
Q/C = :	90.8	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
V = :	0.5	Fraction of vegetative cover (unitless)
Um = :	4.69	mean annual wind speed (m/sec)
Ut = :	11.32	equivalent threshold windspeed at 7m (m/sec)
F(x) = :	0.194	fuction dependent on Um/Ut using Cowherd et al. (unitless)
PEF = :	1.32E+09	Particulate Emmission Factor (m^3/kg)

Chemical	URF $(ug/m^3)^{-1}$	RfC (ug/m^3)	SL-carc (mg/kg)	SL-ncarc (mg/kg)	SSL (mg/kg)
Arsenic	4.30E-03	NA	745	NA	745
Beryllium	2.40E-03	NA	1335	NA	1335

Source: Soil Screening Level User's Guide.

1	2	3	4	5	6	7	8
Chemical	**MW**	**Koc**	**Dair**	**Dwater**	**S**	**H'**	**H**
	g/mole	**L/Kg**	**(cm^2/sec)**	**(cm^2/sec)**	**mg/L**		**(atm-m^3/m**
Acenaphthalene	154	7.08E+03	4.21E-02	7.69E-06	4.24E+00	6.36E-03	1.55E-04
Acetone	58	5.75E+01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.88E-05
Aldrin	365	2.45E+06	1.32E-02	4.86E-06	1.80E-01	6.97E-03	1.70E-04
Anthracene	178	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	6.51E-05
Benzo(a)anthracene	228	3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	3.34E-06
Benzene	78	5.89E+01	8.80E-02	9.80E-06	1.75E+03	2.28E-01	5.56E-03
Benzo(b)fluoranthene	252	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.55E-03	1.11E-04
Benzo(k)fluoranthene	252	1.23E+06	2.26E-02	5.56E-06	8.00E-04	3.40E-05	8.29E-07
Benzoic acid		6.00E-01	5.36E-02	7.97E-06	3.50E+03	6.31E-05	1.54E-06
Benzo(a)pyrene	252	1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	1.13E-06
Bis(2-chloroethyl)ether	143	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.38E-04	1.80E-05
Bis(2-ethylhexyl)phthalate	391	1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.18E-06	1.02E-07
Bromodichloromethane	163.83	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.56E-02	1.60E-03
Bromoform		8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.19E-02	5.34E-04
2-Butanone	72.11		7.80E-02	8.80E-06	2.75E+05	1.91E-03	4.66E-05
Butanol		6.92E+00	8.00E-02	9.30E-06	7.40E+04	3.61E-04	8.80E-06
Butly benzyl phthalate		5.75E+04	1.74E-02	4.83E-06	2.69E+00	5.17E-05	1.26E-06
Carbazole		3.39E+03	3.90E-02	7.03E-06	7.48E+00	6.26E-07	1.53E-08
Carbon disulfide	76	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02
Carbon tetrachloride	154	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02
Chlordane	410	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05
p-Chloraniline		6.61E+01	4.83E-02	1.01E-05	5.30E+03	1.36E-05	3.32E-07
Chlorobenzene	113	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	3.71E-03
Chlorodibromomethane	208	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.21E-02	7.83E-04
Chloroform	119	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03
2-Chlorophenol		3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04
Chloromethane			7.80E-02	1.00E-05		3.62E-01	8.82E-03
Chrysene	228	3.98E+05	2.48E-02	6.21E-06	1.60E-03	3.88E-03	9.46E-05
DDD	320	1.00E+06	1.69E-02	4.76E-06	9.00E-02	1.64E-04	4.00E-06
DDE	318	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.61E-04	2.10E-05
DDT	355	2.62E+06	1.37E-02	4.95E-06	2.50E-02	3.32E-04	8.10E-06
Dibenzo(a,h)anthracene	278	3.80E+06	2.02E-02	5.18E-06	2.49E-03	6.03E-07	1.47E-08
Di-n-butyl phthalate	278	3.39E+04	4.38E-02	7.86E-06	1.12E+01	3.85E-08	9.39E-10
1,2-Dichlorobenzene	147	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.79E-02	1.90E-03
1,3-Dichlorobenzene	147	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03
1,4-Dichlorobenzene	147	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03
3,3-Dichlorobenzidine	253	7.24E+02	1.94E-02	6.74E-06	3.11E+00	1.64E-07	4.00E-09
1,1-Dichloroethane	99	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03
1,2-Dichloroethane	99	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.01E-02	9.78E-04
1,1-Dichloroethylene	97	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.61E-02
1,1-Dichloroethene	97	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.61E-02
cis-1,2-Dichloroethene	97	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03
trans-1,2-Dichloroethene	97	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.85E-01	9.39E-03
1,2-Dichloroethene (total)	97	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03
2,4-Dichlorophenol	163	1.47E+02	3.46E-02	8.77E-06	4.50E+03	1.30E-04	3.17E-06
1,2-Dichloropropane	113	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.80E-03

1,3-Dichloropropene	111	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.26E-01	1.77E-02
Dieldrin	381	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.19E-04	1.51E-05
Diethylphthalate	222	2.88E+02	2.56E-02	6.35E-06	1.08E+03	1.85E-05	4.51E-07
2,4-Dimethylphenol		2.09E+02	5.84E-02	8.69E-06	7.87E+03	8.20E-05	2.00E-06
2,4-Dinitrophenol		1.00E-02	2.73E-02	9.06E-06	2.79E+03	1.82E-05	4.44E-07
2,4-Dintrotoluene		9.55E+01	2.03E-01	7.06E-06	2.70E+02	3.80E-06	9.27E-08
2,6-Dintrotoluene		6.92E+01	3.27E-02	7.26E-06	1.82E+02	3.06E-05	7.46E-07
Di-n-octyl phthalate		8.32E+07	1.51E-02	3.58E-06	2.00E-02	2.74E-03	6.68E-05
Endosulfan	274	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.59E-04	1.12E-05
Endrin		1.23E+04	1.25E-02	4.74E-06	2.50E-01	3.08E-04	7.51E-06
Ethylbenzene	106	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.23E-01	7.88E-03
Fluoranthene	202	1.07E+05	3.02E-02	6.35E-06	2.06E-01	6.60E-04	1.61E-05
Fluorene	116	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.61E-03	6.37E-05
Heptachlor	374	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.07E+01	1.48E+00
Heptachlor epoxide	389	9.32E+04	1.32E-02	4.23E-06	2.00E-01	3.90E-04	9.51E-06
Hexachlorobenzene	285	5.50E+04	5.42E-02	5.91E-06	6.20E+00	5.41E-02	1.32E-03
Hexachloro-1,3-butadiene		5.37E+04	5.61E-02	6.16E-06	3.23E+00	3.34E-01	8.15E-03
alpha-HCH	291	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.35E-04	1.06E-05
beta-HCH	291	1.26E+03	1.42E-02	7.34E-06	2.40E-01	3.05E-05	7.44E-07
Lindane	291	1.07E+03	1.42E-02	7.34E-06	6.80E+00	5.74E-04	1.40E-05
Hexachlorocyclopentadiene	273	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.11E+00	2.71E-02
Hexachloroethane	237	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03
Indeno(1,2,3-cd)pyrene	276	3.47E+06	1.90E-02	5.66E-06	2.20E-05	6.56E-05	1.60E-06
Isophorone	138	4.68E+01	6.23E-02	6.76E-06	1.20E+04	2.72E-04	6.63E-06
Mercury			3.07E-02	6.30E-06		4.67E-01	1.14E-02
Methoxychlor		9.77E+04	1.56E-02	4.46E-06	4.50E-02	6.48E+04	1.58E+03
Methyl bromide		1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.56E-01	6.24E-03
Methylene chloride	50	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.98E-02	2.19E-03
2-Methylphenol		9.12E+01	7.40E-02	8.30E-06	2.60E+04	4.92E-05	1.20E-06
Naphthalene		2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.83E-04
Nitrobenzene	123	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.84E-04	2.40E-05
N-Nitrosodiphenylamine		1.29E+03	3.12E-02	6.35E-06	3.51E+01	2.05E-04	5.00E-06
N-Nitrosodi-n-propylamine		2.40E+01	5.45E-02	8.17E-06	9.89E+03	9.23E-05	2.25E-06
PCBs		3.09E+05			7.00E-01		
Pentachlorophenol	266	5.92E+02	5.60E-02	6.10E-06	1.95E+03	1.00E-06	2.44E-08
Phenol	94	2.88E+01	8.20E-02	9.10E-06	8.28E+04	1.63E-05	3.98E-07
Pyrene	202	1.05E+05	2.72E-02	7.24E-06	1.35E-01	4.51E-04	1.10E-05
Styrene	104	7.66E+02	7.10E-02	8.00E-06	3.10E+02	1.13E-01	2.76E-03
1,1,2,2-Tetrachloroethane	168	9.33E+01	7.10E-02	7.90E-06	2.97E+03	1.41E-02	3.44E-04
Tetrachloroethene	166	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	1.84E-02
Toluene	92	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.63E-03
Toxaphene	414	2.57E+05	1.16E-02	4.34E-06	7.40E-01	2.46E-04	6.00E-06
1,2,4,Trichlorobenzene	181	1.78E+03	3.00E-02	8.23E-06	3.00E+02	5.82E-02	1.42E-03
1,1,1-Trichloroethane	133	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.05E-01	1.72E-02
1,1,2-Trichloroethane	133	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.74E-02	9.12E-04
Trichloroethene	131	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	1.03E-02
2,4,5-Trichlorophenol	197	1.60E+03	2.91E-02	7.03E-06	1.20E+03	1.78E-04	4.34E-06
2,4,6-Trichlorophenol	197	3.81E+02	3.18E-02	6.25E-06	8.00E+02	3.19E-04	7.78E-06
Vinyl acetate		5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.10E-02	5.12E-04
Vinyl chloride	63	1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	2.71E-02
m-Xylene	106	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.01E-02	7.34E-04

o-Xylene	106	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.13E-01	5.20E-03
p-Xylene	106	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.14E-01	7.66E-03
Xylenes, total	106	4.07E+00	7.00E-02	7.80E-06	1.61E+02	3.01E-01	7.34E-03

Derivation of Volatilization Factor
Source: Soil Screening Guidance

Relevant Equations:

$$VF = \frac{Q/C \times (3.14 \times DA \times T)^{1/2} \times 10^{-4} \left(m^2/cm^2\right)}{(2 \times pb \times DA)}$$

where:

$$DA = \frac{\left[\left(\theta^{10/3} \times Di \times H' + \theta^{10/3} \times Dw\right)/n^2\right]}{pb \times Kd + \theta w + \theta a \times H'}$$

$$Csat = \frac{S}{pb} \times (Kd \times pb + \theta w + H' \times \theta a)$$

Parameter	Value	Definition
Q/C = :	68.81	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
T = :	3.2E+07	Exposure interval (seconds).
pb = :	1.5	Dry soil bulk density (g/cm^3).
ps = :	2.65	soil particle density (g/cm^3).
n = :	0.434	Total soil porosity (L_{pore}/L_{soil}).
θw = :	0.15	Water-filled soil porosity (L_{pore}/L_{soil}).
θa = :	0.284	Air-filled soil porosity (L_{air}/L_{soil}).
Di = :	Chemical specific	Diffusivity in air (cm^2/sec).
H' = :	Chemical specific	Dimensionless Henry's Law Constant.
Dw = :	Chemical specific	Diffusivity in water (cm^2/sec).
DA = :	Chemical specific	Apparent diffusivity (cm^2/sec).
Kd = :	Chemical specific	Soil-water partition coefficient (cm^3/g).
Koc = :	Chemical specific	Soil organic carbon partition coefficient (cm^3/g).
foc = :	0.006	Fraction organic carbon in soil (g/g).

Chemical	Cs (mg/kg)	Koc (cm^3/g)	Di (cm^2/sec)	Dw (cm^2/sec)	S (mg/L)	H'	Kd (cm^3/g)	Da (cm^2/sec)	VF (m^3/kg)	Csat (mg/kg)	CaV (mg/m^3)
IR Area											
1,1-Dichloroethene	0.17	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	3.53E-01	7.82E-03	2.58E+02	1.48E+03	6.59E-04
1,2-Dichloroethene (total)	33	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	2.13E-01	1.90E-03	5.24E+02	1.21E+03	6.30E-02
Tetrachloroethene	52	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	9.30E-01	2.47E-03	4.60E+02	2.35E+02	1.13E-01
Trichloroethene	0.025	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	9.96E-01	1.51E-03	5.87E+02	1.29E+03	4.26E-05
Vinyl Chloride	0.94	1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	1.12E-01	1.49E-02	1.87E+02	1.16E+03	5.02E-03
Anthracene	0.498	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	1.77E+02	2.63E-08	1.41E+05	7.69E+00	3.54E-06
Benzo(a)anthracene	1.053	3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	2.39E+03	1.80E-10	1.70E+06	2.24E+01	6.19E-07
Benzo(a)pyrene	0.864	1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	6.12E+03	2.67E-11	4.42E+06	9.91E+00	1.95E-07
Benzo(b)fluoranthene	1.562	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.55E-03	7.38E+03	7.47E-10	8.35E+05	1.11E+01	1.87E-06
Indeno(1,2,3-cd)pyrene	0.673	3.47E+06	1.90E-02	5.55E-06	2.20E-05	6.56E-05	2.08E+04	4.88E-12	1.03E+07	4.58E-01	4.43E-08
Aroclor-1254	16.429	1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.18E-06	9.06E+04	3.43E-13	3.90E+07	3.08E+04	4.21E-07
Copper	79.004										
Chromium	85.3										

Soil Protective of Groundwater
Source: Soil Screening Guidance

Relevant Equation:

$$Ct = Cw \times \left[Koc \times foc + \left(\frac{\theta w + \theta a \times H'}{Pb} \right) \right]$$

Parameter	Value	Definition
Cw	Chemical specific	Target groundwater level (mg/L).
Koc	Chemical specific	Soil organic carbon partition coefficient (cm^3/g).
H'	Chemical specific	Dimensionless Henry's Law Constant.
foc	0.002	Fraction organic carbon in soil (g/g).
θw	0.3	Water-filled soil porosity (L_{pore}/L_{soil}).
Pb	1.5	Dry soil bulk density (kg/L).
Ps	2.65	Soil particle density (kg/L)
n	0.43	Soil porosity (L_{pore}/L_{soil}).
θa	0.1340	Air-filled soil porosity (L_{air}/L_{soil}).
DAF	20	Dilution Attenuation Factor (unitless).

Chemical	Cw (ug/L)	Koc (L/kg)	H'	Ct	
				No Dilution (ug/kg)	Dilution (ug/kg)
2,4,6-Trinitrotoluene	2.2	#N/A	#N/A	#N/A	#N/A
2-Amino-4,6-dinitrotoluene	2	#N/A	#N/A	#N/A	#N/A
HMX	1800	#N/A	#N/A	#N/A	#N/A
RDX	6.1	#N/A	#N/A	#N/A	#N/A
1,3,5-Trinitrobenzene	110	#N/A	#N/A	#N/A	#N/A
4-Nitrotoluene	61	#N/A	#N/A	#N/A	#N/A
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0
				0	0

Volatilzation from Groundwater to Outdoor Air - RME
Source: ASTM E 1739-95
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
Uair	390	Wind speed above ground in mixing zone (cm/sec)
dair	200	ambient air mixing zone height, (cm)
W	1500	width of source parallel to groundwater flow direction, (cm)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)

RME

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	VF mg/m^3)/(mg/L	Cair (mg/m^3)
1,1-Dichloroethylene		9.00E-02	1.04E-05	2.25E+03	1.07E+00	7.02E-03	1.35E-05	7.28E-04	4.99E-05	
cis-1,2-Dichloroethene	1.30E-01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	1.18E-05	1.53E-06
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Methylene chloride	8.58E-03	1.01E-01	1.17E-05	1.30E+04	8.98E-02	7.88E-03	3.84E-05	1.79E-03	1.03E-05	8.83E-08
Trichloroethene	3.72E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	2.05E-05	7.64E-07

Vapor Intrusion from Groundwater - RME
Source: ASTM E 1739-95
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA

Parameter	Value	Definition
H	Chemical specific	Henry's Law Constant, (cm^3-H_2O)/(cm^3-air)
ER	0.00023	enclosed space air exchange rate, L/sec
Lb	300	enclosed space volume/infiltration area ratio, (cm)
Lcrack	15	enclosed space foundaion or wall thickness, (cm)
n	0.01	areal fraction of cracks in foundation/walls, (cm^2-cracks/cm^2-total area)
hcap	5	thickness of capillary fringe, (cm)
hv	295	thickness of vadose zone, (cm)
Lgw	300	depth to groundwater (cm)
Dws	Chemical specific	effective diffusion coefficient between groundwater and soil (cm^2/sec)
Dcrack	Chemical specific	effective diffusion through foundation cracks, (cm^2/sec)
Dcap	Chemical specific	effective diffusion through capillary fringe, (cm^2/sec)
Ds	Chemical specific	effective diffusion coefficient in soil based on vapor concentration, (cm^2/sec)
Dair	Chemical specific	diffusion coefficient in air, (cm^2/sec)
Dwater	Chemical specific	diffusion coefficient in water, (cm^2/sec)
theta_as	0.26	volumetric air content in vadose zone soils, (cm^3-air/cm^3-soil)
theta_ws	0.12	volumetric water content in vadose zone soils, (cm^3-H_2O/cm^3-soil)
theta_T	0.38	total soil porosity, (cm^3/cm^3-soil)
theta_acap	0.038	volumetric air content in capillary fringe soils, (cm^3-air/cm^3-soil)
theta_wcap	0.342	volumetric water content in capillary fringe soils, (cm^3-H_2O/cm^3-soil)
theta_wcrack	0.12	volumetric water content in foundation/wall cracks, (cm^3-H_2O/cm^3-soil)
Theta_acrack	0.26	volumetric air content in foundation/wall cracks, (cm^3-air/cm^3-soil)

Chemical	Cw (mg/L)	Dair (cm^2/sec)	Dwater (cm^2/sec)	S mg/L	H'	Ds (cm^2/sec)	Dcap (cm^2/sec)	Dws (cm^2/sec)	Dcrack (cm^2/sec)	VF1	VF	Cair (mg/m^3)
1,1-Dichloroethylene	0.00E+00	9.00E-02	1.04E-05	2.25E+03	1.07E+00	7.02E-03	1.35E-05	7.28E-04	7.02E-03	3.52E-05	2.48E-02	0.00E+00
cis-1,2-Dichloroethene	1.30E-01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	5.74E-03	2.27E-05	1.10E-03	5.74E-03	5.33E-05	4.54E-03	5.90E-04
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Methylene chloride	8.58E-03	1.01E-01	1.17E-05	1.30E+04	8.98E-02	7.88E-03	3.84E-05	1.79E-03	7.88E-03	8.64E-05	3.64E-03	3.12E-05
Trichloroethene	3.72E-02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	6.16E-03	1.44E-05	7.59E-04	6.16E-03	3.67E-05	9.58E-03	3.57E-04

Volatilization From Showering - CTE
Source: Foster & Chrostowski, 1987.
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA

Parameter	Value	Definition
Ra	0.025	air exchange rate, (min^{-1})
Ds	10	shower duration, (min)
Dt	15	total time in bathroom, (min)
Fr	10	shower water flow rate, (L/min)
Sv	12	shower room air volume, (m^3)
ts	2	shower dropler drop time, (sec)
d	1	shower droplet diameter, (mm)
T1	293	calibration water temperature, (K)
Ts	318	shower water temperature, (K)
m1	0.982	water viscosity at T1, (cp)
ms	0.616	water viscosity at Ts, (cp)
K	2.19	mass transfer coefficient, (min)

Chemical	Cw (mg/L)	MW (g/mole)	H (atm-m^3/mol	Kl (cm/hr)	Kg (cm/hr)	KL (cm/hr)	Kal (cm/hr)	Cwd mg/L	S	S x K / Ra x CF
cis-1,2-Dichloroethene	1.30E-01	9.70E+01	4.07E-03	1.35E+01	1.29E+03	1.27E+01	1.67E+01	5.55E-02	4.62E-02	3.12E-02
Methylene chloride	8.58E-03	5.00E+01	2.19E-03	1.88E+01	1.80E+03	1.68E+01	2.21E+01	4.48E-03	3.73E-03	3.81E-02
Trichloroethene	3.72E-02	1.31E+02	1.03E-02	1.16E+01	1.11E+03	1.13E+01	1.49E+01	1.46E-02	1.21E-02	2.86E-02

SSLs for Inhalation Volatiles
Source: Soil Screening Guidance

Relevant Equations:

Carcinogens

$$SSL = \frac{TR \times AT \times 365\ days/yr}{URF \times 1000ug/mg \times EF \times ED \times 1/VF}$$

Noncarcinogens

$$SSL = \frac{THQ \times AT \times 365\ days/yr}{EF \times ED \times \left[\frac{1}{RfC} \times \frac{1}{VF}\right]}$$

Volatilzation Factor

$$VF = \frac{Q/C \times (3.14 \times DA \times T)^{1/2} \times 10^{-4}\ (m^2/cm^2)}{(2 \times pb \times DA)}$$

where:

$$DA = \frac{\left[(\theta^{10/3} \times Di \times H' + \theta^{10/3} \times Dw)/n^2\right]}{pb \times Kd + \theta w + \theta a \times H'}$$

$$Csat = \frac{S}{pb} \times (Kd \times pb + \theta w + H' \times \theta a)$$

Parameter	Value	Definition
TR = :	1.00E-06	Target cancer risk (unitless)
THQ = :	1	Target Hazard Quotient (unitless)
EF = :	350	Exposure Frequency (days/yr)
ED = :	30	Exposure duration (yrs)
ATc = :	70	Averaging Time -carcinogens (yrs)
ATn = :	30	Averaging Time -noncarcinogens (yrs)
URF = :	Chemical specific	Inhalation unit risk factor $(ug/m^3)^{-1}$
RfC = :	Chemical specific	Inhalation reference concentration (ug/m^3)
Q/C = :	68.81	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
T = :	9.5E+08	Exposure interval (seconds).
pb = :	1.5	Dry soil bulk density (g/cm^3).
ps = :	2.65	soil particle density (g/cm^3).
n = :	0.434	Total soil porosity (L_{pore}/L_{soil}).
θw = :	0.15	Water-filled soil porosity (L_{pore}/L_{soil}).
θa = :	0.284	Air-filled soil porosity (L_{air}/L_{soil}).
Di = :	Chemical specific	Diffusivity in air (cm^2/sec).
H' = :	Chemical specific	Dimensionless Henry's Law Constant.
Dw = :	Chemical specific	Diffusivity in water (cm^2/sec).
DA = :	Chemical specific	Apparent diffusivity (cm^2/sec).
Kd = :	Chemical specific	Soil-water partition coefficient (cm^3/g).
Koc = :	Chemical specific	Soil organic carbon partition coefficient (cm^3/g).
foc = :	0.006	Fraction organic carbon in soil (g/g).

Chemical	URF $(ug/m^3)^{-1}$	RfC (ug/m^3)	Koc (cm^3/g)	Di (cm^2/sec)	Dw (cm^2/sec)	S (mg/L)	H'	Kd (cm^3/g)	Da (cm^2/sec)	VF (m^3/kg)	SL-carc (mg/kg)	SL-ncarc (mg/kg)	Csat (mg/kg)	SSL (mg/kg)
IR Area														
1,1-Dichloroethene	5.00E-05	NA	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	3.53E-01	7.82E-03	1.41E+03	6.88E-02	NA	1.48E+03	6.88E-02
Toluene	NA	0.4	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	1.09E+00	1.01E-03	3.93E+03	NA	1.64E+03	6.54E+02	6.54E+02
Methylene Chloride	4.70E-07	3	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.98E-02	7.02E-02	2.58E-03	2.46E+03	1.27E+01	7.70E+03	2.43E+03	1.27E+01
1,1-Dichloroethane	NA	0.5	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	1.90E-01	2.73E-03	2.39E+03	NA	1.25E+03	1.69E+03	1.25E+03
Vinyl Chloride	NA		1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	1.12E-01	1.49E-02	1.03E+03	NA	NA	1.16E+03	NA
Anthracene	NA		2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	1.77E+02	2.63E-08	7.71E+05	NA	NA	7.69E+00	NA
Benzo(a)anthracene	NA		3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	2.39E+03	1.80E-10	9.32E+06	NA	NA	2.24E+01	NA
Benzo(a)pyrene	NA		1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	6.12E+03	2.67E-11	2.42E+07	NA	NA	9.91E+00	NA
Benzo(b)fluoranthene	NA		1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.55E-03	7.38E+03	7.47E-10	4.57E+06	NA	NA	1.11E+01	NA
Indeno(1,2,3-cd)pyrene	NA		3.47E+06	1.90E-02	5.55E-06	2.20E-05	6.56E-05	2.08E+04	4.88E-12	5.66E+07	NA	NA	4.58E-01	NA
Aroclor-1254	NA		1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.18E-06	9.06E+04	3.43E-13	2.14E+08	NA	NA	3.08E+04	NA
Copper														

SSLs for Inhalation Volatiles
Source: Soil Screening Guidance

Relevant Equations:
Carcinogens

$$SSL = \frac{TR \times AT \times 365\ days/yr}{URF \times 1000ug/mg \times EF \times ED \times 1/PEF}$$

Noncarcinogens

$$SSL = \frac{THQ \times AT \times 365\ days/yr}{EF \times ED \times \left[\frac{1}{RfC} \times \frac{1}{PEF}\right]}$$

where

$$PEF = Q/C \times \frac{3600 sec/hr}{0.036 \times (1-V) \times (Um/Ut)^3 \times F(x)}$$

Parameter	Value	Definition
TR = :	1.00E-06	Target cancer risk (unitless)
THQ = :	1	Target Hazard Quotient (unitless)
EF = :	350	Exposure Frequency (days/yr)
ED = :	30	Exposure duration (yrs)
ATc = :	70	Averaging Time -carcinogens (yrs)
ATn = :	30	Averaging Time -noncarcinogens (yrs)
URF = :	Chemical specific	Inhalation unit risk factor $(ug/m^3)^{-1}$
RfC = :	Chemical specific	Inhalation reference concentration (ug/m^3)
Q/C = :	90.8	Inverse of mean conc. at center of source (g/m^2-s per kg/m^3).
V = :	0.5	Fraction of vegetative cover (unitless)
Um = :	4.69	mean annual wind speed (m/sec)
Ut = :	11.32	equivalent threshold windspeed at 7m (m/sec)
F(x) = :	0.194	fuction dependent on Um/Ut using Cowherd et al. (unitless)
PEF = :	1.32E+09	Particulate Emmission Factor (m^3/kg)

Chemical	URF $(ug/m^3)^{-1}$	RfC (ug/m^3)	SL-carc (mg/kg)	SL-ncarc (mg/kg)	SSL (mg/kg)
Arsenic	4.30E-03	NA	745	NA	745
Beryllium	2.40E-03	NA	1335	NA	1335

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC CRANE, INDIANA
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION:

$$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	3.96	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	350	Exposure Frequency (days/year)
ED = :	24	Exposure Duration (years)
BW = :	70	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	8,760	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	7.4E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	2.2E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC CRANE, INDIANA
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
cis-1,2-Dichloroethene	4.62E-02	3.4E-04	1.0E-03		1.00E-02	NA	NA	1.0E-01	79.2%
Methylene chloride	3.73E-03	2.8E-05	8.1E-05	1.60E-03		4.4E-08	0.1%	NA	NA
Trichloroethene	1.21E-02	9.0E-05	2.6E-04	4.00E-01	1.00E-02	3.6E-05	99.9%	2.6E-02	20.8%
					Total	**3.6E-05**	**100.0%**	**1.3E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION:

$$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:

K = :	3.96	Mass transfer coefficient (min)
IR_{sh} = :	10	Inhalation rate (L/min)
S = :		Volatile chemical generation rate (mg/m^3-min-shower)
EF = :	350	Exposure Frequency (days/year)
ED = :	6	Exposure Duration (years)
BW = :	15	Body Weight (kg)
ATc = :	25,550	Averaging time for carcinogenic exposures (days)
Atn = :	2,190	Averaging time for noncarcinogenic exposures (days)
R_a = :	0.025	Air exchange rate (min^{-1})
CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.7E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	1.0E-01	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - RME
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
cis-1,2-Dichloroethene	4.62E-02	4.0E-04	4.7E-03		1.00E-02	NA	NA	4.7E-01	79.2%
Methylene chloride	3.73E-03	3.2E-05	3.8E-04	1.60E-03		5.2E-08	0.1%	NA	NA
Trichloroethene	1.21E-02	1.1E-04	1.2E-03	4.00E-01	1.00E-02	4.2E-05	99.9%	1.2E-01	20.8%
					Total	**4.2E-05**	**100.0%**	**5.9E-01**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC CRANE, INDIANA
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION:

$$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	7	Exposure Duration (years)
	BW = :	70	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	2,555	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	8.0E-04	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	8.0E-03	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC CRANE, INDIANA
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- ADULT RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
cis-1,2-Dichloroethene	4.62E-02	3.7E-05	3.7E-04		1.00E-02	NA	NA	3.7E-02	79.2%
Methylene chloride	3.73E-03	3.0E-06	3.0E-05	1.60E-03		4.8E-09	0.1%	NA	NA
Trichloroethene	1.21E-02	9.7E-06	9.7E-05	4.00E-01	1.00E-02	3.9E-06	99.9%	9.7E-03	20.8%
					Total	**3.9E-06**	**100.0%**	**4.7E-02**	**100.0%**

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

HAZARD INDICES AND INCREMENTAL CANCER RISKS ARE CALCULATED BY THIS SPREADSHEET.
EXPOSURES THROUGH THE INHALATION OF VOLATILES WHILE SHOWERING ARE CONSIDERED.
INTAKE EQUATION IS BASED ON EPA, 1989 AND FOSTER AND CHROSTOWSKI, 1987.
ASSUMPTIONS ARE OUTLINED BELOW.

RELEVANT EQUATION:

$$\text{Intake} = \frac{S \times IR_{SW} \times K \times EF \times ED}{BW \times AT \times R_a \times CF}$$

WHERE:			
	K = :	2.19	Mass transfer coefficient (min)
	IR_{sh} = :	10	Inhalation rate (L/min)
	S = :		Volatile chemical generation rate (mg/m^3-min-shower)
	EF = :	234	Exposure Frequency (days/year)
	ED = :	2	Exposure Duration (years)
	BW = :	15	Body Weight (kg)
	ATc = :	25,550	Averaging time for carcinogenic exposures (days)
	Atn = :	730	Averaging time for noncarcinogenic exposures (days)
	R_a = :	0.025	Air exchange rate (min^{-1})
	CF = :	1.00E+03	Convesrion Factor (L/m^3)

Unit Dose

Lifetime Chronic Daily Intake =	1.1E-03	(min-m^3-shower)/(kg-day)
Chronic Daily Intake = :	3.7E-02	(min-m^3-shower)/(kg-day)

RISK ASSESSMENT SPREADSHEET - INHALATION OF VOLATILES FROM GROUNDWATER

SITE NAME: SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
LOCATION: NSWC-WHITE OAK SILVER SPRING, MARYLAND
EXPOSURE SCENARIO: INHALATION OF VAPOR WHILE SHOWERING- CHILD RESIDENT - CTE
MEDIA: GROUNDWATER TO INDOOR AIR
DATE:

CHEMICAL	S (mg/m^3- min - shower)	Lifetime Chronic Daily Intake (mg/kg/day)	Chronic Daily Intake (mg/kg/day)	Cancer Slope Factor $(mg/kg/day)^{-1}$	Reference Dose (mg/kg/day)	Lifetime Cancer Risk	Percent Cancer Risk	Hazard Quotient	Percent Hazard Quotient
cis-1,2-Dichloroethene	4.62E-02	4.9E-05	1.7E-03		1.00E-02	NA	NA	1.7E-01	79.2%
Methylene chloride	3.73E-03	4.0E-06	1.4E-04	1.60E-03		6.4E-09	0.1%	NA	NA
Trichloroethene	1.21E-02	1.3E-05	4.5E-04	4.00E-01	1.00E-02	5.2E-06	99.9%	4.5E-02	20.8%
					Total	**5.2E-06**	**100.0%**	**2.2E-01**	**100.0%**

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	METHYLENE CHLORIDE	1.1E-12			1.1E-12	METHYLENE CHLORIDE	Liver	1.8E-07			1.8E-07
			TETRACHLOROETHENE	3.8E-12			3.8E-12	TETRACHLOROETHENE	Liver	5.1E-07			5.1E-07
			TRICHLOROETHENE	1.1E-12			1.1E-12	TRICHLOROETHENE	CNS	1.2E-06			1.2E-06
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	5.3E-06			5.3E-06
			BENZO(A)ANTHRACENE	7.3E-10		3.5E-10	1.1E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.6E-09		3.1E-09	9.8E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	3.6E-06		1.7E-06	5.3E-06
			AROCLOR-1254	3.1E-09		1.6E-09	4.7E-09	AROCLOR-1254	mmunological, Nails	5.5E-03		2.8E-03	8.3E-03
			PENTACHLOROPHENOL	4.5E-12		4.1E-12	8.6E-12	PENTACHLOROPHENOL	Liver and Kidney	8.8E-08		7.9E-08	1.7E-07
			ALUMINUM					ALUMINUM	Body Weight	2.7E-02			2.7E-02
			ANTIMONY					ANTIMONY	Lifespan	6.2E-03			6.2E-03
			BARIUM					BARIUM	Blood	3.4E-03			3.4E-03
			CHROMIUM					CHROMIUM	NOAEL	1.2E-02			1.2E-02
			IRON					IRON	Liver, Blood, GI Trac	1.9E-01			1.9E-01
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			9.6E-03	9.6E-03
			Methylene Chloride			3.0E-10	3.0E-10	Methylene Chloride	Liver			4.6E-05	4.6E-05
			Trichloroethene			7.5E-09	7.5E-09	Trichloroethene	CNS			8.0E-03	8.0E-03
			Dieldrin			1.7E-08	1.7E-08	Dieldrin	Liver			1.5E-03	1.5E-03
			Aluminum					Aluminum	Body Weight			2.4E-05	2.4E-05
			Arsenic			4.1E-09	4.1E-09	Arsenic	Skin, Vascular			6.3E-04	6.3E-04
			Barium					Barium	Blood			3.3E-03	3.3E-03
			Beryllium					Beryllium	Gastrointestinal			6.0E-03	6.0E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			3.7E-04	3.7E-04
			Iron					Iron	Liver, Blood, GI Tract			8.5E-03	8.5E-03
			Manganese					Manganese	CNS			5.6E-01	5.6E-01
			Nickel					Nickel	Decreased Organ/ Body Weights			4.4E-03	4.4E-03

Total Risk Across Surface Soil	1.6E-08
Total Risk Across Groundwater	2.9E-08
Total Risk Across All Media and All Exposure Routes	4.4E-08

Total Hazard Index Across All Media and All Exposure Routes	8.6E-01
Total Liver HI =	2.0E-01
Total Kidney HI =	1.7E-07
Total Vascular HI =	1.0E-03
Total GI Tract HI =	2.1E-01
Total Skin HI =	6.3E-04
Total Blood HI =	2.2E-01
Total CNS HI =	5.7E-01
Total Immune System HI =	8.7E-03
Total Body Weight HI =	3.2E-02
Total Lifespan HI =	6.2E-03
Total Nails HI =	8.3E-03

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.3E-12			1.3E-12	METHYLENE CHLORIDE	Liver	8.3E-09			8.3E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	4.8E-06			4.8E-06
			BENZO(A)ANTHRACENE	3.7E-09		3.2E-09	6.8E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.2E-08		2.7E-08	5.9E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.7E-06		1.5E-06	3.2E-06
			PENTACHLOROPHENOL	9.8E-12		1.6E-11	2.6E-11	PENTACHLOROPHENOL	Liver and Kidney	7.6E-09		1.3E-08	2.0E-08
			ANTIMONY					ANTIMONY	Lifespan	2.6E-04			2.6E-04
							Total Risk Across Surface Soil 6.6E-08						Total Hazard Index Across All Media and All Exposure Routes 2.6E-04

Total Risk Across All Media and All Exposure Routes 6.6E-08

Total Liver HI =	2.8E-08
Total Kidney HI =	2.0E-08
Total Body Weight HI =	8.0E-06
Total Lifespan HI =	2.6E-04

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.4E-11			1.4E-11	METHYLENE CHLORIDE	Liver	8.6E-08			8.6E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	5.0E-05			5.0E-05
			BENZO(A)ANTHRACENE	3.8E-08		3.3E-08	7.1E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.3E-07		2.8E-07	6.2E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.8E-05		1.5E-05	3.3E-05
			PENTACHLOROPHENOL	1.0E-10		1.7E-10	2.7E-10	PENTACHLOROPHENOL	Liver and Kidney	7.9E-08		1.3E-07	2.1E-07
			ANTIMONY					ANTIMONY	Lifespan	2.7E-03			2.7E-03
							Total Risk Across Surface Soil 6.9E-07						Total Hazard Index Across All Media and All Exposure Routes 2.7E-03

Total Risk Across All Media and All Exposure Routes 6.9E-07

Total Liver HI =	3.0E-07
Total Kidney HI =	2.1E-07
Total Body Weight HI =	8.3E-05
Total Lifespan HI =	2.7E-03

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	3.5E-12			3.5E-12	METHYLENE CHLORIDE	Liver	1.8E-08			1.8E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	1.0E-05			1.0E-05
			BENZO(A)ANTHRACENE	9.6E-09		5.0E-09	1.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	8.3E-08		4.4E-08	1.3E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	3.7E-06		1.9E-06	5.6E-06
			PENTACHLOROPHENOL	2.5E-11		2.6E-11	5.1E-11	PENTACHLOROPHENOL	Liver and Kidney	1.7E-08		1.7E-08	3.3E-08
			ANTIMONY					ANTIMONY	Lifespan	5.5E-04			5.5E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	1.6E-03		2.0E-03	3.6E-03
Sediment	Sediment	Sediment	AROCLOR-1248	6.6E-08		8.4E-07	9.1E-07	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	2.2E-03			2.2E-03
			ARSENIC	8.0E-07		2.2E-06	3.0E-06	ARSENIC	Skin, Vascular	4.1E-03			4.1E-03
			IRON					IRON	Liver, Blood, GI Tract	1.3E-02		1.1E-02	2.4E-02
			MANGANESE					MANGANESE	CNS	3.8E-03			3.8E-03

Total Risk Across Surface Soil	1.4E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	3.9E-06
Total Risk Across All Media and All Exposure Routes	4.0E-06

Total Hazard Index Across All Media and All Exposure Routes	3.8E-02
Total Liver HI =	2.4E-02
Total Kidney HI =	3.3E-08
Total Vascular HI =	4.1E-03
Total GI Tract HI =	2.4E-02
Total Skin HI =	4.1E-03
Total Blood HI =	2.4E-02
Total CNS HI =	3.8E-03
Total Body Weight HI =	2.2E-03
Total Lifespan HI =	4.2E-03

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	4.4E-11			4.4E-11	METHYLENE CHLORIDE	Liver	1.1E-06			1.1E-06
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	6.5E-04			6.5E-04
			BENZO(A)ANTHRACENE	1.2E-07		3.1E-08	1.5E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.0E-06		2.7E-07	1.3E-06	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	2.3E-04		6.0E-05	2.9E-04
			PENTACHLOROPHENOL	3.2E-10		1.6E-10	4.8E-10	PENTACHLOROPHENOL	Liver and Kidney	1.0E-06		5.2E-07	1.6E-06
			ANTIMONY					ANTIMONY	Lifespan	3.5E-02			3.5E-02
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	1.0E-02		1.4E-02	2.4E-02
Sediment	Sediment	Sediment	AROCLOR-1248	8.3E-07		2.3E-07	1.1E-06	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	1.4E-01			1.4E-01
			ARSENIC	1.0E-05		6.0E-07	1.1E-05	ARSENIC	Skin, Vascular	2.6E-01			2.6E-01
			IRON					IRON	Liver, Blood, GI Tract	7.9E-01		1.6E-02	8.1E-01
			MANGANESE					MANGANESE	CNS	2.4E-01			2.4E-01
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.2E+00	4.7E-01	7.6E-02	1.8E+00
			Methylene Chloride	5.3E-07	5.2E-08	1.4E-08	5.9E-07	Methylene Chloride	Liver	1.4E-02		3.6E-04	1.4E-02
			Trichloroethene	3.4E-06	4.2E-05	3.8E-07	4.6E-05	Trichloroethene	CNS	5.9E-01	1.2E-01	6.7E-02	7.8E-01
			Dieldrin	1.8E-06		8.8E-07	2.7E-06	Dieldrin	Liver	2.6E-02		1.3E-02	3.9E-02
			Aluminum					Aluminum	Body Weight	3.4E-02		1.5E-04	3.4E-02
			Arsenic	3.4E-05		1.5E-07	3.5E-05	Arsenic	Skin, Vascular	8.9E-01		3.9E-03	8.9E-01
			Barium					Barium	Blood	3.2E-01		2.0E-02	3.4E-01
			Beryllium					Beryllium	Gastrointestinal	5.9E-02		3.7E-02	9.6E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	5.2E-01		2.3E-03	5.2E-01
			Iron					Iron	Liver, Blood, GI Tract	1.2E+01		5.2E-02	1.2E+01
			Manganese					Manganese	CNS	3.2E+01		3.5E+00	3.5E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	1.2E+00		2.7E-02	1.3E+00

Total Risk Across Surface Soil	1.5E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	1.2E-05
Total Risk Across Groundwater	8.4E-05
Total Risk Across All Media and All Exposure Routes	9.7E-05

Total Hazard Index Across All Media and All Exposure Routes	5.4E+01
Total Liver HI =	1.3E+01
Total Kidney HI =	1.6E-06
Total Vascular HI =	1.7E+00
Total GI Tract HI =	1.3E+01
Total Skin HI =	1.2E+00
Total Blood HI =	1.5E+01
Total CNS HI =	3.6E+01
Total Body Weight HI =	1.4E+00
Total Lifespan HI =	5.9E-02
Total Immune System HI =	5.2E-01

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.0E-12			1.0E-12	METHYLENE CHLORIDE	Liver	1.5E-08			1.5E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	8.5E-06			8.5E-06
			BENZO(A)ANTHRACENE	2.9E-09		2.8E-09	5.7E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.5E-08		2.5E-08	4.9E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	3.0E-06		3.0E-06	6.0E-06
			PENTACHLOROPHENOL	7.6E-12		1.5E-11	2.2E-11	PENTACHLOROPHENOL	Liver and Kidney	1.3E-08		2.6E-08	3.9E-08
			ANTIMONY					ANTIMONY	Lifespan	4.5E-04			4.5E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	2.7E-04		6.8E-04	9.4E-04
Sediment	Sediment	Sediment	AROCLOR-1248	2.0E-08		2.1E-08	4.1E-08	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	1.8E-03			1.8E-03
			ARSENIC	2.4E-07		5.5E-08	2.9E-07	ARSENIC	Skin, Vascular	3.4E-03			3.4E-03
			IRON					IRON	Liver, Blood, GI Tract	1.0E-02		7.7E-04	1.1E-02
			MANGANESE					MANGANESE	CNS	3.1E-03			3.1E-03

Total Risk Across Surface Soil	5.5E-08
Total Risk Across Surface Water	
Total Risk Across Sediment	3.3E-07
Total Risk Across All Media and All Exposure Routes	3.9E-07

Total Hazard Index Across All Media and All Exposure Routes	2.1E-02
Total Liver HI =	1.1E-02
Total Kidney HI =	3.9E-08
Total Vascular HI =	3.4E-03
Total GI Tract HI =	1.1E-02
Total Skin HI =	3.4E-03
Total Blood HI =	1.1E-02
Total CNS HI =	3.1E-03
Total Body Weight HI =	1.8E-03
Total Lifespan HI =	1.4E-03

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.9E-11			1.9E-11	METHYLENE CHLORIDE	Liver	1.2E-07			1.2E-07
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	7.0E-05			7.0E-05
			BENZO(A)ANTHRACENE	5.1E-08		2.7E-08	7.9E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.5E-07		2.4E-07	6.8E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	2.5E-05		1.3E-05	3.8E-05
			PENTACHLOROPHENOL	1.4E-10		1.4E-10	2.8E-10	PENTACHLOROPHENOL	Liver and Kidney	1.1E-07		1.1E-07	2.2E-07
			ANTIMONY					ANTIMONY	Lifespan	3.7E-03			3.7E-03
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	1.1E-02		1.3E-02	2.4E-02
Sediment	Sediment	Sediment	AROCLOR-1248	3.6E-07		2.0E-07	5.6E-07	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	1.5E-02			1.5E-02
			ARSENIC	4.3E-06		5.2E-07	4.8E-06	ARSENIC	Skin, Vascular	2.8E-02			2.8E-02
			IRON					IRON	Liver, Blood, GI Tract	8.5E-02		3.4E-03	8.8E-02
			MANGANESE					MANGANESE	CNS	2.5E-02			2.5E-02
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	3.6E-01	1.0E-01	3.3E-02	4.9E-01
			Methylene Chloride	6.0E-07	4.4E-08	2.3E-08	6.7E-07	Methylene Chloride	Liver	3.9E-03		1.5E-04	4.1E-03
			Trichloroethene	3.8E-06	3.6E-05	6.7E-07	4.1E-05	Trichloroethene	CNS	1.7E-01	2.6E-02	3.0E-02	2.3E-01
			Dieldrin	2.1E-06		1.6E-06	3.6E-06	Dieldrin	Liver	7.6E-03		5.7E-03	1.3E-02
			Aluminum					Aluminum	Body Weight	9.6E-03		5.0E-05	9.6E-03
			Arsenic	3.9E-05		2.1E-07	3.9E-05	Arsenic	Skin, Vascular	2.5E-01		1.3E-03	2.6E-01
			Barium					Barium	Blood	9.2E-02		6.9E-03	9.9E-02
			Beryllium					Beryllium	Gastrointestinal	1.7E-02		1.3E-02	2.9E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	1.5E-01		7.8E-04	1.5E-01
			Iron					Iron	Liver, Blood, GI Tract	3.4E+00		1.8E-02	3.4E+00
			Manganese					Manganese	CNS	9.0E+00		1.2E+00	1.0E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	3.5E-01		9.2E-03	3.6E-01

Total Risk Across Surface Soil	7.6E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	5.4E-06
Total Risk Across Groundwater	8.4E-05
Total Risk Across All Media and All Exposure Routes	9.1E-05

Total Hazard Index Across All Media and All Exposure Routes	1.5E+01
Total Liver HI =	3.5E+00
Total Kidney HI =	2.2E-07
6.3E-06 Total Vascular HI =	4.3E-01
1.5E-05 Total GI Tract HI =	3.5E+00
8.7E-05 Total Skin HI =	2.8E-01
Total Blood HI =	4.1E+00
Total CNS HI =	1.1E+01
Total Body Weight HI =	3.9E-01
Total Lifespan HI =	2.8E-02
Total Immune System HI =	1.5E-01

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	METHYLENE CHLORIDE	5.7E-13			5.7E-13	METHYLENE CHLORIDE	Liver	8.9E-08			8.9E-08
			TETRACHLOROETHENE	1.9E-12			1.9E-12	TETRACHLOROETHENE	Liver	2.5E-07			2.5E-07
			TRICHLOROETHENE	5.5E-13			5.5E-13	TRICHLOROETHENE	CNS	5.9E-07			5.9E-07
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.7E-06			2.7E-06
			BENZO(A)ANTHRACENE	3.7E-10		9.9E-11	4.7E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.3E-09		9.0E-10	4.2E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.8E-06		4.8E-07	2.3E-06
			AROCLOR-1254	1.6E-09		4.6E-10	2.0E-09	AROCLOR-1254	mmunological, Nails	2.8E-03		8.0E-04	3.6E-03
			PENTACHLOROPHENOL	2.3E-12		1.2E-12	3.4E-12	PENTACHLOROPHENOL	Liver and Kidney	4.4E-08		2.3E-08	6.7E-08
			ALUMINUM					ALUMINUM	Body Weight	1.4E-02			1.4E-02
			ANTIMONY					ANTIMONY	Lifespan	3.1E-03			3.1E-03
			BARIUM					BARIUM	Blood	1.7E-03			1.7E-03
			CHROMIUM					CHROMIUM	NOAEL	6.0E-03			6.0E-03
			IRON					IRON	Liver, Blood, GI Trac	9.7E-02			9.7E-02
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			6.8E-03	6.8E-03
			Methylene Chloride			2.1E-10	2.1E-10	Methylene Chloride	Liver			3.2E-05	3.2E-05
			Trichloroethene			5.5E-09	5.5E-09	Trichloroethene	CNS			5.8E-03	5.8E-03
			Dieldrin			1.3E-08	1.3E-08	Dieldrin	Liver			1.1E-03	1.1E-03
			Aluminum					Aluminum	Body Weight			1.5E-05	1.5E-05
			Arsenic			2.6E-09	2.6E-09	Arsenic	Skin, Vascular			4.1E-04	4.1E-04
			Barium					Barium	Blood			2.1E-03	2.1E-03
			Beryllium					Beryllium	Gastrointestinal			3.8E-03	3.8E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			2.4E-04	2.4E-04
			Iron					Iron	Liver, Blood, GI Tract			5.5E-03	5.5E-03
			Manganese					Manganese	CNS			3.6E-01	3.6E-01
			Nickel					Nickel	Decreased Organ/ Body Weights			2.8E-03	2.8E-03

Total Risk Across Surface Soil	6.7E-09
Total Risk Across Groundwater	2.1E-08
Total Risk Across All Media and All Exposure Routes	2.8E-08

Total Hazard Index Across All Media and All Exposure Routes	5.2E-01
Total Liver HI =	1.0E-01
Total Kidney HI =	6.7E-08
Total Vascular HI =	6.5E-04
Total GI Tract HI =	1.1E-01
Total Skin HI =	4.1E-04
Total Blood HI =	1.1E-01
Total CNS HI =	3.7E-01
Total Immune System HI =	3.8E-03
Total Body Weight HI =	1.6E-02
Total Lifespan HI =	3.1E-03
Total Nails HI =	3.6E-03

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.2E-13			1.2E-13	METHYLENE CHLORIDE	Liver	2.1E-09			2.1E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	1.2E-06			1.2E-06
			BENZO(A)ANTHRACENE	3.3E-10		5.7E-11	3.9E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.9E-09		4.9E-10	3.4E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	4.3E-07		7.3E-08	5.0E-07
			PENTACHLOROPHENOL	8.8E-13		2.9E-13	1.2E-12	PENTACHLOROPHENOL	Liver and Kidney	1.9E-09		6.3E-10	2.5E-09
			ANTIMONY					ANTIMONY	Lifespan	6.4E-05			6.4E-05
						Total Risk Across Surface Soil	3.7E-09		Total Hazard Index Across All Media and All Exposure Routes				6.6E-05

Total Risk Across All Media and All Exposure Routes 3.7E-09

Total Liver HI =	4.6E-09
Total Kidney HI =	2.5E-09
Total Body Weight HI =	1.7E-06
Total Lifespan HI =	6.4E-05

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.2E-12			2.2E-12	METHYLENE CHLORIDE	Liver	3.8E-08			3.8E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.2E-05			2.2E-05
			BENZO(A)ANTHRACENE	6.0E-09		1.0E-09	7.1E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	5.2E-08		9.0E-09	6.1E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	7.8E-06		1.3E-06	9.1E-06
			PENTACHLOROPHENOL	1.6E-11		5.3E-12	2.1E-11	PENTACHLOROPHENOL	Liver and Kidney	3.5E-08		1.1E-08	4.6E-08
			ANTIMONY					ANTIMONY	Lifespan	1.2E-03			1.2E-03
						Total Risk Across Surface Soil	6.8E-08		Total Hazard Index Across All Media and All Exposure Routes				1.2E-03

Total Risk Across All Media and All Exposure Routes	6.8E-08

Total Liver HI =	8.4E-08
Total Kidney HI =	4.6E-08
Total Body Weight HI =	3.1E-05
Total Lifespan HI =	1.2E-03

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.6E-13			2.6E-13	METHYLENE CHLORIDE	Liver	4.5E-09			4.5E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.6E-06			2.6E-06
			BENZO(A)ANTHRACENE	7.2E-10		9.3E-11	8.1E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.2E-09		8.1E-10	7.0E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	9.2E-07		1.2E-07	1.0E-06
			PENTACHLOROPHENOL	1.9E-12		4.8E-13	2.4E-12	PENTACHLOROPHENOL	Liver and Kidney	4.1E-09		1.0E-09	5.2E-09
			ANTIMONY					ANTIMONY	Lifespan	1.4E-04			1.4E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	4.1E-04		4.9E-04	9.0E-04
Sediment	Sediment	Sediment	AROCLOR-1248	5.0E-09		2.5E-08	3.0E-08	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	5.5E-04			5.5E-04
			ARSENIC	6.0E-08		6.5E-08	1.3E-07	ARSENIC	Skin, Vascular	1.0E-03			1.0E-03
			IRON					IRON	Liver, Blood, GI Tract	3.2E-03		1.1E-03	4.3E-03
			MANGANESE					MANGANESE	CNS	9.4E-04			9.4E-04

Total Risk Across Surface Soil	7.8E-09
Total Risk Across Surface Water	
Total Risk Across Sediment	1.6E-07
Total Risk Across All Media and All Exposure Routes	1.6E-07

Total Hazard Index Across All Media and All Exposure Routes	7.9E-03
Total Liver HI =	4.3E-03
Total Kidney HI =	5.2E-09
Total Vascular HI =	1.0E-03
Total GI Tract HI =	4.3E-03
Total Skin HI =	1.0E-03
Total Blood HI =	4.3E-03
Total CNS HI =	9.4E-04
Total Body Weight HI =	5.5E-04
Total Lifespan HI =	1.0E-03

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.6E-13			2.6E-13	METHYLENE CHLORIDE	Liver	3.7E-09			3.7E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.1E-06			2.1E-06
			BENZO(A)ANTHRACENE	7.1E-10		2.3E-10	9.4E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.2E-09		2.0E-09	8.2E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	7.5E-07		2.4E-07	9.9E-07
			PENTACHLOROPHENOL	1.9E-12		1.2E-12	3.1E-12	PENTACHLOROPHENOL	Liver and Kidney	3.4E-09		2.1E-09	5.4E-09
			ANTIMONY					ANTIMONY	Lifespan	1.1E-04			1.1E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	6.6E-05		1.4E-04	2.0E-04
Sediment	Sediment	Sediment	AROCLOR-1248	4.9E-09		1.7E-09	6.7E-09	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	4.5E-04			4.5E-04
			ARSENIC	6.0E-08		4.4E-09	6.4E-08	ARSENIC	Skin, Vascular	8.4E-04			8.4E-04
			IRON					IRON	Liver, Blood, GI Tract	2.6E-03		6.3E-05	2.6E-03
			MANGANESE					MANGANESE	CNS	7.7E-04			7.7E-04

Total Risk Across Surface Soil	9.1E-09
Total Risk Across Surface Water	
Total Risk Across Sediment	7.1E-08
Total Risk Across All Media and All Exposure Routes	8.0E-08

Total Hazard Index Across All Media and All Exposure Routes	5.0E-03
Total Liver HI =	2.6E-03
Total Kidney HI =	5.4E-09
Total Vascular HI =	8.4E-04
Total GI Tract HI =	2.6E-03
Total Skin HI =	8.4E-04
Total Blood HI =	2.6E-03
Total CNS HI =	7.7E-04
Total Body Weight HI =	4.5E-04
Total Lifespan HI =	3.2E-04

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.7E-12			2.7E-12	METHYLENE CHLORIDE	Liver	6.0E-08			6.0E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	3.5E-05			3.5E-05
			BENZO(A)ANTHRACENE	7.5E-09		9.8E-10	8.5E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.5E-08		8.5E-09	7.3E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.2E-05		1.6E-06	1.4E-05
			PENTACHLOROPHENOL	2.0E-11		5.0E-12	2.5E-11	PENTACHLOROPHENOL	Liver and Kidney	5.6E-08		1.4E-08	6.9E-08
			ANTIMONY					ANTIMONY	Lifespan	1.9E-03			1.9E-03
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	3.7E-03		4.4E-03	8.1E-03
Sediment	Sediment	Sediment	AROCLOR-1248	3.5E-08		4.9E-09	4.0E-08	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	4.9E-03			4.9E-03
			ARSENIC	4.2E-07		1.3E-08	4.3E-07	ARSENIC	Skin, Vascular	9.3E-03			9.3E-03
			IRON					IRON	Liver, Blood, GI Tract	2.8E-02		2.8E-04	2.9E-02
			MANGANESE					MANGANESE	CNS	8.5E-03			8.5E-03
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.5E-01	3.7E-02	2.1E-02	3.1E-01
			Methylene Chloride	1.2E-07	4.8E-09	4.5E-09	1.3E-07	Methylene Chloride	Liver	2.7E-03		1.0E-04	2.8E-03
			Trichloroethene	7.9E-07	3.9E-06	1.3E-07	4.8E-06	Trichloroethene	CNS	1.2E-01	9.7E-03	1.9E-02	1.5E-01
			Dieldrin	4.2E-07		3.0E-07	7.2E-07	Dieldrin	Liver	5.3E-03		3.8E-03	9.1E-03
			Aluminum					Aluminum	Body Weight	6.7E-03		2.2E-05	6.7E-03
			Arsenic	8.0E-06		2.6E-08	8.0E-06	Arsenic	Skin, Vascular	1.8E-01		5.7E-04	1.8E-01
			Barium					Barium	Blood	6.5E-02		3.0E-03	6.8E-02
			Beryllium					Beryllium	Gastrointestinal	1.2E-02		5.4E-03	1.7E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	1.0E-01		3.4E-04	1.0E-01
			Iron					Iron	Liver, Blood, GI Tract	2.4E+00		7.7E-03	2.4E+00
			Manganese					Manganese	CNS	6.3E+00		5.1E-01	6.8E+00
			Nickel					Nickel	Decreased Organ/ Body Weights	2.5E-01		4.0E-03	2.5E-01

Total Risk Across Surface Soil	8.2E-08
Total Risk Across Surface Water	
Total Risk Across Sediment	4.7E-07
Total Risk Across Groundwater	1.4E-05
Total Risk Across All Media and All Exposure Routes	1.4E-05

Total Hazard Index Across All Media and All Exposure Routes	1.0E+01
Total Liver HI =	2.4E+00
Total Kidney HI =	6.9E-08
Total Vascular HI =	2.9E-01
Total GI Tract HI =	2.4E+00
Total Skin HI =	1.9E-01
Total Blood HI =	2.8E+00
Total CNS HI =	7.1E+00
Total Body Weight HI =	2.6E-01
Total Lifespan HI =	1.0E-02
Total Immune System HI =	1.0E-01

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	4.8E-12			4.8E-12	METHYLENE CHLORIDE	Liver	3.8E-07			3.8E-07
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.2E-04			2.2E-04
			BENZO(A)ANTHRACENE	1.3E-08		1.2E-09	1.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.2E-07		1.1E-08	1.3E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	7.7E-05		7.0E-06	8.4E-05
			PENTACHLOROPHENOL	3.6E-11		6.2E-12	4.2E-11	PENTACHLOROPHENOL	Liver and Kidney	3.5E-07		6.0E-08	4.1E-07
			ANTIMONY					ANTIMONY	Lifespan	1.2E-02			1.2E-02
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	3.4E-03		4.0E-03	7.4E-03
Sediment	Sediment	Sediment	AROCLOR-1248	9.3E-08		9.1E-09	1.0E-07	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	4.6E-02			4.6E-02
			ARSENIC	1.1E-06		2.3E-08	1.1E-06	ARSENIC	Skin, Vascular	8.7E-02			8.7E-02
			IRON					IRON	Liver, Blood, GI Tract	2.6E-01		1.8E-03	2.7E-01
			MANGANESE					MANGANESE	CNS	7.9E-02			7.9E-02
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	5.5E-01	1.7E-01	4.2E-02	7.6E-01
			Methylene Chloride	7.8E-08	6.4E-09	2.5E-09	8.6E-08	Methylene Chloride	Liver	6.0E-03		2.0E-04	6.2E-03
			Trichloroethene	4.9E-07	5.2E-06	7.2E-08	5.8E-06	Trichloroethene	CNS	2.6E-01	4.5E-02	3.8E-02	3.5E-01
			Dieldrin	2.7E-07		1.7E-07	4.4E-07	Dieldrin	Liver	1.2E-02		7.4E-03	1.9E-02
			Aluminum					Aluminum	Body Weight	1.5E-02		4.9E-05	1.5E-02
			Arsenic	5.0E-06		1.7E-08	5.1E-06	Arsenic	Skin, Vascular	3.9E-01		1.3E-03	3.9E-01
			Barium					Barium	Blood	1.4E-01		6.7E-03	1.5E-01
			Beryllium					Beryllium	Gastrointestinal	2.6E-02		1.2E-02	3.8E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	2.3E-01		7.6E-04	2.3E-01
			Iron					Iron	Liver, Blood, GI Tract	5.2E+00		1.7E-02	5.3E+00
			Manganese					Manganese	CNS	1.4E+01		1.1E+00	1.5E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	5.4E-01		8.9E-03	5.5E-01

Total Risk Across Surface Soil	1.4E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	1.2E-06
Total Risk Across Groundwater	1.1E-05
Total Risk Across All Media and All Exposure Routes	1.3E-05

Total Hazard Index Across All Media and All Exposure Routes	2.3E+01
Total Liver HI =	5.6E+00
Total Kidney HI =	4.1E-07
Total Vascular HI =	7.1E-01
Total GI Tract HI =	5.6E+00
Total Skin HI =	4.8E-01
Total Blood HI =	6.4E+00
Total CNS HI =	1.6E+01
Total Body Weight HI =	6.1E-01
Total Lifespan HI =	1.9E-02
Total Immune System HI =	2.3E-01

RAGS - PART D TABLES FOR SWMU 10

Selection of Exposure Pathways

SWMU10Table1.xls

COPC Selection

SWMU10Table2.1.xls - Surface Soil - Direct Contact
SWMU10Table2.2.xls - Surface Soil - Migration Pathways
SWMU10Table2.3.xls - Surface/Subsurface Soil - Direct Contact
SWMU10Table2.4.xls - Surface/Subsurface Soil - Migration Pathways
SWMU10Table2.5.xls - Groundwater
SWMU10Table2.6.xls - Surface Water
SWMU10Table2.7.xls - Sediment

Exposure Point Concentration Summary

SWMU10Table3.1.xls - Surface Soil
SWMU10Table3.2.xls - Surface/Subsurface Soil
SWMU10Table3.3.xls - Groundwater
SWMU10Table3.4.xls - Surface Water
SWMU10Table3.5.xls - Sediment

COPC Toxicity Information

Table5.1.xls - Noncancer - Oral/Dermal
Table5.2.xls - Noncancer - Inhalation
Table6.1.xls - Cancer - Oral/Dermal
Table6.2.xls - Cancer - Inhalation

The following files contain RAGS-Part D Tables 4, 7, and 8.

Risk Assessment Calculations for Surface Soil

SWMU10SSAdultRes.xls
SWMU10SSAdultResCTE.xls
SWMU10SSChildRes.xls
SWMU10SSChildResCTE.xls
SWMU10SSMainW.xls
SWMU10SSMainWCTE.xls
SWMU10SSOccupW.xls
SWMU10SSOccupWCTE.xls
SWMU10SSRecrUser.xls
SWMU10SSRecrUserCTE.xls
SWMU10SSTresp.xls
SWMU10SSTrespCTE.xls

Risk Assessment Calculations for Surface/subsurface Soil

SWMU10SOConstW.xls
SWMU10SOConstWCTE.xls

Risk Assessment Calculations for Groundwater

SWMU10GWAdultRes.xls
SWMU10GWAdultResCTE.xls
SWMU10GWChildRes.xls

SWMU10GWChildResCTE.xls
SWMU10GWConstW.xls
SWMU10GWConstWCTE.xls

Risk Assessment Calculations for Surface Water

SWMU10SWAdultRes.xls
SWMU10SWAdultResCTE.xls
SWMU10SWChildRes.xls
SWMU10SWChildResCTE.xls
SWMU10SWRecrUser.xls
SWMU10SWRecrUserCTE.xls
SWMU10SWTresp.xls
SWMU10SWTrespCTE.xls

Risk Assessment Calculations for Sediment

SWMU10SedAdultRes.xls
SWMU10SedAdultResCTE.xls
SWMU10SedChildRes.xls
SWMU10SedChildResCTE.xls
SWMU10SedRecrUser.xls
SWMU10SedRecrUserCTE.xls
SWMU10SedTresp.xls
SWMU10SedTrespCTE.xls

Risk Assessment Summary

SWMU10Tbl9s.xls
SWMU10Tbl9sCTE.xls

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			CALCULATION OF NON-CANCER HAZARDS FROM EX
SWMU 10 - TABLE 8.1	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 10 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RM
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			CALCULATION OF NON-CANCER HAZARDS FROM EX
SWMU 10 - TABLE 8.16	REASONABLE MAXIMUM EXPOSURE (RME)		SWMU 10 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (R
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			CALCULATION OF CANCER RISKS FROM EXPOSURE
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TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface/ Subsurface Soil	Surface/ Subsurface Soil	Entire Site	Excavation/Construction Workers	Adult	Ingestion	On-site	Quant	Infrequent excavation activities may occur at the site and excavation/construction projects may occur in the future.
						Dermal	On-site	Quant	Infrequent excavation activities may occur at the site and excavation/construction projects may occur in the future.
		Air	Vapors and Particulates in Air - Entire Site	Excavation/Construction Workers	Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs for transfers from soil to air.
	Surface Soil(2)	Surface Soil	Entire Site	Maintenance Workers	Adult	Ingestion	On-site	None	NSWC Crane is an active facility and maintenance activities , such as groundskeeping, may be performed at the site.
						Dermal	On-site	None	NSWC Crane is an active facility and maintenance activities , such as groundskeeping, may be performed at the site.
				Occupational Workers	Adult	Ingestion	On-site	None	SWMU 10 is currently an active site and workers may be exposed during work related activities.
						Dermal	On-site	None	SWMU 10 is currently an active site and workers may be exposed during work related activities.
				Trespassers	Adolescent	Ingestion	On-site	Quant(3)	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	Qual(4)	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs(5) for transfers from soil to air.
	Groundwater	Groundwater	Surficial Aquifer	Excavation/Construction Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	Quant	Excavation/construction activities may occur at the site and workers may be exposed by direct contact with groundwater.
		Groundwater/Air	Surficial Aquifer	Maintenance Workers, Occupational Workers, and Trespassers	Adult and Adolescent	Ingestion	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Dermal	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.
						Inhalation	On-site	None	Direct contact with groundwater does not occur under current land use. Shallow groundwater is not expected to be used as a domestic water supply.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Construction/Excavation, Maintenance, and Occupational Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespassers	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	On-site Streams, Ponded Water and Draingeways	Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Construction/Excavation, Maintenance, and Occupational Workers	Adult	Ingestion	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
						Dermal	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Trespasser	Adolescent	Ingestion	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
						Dermal	On-site	Quant	Although access to the base is controlled, once inside the base access to the study areas is not limited by any physical constraints.
					Adult	Ingestion	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
						Dermal	On-site	None	Potential risks are assumed to be similar to adolescent trespassers. Risks for this receptor will be inferred using the calculated risks for the adolescent trespasser.
		Air	Vapors and Particulates in Air - Entire Site	Workers and Trespassers	Adult and Adolescent	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
Future	Surface Soil	Surface Soil	Entire Site	Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	Vapors and Particulates in Air - Entire Site	Recreational Users and Residents	Child and Adult	Inhalation	On-site	Qual	Exposure is evaluated qualitatively by a comparison of site data to USEPA Generic SSLs for transfers from soil to air.

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Surficial Aquifer	Recreational Users	Adult	Ingestion	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
						Dermal	On-site	None	Direct contact with groundwater is not expected to occur for future recreational users.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
		Air	Vapors	Recreational Users	Adult	Inhalation	On-site	None	Minimal exposure is anticipated (i.e., so low such that it is not worth quantifying).
				Resident	Child and Adult	Inhalation	On-site	Quant	Although it is unlikely that shallow groundwater at the site would be used as a domestic water supply. This scenario is included to aid in future risk management decisions.
	Surface Water	Surface Water	On-site Streams, Ponded Water and Draingeways	Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Child and Adult	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Recreational Users and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).
	Sediment	Sediment	On-site Streams, Ponded Water and Draingeways	Recreational Users	Adult	Ingestion	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
						Dermal	On-site	Quant	This scenario is evaluated on the assumption that the Facility would close and be turned into a state park in the future.
				Residents	Adult and Child	Ingestion	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
						Dermal	On-site	Quant	Although the scenario is unlikely, a residential scenario is included to aid in future risk management decisions.
		Air	On-site Streams, Ponded Water and Draingeways	Recreational Users and Residents	Child and Adult	Inhalation	On-site	None	Minimal exposure to vapors emitted from surface water is anticipated (i.e., so low such that it is not worth quantifying).

Footnotes:
1 Surface/subsurface soil is defined as soil collected from 0 to 10 feet bgs; no exposure to soil at depths below 10 feet bgs is anticipated.
2 Surface soil is defined as soil collected from 0 to 2 feet below ground surface (bgs).
3 Quantitative.
4 Qualitative.
5 Soil Screening Levels (USEPA, May 1996).

SWMU 10 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTIONOF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
SEMIVOLATILE ORGANICS																	
208-96-8	ACENAPHTHYLENE	0.47	J	0.47	J	mg/kg	10SB030002	1/1	---	0.47	NA	370(7)	N	9500(7)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.11	J	0.11	J	mg/kg	10SB030002	1/1	---	0.11	NA	2200	N	47000	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.53	J	0.53	J	mg/kg	10SB030002	1/1	---	0.53	NA	0.62	C	5	IDEM	No	BSL
50-32-8	**BENZO(A)PYRENE**	0.99	J	0.99	J	mg/kg	10SB030002	1/1	---	0.99	NA	**0.062**	C	**0.5**	IDEM	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.96	J	0.96	J	mg/kg	10SB030002	1/1	---	0.96	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.86	J	0.86	J	mg/kg	10SB030002	1/1	---	0.86	NA	230(8)	N	5500(8)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.74	J	0.74	J	mg/kg	10SB030002	1/1	---	0.74	NA	6.2	C	50	IDEM	No	BSL
218-01-9	CHRYSENE	0.56	J	0.56	J	mg/kg	10SB030002	1/1	---	0.56	NA	62	C	500	IDEM	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.2	J	0.2	J	mg/kg	10SB030002	1/1	---	0.2	NA	**0.062**	C	0.5	IDEM	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0	J	0	J	mg/kg	10SB030002	1/1	---	0.37	NA	230	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.61	J	0.61	J	mg/kg	10SB030002	1/1	---	0.61	NA	0.62	C	5	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.1	J	0.1	J	mg/kg	10SB030002	1/1	---	0.13	NA	230(8)	N	5500(8)	IDEM	No	BSL
129-00-0	PYRENE	0.39	J	0.39	J	mg/kg	10SB030002	1/1	---	0.39	NA	230	N	5500	IDEM	No	BSL
EXPLOSIVES																	
35572-78-2	**2-AMINO-4,6-DINITROTOLUENE**	0.53		0.53		mg/kg	10SB090002	1/10	0.5	0.53	NA	**0.47(9)**	N	NA	IDEM	**Yes**	**ASL**
2691-41-0	HMX	1.3		55		mg/kg	10SB050002	5/10	0.5	55	NA	310	N	NA	IDEM	No	BSL
121-82-4	**RDX**	1.6		8		mg/kg	10SB030002	2/10	0.5	8	NA	**4.4**	C	NA	IDEM	**Yes**	**ASL**
INORGANICS																	
7429-90-5	ALUMINUM	1530	J	12200	J	mg/kg	10SB050002	10/10	---	12200	No	**7600**	N	NA	IDEM	No	BKG
7440-38-2	ARSENIC	0.87		9.3	J	mg/kg	10SB090002	10/10	---	9.3	No	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	BARIUM	46.8	J	117	J	mg/kg	10SB050002	10/10	---	117	No	540	N	23000	IDEM	No	BSL,BKG
7440-41-7	BERYLLIUM	1	J	1	J	mg/kg	10SB050002	1/10	0.57 - 0.99	1	No	15	N	680	IDEM	No	BSL,BKG
7440-43-9	CADMIUM	1	J	3.4	J	mg/kg	10SB020002	2/10	0.57 - 0.99	3.4	No	3.7	N	12	IDEM	No	BSL,BKG
7440-70-2	CALCIUM	960	J	249000	J	mg/kg	10SB080002	10/10	---	249000	**Yes**	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	6.4		22		mg/kg	10SB090002	10/10	---	22	No	30(10)	C	430(10)	IDEM	No	BSL,BKG
7440-48-4	COBALT	1.5		9.7		mg/kg	10SB090002	10/10	---	9.7	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	2		12.3	J	mg/kg	10SB020002	10/10	---	12.3	No	310	N	13000	IDEM	No	BSL,BKG
7439-89-6	IRON	3420	J	26500	J	mg/kg	10SB090002	10/10	---	26500	No	**2300**	N	NA	IDEM	No	BKG
7439-92-1	LEAD	4.2	J	25.1		mg/kg	10SB090002	10/10	---	25.1	No	400(11)	N	400	IDEM	No	BSL,BKG
7439-95-4	MAGNESIUM	1010	J	14700	J	mg/kg	10SB080002	10/10	---	14700	**Yes**	NA		NA	IDEM	No	NUT
7439-96-5	MANGANESE	78.1		674	J	mg/kg	10SB090002	10/10	---	674	No	**180**	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.04		0.04		mg/kg	2, 10SB060002, 1	3/10	0.03 - 0.05	0.04	No	2.3(12)	N	55	IDEM	No	BSL,BKG
7440-02-0	NICKEL	6.4		15.7		mg/kg	10SB080002	10/10	---	15.7	No	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	321	J	506	J	mg/kg	10SB050002	2/10	401 - 493	506	No	NA		NA	IDEM	No	NUT, BKG
7440-62-2	VANADIUM	4.4		26.6	J	mg/kg	10SB090002	10/10	---	26.6	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	ZINC	19.8	J	50	J	mg/kg	10SB090002	10/10	---	50	No	2300	N	100000	IDEM	No	BSL,BKG

SWMU 10 - TABLE 2.1

OCCURRENCE, DISTRIBUTION, AND SELECTIONOF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	1.5	J	10	J	meq/100 g	10SB020002	2/2	---	10	NA	NA	NA	NA	No	NTX
	pH	8	J	8.5	J	S.U.	10SB080002	2/2	---	8.5	NA	NA	NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1600		1900		mg/kg	10SB020002	2/2	---	1900	NA	NA	NA	NA	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Acenaphthene is used as a surrogate for acenaphthylene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Value is for aminodinitrotoluenes (U.S. EPA, Region 3, October 2001)
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994).
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001).

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract service.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not a.ailable.
sat = Soil saturation concentration..

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

10SB010002	10SB060002
10SB020002	10SB070002
10SB030002	10SB080002
10SB040002	10SB090002
10SB050002	10SB100002

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 10 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
SEMIVOLATILE ORGANICS																	
208-96-8	ACENAPHTHYLENE	0.47	J	0.47	J	mg/kg	10SB030002	1/1	---	0.47	NA	29(8)	N	NA	130(8)	No	BSL
120-12-7	ANTHRACENE	0.11	J	0.11	J	mg/kg	10SB030002	1/1	---	0.11	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.53	J	0.53	J	mg/kg	10SB030002	1/1	---	0.53	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.99	J	0.99	J	mg/kg	10SB030002	1/1	---	0.99	NA	**0.4**	C	NA	8.2	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.96	J	0.96	J	mg/kg	10SB030002	1/1	---	0.96	NA	**0.2**	C	NA	57	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.86	J	0.86	J	mg/kg	10SB030002	1/1	---	0.86	NA	210(9)	N	NA	570(9)	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.74	J	0.74	J	mg/kg	10SB030002	1/1	---	0.74	NA	2	C	NA	39	No	BSL
218-01-9	CHRYSENE	0.56	J	0.56	J	mg/kg	10SB030002	1/1	---	0.56	NA	8	C	NA	25	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.2	J	0.2	J	mg/kg	10SB030002	1/1	---	0.2	NA	**0.08**	C	NA	18	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.37	J	0	J	mg/kg	10SB030002	1/1	---	0.37	NA	210	N	NA	880	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.61	J	0.61	J	mg/kg	10SB030002	1/1	---	0.61	NA	0.7	C	NA	3.1	No	BSL
85-01-8	PHENANTHRENE	0.13	J	0.1	J	mg/kg	10SB030002	1/1	---	0.13	NA	210(9)	N	NA	570(9)	No	BSL
129-00-0	PYRENE	0.39	J	0.39	J	mg/kg	10SB030002	1/1	---	0.39	NA	210	N	NA	570	No	BSL
EXPLOSIVES																	
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	0.53		0.53		mg/kg	10SB090002	1/10	0.5	0.53	NA	NA	N	NA	NA	No	NTX
2691-41-0	HMX	1.3		55		mg/kg	10SB050002	5/10	0.5	55	NA	NA	N	NA	NA	No	NTX
121-82-4	RDX	1.6		8		mg/kg	10SB030002	2/10	0.5	8	NA	NA	C	NA	NA	No	NTX
INORGANICS																	
7429-90-5	ALUMINUM	1530	J	12200	J	mg/kg	10SB050002	10/10	---	12200	No	NA	N	NA	NA	No	NTX, BKG
7440-38-2	ARSENIC	0.87		9.3	J	mg/kg	10SB090002	10/10	---	9.3	No	**1**	C	750	29	No	BKG
7440-39-3	BARIUM	46.8	J	117	J	mg/kg	10SB050002	10/10	---	117	No	**82**	N	690000	1600	No	BKG
7440-41-7	BERYLLIUM	1	J	1	J	mg/kg	10SB050002	1/10	0.57 - 0.99	1	No	3	N	1300	63	No	BSL,BKG
7440-43-9	CADMIUM	1	J	3.4	J	mg/kg	10SB020002	2/10	0.57 - 0.99	3.4	No	**0.4**	N	1800	7.5	No	BKG
7440-70-2	CALCIUM	960	J	249000	J	mg/kg	10SB080002	10/10	---	249000	**Yes**	NA		NA	NA	No	NUT
7440-47-3	CHROMIUM	6.4		22		mg/kg	10SB090002	10/10	---	22	No	**2**	C	270	38	No	BKG
7440-48-4	COBALT	1.5		9.7		mg/kg	10SB090002	10/10	---	9.7	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	2		12.3	J	mg/kg	10SB020002	10/10	---	12.3	No	NA	N	NA	580	No	BSL,BKG
7439-89-6	IRON	3420	J	26500	J	mg/kg	10SB090002	10/10	---	26500	No	NA	N	NA	NA	No	NTX, BKG
7439-92-1	LEAD	4.2	J	25.1		mg/kg	10SB090002	10/10	---	25.1	No	NA	N	NA	81	No	BSL,BKG
7439-95-4	MAGNESIUM	1010	J	14700	J	mg/kg	10SB080002	10/10	---	14700	**Yes**	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	78.1		674	J	mg/kg	10SB090002	10/10	---	674	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	MERCURY	0.04		0.04		mg/kg	10SB090002, 10SB060002, 10SB050002	3/10	0.03 - 0.05	0.04	No	0.1	N	10	2.1	No	BSL,BKG
7440-02-0	NICKEL	6.4		15.7		mg/kg	10SB080002	10/10	---	15.7	No	**7**	N	13000	950	No	BKG
7440-09-7	POTASSIUM	321	J	506	J	mg/kg	10SB050002	2/10	401 - 493	506	No	NA		NA	NA	No	NUT
7440-62-2	VANADIUM	4.4		26.6	J	mg/kg	10SB090002	10/10	---	26.6	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	ZINC	19.8	J	50	J	mg/kg	10SB090002	10/10	---	50	No	620	N	NA	14000	No	BSL,BKG

SWMU 10 - TABLE 2.2

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface Soil
Exposure Point: Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater	USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
MISCELLANEOUS PARAMETERS																
	CATION EXCHANGE CAPACITY	1.5	J	10	J	meq/100 g	10SB020002	2/2	---	10	NA	NA	NA	NA	No	NTX
	pH	8	J	8.5	J	S.U.	10SB080002	2/2	---	8.5	NA	NA	NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1600		1900		mg/kg	10SB020002	2/2	---	1900	NA	NA	NA	NA	No	NTX

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to groundwater (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Associated Samples:

10SB010002	10SB060002
10SB020002	10SB070002
10SB030002	10SB080002
10SB040002	10SB090002
10SB050002	10SB100002

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 10 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
Semi-Volatiles																	
83-32-9	ACENAPHTHENE	0.011		0.011		mg/kg	10SB030810	1/2	0.038	0.011	NA	370	N	9500	IDEM	No	BSL
208-96-8	ACENAPHTHYLENE	0.47	J	0.47	J	mg/kg	10SB030002	1/2	0.008	0.47	NA	370(7)	N	9500(7)	IDEM	No	BSL
120-12-7	ANTHRACENE	0.11	J	0.11	J	mg/kg	10SB030002	1/2	0.008	0.11	NA	2200	N	47000	IDEM	No	BSL
56-55-3	BENZO(A)ANTHRACENE	0.53	J	0.53	J	mg/kg	10SB030002	1/2	0.008	0.53	NA	0.62	C	5	IDEM	No	BSL
50-32-8	**BENZO(A)PYRENE**	0.99	J	0.99	J	mg/kg	10SB030002	1/2	0.008	0.99	NA	**0.062**	C	**0.5**	IDEM	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.96	J	0.96	J	mg/kg	10SB030002	1/2	0.008	0.96	NA	**0.62**	C	5	IDEM	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.86	J	0.86	J	mg/kg	10SB030002	1/2	0.008	0.86	NA	230(8)	N	5500(8)	IDEM	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.74	J	0.74	J	mg/kg	10SB030002	1/2	0.008	0.74	NA	6.2	C	50	IDEM	No	BSL
218-01-9	CHRYSENE	0.56	J	0.56	J	mg/kg	10SB030002	1/2	0.008	0.56	NA	62	C	500	IDEM	No	BSL
117-84-0	DI-N-OCTYL PHTHALATE	1		1		mg/kg	10SB030810	1/2	0.38	1.4	NA	240	N	3700	IDEM	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.2	J	0.2	J	mg/kg	10SB030002	1/2	0.008	0.2	NA	**0.062**	C	0.5	IDEM	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.4	J	0.4	J	mg/kg	10SB030002	1/2	0.008	0.37	NA	230	N	6300	IDEM	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.61	J	0.61	J	mg/kg	10SB030002	1/2	0.008	0.61	NA	0.62	C	5	IDEM	No	BSL
85-01-8	PHENANTHRENE	0.13	J	0.13	J	mg/kg	10SB030002	1/2	0.008	0.13	NA	230(8)	N	5500(8)	IDEM	No	BSL
129-00-0	PYRENE	0.39	J	0.39	J	mg/kg	10SB030002	1/2	0.008	0.39	NA	230	N	5500	IDEM	No	BSL
Explosives																	
35572-78-2	**2-AMINO-4,6-DINITROTOLUENE**	0.53		0.53		mg/kg	10SB090002	1/20	0.5	0.53	NA	**0.47(9)**	N	NA	IDEM	**Yes**	**ASL**
2691-41-0	HMX	0.57		55		mg/kg	10SB050002	6/20	0.5	55	NA	310	N	NA	IDEM	No	BSL
121-82-4	**RDX**	1.6		8		mg/kg	10SB030002	2/20	0.5	8	NA	**4.4**	C	NA	IDEM	**Yes**	**ASL**
Inorganics																	
7429-90-5	ALUMINUM	1530	J	12200	J	mg/kg	10SB050002	20/20	---	12200	No	**7600**	N	NA	IDEM	No	BKG
7440-36-0	ANTIMONY	1		1.4		mg/kg	10SB050406	2/20	0.75 - 1	1.4	No	3.1	N	140	IDEM	No	BSL,BKG
7440-38-2	ARSENIC	0.09	J	12.2	J	mg/kg	10SB090204	20/20	---	12.2	No	**0.39**	C	**3.9**	IDEM	No	BKG
7440-39-3	BARIUM	21.1	J	122	J	mg/kg	10SB020709	20/20	---	122	No	540	N	23000	IDEM	No	BSL,BKG
7440-41-7	BERYLLIUM	1	J	1	J	mg/kg	10SB050002	1/20	0.57 - 0.99	1	No	15	N	680	IDEM	No	BSL,BKG
7440-43-9	CADMIUM	1	J	3.4	J	mg/kg	10SB020002	2/20	0.57 - 0.99	3.4	No	3.7	N	12	IDEM	No	BSL,BKG
7440-70-2	CALCIUM	525	J	249000	J	mg/kg	10SB080002	18/20	408 - 457	249000	**Yes**	NA		NA	IDEM	No	NUT
7440-47-3	CHROMIUM	5.0		27.6		mg/kg	10SB090204	20/20	---	27.6	No	30(10)	C	430(10)	IDEM	No	BSL,BKG
7440-48-4	COBALT	1.5		20.6		mg/kg	10SB090204	20/20	---	20.6	No	140	N	NA	IDEM	No	BSL,BKG
7440-50-8	COPPER	2		12.3	J	mg/kg	10SB020002	20/20	---	12.3	No	310	N	13000	IDEM	No	BSL,BKG
7439-89-6	IRON	2000	J	36600	J	mg/kg	10SB090204	20/20	---	36600	No	**2300**	N	NA	IDEM	No	BKG
7439-92-1	LEAD	4.2	J	25.1		mg/kg	10SB090002	20/20	---	25.1	No	400(11)	N	400	IDEM	No	BSL,BKG
7439-95-4	MAGNESIUM	819	J	14700	J	mg/kg	10SB080002	20/20	---	14700	**Yes**	NA		NA	IDEM	No	NUT
7439-96-5	MANGANESE	18.8	J	1260	J	mg/kg	10SB020709	20/20	---	1260	No	**180**	N	NA	IDEM	No	BKG
7439-97-6	MERCURY	0.03		0.05		mg/kg	3020709,10SB09	6/20	0.03 - 0.05	0.05	No	2.3(12)	N	55	IDEM	No	BSL,BKG
7440-02-0	NICKEL	5.1		15.7		mg/kg	10SB080002	20/20	---	15.7	No	160	N	6900	IDEM	No	BSL,BKG
7440-09-7	POTASSIUM	321	J	513	J	mg/kg	10SB080406	3/20	401 - 493	513	No	NA		NA	IDEM	No	NUT, BKG
7440-62-2	VANADIUM	2.6	J	33.8	J	mg/kg	10SB090204	20/20	---	33.8	No	55	N	NA	IDEM	No	BSL,BKG
7440-66-6	ZINC	7.1	J	50	J	mg/kg	10SB090002	20/20	---	50	No	2300	N	100000	IDEM	No	BSL,BKG
Miscellaneous Parameters																	
	CATION EXCHANGE CAPACITY	1.5	J	10	J	meq/100 g	1020002, 10SB04	7/7	---	10	NA	NA		NA	IDEM	No	NTX
	pH	5.2	J	8.5	J	S.U.	3080002,10SB08	7/7	---	8.5	NA	NA		NA	IDEM	No	NTX
	TOTAL ORGANIC CARBON	1600		3200		mg/kg	10SB090204	6/7	1000	3200	NA	NA		NA	IDEM	No	NTX

SWMU 10 - TABLE 2.3

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SURFACE/SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	Risk-Based COPC Screening Level (5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Acenaphthene is used as a surrogate for acenaphthylene.
8 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.
9 Value is for aminodinitrotoluenes (U.S. EPA, Region 3, October 2001)
10 Hexavalent chromium.
11 OSWER soil screening level for residential land use (U.S. EPA, July 1994)
12 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001)

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

Associated Sample:

10SB010002	10SB060002	10SB090204	10SB050406
10SB020002	10SB070002	10SB010810	10SB060507
10SB030002	10SB080002	10SB020709	10SB070406
10SB040002	10SB090002	10SB030810	10SB080406
10SB050002	10SB100002	10SB040305	10SB100608

SWMU 10 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface/Subsurface Soil
Exposure Point: Surface/Subsurface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Site Above Background ? (4)	USEPA Generic SSL for Migration to Groundwater		USEPA Generic SSL for Soil to Air (5)	IDEM SSL for Migration to Groundwater (6)	COPC Flag	Rationale for Contaminant Deletion or Selection (7)
SEMIVOLATILE ORGANICS																	
83-32-9	ACENAPHTHENE	0.011		0.011		mg/kg	10SB030810	1/2	0.038	0.011	NA	29	N	NA	130	No	BSL
208-96-8	ACENAPHTHYLENE	0.47	J	0.47	J	mg/kg	10SB030002	1/2	0.008	0.47	NA	29(8)	N	NA	130(8)	No	BSL
120-12-7	ANTHRACENE	0.11	J	0.11	J	mg/kg	10SB030002	1/2	0.008	0.11	NA	590	N	NA	51	No	BSL
56-55-3	**BENZO(A)ANTHRACENE**	0.53	J	0.53	J	mg/kg	10SB030002	1/2	0.008	0.53	NA	**0.08**	C	NA	19	**Yes**	**ASL**
50-32-8	**BENZO(A)PYRENE**	0.99	J	0.99	J	mg/kg	10SB030002	1/2	0.008	0.99	NA	**0.4**	C	NA	8.2	**Yes**	**ASL**
205-99-2	**BENZO(B)FLUORANTHENE**	0.96	J	0.96	J	mg/kg	10SB030002	1/2	0.008	0.96	NA	**0.2**	C	NA	57	**Yes**	**ASL**
191-24-2	BENZO(G,H,I)PERYLENE	0.86	J	0.86	J	mg/kg	10SB030002	1/2	0.008	0.86	NA	210(9)	N	NA	570(9)	No	BSL
207-08-9	BENZO(K)FLUORANTHENE	0.74	J	0.74	J	mg/kg	10SB030002	1/2	0.008	0.74	NA	2	C	NA	39	No	BSL
218-01-9	CHRYSENE	0.56	J	0.56	J	mg/kg	10SB030002	1/2	0.008	0.56	NA	8	C	NA	25	No	BSL
117-84-0	DI-N-OCTYL PHTHALATE	1.4		1.4		mg/kg	10SB030810	1/2	0.38	1.4	NA	10000	N	10000	67000	No	BSL
53-70-3	**DIBENZO(A,H)ANTHRACENE**	0.2	J	0.2	J	mg/kg	10SB030002	1/2	0.008	0.2	NA	**0.08**	C	NA	18	**Yes**	**ASL**
206-44-0	FLUORANTHENE	0.37	J	0.37	J	mg/kg	10SB030002	1/2	0.008	0.37	NA	210	N	NA	880	No	BSL
193-39-5	INDENO(1,2,3-CD)PYRENE	0.61	J	0.61	J	mg/kg	10SB030002	1/2	0.008	0.61	NA	0.7	C	NA	3.1	No	BSL
85-01-8	PHENANTHRENE	0.13	J	0.13	J	mg/kg	10SB030002	1/2	0.008	0.13	NA	210(9)	N	NA	570(9)	No	BSL
129-00-0	PYRENE	0.39	J	0.39	J	mg/kg	10SB030002	1/2	0.008	0.39	NA	210	N	NA	570	No	BSL
EXPLOSIVES																	
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	0.53		0.53		mg/kg	10SB090002	1/20	0.5	0.53	NA	NA	N	NA	NA	No	NTX
2691-41-0	HMX	0.57		55		mg/kg	10SB050002	6/20	0.5	55	NA	NA	N	NA	NA	No	NTX
121-82-4	RDX	1.6		8		mg/kg	10SB030002	2/20	0.5	8	NA	NA	C	NA	NA	No	NTX
INORGANICS																	
7429-90-5	ALUMINUM	1530	J	12200	J	mg/kg	10SB050002	20/20	---	12200	No	NA	N	NA	NA	No	NTX, BKG
7440-36-0	ANTIMONY	1		1.4		mg/kg	10SB050406	2/20	0.75 - 1	1.4	No	**0.3**	N	NA	5.4	No	BKG
7440-38-2	ARSENIC	0.09	J	12.2	J	mg/kg	10SB090204	20/20	---	12.2	No	**1**	C	750	29	No	BKG
7440-39-3	BARIUM	21.1	J	122	J	mg/kg	10SB020709	20/20	---	122	No	**82**	N	690000	1600	No	BKG
7440-41-7	BERYLLIUM	1	J	1	J	mg/kg	10SB050002	1/20	0.57 - 0.99	1	No	3	N	1300	63	No	BSL,BKG
7440-43-9	CADMIUM	1	J	3.4	J	mg/kg	10SB020002	2/20	0.57 - 0.99	3.4	No	**0.4**	N	1800	7.5	No	BKG
7440-70-2	CALCIUM	525	J	249000	J	mg/kg	10SB080002	18/20	408 - 457	249000	**Yes**	NA		NA	NA	No	NUT
7440-47-3	CHROMIUM	5		27.6		mg/kg	10SB090204	20/20	---	27.6	No	**2**	C	270	38	No	BKG
7440-48-4	COBALT	1.5		20.6		mg/kg	10SB090204	20/20	---	20.6	No	NA	N	NA	NA	No	NTX, BKG
7440-50-8	COPPER	2		12.3	J	mg/kg	10SB020002	20/20	---	12.3	No	NA	N	NA	580	No	BSL,BKG
7439-89-6	IRON	2000	J	36600	J	mg/kg	10SB090204	20/20	---	36600	No	NA	N	NA	NA	No	NTX, BKG
7439-92-1	LEAD	4.2	J	25.1		mg/kg	10SB090002	20/20	---	25.1	No	NA	N	NA	81	No	BSL,BKG
7439-95-4	MAGNESIUM	819	J	14700	J	mg/kg	10SB080002	20/20	---	14700	**Yes**	NA		NA	NA	No	NUT
7439-96-5	MANGANESE	18.8	J	1260	J	mg/kg	10SB020709	20/20	---	1260	No	NA	N	NA	NA	No	NTX, BKG
7439-97-6	MERCURY	0.03		0.05		mg/kg	3020709,10SB09	6/20	0.03 - 0.05	0.05	No	0.1	N	10	2.1	No	BSL,BKG
7440-02-0	NICKEL	5.1		15.7		mg/kg	10SB080002	20/20	---	15.7	No	**7**	N	13000	950	No	BKG
7440-09-7	POTASSIUM	321	J	513	J	mg/kg	10SB080406	3/20	401 - 493	513	No	NA		NA	NA	No	NUT
7440-62-2	VANADIUM	2.6	J	33.8	J	mg/kg	10SB090204	20/20	---	33.8	No	300	N	NA	NA	No	BSL,BKG
7440-66-6	ZINC	7.1	J	50	J	mg/kg	10SB090002	20/20	---	50	No	620	N	NA	14000	No	BSL,BKG
MISCELLANEOUS PARAMETERS																	
	CATION EXCHANGE CAPACITY	1.5	J	10	J	meq/100 g	020002, 10SB04	7/7	---	10	NA	NA		NA	NA	No	NTX
	pH	5.2	J	8.5	J	S.U.	080002,10SB08	7/7	---	8.5	NA	NA		NA	NA	No	NTX
	TOTAL ORGANIC CARBON	1600		3200		mg/kg	10SB090204	6/7	1000	3200	NA	NA		NA	NA	No	NTX

SWMU 10 - TABLE 2.4

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - MIGRATION PATHWAYS FROM SURFACE/SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, soil concentrations were compared to base-wide background data presented in the Basewide Background Soil Investigation Report (TtNUS, Inc., January 2001) by means of the Wilcoxon Rank Sum Test. If the Wilcoxon Test determined that a constituent concentration was not significanty different from background, that chemical was not selected as a COPC.
5 Soil Screening Guidance: Technical Background Document. (U.S. EPA, May 1996). The migration to groundwater value represents a dilution and attenuation factor (DAF) of 1.
6 Residential levels for migration from soil to groundwater (IDEM, July 2001).
7 The chemical is selected as a COPC if the maximum detected concentration exceeds any screening level.
8 Acenaphthene is used as a surrogate for acenaphthylene.
9 Pyrene is used as a surrogate for benzo(g,h,i)perylene and phenanthrene.

Associated Samples:

10SB010002	10SB090204
10SB020002	10SB010810
10SB030002	10SB020709
10SB040002	10SB030810
10SB050002	10SB040305
10SB060002	10SB050406
10SB070002	10SB060507
10SB080002	10SB070406
10SB090002	10SB080406
10SB100002	10SB100608

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for migration from soil to groundwater (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 10 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
EXPLOSIVES																
99-35-4	1,3,5-TRINITROBENZENE	2.7	J	3.5	J	µg/L	10GW1701	2/17	0.29 - 1.7	3.5	NA	110 N	NA NA	FED-MCL IDEM	No	BSL
118-96-7	**2,4,6-TRINITROTOLUENE**	5.8	J	56	J	µg/L	10GWC5501	3/17	0.29 - 1.7	56	NA	**2.2** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
606-20-2	**2,6-DINITROTOLUENE**	1.5		1.5		µg/L	10GWC5501	1/17	0.29 - 1.7	1.5	NA	3.6 N	NA **1.3**	FED-MCL IDEM	**Yes**	**ASL**
35572-78-2	**2-AMINO-4,6-DINITROTOLUENE**	2.8		20		µg/L	10GW1701	3/17	0.29 - 1.7	20	NA	**0.22(7)** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
19406-51-0	**4-AMINO-2,6-DINITROTOLUENE**	1.7	J	18		µg/L	10GW1701	4/17	0.29 - 1.7	18	NA	**0.22(7)** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
2691-41-0	**HMX**	12		240		µg/L	10GW1701	4/17	0.29 - 1.7	240	NA	**180** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
121-82-4	**RDX**	4.9		240		µg/L	10GWC5501	4/17	0.29 - 1.7	240	NA	**0.61** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
INORGANICS																
7429-90-5	**ALUMINUM**	461	J	22300	J	µg/L	10GW1601	5/17	200	22300	ND	**3600** N	**50 to 200(8)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.18		5.1		µg/L	10GWC33P201	9/17	1	5.1	ND	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	7.9		104		µg/L	10GW1701	17/17	0	104	**17.9**	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-41-7	**BERYLLIUM**	1.6		20.3		µg/L	10GW1601	4/17	1	20.3	ND	**7.3** N	**4** **4**	FED-MCL IDEM	**Yes**	**ASL**
7440-43-9	**CADMIUM**	4.5		4.5		µg/L	10GW1601	1/17	1	4.5	ND	**1.8** N	5 5	FED-MCL IDEM	**Yes**	**ASL**
7440-70-2	CALCIUM	26100		337000		µg/L	10GWC31P301	15/17	5000	337000	**17000**	NA	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	**COBALT**	7.8		299		µg/L	10GW1601	11/17	3	299	ND	**73** N	NA NA	FED-AL IDEM	**Yes**	**ASL**
7440-50-8	COPPER	2.1		34.8		µg/L	10GWC41P301	6/17	2	34.8	ND	150 N	1300 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	167		93700		µg/L	10GWC3501	16/17	100	93700	**22000**	**1100** N	**300(8)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-92-1	LEAD	1.2		13.4		µg/L	10GW1601	2/17	1	13.4	ND	15	15 NA	FED-MCL IDEM	No	BSL
7439-95-4	MAGNESIUM	5370	J	326000	J	µg/L	10GWC31P301	15/17	5000	326000	**11800**	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	176		21800		µg/L	10GWC31P301	15/17	15	21800	**897**	**88** N	**50(8)** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-97-6	MERCURY	0.2		0.2		µg/L	10GW1701	1/17	0.2	0.2	ND	1.1(9) N	2 2	FED-MCL IDEM	No	BSL
7440-02-0	**NICKEL**	12		695		µg/L	10GWC31P301	12/17	10	695	ND	**73** N	NA 730	FED-MCL IDEM	**Yes**	**ASL**
7440-09-7	POTASSIUM	8150	J	10200	J	µg/L	10GWC4101	4/17	5000	10200	ND	NA	NA NA	FED-MCL IDEM	No	NUT
7782-49-2	SELENIUM	1.3	J	9.3		µg/L	10GWC41P301	7/17	1	9.3	ND	18 N	50 50	FED-MCL IDEM	No	BSL
7440-23-5	SODIUM	6870	J	252000		µg/L	10GWC41P301	16/17	5000	252000	**15700**	NA	NA NA	FED-MCL IDEM	No	NUT
7440-28-0	**THALLIUM**	1.2		1.2		µg/L	10GW1601	1/17	1	1.2	ND	**0.24** N	2 2	FED-MCL IDEM	**Yes**	**ASL**
7440-66-6	**ZINC**	11.8		1660		µg/L	10GW1601	12/17	10	1660	ND	**1100** N	5000 11000	FED-MCL IDEM	**Yes**	**ASL**

SWMU 10 - TABLE 2.5

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - GROUND WATER
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
FILTERED METALS																
7440-39-3	BARIUM, FILTERED	27.5		27.5		µg/L	10GWC5701-F	1/1	---	27.5	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM, FILTERED	33400		33400		µg/L	10GWC5701-F	1/1	5000	33400	NA	NA	NA NA	FED-MCL IDEM	No	NUT
7440-48-4	COBALT, FILTERED	31.3		31.3		µg/L	10GWC5701-F	1/1	3	31.3	NA	73 N	NA NA	FED-AL IDEM	No	BSL
7439-89-6	**IRON, FILTERED**	3510		3510		µg/L	10GWC5701-F	1/1	100	3510	NA	**1100** N	**300** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM, FILTERED	24600	J	24600	J	µg/L	10GWC5701-F	1/1	5000	24600	NA	NA	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE, FILTERED**	3940		3940		µg/L	10GWC5701-F	1/1	15	3940	NA	**88** N	**50** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-02-0	**NICKEL, FILTERED**	89.2		89.2		µg/L	10GWC5701-F	1/1	10	89.2	NA	**73** N	NA 730	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM, FILTERED	22400	J	22400	J	µg/L	10GWC5701-F	1/1	5000	22400	NA	NA	NA NA	FED-MCL IDEM	No	NUT
7440-66-6	ZINC, FILTERED	114		114		µg/L	10GWC5701-F	1/1	10	114	NA	1100 N	5000 11000	FED-MCL IDEM	No	BSL
MISCELLANEOUS PARAMETERS																
14797-55-8	NITRATE	40		300		µg/L	10GW0201	5/5	---	300	NA	1000 N	10000 NA	FED-MCL IDEM	No	BSL
	NITRITE/NITRATE	90		400		µg/L	10GW1701	3/12	10 - 250	400	NA	1000 N	NA NA	FED-MCL IDEM	No	BSL

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 To determine whether metal concentrations were within background levels, maximum groundwater concentrations were compared to concentrations in upgradient groundwater sample 10GWC5201. If the concentration in the site groundwater concentration was less than the upgradient concentration, that metal was not selected as a COPC.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a targetHzard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Value is for aminodinitrotoluenes (U.S. EPA, Region 3, October 2001).
8 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).
9 Value is for mercuric chloride (U.S. EPA, Region 3, October 2001).

Associated Samples:

10GW0201	10GWC3501	10GWC26F	10GWC41P301
10GW0301	10GWC35P201	10GWC31C	10GWC5501
10GW1601	10GWC3701	10GWC31F	10GWC55P201
10GW1701	10GWC37P301	10GWC33C	10GWC5701
10GWC2601	10GWC4101	10GWC33F	10GWC5701-F

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001).

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 10 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
EXPLOSIVES																
118-96-7	**2,4,6-TRINITROTOLUENE**	1.6		4.4		µg/L	10SW0701	3/12	0.53 - 1.3	4.4	NA	**2.2** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
35572-78-2	**2-AMINO-4,6-DINITROTOLUENE**	0.41	J	0.41	J	µg/L	10SW0401	1/12	0.36 - 1.3	0.41	NA	**0.22** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
19406-51-0	**4-AMINO-2,6-DINITROTOLUENE**	0.96	J	1.4		µg/L	10SW0701	3/12	0.53 - 1.3	1.4	NA	**0.22** N	NA NA	FED-MCL IDEM	**Yes**	**ASL**
2691-41-0	HMX	6.4		22		µg/L	10SW0701	7/12	0.82 - 1.2	22	NA	180 N	NA NA	FED-MCL IDEM	No	BSL
121-82-4	**RDX**	1.9		18		µg/L	10SW0701	7/12	0.82 - 1.2	18	NA	**0.61** C	NA NA	FED-MCL IDEM	**Yes**	**ASL**
INORGANICS																
7429-90-5	**ALUMINUM**	213	J	837	J	µg/L	10SW0801	11/12	200	837	NA	3600 N	**50 to 200(8)** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-38-2	**ARSENIC**	0.24		1.8		µg/L	10SW0901	12/12	---	1.8	NA	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	24.1		86.4		µg/L	10SW0901	12/12	---	86.4	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM	6540		85900		µg/L	10SW0901	12/12	---	85900	NA	NA	NA NA	FED-MCL IDEM	No	NUT
7440-50-8	COPPER	2		2		µg/L	10SW0901	1/12	2	2	NA	150 N	1000 1300	FED-MCL IDEM	No	BSL
7439-89-6	**IRON**	181	J	1120	J	µg/L	10SW1101	12/12	---	1120	NA	**1100** N	**300** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM	7560	J	11100	J	µg/L	10SW0901	2/12	5000	11100	NA	NA N	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE**	25.7	J	125	J	µg/L	10SW0801	10/12	15	125	NA	**88** N	**50** NA	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM	5100	J	110000	J	µg/L	10SW0901	10/12	5000	110000	NA	NA	NA NA	FED-AL IDEM	No	NUT
7440-66-6	ZINC	11.2		113		µg/L	10SW0901	2/12	10	113	NA	1100 N	5000 11000	FED-MCL IDEM	No	BSL
FILTERED METALS																
7440-36-0	ANTIMONY, FILTERED	1		1		µg/L	10SW0101-F	1/12	1	1	NA	1.5 N	6 NA	FED-MCL IDEM	No	BSL
7440-38-2	**ARSENIC, FILTERED**	0.17		1.6		µg/L	10SW0901-F	12/12	---	1.6	NA	**0.045** C	50 50	FED-MCL IDEM	**Yes**	**ASL**
7440-39-3	BARIUM, FILTERED	23.1		80.3		µg/L	10SW0901-F	12/12	---	80.3	NA	260 N	2000 2000	FED-MCL IDEM	No	BSL
7440-70-2	CALCIUM, FILTERED	6360		80100		µg/L	10SW0901-F	12/12	---	80100	NA	NA N	NA NA	FED-MCL IDEM	No	NUT
7439-89-6	**IRON, FILTERED**	111		962		µg/L	10SW1101-F	11/12	100	962	NA	1100 N	**300** NA	FED-MCL IDEM	**Yes**	**ASL**
7439-95-4	MAGNESIUM, FILTERED	7260	J	10400	J	µg/L	10SW0901-F	2/12	5000	10400	NA	NA N	NA NA	FED-MCL IDEM	No	NUT
7439-96-5	**MANGANESE, FILTERED**	16.8		139		µg/L	10SW1101-F	8/12	15	139	NA	**88** N	**50**	FED-MCL IDEM	**Yes**	**ASL**
7440-23-5	SODIUM, FILTERED	5280	J	106000	J	µg/L	10SW0901-F	10/12	5000	106000	NA	NA C	NA NA	FED-MCL IDEM	No	NUT
7440-66-6	ZINC, FILTERED	10.3		102		µg/L	10SW0901-F	2/12	10	102	NA	1100 N	5000 11000	FED-MCL IDEM	No	BSL

SWMU 10 - TABLE 2.6

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects(2)	Concentration Used for Screening(3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level(5)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection(6)
MISCELLANEOUS PARAMETERS																
	HARDNESS	27		260		µg/L	10SW0901	12/12	---	260	NA	NA	N N	FED-MCL IDEM	No	BSL
14797-55-8	NITRATE	0.09		1.6		µg/L	10SW0901	12/12	---	1.6	NA	1000 N	10000 N	FED-MCL IDEM	No	BSL
	TOTAL SUSPENDED SOLIDS	3	J	50	J	µg/L	10SW0901	10/12	2	50	NA	NA	N N	FED-MCL IDEM	No	BSL

Footnotes:

1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No upgradient locations could be determined for surface water at SWMU 10. Therefore, no constituents were eliminated on the basis of background.
5 The risk-based COPC screening level for tap water use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Value is for aminodinitrotoluenes (U.S. EPA, Region 3, October 2001).
8 Secondary MCL, based on aesthetic water quality (i.e., color, odor, taste, etc.).

Definitions:

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
J = Estimated value.
N = Noncarcinogen.
NA = Not analyzed / not applicable.
ND = Not detected.
FED-AL = Federal action level (U.S. EPA, 2000).
FED-MCL = Federal Maximum Contaminant Level (U.S. EPA, 2000).
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential closure levels for groundwater (IDEM, July 2001).

Associated Samples:

10SW0101	10SW0501	10SW0901
10SW0101-F	10SW0501-F	10SW0901-F
10SW0201	10SW0601	10SW1001
10SW0201-F	10SW0601-F	10SW1001-F
10SW0301	10SW0701	10SW1101
10SW0301-F	10SW0701-F	10SW1101-F
10SW0401	10SW0801	10SW1201
10SW0401-F	10SW0801-F	10SW1201-F

Rationale Codes:

For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.
For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 10 - TABLE 2.7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Sediment
Exposure Point: Sediment

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (1)	Range of Nondetects (2)	Concentration Used for Screening (3)	Upgradient Sample Concentration (4)	Risk-Based COPC Screening Level (5)		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
EXPLOSIVES																	
2691-41-0	HMX	51		51		mg/kg	10SD070006	1/12	0.5 - 0.5	51	NA	310	N	NA	IDEM	No	BSL
INORGANICS																	
7429-90-5	**ALUMINUM**	4430		9190		mg/kg	10SD080006	12/12	---	9190	NA	**7600**	N	NA	IDEM	**Yes**	**ASL**
7440-36-0	ANTIMONY	1.4		2.2		mg/kg	10SD050006	3/12	0.98 - 1.2	2.2	NA	3.1	N	140	IDEM	No	BSL
7440-38-2	**ARSENIC**	3.1	J	34.2	J	mg/kg	10SD040006	12/12	---	34.2	NA	**0.39**	C	**3.9**	IDEM	**Yes**	**ASL**
7440-39-3	BARIUM	45.2	J	276	J	mg/kg	10SD120006	12/12	---	276	NA	540	N	23000	IDEM	No	BSL
7440-41-7	BERYLLIUM	1.4	J	2.1	J	mg/kg	10SD080006	5/12	0.98 - 1.2	2.1	NA	15	N	680	IDEM	No	BSL
7440-43-9	CADMIUM	1.3	J	2.4	J	mg/kg	10SD070006	4/12	0.98 - 1.2	2.4	NA	3.7	N	12	IDEM	No	BSL
7440-70-2	CALCIUM	564		5920		mg/kg	10SD090006	12/12	---	5920	NA	NA		NA	IDEM	No	NUT
7440-47-3	**CHROMIUM**	9.0	J	65.7	J	mg/kg	10SD040006	12/12	---	65.7	NA	**30(7)**	C	430(7)	IDEM	**Yes**	**ASL**
7440-48-4	COBALT	6	J	51.8	J	mg/kg	10SD080006	12/12	---	51.8	NA	140	N	NA	IDEM	No	BSL
7440-50-8	COPPER	7.5	J	16.9	J	mg/kg	10SD080006	12/12	---	16.9	NA	310	N	13000	IDEM	No	BSL
7439-89-6	**IRON**	12100	J	71100	J	mg/kg	10SD040006	12/12	---	71100	NA	**2300**	N	NA	IDEM	**Yes**	**ASL**
7439-92-1	LEAD	13.3	J	37	J	mg/kg	10SD040006	12/12	---	37	NA	400(8)	N	400	IDEM	No	BSL
7439-95-4	MAGNESIUM	613		1590		mg/kg	10SD090006	8/12	487 - 607	1590	NA	NA		NA	IDEM	No	NUT
7439-96-5	**MANGANESE**	165	J	3900	J	mg/kg	10SD120006	12/12	---	3900	NA	**180**	N	NA	IDEM	**Yes**	**ASL**
7439-97-6	MERCURY	0.04	J	0.05	J	mg/kg	10SD040006	2/12	0.03 - 0.07	0.05	NA	2.3	N	55	IDEM	No	BSL
7440-02-0	NICKEL	7.5	J	44.6	J	mg/kg	10SD080006	12/12	---	44.6	NA	160	N	6900	IDEM	No	BSL
7440-62-2	**VANADIUM**	13.2	J	63.2	J	mg/kg	10SD040006	12/12	---	63.2	NA	**55**	N	NA	IDEM	**Yes**	**ASL**
7440-66-6	ZINC	36.5	J	301	J	mg/kg	10SD090006	12/12	---	301	NA	2300	N	100000	IDEM	No	BSL
MISCELLANEOUS PARAMETERS																	
	TOTAL ORGANIC CARBON	4000	J	22000	J	mg/kg	10SD010006	12/12	---	22000	NA	NA		NA	IDEM	No	NTX

SWMU 10 - TABLE 2.7

OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - DIRECT CONTACT WITH SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, CRANE, INDIANA

Footnotes:
1 Only the original of duplicate sample was used for COPC selection. The duplicate was used for quality control purposes only.
2 Values presented are sample-specific quantitation limits.
3 The maximum detected concentration is used for screening purposes.
4 No upgradient locations could be determined for surface water at SWMU 10. Therefore, no constituents were eliminated on the basis of background.
5 The risk-based soil COPC screening level for residential land use is presented. The value is based on a target Hazard Quotient of 0.1 for noncarcinogens (denoted with a "N" flag) or an incremental cancer risk of 1E-6 for carcinogens (denoted with a "C" flag) (U.S. EPA, Region 9, October 2002).
6 The chemical is selected as a COPC if the maximum detected concentration exceeds the risk-based COPC screening level and/or an ARAR/TBC(s).
7 Hexavalent chromium.
8 OSWER soil screening level for residential land use (U.S. EPA, July 1994).

Associated Samples:

10SD010006	10SD070006
10SD020006	10SD080006
10SD030006	10SD090006
10SD040006	10SD100006
10SD050006	10SD110006
10SD060006	10SD120006

Definitions:
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/to be considered.
C = Carcinogen.
CAS = Chemical abstract services.
COPC = Chemical of potential concern.
IDEM = Indiana Department of Environmental Management, Risk Integrated System of Closure (RISC) residential levels for direct contact with soil (IDEM, July 2001).
J = Estimated value.
N = Noncarcinogen.
NA = Not applicable/not available.
sat = Soil saturation concentration.

Rationale Codes:
For Selection as a COPC:
ASL = Above COPC screening level/ARAR/TBC.

For Elimination as a COPC:
BKG = Within background levels.
BSL = Below COPC screening level/ARAR/TBC.
NTX = No toxicity information.
NUT = Essential nutrient.

Shaded cells indicate that the specified criterion or background level has been exceeded or that the chemical has been selected as a COPC.

SWMU 10 - TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BENZO(A)ANTHRACENE	mg/kg	5.30E-01	NA	5.30E-01	J	mg/kg	5.30E-01	Maximum	N<10(1)	5.30E-01	Maximum	N<10(1)
BENZO(A)PYRENE	mg/kg	9.90E-01	NA	9.90E-01	J	mg/kg	9.90E-01	Maximum	N<10(1)	9.90E-01	Maximum	N<10(1)
BENZO(B)FLUORANTHENE	mg/kg	9.60E-01	NA	9.60E-01	J	mg/kg	9.60E-01	Maximum	N<10(1)	9.60E-01	Maximum	N<10(1)
DIBENZO(A,H)ANTHRACENE	mg/kg	2.00E-01	NA	2.00E-01	J	mg/kg	2.00E-01	Maximum	N<10(1)	2.00E-01	Maximum	N<10(1)
2-AMINO-4,6-DINITROTOLUENE	mg/kg	2.78E-01	NA	5.30E-01		mg/kg	3.23E-01	95% UCL-T	W - Test (2)	3.23E-01	95% UCL-T	W - Test (2)
RDX	mg/kg	1.16E+00	NA	8.00E+00		mg/kg	3.42E+00	95% UCL-T	W - Test (2)	3.42E+00	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface soil samples collected. Therefore, maximum concentration is used for the exposure point concentration.
(2) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.

SWMU 10 - TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface / Subsurface Soil
Exposure Medium: Surface / Subsurface Soil
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BENZO(A)ANTHRACENE	mg/kg	2.67E-01	NA	5.30E-01	J	mg/kg	5.30E-01	Maximum	N<10(1)	5.30E-01	Maximum	N<10(1)
BENZO(A)PYRENE	mg/kg	4.97E-01	NA	9.90E-01	J	mg/kg	9.90E-01	Maximum	N<10(1)	9.90E-01	Maximum	N<10(1)
BENZO(B)FLUORANTHENE	mg/kg	4.82E-01	NA	9.60E-01	J	mg/kg	9.60E-01	Maximum	N<10(1)	9.60E-01	Maximum	N<10(1)
DIBENZO(A,H)ANTHRACENE	mg/kg	1.02E-01	NA	2.00E-01	J	mg/kg	2.00E-01	Maximum	N<10(1)	2.00E-01	Maximum	N<10(1)
2-AMINO-4,6-DINITROTOLUENE	mg/kg	2.64E-01	NA	5.30E-01		mg/kg	2.82E-01	95% UCL-T	W - Test (2)	2.82E-01	95% UCL-T	W - Test (2)
RDX	mg/kg	7.05E-01	NA	8.00E+00		mg/kg	7.59E-01	95% UCL-T	W - Test (2)	7.59E-01	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Less than 10 surface soil samples collected. Therefore, maximum concentration is used for the exposure point concentration.
(2) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.

SWMU 10 - TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2-AMINO-4,6-DINITROTOLUEN	mg/L	2.06E-03	NA	2.00E-02		mg/L	4.06E-03	95% UCL-T	W - Test (1)	4.06E-03	95% UCL-T	W - Test (1)
4-AMINO-2,6-DINITROTOLUEN	mg/L	2.52E-03	NA	1.80E-02		mg/L	6.49E-03	95% UCL-T	W - Test (1)	6.49E-03	95% UCL-T	W - Test (1)
2,4,6-TRINITROTOLUENE	mg/L	4.20E-04	NA	1.50E-03	J	mg/L	5.48E-04	95% UCL-T	W - Test (1)	5.48E-04	95% UCL-T	W - Test (1)
2,6-DINITROTOLUENE	mg/L	5.46E-03	NA	5.60E-02		mg/L	1.61E-02	95% UCL-T	W - Test (1)	1.61E-02	95% UCL-T	W - Test (1)
HMX	mg/L	2.39E-02	NA	2.40E-01		mg/L	2.40E-01	Maximum	W - Test (2)	2.40E-01	Maximum	W - Test (2)
RDX	mg/L	1.78E-02	NA	2.40E-01		mg/L	1.15E-01	95% UCL-T	W - Test (1)	1.15E-01	95% UCL-T	W - Test (1)
ALUMINUM	mg/L	1.96E+00	NA	2.23E+01	J	mg/L	7.13E+00	95% UCL-T	W - Test (1)	7.13E+00	95% UCL-T	W - Test (1)
ARSENIC	mg/L	1.05E-03	NA	5.10E-03		mg/L	1.70E-03	95% UCL-T	W - Test (3)	1.70E-03	95% UCL-T	W - Test (3)
BERYLLIUM	mg/L	2.21E-03	NA	2.03E-02		mg/L	3.44E-03	95% UCL-T	W - Test (1)	3.44E-03	95% UCL-T	W - Test (1)
CADMIUM	mg/L	7.35E-04	NA	4.50E-03		mg/L	8.65E-04	95% UCL-T	W - Test (1)	8.65E-04	95% UCL-T	W - Test (1)
COBALT	mg/L	6.53E-02	NA	2.99E-01		mg/L	2.99E-01	Maximum	W - Test (2)	2.99E-01	Maximum	W - Test (2)
IRON	mg/L	1.61E+01	NA	9.37E+01		mg/L	9.37E+01	Maximum	W - Test (2)	9.37E+01	Maximum	W - Test (2)
MANGANESE	mg/L	5.05E+00	NA	2.18E+01		mg/L	2.18E+01	Maximum	W - Test (2)	2.18E+01	Maximum	W - Test (2)
NICKEL	mg/L	1.66E-01	NA	6.95E-01		mg/L	6.95E-01	Maximum	W - Test (2)	6.95E-01	Maximum	W - Test (2)
THALLIUM	mg/L	5.41E-04	NA	1.20E-03		mg/L	5.93E-04	95% UCL-T	W - Test (1)	5.93E-04	95% UCL-T	W - Test (1)
ZINC	mg/L	2.12E-01	NA	1.66E+00		mg/L	1.66E+00	Maximum	W - Test (2)	1.66E+00	Maximum	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.
(2) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
(3) Shapiro-Wilk W Test indicates data are log-normally distributed.

SWMU 10 - TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
2-AMINO-4,6-DINITROTOLUEN	mg/L	4.37E-04	NA	4.10E-04	J	mg/L	4.10E-04	Maximum	W - Test (1)	4.10E-04	Maximum	W - Test (1)
4-AMINO-2,6-DINITROTOLUEN	mg/L	6.51E-04	NA	1.40E-03		mg/L	8.78E-04	95% UCL-T	W - Test (2)	8.78E-04	95% UCL-T	W - Test (2)
2,4,6-TRINITROTOLUENE	mg/L	1.08E-03	NA	4.40E-03		mg/L	2.00E-03	95% UCL-T	W - Test (3)	2.00E-03	95% UCL-T	W - Test (3)
RDX	mg/L	4.24E-03	NA	1.80E-02		mg/L	1.80E-02	Maximum	W - Test (1)	1.80E-02	Maximum	W - Test (1)
ALUMINUM	mg/L	3.50E-01	NA	8.37E-01	J	mg/L	4.93E-01	95% UCL-T	W - Test (2)	4.93E-01	95% UCL-T	W - Test (2)
ARSENIC	mg/L	5.08E-04	NA	1.80E-03		mg/L	7.07E-04	95% UCL-T	W - Test (3)	7.07E-04	95% UCL-T	W - Test (3)
IRON	mg/L	5.10E-01	NA	1.12E+00	J	mg/L	7.10E-01	95% UCL-T	W - Test (2)	7.10E-01	95% UCL-T	W - Test (2)
MANGANESE	mg/L	4.88E-02	NA	1.25E-01	J	mg/L	1.12E-01	95% UCL-T	W - Test (2)	1.12E-01	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) 95% UCL is greater than the maximum concentration. Therefore, the maximum concentration is used as the EPC.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.
(3) Shapiro-Wilk W Test indicates that the distrubution of the data is undefined. Best fit is a log-normal distribution.

SWMU 10 - TABLE 3.5
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY - SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency Exposure		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/kg	6.67E+03	NA	9.19E+03		mg/kg	7.43E+03	95% UCL-N	W - Test (1)	7.43E+03	95% UCL-N	W - Test (1)
ARSENIC	mg/kg	1.16E+01	NA	3.42E+01	J	mg/kg	1.98E+01	95% UCL-T	W - Test (2)	1.98E+01	95% UCL-T	W - Test (2)
CHROMIUM	mg/kg	2.35E+01	NA	6.57E+01	J	mg/kg	3.84E+01	95% UCL-T	W - Test (2)	3.84E+01	95% UCL-T	W - Test (2)
IRON	mg/kg	3.15E+04	NA	7.11E+04	J	mg/kg	4.86E+04	95% UCL-T	W - Test (2)	4.86E+04	95% UCL-T	W - Test (2)
MANGANESE	mg/kg	1.54E+03	NA	3.90E+03	J	mg/kg	3.69E+03	95% UCL-T	W - Test (2)	3.69E+03	95% UCL-T	W - Test (2)
VANADIUM	mg/kg	2.83E+01	NA	6.32E+01	J	mg/kg	3.92E+01	95% UCL-T	W - Test (2)	3.92E+01	95% UCL-T	W - Test (2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Shapiro-Wilk W Test indicates data are normally distributed.
(2) Shapiro-Wilk W Test indicates data are log-normally distributed.

TABLE 5.1
NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Oral RfD Units	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal RfD(2)	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ(3)
1,1-Dichloroethene	chronic	9.0E-03	mg/kg-day	1	9.00E-03	mg/kg-day	Liver	1,000	IRIS	11/20/01
Benzene	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day		NA	NCEA	09/25/01
Chloroform	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
cis-1,2-Dichloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Blood	NA	HEAST	07/97
Methylene Chloride	chronic	6.0E-02	mg/kg-day	1	6.00E-02	mg/kg-day	Liver	100	IRIS	11/20/01
Tetrachloroethene	chronic	1.0E-02	mg/kg-day	1	1.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Trichloroethene	chronic	6.0E-03	mg/kg-day	1	6.00E-03	mg/kg-day	CNS	NA	NCEA	09/25/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Vinyl Chloride	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Liver	30	IRIS	11/20/01
Naphthalene	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Body Weight	3,000	IRIS	11/20/01
Bis(2-ethylhexyl)phthalate	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Liver	1,000	IRIS	11/20/01
Aroclor-1254	chronic	2.0E-05	mg/kg-day	1	2.00E-05	mg/kg-day	Immunological, Nails	300	IRIS	11/20/01
Dieldrin	chronic	5.0E-05	mg/kg-day	1	5.00E-05	mg/kg-day	Liver	100	IRIS	11/20/01
Pentachlorophenol	chronic	3.0E-02	mg/kg-day	1	3.00E-02	mg/kg-day	Liver, Kidney	100	IRIS	11/20/01
2,4,6-Trinitrotoluene	chronic	5.0E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Liver	1,000	IRIS	11/20/01
2,6-Dinitrotoluene	chronic	1.0E-03	mg/kg-day	1	1.00E-03	mg/kg-day	Liver	NA	HEAST	07/97
2-Amino-4,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
4-Amino-2,6-dinitrotoluene	chronic	6.0E-05	mg/kg-day	1	6.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
HMX	chronic	5.2E-02	mg/kg-day	1	5.20E-02	mg/kg-day	Liver, Blood	1,000	IRIS	11/20/01
RDX	chronic	3.0E-03	mg/kg-day	1	3.00E-03	mg/kg-day	Prostate	100	IRIS	11/20/01
Aluminum	chronic	1.0E+00	mg/kg-day	1	1.00E+00	mg/kg-day	Immunological, Nails	300	NCEA	09/25/01
Antimony	chronic	4.0E-04	mg/kg-day	0.15	6.00E-05	mg/kg-day	Lifespan	1,000	IRIS	11/20/01
Arsenic	chronic	3.0E-04	mg/kg-day	1	3.00E-04	mg/kg-day	Skin, Vascular	3	IRIS	11/20/01
Barium	chronic	7.0E-02	mg/kg-day	0.07	4.90E-03	mg/kg-day	Blood	1,000	IRIS	11/20/01
Beryllium	chronic	2.0E-03	mg/kg-day	0.007	1.40E-05	mg/kg-day	Gastrointestinal	300	IRIS	11/20/01
Cadmium (diet)	chronic	5.0E-04	mg/kg-day	0.025	1.25E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Cadmium (water)	chronic	5.0E-04	mg/kg-day	0.05	2.50E-05	mg/kg-day	Kidney	10	IRIS	11/20/01
Chromium	chronic	1.5E+00	mg/kg-day	0.025	3.75E-02	mg/kg-day	NOAEL	1,000	IRIS	11/20/01
Cobalt	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Cardiovascular, Immunological, Neurological	NA	NCEA	09/25/01
Copper	chronic	4.0E-02	mg/kg-day	1	4.00E-02	mg/kg-day		NA	HEAST	07/97
Iron	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Liver/Blood/GI Tract	NA	NCEA	09/25/01
Manganese (soil)	chronic	7.0E-02	mg/kg-day	0.04	2.80E-03	mg/kg-day	CNS	1	IRIS	11/20/01
Manganese (water)	chronic	2.4E-02	mg/kg-day	0.04	9.60E-04	mg/kg-day	CNS	1	IRIS	11/20/01
Mercury	chronic	3.0E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	CNS	1,000	IRIS	11/20/01
Nickel	chronic	2.0E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	Decreased body / organ weights	300	IRIS	11/20/01
Selenium	chronic	5.0E-03	mg/kg-day	1	5.00E-03	mg/kg-day	Blood/Skin/CNS	3	IRIS	11/20/01
Silver	chronic	5.0E-03	mg/kg-day	0.04	2.00E-04	mg/kg-day	Argyria	3	IRIS	11/20/01
Thallium	chronic	7.0E-05	mg/kg-day	1	7.00E-05	mg/kg-day	Liver	NA	IRIS	11/20/01
Vanadium	chronic	7.0E-03	mg/kg-day	0.026	1.82E-04	mg/kg-day	NOEL	100	HEAST	07/97
Zinc	chronic	3.0E-01	mg/kg-day	1	3.00E-01	mg/kg-day	Blood	3	IRIS	11/20/01
Cyanide	chronic	2.0E-02	mg/kg-day	1	2.00E-02	mg/kg-day	Weight Loss, Thyroid	500	IRIS	11/20/01

(1) USEPA, 2000 .
(2) RfD dermal = RfDoral x (Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA

Notes: RfD = Reference dose
CNS = Central Nervous System
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
HEAST = Health Effects Assessment Summary Tables (USEPA, July 1997)
NCEA = USEPA National Center for Environmental Assessment (USEPA Region 3 RBC Table, September 2001)
NA = Not applicable/Not Available
NOAEL = No Observed Adverse Effect Level

TABLE 5.2

NON-CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Date
Chloroform	Chronic	3.0E-01	$\mu g/m^3$	8.6E-05	mg/kg-day	Liver	NA	NCEA	9/25/2001
cis-1,2-Dichloroethene	Chronic	3.5E+01	$\mu g/m^3$	1.0E-02	mg/kg-day	Blood	NA	IRIS	11/20/2001
Vinyl Chloride	Chronic	1.0E+02	$\mu g/m^3$	2.9E-02	mg/kg-day	Liver	NA	IRIS	11/20/2001

Notes:

RfC = Reference Concentration

RfD = Reference Dose

IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)

NCEA = USEPA National Center for Environmental Assessment

TABLE 6.1
CANCER TOXICITY DATA FOR CHEMCIALS OF CONCERN-- ORAL/DERMAL
SWMUS 4, 5, 9, 10
NSWC CRANE. INDIANA

Chemical of Potential Concern	Oral CSF	Oral to Dermal Adjustment Factor(1)	Adjusted Dermal Cancer Slope Factor(2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date(3)
1,1-Dichloroethene	6.0E-01	1	6.00E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	2.9E-02	1	2.90E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	6.1E-03	1	6.10E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	7.5E-03	1	7.50E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethene	5.2E-02	1	5.20E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethene	1.1E-02	1	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl Chloride (adult)	7.5E-01	1	7.50E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl Chloride (early life)	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benzo(a)anthracene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(a)pyrene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo(b)fluoranthene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenzo(a,h)anthracene	7.3E+00	1	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno(1,2,3-cd)pyrene	7.3E-01	1	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Bis(2-ethylhexyl)phthalate	1.4E-02	1	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Pentachlorophenol	1.2E-01	1	1.20E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1248	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1254	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Aroclor-1260	2.0E+00	1	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
2,4,6-Trinitrotoluene	3.0E-02	1	3.00E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
RDX	1.1E-01	1	1.10E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Arsenic	1.5E+00	1	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
delta-BHC	6.3E+00	1	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	1.6E+01	1	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001

(1) USEPA, 2000).
(2) CSFdermal = CSForal/(Oral to Dermal Adjustment Factor)
(3) Dates of IRIS, HEAST, or NCEA.

Notes:
CSF = Cancer Slope Factor
IRIS = Integrated Risk Information System, on-line database search (USEPA, November 2001)
NCEA = USEPA National Center for Environmental Assessment
(USEPA Region III RBC Table, September 2001)

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in anima inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6-2

CANCER TOXICITY DATA FOR CHEMICALS OF CONCERN -- INHALATION

SWMUS 4, 5, 9, 10

NSWC CRANE. INDIANA

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
1,1-Dichloroethene	5.0E-05	$(mg/m^3)^{-1}$	3.5E+03	1.75E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/20/2001
Benzene	7.8E-06	$(mg/m^3)^{-1}$	3.5E+03	2.73E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Chloroform	2.3E-05	$(mg/m^3)^{-1}$	3.5E+03	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Methylene Chloride	4.7E-07	$(mg/m^3)^{-1}$	3.5E+03	1.60E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Tetrachloroethylene (PCE)	5.8E-07	$(mg/m^3)^{-1}$	3.5E+03	2.03E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Trichloroethylene (TCE)	1.7E-06	$(mg/m^3)^{-1}$	3.5E+03	6.00E-03	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	9/25/2001
Vinyl chloride (child/adult)	8.8E-06	$(mg/m^3)^{-1}$	3.5E+03	3.08E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Vinyl chloride (adult)	4.4E-06	$(mg/m^3)^{-1}$	3.5E+03	1.54E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001
Benz[a]anthracene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[a]pyrene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Benzo[b]fluoranthene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dibenz[ah]anthracene	8.9E-04	$(mg/m^3)^{-1}$	3.5E+03	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Indeno[1,2,3-cd]pyrene	8.9E-05	$(mg/m^3)^{-1}$	3.5E+03	3.10E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Polychlorinated Biphenyls (PCBs)	1.0E-04	$(mg/m^3)^{-1}$	3.5E+03	3.50E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Dieldrin	4.6E-03	$(mg/m^3)^{-1}$	3.5E+03	1.61E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
delta-BHC	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/20/2001
Beryllium	2.4E-03	$(mg/m^3)^{-1}$	3.5E+03	8.40E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Cadmium	1.8E-03	$(mg/m^3)^{-1}$	3.5E+03	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/20/2001
Chromium VI	1.2E-02	$(mg/m^3)^{-1}$	3.5E+03	4.20E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/20/2001

IRIS = Integrated Risk Information System (November 2001)

HEAST= Health Effects Assessment Summary Tables

NCEA = USEPA National Center for Environmental Assessment (USEPA Region III RBC Table, September 2001)

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

SWMU 10 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 10 - TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.9E-02
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.4E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.0E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	5.5E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.1E-02
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-02
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.4E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-03
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.5E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.9E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.5E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	3.1E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.3E-02
	(total)												**1.1E-01**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.6E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	4.7E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.8E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.6E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	5.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.5E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	5.5E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.8E-02
	(total)												**7.4E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.9E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.7E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-06
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.6E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.9E-06**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	7.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	9.7E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-06**

SWMU 10 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 10 - TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.3E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.8E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.7E-03
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.5E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.0E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.3E-03
	(total)												**3.8E-02**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	9.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.1E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.5E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.1E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.2E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.9E-02
	(total)												**2.7E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.6E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.8E-07**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	9.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.8E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

SWMU 10 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 10 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.0E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-02
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.2E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.7E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	5.1E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.0E-02
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-02
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.3E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.3E-03
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.1E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.9E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.2E-02
	(total)												**1.1E-01**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.7E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	4.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.0E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.9E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.8E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	6.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.0E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.5E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	5.7E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.9E-02
	(total)												**7.6E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	9.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.4E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.9E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.8E-07**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	4.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.5E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	5.1E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**7.8E-07**

SWMU 10 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 10 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.5E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.8E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	7.5E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.7E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.4E-03
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.1E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.2E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	9.5E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.0E-03
	(total)												**3.5E-02**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	8.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.5E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.9E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.2E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.2E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.4E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.2E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	7.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.4E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.5E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.7E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.7E-02
	(total)												**2.4E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.9E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-08**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	5.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	3.4E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	7.0E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.7E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**8.8E-08**

SWMU 10 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 10 - TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.7E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.8E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.6E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.0E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	8.2E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.6E-03
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	7.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.0E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	2.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.6E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	2.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.6E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.5E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.9E-03
	(total)												**1.7E-02**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.2E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.4E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	6.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.2E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.2E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.4E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	8.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.9E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	3.6E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	5.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	5.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.7E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	8.2E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	8.6E-03
	(total)												**1.1E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	7.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	3.5E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.1E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.4E-07**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.8E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	2.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.5E-08**
										Total Risk Across All Exposure Routes/Pathways	**6.2E-07**

SWMU 10 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 10 - TABLE 7.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	4.2E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.0E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.5E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.0E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.1E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.1E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	5.0E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.0E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	7.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	7.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.1E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.7E-04
	(total)												**4.2E-03**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.8E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.3E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.9E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.5E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.0E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.0E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	9.1E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.1E-06
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.3E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.4E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.3E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.4E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.1E-03
	(total)												**2.9E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	5.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.6E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	6.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	9.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	9.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.1E-08**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.9E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.9E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.9E-09**
										Total Risk Across All Exposure Routes/Pathways	**4.7E-08**

SWMU 10 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 10 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.7E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.5E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	5.8E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	9.7E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.0E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	3.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.3E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	4.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.6E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	4.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	7.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.1E-04
	(total)												**2.7E-03**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.8E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.4E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.0E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.4E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.9E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.8E-05
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.2E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.0E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.8E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.9E-03
	(total)												**3.8E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	4.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	9.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.1E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	6.3E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.9E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	5.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	7.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	7.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-08**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.3E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-11
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	2.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	2.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.4E-09**
										Total Risk Across All Exposure Routes/Pathways	**4.2E-08**

SWMU 10 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 10 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	6.8E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.5E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.4E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	3.3E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.6E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.9E-05
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.2E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.2E-06
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.8E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	7.7E-05
	(total)												**6.9E-04**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.0E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.1E-05
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	6.5E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.1E-09	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.2E-06
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	8.5E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E-05
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.5E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.5E-06
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.6E-09	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.6E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	5.7E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	6.0E-04
	(total)												**8.2E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	5.2E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.7E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.1E-09**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	4.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	6.5E-10	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.3E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	5.7E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-10
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	5.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	9.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-09**
										Total Risk Across All Exposure Routes/Pathways	**1.0E-08**

SWMU 10 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 10 - TABLE 7.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	1.5E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	2.8E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	2.7E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	5.6E-07	mg/kg-day		mg/kg-day	NA	NA	
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	7.9E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	(total)												**1.3E-02**
Dermal	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	7.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.3E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	2.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	2.9E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.8E-03
	(total)												**4.8E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.1 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	2.1E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.56E-08
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	4.0E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.91E-07
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	3.9E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.82E-08
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	8.1E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	5.88E-08
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	1.1E-08	mg/kg-day		(mg/kg-day)-1	
	(total)										**3.9E-07**
Dermal	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	1.0E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	7.3E-09
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	1.9E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.4E-07
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.8E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.3E-08
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	3.8E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.8E-08
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	4.1E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										**1.9E-07**
										Total Risk Across All Exposure Routes/Pathways	**5.8E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.1
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	480	USEPA 1991	240	1/2 RME value	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction ingested	--[3]	1.0	Professional Judgement	1.0	Professional Judgement	BW x AT
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	USEPA, December 1989
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	USEPA 2000	0.1	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA 1989	365	USEPA 1989	

1 Surface soil is defined as soil collected from depths of 0 to 2 foot bgs.
2 CDI = Chronic Daily Intake
3 Unitless; no units are associated with this parameter.

Daily Intake Calculations

Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.03E-08
Noncancer Ingestion Intake - RME = 2.82E-06

Cancer Ingestion Intake - CTE = 2.01E-08
Noncancer Ingestion Intake - CTE = 1.41E-06

Cancer Dermal Intake - RME = 1.46E-07
Noncancer Dermal Intake - RME = 1.02E-05

Cancer Dermal Intake - CTE = 4.19E-08
Noncancer Dermal Intake - CTE = 2.94E-06

SWMU 10 - TABLE 7.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	7.5E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.4E-06	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	2.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	4.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.6E-03
	(total)												**6.6E-03**
Dermal	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	2.0E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	3.8E-07	mg/kg-day		mg/kg-day	NA	NA	
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	3.7E-07	mg/kg-day		mg/kg-day	NA	NA	
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	7.6E-08	mg/kg-day		mg/kg-day	NA	NA	
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	8.3E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.4E-03
	(total)												**1.4E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**8.0E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.1a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO SURFACE / SUBSURFACE SOIL
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Soil/Subsurface Soil
Exposure Medium: Surface Soil/subsurface Soil
Exposure Point: Entire Site
Receptor Population: ConstructionWorker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	1.1E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	7.79E-09
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	2.0E-08	mg/kg-day	7.30E+00	(mg/kg-day)-1	1.45E-07
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	1.9E-08	mg/kg-day	7.30E-01	(mg/kg-day)-1	1.41E-08
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	4.0E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	2.94E-08
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	5.7E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										**2.0E-07**
Dermal	BENZO(A)ANTHRACENE	5.30E-01	mg/kg	5.30E-01	mg/kg	M	2.9E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	2.1E-09
	BENZO(A)PYRENE	9.90E-01	mg/kg	9.90E-01	mg/kg	M	5.4E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	3.9E-08
	BENZO(B)FLUORANTHENE	9.60E-01	mg/kg	9.60E-01	mg/kg	M	5.2E-09	mg/kg-day	7.30E-01	(mg/kg-day)-1	3.8E-09
	DIBENZO(A,H)ANTHRACENE	2.00E-01	mg/kg	2.00E-01	mg/kg	M	1.1E-09	mg/kg-day	7.30E+00	(mg/kg-day)-1	8.0E-09
	2-AMINO-4,6-DINITROTOLUE	2.82E-01	mg/kg	2.82E-01	mg/kg	M	1.2E-09	mg/kg-day		(mg/kg-day)-1	
	(total)										**5.3E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 10 - TABLE 7.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	1.1E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.9E+00
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	1.8E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.0E+00
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	4.4E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.8E-01
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.5E-05	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.5E-02
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	6.6E-03	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	1.3E-01
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	3.1E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.0E+00
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	2.0E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.0E-01
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	4.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.6E-01
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	9.4E-05	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	4.7E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	2.4E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.7E-02
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	8.2E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	4.1E-01
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	2.6E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.6E+00
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	6.0E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	2.5E+01
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	1.9E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.5E-01
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	1.6E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	2.3E-01
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	4.5E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E-01
	(total)												**4.3E+01**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	1.6E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.6E-02
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	2.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.2E-02
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.7E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.4E-03
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	6.4E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	6.4E-04
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	2.4E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	4.7E-04
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	2.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.3E-03
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	1.0E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-03
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	2.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.1E-04
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	4.9E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	3.5E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	1.2E-07	mg/kg-day	2.50E-05	mg/kg-day	NA	NA	4.9E-03
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	4.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-03
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	1.3E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.5E-02
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	3.1E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.2E+00
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	2.0E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.5E-02
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	8.5E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.2E-03
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	1.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.7E-04
	(total)												**3.4E+00**

Total Hazard Index Across All Exposure Routes/Pathways **4.6E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.9 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	3.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	6.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.5E-04	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-06
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	5.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	2.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.1E-03	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-04
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	6.7E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.6E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-05
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	3.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	8.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	2.8E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	8.8E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	2.0E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	6.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	5.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	1.6E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.5E-04**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	5.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	8.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	5.8E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	2.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	8.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	9.6E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	3.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	8.3E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	1.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	4.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	4.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	1.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	6.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	2.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	4.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.5E-04**

SWMU 10 - TABLE 4.9
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	2	USEPA, March 1991	1.4	USEPA, May 1993	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	18,000	USEPA, 2000	18,000	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	USEPA, March 1991	7	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	0.58	USEPA, 2000	0.25	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-03
Noncancer Ingestion Intake(RME) = 2.74E-02

Cancer Ingestion Intake(CTE) = 1.92E-03
Noncancer Ingestion Intake(CTE) = 1.92E-02

Cancer Dermal Intake(RME) = 8.45E+01
Noncancer Dermal Intake(RME) = 2.47E+02

Cancer Dermal Intake(CTE) = 2.47E+01
Noncancer Dermal Intake(CTE) = 2.47E+02

SWMU 10 - TABLE 7.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	7.8E-05	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E+00
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	1.2E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.1E+00
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	3.1E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.2E-01
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.1E-05	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.1E-02
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	4.6E-03	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	9.2E-02
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	2.2E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	7.3E-01
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	1.4E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-01
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	3.3E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-01
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	6.6E-05	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	3.3E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	1.7E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.3E-02
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	5.7E-03	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.9E-01
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	1.8E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.0E+00
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	4.2E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.7E+01
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	1.3E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.7E-01
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	1.1E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.6E-01
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	3.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.1E-01
	(total)												**3.0E+01**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	1.0E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-02
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	1.6E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.7E-02
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.1E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.2E-03
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	4.2E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	4.2E-04
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	1.5E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	3.1E-04
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.1E-03
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	4.4E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.4E-04
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-04
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	2.1E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.5E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	5.3E-08	mg/kg-day	2.50E-05	mg/kg-day	NA	NA	2.1E-03
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.8E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	9.2E-04
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	5.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.9E-02
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	1.3E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.4E+00
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	8.6E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.1E-02
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	3.7E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	5.2E-04
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	6.1E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-04
	(total)												**1.5E+00**

Total Hazard Index Across All Exposure Routes/Pathways **3.1E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.9a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	7.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	3.1E-05	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	9.2E-07
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	4.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	2.2E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-05
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	1.4E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	3.3E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-06
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	6.6E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	5.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	1.8E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	4.2E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	1.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	1.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	3.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.0E-05**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	1.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.1E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-09
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	4.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.8E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	4.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.0E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	5.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	5.8E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	1.3E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	8.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	3.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	6.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.2E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.0E-05**

SWMU 10 - TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 10 - TABLE 7.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	3.9E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.5E+00
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	6.2E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.0E+01
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.5E-03	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.1E+00
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	5.3E-05	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	5.3E-02
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	2.3E-02	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	4.6E-01
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.1E-02	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	3.7E+00
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	6.8E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	6.8E-01
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.6E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.4E-01
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	3.3E-04	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	1.6E-01
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	8.3E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.7E-01
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	2.9E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.4E+00
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	9.0E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.0E+01
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	2.1E+00	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	8.7E+01
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	6.7E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	3.3E+00
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	5.7E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	8.1E-01
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	1.6E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	5.3E-01
	(total)												**1.5E+02**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	3.5E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.8E-02
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	5.6E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	9.3E-02
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	3.8E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.7E-03
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.4E-06	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.4E-03
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	5.3E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	1.1E-03
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	6.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.1E-02
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	3.0E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.0E-03
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	7.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-03
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	1.5E-06	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.0E-01
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	3.6E-07	mg/kg-day	2.50E-05	mg/kg-day	NA	NA	1.5E-02
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.3E-04	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.3E-03
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	4.0E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E-01
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	9.2E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	9.6E+00
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	5.9E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	7.3E-02
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	2.5E-07	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.6E-03
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	4.2E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-03
	(total)												**1.0E+01**

Total Hazard Index Across All Exposure Routes/Pathways **1.6E+02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.10 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	3.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	5.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.3E-04	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-06
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	4.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	2.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	9.4E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-04
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	5.9E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.4E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-05
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	2.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	7.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	2.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	7.7E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	1.8E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	5.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	1.4E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-04**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	3.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	4.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	3.3E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	9.9E-09
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	4.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	5.4E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.9E-07
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	2.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	6.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.2E-08
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	1.2E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	3.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	3.4E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	7.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	5.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	3.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.9E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.3E-04**

SWMU 10 - TABLE 4.10
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3.1	Maximum	See Table 3.1	Ingestion CDI (mg/kg/day) =
	IRgw	Water Ingestion Rate	L/day	1.5	USEPA, 1997	0.66	USEPA, 1997	Cgw x IRgw x EF x ED
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	BW x AT
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, May 1993	CDI = Chronic Daily Intake
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	USEPA, December 1989
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	6,600	USEPA, 2000	6,600	USEPA, 2000	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	USEPA, March 1991	2	USEPA, March 1991	of the text.
	EF	Exposure Frequency	days/year	350	USEPA, March 1991	350	USEPA, March 1991	
	t_{event}	Duration of Event	hour/event	1	USEPA, 2000	0.33	USEPA, 2000	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 8.22E-03
Noncancer Ingestion Intake(RME) = 9.59E-02

Cancer Ingestion Intake(CTE) = 1.21E-03
Noncancer Ingestion Intake(CTE) = 4.22E-02

Cancer Dermal Intake(RME) = 3.62E+01
Noncancer Dermal Intake(RME) = 4.22E+02

Cancer Dermal Intake(CTE) = 1.21E+01
Noncancer Dermal Intake(CTE) = 4.22E+02

SWMU 10 - TABLE 7.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	1.7E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.9E+00
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	2.7E-04	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.6E+00
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	6.8E-04	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.4E+00
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	2.3E-05	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	2.3E-02
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	1.0E-02	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	2.0E-01
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	4.8E-03	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E+00
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	3.0E-01	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.0E-01
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	7.2E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-01
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	1.5E-04	mg/kg-day	2.00E-03	mg/kg-day	NA	NA	7.3E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	3.6E-05	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	7.3E-02
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.3E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.3E-01
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	4.0E+00	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.3E+01
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	9.2E-01	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.8E+01
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	2.9E-02	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.5E+00
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	2.5E-05	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.6E-01
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	7.0E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-01
	(total)												**6.5E+01**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	2.0E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.4E-02
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	3.2E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.4E-02
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	2.2E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.4E-03
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	8.3E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	8.3E-04
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	3.0E-05	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	6.1E-04
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	3.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.2E-02
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	9.9E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.9E-04
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	2.4E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	7.9E-04
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	4.8E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	3.4E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	1.2E-07	mg/kg-day	2.50E-05	mg/kg-day	NA	NA	4.8E-03
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	4.2E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	2.1E-03
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	1.3E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.3E-02
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	3.0E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	3.2E+00
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	1.9E-05	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	2.4E-02
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	8.3E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	1.2E-03
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	1.4E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.6E-04
	(total)												**3.4E+00**

Total Hazard Index Across All Exposure Routes/Pathways **6.9E+01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.10a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Resident
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	7.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	1.9E-05	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.8E-07
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	6.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	2.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.4E-04	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	8.6E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	2.0E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-06
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	4.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	1.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	3.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	1.1E-01	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	2.6E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	8.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	7.1E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	2.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-05**
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	5.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	9.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	6.3E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	2.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	8.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	2.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	6.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	1.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	3.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	3.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	8.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	5.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	2.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	4.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.3E-07**
										Total Risk Across All Exposure Routes/Pathways	**1.9E-05**

SWMU 10 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	of the text.
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 10 - TABLE 7.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	4.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.7E-03
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	6.4E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-02
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	4.4E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.7E-04
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.6E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.6E-04
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	6.0E-06	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	1.2E-04
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	7.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-03
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	4.9E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.9E-04
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-04
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	2.3E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.7E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	5.9E-08	mg/kg-day	2.50E-05	mg/kg-day	NA	NA	2.4E-03
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	2.0E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	1.0E-03
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	6.4E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E-02
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	1.5E-03	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.5E+00
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	9.5E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	1.2E-02
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	4.0E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	5.8E-04
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	6.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.3E-04
	(total)												**1.6E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.6E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.8 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	5.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	9.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	6.2E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-10
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	2.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	8.6E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	1.0E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	6.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	3.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	8.4E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	9.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	2.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	1.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	5.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	9.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.4E-08**

SWMU 10 - TABLE 4.8
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Dermal	Cgw	Chemical Concentration in Ground Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	5,800	USEPA, 1997	5,000	USEPA, 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	1	Professional Judgement	1	Professional Judgement	of the text.
	EF	Exposure Frequency	days/year	150	Professional Judgement	150	Professional Judgement	
	t_{event}	Duration of Event	hour/event	2	Professional Judgement	1.5	Professional Judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	USEPA, December 1989	365	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Dermal Intake(RME) = 4.86E-01
Noncancer Dermal Intake(RME) = 3.41E+01

Cancer Dermal Intake(CTE) = 4.19E-01
Noncancer Dermal Intake(CTE) = 2.94E+01

SWMU 10 - TABLE 7.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	3.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.0E-03
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	4.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.0E-03
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	3.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.5E-04
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.2E-07	mg/kg-day	1.00E-03	mg/kg-day	NA	NA	1.2E-04
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	4.5E-06	mg/kg-day	5.00E-02	mg/kg-day	NA	NA	9.0E-05
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	5.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.8E-03
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	3.1E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.1E-04
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	7.5E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.5E-04
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	1.5E-07	mg/kg-day	1.40E-05	mg/kg-day	NA	NA	1.1E-02
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	3.8E-08	mg/kg-day	2.50E-05	mg/kg-day	NA	NA	1.5E-03
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.3E-05	mg/kg-day	2.00E-02	mg/kg-day	NA	NA	6.6E-04
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	4.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.4E-02
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	9.6E-04	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.0E+00
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	6.1E-06	mg/kg-day	8.00E-04	mg/kg-day	NA	NA	7.7E-03
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	2.6E-08	mg/kg-day	7.00E-05	mg/kg-day	NA	NA	3.7E-04
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	4.4E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.5E-04
	(total)												**1.1E+00**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.1E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.8a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF CONSTRUCTION WORKERS TO GROUNDWATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Entire Site
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal	2-Amino-4,6-dinitrotoluene	4.06E-03	mg/L	4.06E-03	mg/L	M	4.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	6.49E-03	mg/L	6.49E-03	mg/L	M	6.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	1.61E-02	mg/L	1.61E-02	mg/L	M	4.7E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	2,6-Dinitrotoluene	5.48E-04	mg/L	5.48E-04	mg/L	M	1.8E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	HMX	2.40E-01	mg/L	2.40E-01	mg/L	M	6.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	RDX	1.15E-01	mg/L	1.15E-01	mg/L	M	7.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-09
	Aluminum	7.13E+00	mg/L	7.13E+00	mg/L	M	4.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	1.70E-03	mg/L	1.70E-03	mg/L	M	1.1E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Beryllium	3.44E-03	mg/L	3.44E-03	mg/L	M	2.2E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cadmium	8.65E-04	mg/L	8.65E-04	mg/L	M	5.4E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Cobalt	2.99E-01	mg/L	2.99E-01	mg/L	M	1.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Iron	9.37E+01	mg/L	9.37E+01	mg/L	M	5.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	2.18E+01	mg/L	2.18E+01	mg/L	M	1.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Nickel	6.95E-01	mg/L	6.95E-01	mg/L	M	8.7E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Thallium	5.93E-04	mg/L	5.93E-04	mg/L	M	3.7E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Zinc	1.66E+00	mg/L	1.66E+00	mg/L	M	6.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-08**

Total Risk Across All Exposure Routes/Pathways **1.0E-08**

SWMU 10 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 10 - TABLE 7.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.9E-02
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.4E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.0E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	5.5E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.1E-02
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.9E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-02
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.4E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.4E-03
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.9E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.5E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.9E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.5E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	3.1E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.3E-02
	(total)												**1.1E-01**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.6E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	4.7E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.8E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.8E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.6E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	5.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.9E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.5E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	5.5E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.8E-02
	(total)												**7.4E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.13 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.3E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.9E-06	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.7E-05	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-06
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.6E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.0E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.9E-06**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	7.5E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	9.7E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-09
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.0E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-06**

SWMU 10 - TABLE 4.13
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	24	EPA 1993a	7	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	8760	EPA 1989	2,555	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	24	EPA 1993a	7	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, December 1989	2,555	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 9.39E-04
Noncancer Ingestion Intake(RME) = 2.74E-03

Cancer Ingestion Intake(CTE) = 9.16E-05
Noncancer Ingestion Intake(CTE) = 9.16E-04

Cancer Dermal Intake(RME) = 4.26E+01
Noncancer Dermal Intake(RME) = 1.24E+02

Cancer Dermal Intake(CTE) = 8.31E+00
Noncancer Dermal Intake(CTE) = 8.31E+01

SWMU 10 - TABLE 7.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.3E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.0E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.8E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.7E-03
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.5E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.2E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.5E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.0E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.3E-03
	(total)												**3.8E-02**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	9.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.6E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.1E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.5E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.7E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.1E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.2E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.9E-02
	(total)												**2.7E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.4E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.13a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.8E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.8E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.6E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.5E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.5E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.0E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.8E-07**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	9.9E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.8E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.3E-07**

SWMU 10 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 10 - TABLE 7.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.0E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.7E-02
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.2E-06	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.7E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	5.1E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.0E-02
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.6E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.5E-02
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.3E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.3E-03
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.8E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.1E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.9E-04	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.2E-02
	(total)												**1.1E-01**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.2E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.7E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	4.8E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	8.0E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.9E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	5.8E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	6.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.0E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.5E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.5E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.6E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.6E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	5.7E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	5.9E-02
	(total)												**7.6E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.8E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.14 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	9.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.4E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.9E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.5E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-07
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.6E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.8E-07**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.9E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	4.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.5E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	5.1E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.6E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.6E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.1E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.9E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.0E-07**
										Total Risk Across All Exposure Routes/Pathways	**7.8E-07**

SWMU 10 - TABLE 4.14
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	EPA 1993a	Maximum	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	350	EPA 1993a	234	EPA 1993a	BW x AT
	ED	Exposure Duration	(years)	6	EPA 1993a	2	EPA 1993a	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	15	EPA 1989	15	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	2190	EPA 1989	730	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	2,000	USEPA, August 1997	1,745	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	6	EPA 1993a	2	EPA 1993a	of the text.
	EF	Exposure Frequency	days/year	350	EPA 1993a	234	EPA 1993a	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	15	USEPA, March 1991	15	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, December 1989	730	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 2.19E-04
Noncancer Ingestion Intake(RME) = 2.56E-03

Cancer Ingestion Intake(CTE) = 2.44E-05
Noncancer Ingestion Intake(CTE) = 8.55E-04

Cancer Dermal Intake(RME) = 1.10E+01
Noncancer Dermal Intake(RME) = 1.28E+02

Cancer Dermal Intake(CTE) = 2.13E+00
Noncancer Dermal Intake(CTE) = 7.46E+01

SWMU 10 - TABLE 7.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.5E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.8E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	7.5E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.3E-02
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.7E-06	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.4E-03
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.5E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.1E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.2E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	4.2E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	6.0E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-03
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	6.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.0E-03
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	9.5E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.0E-03
	(total)												**3.5E-02**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	8.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.5E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.9E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.2E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.2E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.4E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.5E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	8.2E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	7.4E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	7.4E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.1E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.5E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.1E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.5E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.7E-05	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	1.7E-02
	(total)												**2.4E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.14a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.9E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.7E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-08**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.5E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	5.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	3.4E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	7.0E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	7.7E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.0E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.5E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.8E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.2E-08**
										Total Risk Across All Exposure Routes/Pathways	**8.8E-08**

SWMU 10 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 10 - TABLE 7.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.7E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.8E-03
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.6E-07	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	6.0E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	8.2E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	1.6E-03
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	7.3E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.4E-03
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.0E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.0E-04
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	2.9E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.6E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	2.9E-04	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	9.6E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.5E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	1.9E-03
	(total)												**1.7E-02**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.2E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.4E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	6.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.2E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.2E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.4E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	8.6E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.9E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	3.6E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.6E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	5.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.7E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	5.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.7E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	8.2E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	8.6E-03
	(total)												**1.1E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**2.8E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.11 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	7.2E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	3.5E-07	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.1E-06	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**5.4E-07**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.4E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.8E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.7E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	2.2E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	2.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	3.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.5E-08**
										Total Risk Across All Exposure Routes/Pathways	**6.2E-07**

SWMU 10 - TABLE 4.11
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	95%UCL	EPA 1993a	95%UCL	EPA 1993a	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.05	EPA 1995	0.05	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	52	Professional judgement	26	Professional Judgement	BW x AT
	ED	Exposure Duration	(years)	30	USEPA, March 1993	9	USEPA, March 1993	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	70	EPA 1989	70	EPA 1989	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	10950	EPA 1989	3,285	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	9,070	USEPA, August 1997	9,070	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional Judgement	1	Professional Judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	30	USEPA, March 1993	9	USEPA, March 1993	of the text.
	EF	Exposure Frequency	days/year	52	Professional judgement	26	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	70	USEPA, March 1991	70	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA, December 1989	3,285	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.74E-04
Noncancer Ingestion Intake(RME) = 4.07E-04

Cancer Ingestion Intake(CTE) = 1.31E-05
Noncancer Ingestion Intake(CTE) = 1.02E-04

Cancer Dermal Intake(RME) = 7.91E+00
Noncancer Dermal Intake(RME) = 1.85E+01

Cancer Dermal Intake(CTE) = 1.19E+00
Noncancer Dermal Intake(CTE) = 9.23E+00

SWMU 10 - TABLE 7.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	4.2E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	7.0E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	8.9E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.5E-03
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.0E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	4.1E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.1E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	5.0E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	5.0E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	7.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.4E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	7.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.4E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.1E-05	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	4.7E-04
	(total)												**4.2E-03**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.8E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.3E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	3.9E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.5E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	3.0E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.0E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	9.1E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.1E-06
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.3E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	4.4E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.3E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	4.4E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.1E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.1E-03
	(total)												**2.9E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**7.2E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.11a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	5.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.1E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.6E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	2.4E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	6.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	9.3E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	9.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.5E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.1E-08**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.4E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.9E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.9E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.7E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**6.9E-09**
										Total Risk Across All Exposure Routes/Pathways	**4.7E-08**

SWMU 10 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 10 - TABLE 7.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	2.7E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.5E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	5.8E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	9.7E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.3E-07	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.7E-04
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.2E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	4.0E-04
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	3.3E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.3E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	4.7E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.6E-04
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	4.7E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.6E-04
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	7.4E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	3.1E-04
	(total)												**2.7E-03**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.8E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.4E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	4.0E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	1.4E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	2.9E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.8E-05
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.2E-05	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.2E-05
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.8E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	6.0E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.8E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.0E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.8E-06	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	2.9E-03
	(total)												**3.8E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**6.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.12 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	4.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	9.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.1E-08	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	6.3E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.9E-07	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	5.1E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	7.4E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	7.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.2E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.2E-08**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	3.7E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	2.3E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	6.8E-11
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.6E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	2.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.2E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	2.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	4.4E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**9.4E-09**
										Total Risk Across All Exposure Routes/Pathways	**4.2E-08**

SWMU 10 - TABLE 4.12
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	(mg/L)	Maximum	See Table 3	Maximum	See Table 3	Chronic Daily Intake (CDI) (mg/kg-day)=
	IR	Ingestion Rate of Surface Water	(L/hr)	0.01	EPA 1995	0.01	EPA 1995	Cw x IR x ET x EF x ED
	EF	Exposure Frequency	(days/year)	26	Professional judgement	13	1/2 RME value	BW x AT
	ED	Exposure Duration	(years)	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	ET	Exposure Time	(hr/day)	4	Professional judgement	2	Professional Judgement	
	BW	Body Weight	(kg)	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	(days)	25550	EPA 1989	25550	EPA 1989	
	AT-N	Averaging Time (Noncancer)	(days)	4015	EPA 1989	4,015	EPA 1989	
Dermal	Cw	Chemical Concentration in Water	mg/L	Maximum	See Table 3	Maximum	See Table 3	The equations and parameters for
	A	Skin Surface Area	cm^2	3,820	USEPA, August 1997	3,100	USEPA, August 1997	for estimating DAevent and the chemical-
	DAevent	Absorbed Dose per Event	mg/cm^2-event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	specific dermally absorbed dose from
	EV	Event Frequency	event/day	1	Professional judgement	1	Professional judgement	water (DAD) are provided in Section 6.1
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	of the text.
	EF	Exposure Frequency	days/year	26	Professional judgement	13	Professional judgement	
	t_{event}	Duration of Event	hour/event	4	Professional judgement	2	Professional judgement	USEPA, January 1992
	t*	Time to reach steady state	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	T	Lag Time	hour/event	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	B	Bunge Model Constant	dimensionless	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	Kp	Permeability Coefficient from Water	cm/hour	chemical-specific	USEPA, 2000	chemical-specific	USEPA, 2000	
	BW	Body Weight	kg	43	USEPA, March 1991	43	USEPA, March 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, December 1989	25,550	USEPA, December 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA, December 1989	4,015	USEPA, December 1989	

Daily Intake Calculations
Ingestion Intake = (IRgw x EF x ED) / (BW x AT)
Dermal Intake = (A x EV x ED x EF) / (BW x AT)

Cancer Ingestion Intake(RME) = 1.04E-05
Noncancer Ingestion Intake(RME) = 6.63E-05

Cancer Ingestion Intake(CTE) = 2.60E-06
Noncancer Ingestion Intake(CTE) = 1.66E-05

Cancer Dermal Intake(RME) = 9.94E-01
Noncancer Dermal Intake(RME) = 6.33E+00

Cancer Dermal Intake(CTE) = 4.03E-01
Noncancer Dermal Intake(CTE) = 2.57E+00

SWMU 10 - TABLE 7.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	6.8E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-04
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.5E-08	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	2.4E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	3.3E-08	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	6.6E-05
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	3.0E-07	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	9.9E-05
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	8.2E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	8.2E-06
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.2E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.9E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.2E-05	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.9E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	1.8E-06	mg/kg-day	2.40E-02	mg/kg-day	NA	NA	7.7E-05
	(total)												**6.9E-04**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	3.0E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	5.1E-05
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	6.5E-09	mg/kg-day	6.00E-05	mg/kg-day	NA	NA	1.1E-04
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	4.1E-09	mg/kg-day	5.00E-04	mg/kg-day	NA	NA	8.2E-06
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	8.5E-08	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.8E-05
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	2.5E-06	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	2.5E-06
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	3.6E-09	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.2E-05
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	3.6E-06	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	1.2E-05
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	5.7E-07	mg/kg-day	9.60E-04	mg/kg-day	NA	NA	6.0E-04
	(total)												**8.2E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.5E-03**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

SWMU 10 - TABLE 8.12a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SURFACE WATER
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	1.1E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	2.3E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	5.2E-09	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	4.7E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	5.2E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	1.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	1.8E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	2.9E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**8.1E-09**
Dermal	2-Amino-4,6-dinitrotoluene	4.10E-04	mg/L	4.10E-04	mg/L	M	4.8E-10	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	4-Amino-2,6-dinitrotoluene	8.78E-04	mg/L	8.78E-04	mg/L	M	1.0E-09	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	2,4,6-Trinitrotoluene	2.00E-03	mg/L	2.00E-03	mg/L	M	6.5E-10	mg/kg-day	3.00E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	RDX	1.80E-02	mg/L	1.80E-02	mg/L	M	1.3E-08	mg/kg-day	1.10E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-09
	Aluminum	4.93E-01	mg/L	4.93E-01	mg/L	M	4.0E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Arsenic	7.07E-04	mg/L	7.07E-04	mg/L	M	5.7E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-10
	Iron	7.10E-01	mg/L	7.10E-01	mg/L	M	5.7E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	Manganese	1.12E-01	mg/L	1.12E-01	mg/L	M	9.0E-08	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.3E-09**
										Total Risk Across All Exposure Routes/Pathways	**1.0E-08**

SWMU 10 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

SWMU 10 - TABLE 7.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	1.0E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.0E-02
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	2.7E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.1E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	5.3E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.8E-02
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	6.7E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.2E-01
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	5.1E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	7.2E-02
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	5.4E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	7.7E-03
	(total)												**4.2E-01**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	3.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**1.1E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.3E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1

Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.17 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	3.5E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	9.3E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.40E-05
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	2.3E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	1.7E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	1.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-05**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.1E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.7E-06**
										Total Risk Across All Exposure Routes/Pathways	**1.6E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	3.4E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	9.1E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.36E-06
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	2.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	1.7E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	1.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-06**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	2.7E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**4.1E-08**
										Total Risk Across All Exposure Routes/Pathways	**1.4E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.17
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	24	USEPA 1993	7	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1989	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	5,800	USEPA 1997	5,000	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	USEPA 2000	0.01	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	Professional Judgement	234	Professional Judgement	
	ED	Exposure Duration	years	24	Professional Judgement	7	Professional Judgement	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA 1989	2,555	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 4.70E-07
Noncancer Ingestion Intake - RME = 1.37E-06

Cancer Ingestion Intake - CTE = 4.58E-08
Noncancer Ingestion Intake - CTE = 4.58E-07

Cancer Dermal Intake - RME = 1.91E-06
Noncancer Dermal Intake - RME = 5.56E-06

Cancer Dermal Intake - CTE = 4.58E-08
Noncancer Dermal Intake - CTE = 4.58E-07

SWMU 10 - TABLE 7.17a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE ADULT RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	3.4E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.4E-03
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	9.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.0E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	1.8E-05	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.9E-03
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	2.2E-02	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	7.4E-02
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	1.7E-03	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.4E-02
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	1.8E-05	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.6E-03
	(total)												**1.4E-01**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	2.7E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	9.1E-04
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**9.1E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.4E-01**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.18
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 10 - TABLE 7.18 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	9.5E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	9.5E-02
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	2.5E-04	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	8.5E-01
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	4.9E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	1.6E-01
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	6.2E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.1E+00
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	4.7E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	6.7E-01
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	5.0E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	7.2E-02
	(total)												**3.9E+00**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.1E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**5.1E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**4.0E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.18 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	8.1E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	2.2E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.26E-05
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	4.2E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	5.3E-02	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	4.0E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	4.3E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.3E-05**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.3E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-06
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.0E-06**
										Total Risk Across All Exposure Routes/Pathways	**3.5E-05**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.18
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	200	USEPA 1993	100	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	USEPA, December 1989
	ED	Exposure Duration	years	6	USEPA 1993	2	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	2,000	USEPA 1997	1,745	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical specific	USEPA 2000	chemical specific	USEPA 2000	
	EF	Exposure Frequency	days/year	350	USEPA 1993	234	USEPA 1993	
	ED	Exposure Duration	years	6	USEPA 1989	2	USEPA 1989	
	BW	Body Weight	kg	15	USEPA 1993	15	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA 1989	730	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 1.10E-06
Noncancer Ingestion Intake - RME = 1.28E-05

Cancer Ingestion Intake - CTE = 1.22E-07
Noncancer Ingestion Intake - CTE = 4.27E-06

Cancer Dermal Intake - RME = 2.19E-06
Noncancer Dermal Intake - RME = 2.56E-05

Cancer Dermal Intake - CTE = 8.52E-08
Noncancer Dermal Intake - CTE = 2.98E-06

SWMU 10 - TABLE 7.18a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	3.2E-02	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.2E-02
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	8.5E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.8E-01
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	1.6E-04	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.5E-02
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	2.1E-01	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.9E-01
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	1.6E-02	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.3E-01
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	1.7E-04	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.4E-02
	(total)												**1.3E+00**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.8E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	5.9E-03
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**5.9E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E+00**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.18a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF FUTURE CHILD RESIDENTS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Residents
Receptor Age: Child (0 - 6 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	9.1E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	2.4E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.63E-06
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	4.7E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	5.9E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	4.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	4.8E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**3.6E-06**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	5.1E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.6E-08
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.6E-08**
										Total Risk Across All Exposure Routes/Pathways	**3.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

SWMU 10 - TABLE 7.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	1.5E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.5E-03
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	4.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.3E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	7.8E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.6E-03
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	9.9E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	3.3E-02
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	7.5E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	1.1E-02
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	8.0E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	1.1E-03
	(total)												**6.2E-02**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.1E-05	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.7E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**3.7E-02**
												Total Hazard Index Across All Exposure Routes/Pathways	**9.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.15 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	6.5E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.7E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.59E-06
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	3.3E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	4.2E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	3.4E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.6E-06**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	4.7E-06	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-06
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.1E-06**
										Total Risk Across All Exposure Routes/Pathways	**9.7E-06**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.15
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	See Table 3.1	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	9,070	USEPA 1997	9,070	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	1.0	Professional Judgement	0.2	Professional Judgement	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	52	Professional Judgement	26	1/2 RME value	
	ED	Exposure Duration	years	30	USEPA 1993	9	USEPA 1993	
	BW	Body Weight	kg	70	USEPA 1993	70	USEPA 1993	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	10,950	USEPA 1989	3,285	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 8.72E-08
Noncancer Ingestion Intake - RME = 2.04E-07

Cancer Ingestion Intake - CTE = 6.54E-09
Noncancer Ingestion Intake - CTE = 5.09E-08

Cancer Dermal Intake - RME = 7.91E-06
Noncancer Dermal Intake - RME = 1.85E-05

Cancer Dermal Intake - CTE = 2.37E-07
Noncancer Dermal Intake - CTE = 1.85E-06

SWMU 10 - TABLE 7.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	3.8E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.8E-04
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.0E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.4E-03
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	2.0E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	6.5E-04
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	2.5E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	8.2E-03
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	1.9E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.7E-03
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	2.0E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.8E-04
	(total)												**1.6E-02**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.1E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	3.7E-03
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**3.7E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.9E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.15a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADULT RECREATIONAL USERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Recreational User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	4.9E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.3E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.95E-07
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	2.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-07**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.4E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-07
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**2.1E-07**
										Total Risk Across All Exposure Routes/Pathways	**4.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 10 - TABLE 7.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	1.2E-03	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	1.2E-03
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	3.3E-06	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	1.1E-02
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	6.4E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	2.1E-03
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	8.1E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	2.7E-02
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	6.1E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	8.7E-03
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	6.5E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	9.3E-04
	(total)												**5.1E-02**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	7.5E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.5E-03
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**2.5E-03**
												Total Hazard Index Across All Exposure Routes/Pathways	**5.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.16 - REASONABLE MAXIMUM EXPOSURE (RME)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	1.9E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	5.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.74E-07
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	1.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	1.3E-03	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	9.6E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	1.0E-06	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**7.7E-07**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.2E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.8E-07**
										Total Risk Across All Exposure Routes/Pathways	**9.5E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 4.16
VALUES OF DAILY INTAKE CALCULATIONS FOR EXPOSURE OF
ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Ingestion CDI[2] (mg/kg/day) =
	IR	Ingestion Rate of Soil	mg/day	100	USEPA 1993	50	USEPA 1993	Csoil x IR x Fi x EF x ED x CF
	Fi	Fraction Ingested	--[3]	1.0	USEPA 1993	1.0	USEPA 1993	BW x AT
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	USEPA, December 1989
	ED	Exposure Duration	years	11	Adolescent age 6 - 17	11	Adolescent age 6 - 17	
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	
Dermal	Csoil	Chemical Concentration in Soil	mg/kg	95% UCL	USEPA 1993	95% UCL	USEPA 1993	Dermal CDI[2] (mg/kg/day) =
	CF	Conversion Factor	kg/mg	1.0E-06	USEPA 1989	1.0E-06	USEPA 1989	Csoil x CF x SA x AF x ABS x EF x ED
	SA	Skin Surface Area	cm^2/day	3,820	USEPA 1997	3,100	USEPA 1997	BW x AT
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	USEPA 2000	0.04	USEPA 2000	USEPA, December 1989
	ABS	Dermal Absorption Factor (Solid)	unitless	chemical -specific	USEPA 2000	chemical -specific	USEPA 2000	
	EF	Exposure Frequency	days/year	26	Professional Judgement	13	1/2 RME value	
	ED	Exposure Duration	years	11	USEPA 1989	11	USEPA 1989	
	BW	Body Weight	kg	43	USEPA 1989b	43	USEPA 1989b	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA 1989	25,550	USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	4,015	USEPA 1989	4,015	USEPA 1989	

1 CDI = Chronic Daily Intake
2 Unitless; no units are associated with this parameter.

Daily Intake Calculations
Ingestion Intake = (IR x Fi x EF x ED x CF) / (BW x AT)
Dermal Intake = (CF x SA x AF x ABS x EF x ED) / (BW x AT)

Cancer Ingestion Intake - RME = 2.60E-08
Noncancer Ingestion Intake - RME = 1.66E-07

Cancer Ingestion Intake - CTE = 6.51E-09
Noncancer Ingestion Intake - CTE = 4.14E-08

Cancer Dermal Intake - RME = 1.99E-07
Noncancer Dermal Intake - RME = 1.27E-06

Cancer Dermal Intake - CTE = 1.61E-08
Noncancer Dermal Intake - CTE = 1.03E-07

SWMU 10 - TABLE 7.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF NON-CANCER HAZARDS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	3.1E-04	mg/kg-day	1.00E+00	mg/kg-day	NA	NA	3.1E-04
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	8.2E-07	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.7E-03
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	1.6E-06	mg/kg-day	3.00E-03	mg/kg-day	NA	NA	5.3E-04
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	2.0E-03	mg/kg-day	3.00E-01	mg/kg-day	NA	NA	6.7E-03
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	1.5E-04	mg/kg-day	7.00E-02	mg/kg-day	NA	NA	2.2E-03
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	1.6E-06	mg/kg-day	7.00E-03	mg/kg-day	NA	NA	2.3E-04
	(total)												**1.3E-02**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day	1.00E+00	mg/kg-day	NA	NA	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	6.1E-08	mg/kg-day	3.00E-04	mg/kg-day	NA	NA	2.0E-04
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day	7.50E-05	mg/kg-day	NA	NA	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day	3.00E-01	mg/kg-day	NA	NA	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day	2.80E-03	mg/kg-day	NA	NA	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day	1.82E-04	mg/kg-day	NA	NA	
	(total)												**2.0E-04**
												Total Hazard Index Across All Exposure Routes/Pathways	**1.3E-02**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03	Semivolatiles and Pesticides - 0.1
Cadmium - 0.001	PCBs - 0.14
PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

SWMU 10 - TABLE 8.16a - CENTRAL TENDENCY EXPOSURE (CTE)
CALCULATION OF CANCER RISKS FROM EXPOSURE OF ADOLESCENT TRESPASSERS TO SEDIMENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current / Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Entire Site
Receptor Population: Trespasser
Receptor Age: Adolescent (6- 17 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M	4.8E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	1.3E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.94E-07
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M	2.5E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M	3.2E-04	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M	2.4E-05	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M	2.6E-07	mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.9E-07**
Dermal	ALUMINUM	7.43E+03	mg/kg	7.43E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	ARSENIC	1.98E+01	mg/kg	1.98E+01	mg/kg	M	9.6E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	CHROMIUM	3.84E+01	mg/kg	3.84E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	IRON	4.86E+04	mg/kg	4.86E+04	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	MANGANESE	3.69E+03	mg/kg	3.69E+03	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	VANADIUM	3.92E+01	mg/kg	3.92E+01	mg/kg	M		mg/kg-day		$(mg/kg\text{-}day)^{-1}$	
	(total)										**1.4E-08**
										Total Risk Across All Exposure Routes/Pathways	**2.1E-07**

(1) Specify Medium-Specific (M) or Route-Specific (R) EPC selected for risk calculation.

Dermal Absorption Fraction from Soil(ABS) (USEPA 2000):

Arsenic - 0.03 Semivolatiles and Pesticides - 0.1
Cadmium - 0.001 PCBs - 0.14

PAHs - 0.13	Volatiles - No ABS value provided
Dioxins/Furans - 0.03	Other Metals - No ABS value provided

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	BENZO(A)ANTHRACENE	1.6E-08		7.3E-09	2.3E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.9E-07		1.4E-07	4.3E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.8E-08		1.3E-08	4.2E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	5.9E-08		2.8E-08	8.6E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	1.3E-02		4.8E-03	1.8E-02
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver			6.7E-03	6.7E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver			1.1E-02	1.1E-02
			2,4,6-Trinitrotoluene			1.9E-10	1.9E-10	2,4,6-Trinitrotoluene	Liver			8.7E-04	8.7E-04
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver			1.6E-04	1.6E-04
			HMX					HMX	Liver, Blood			1.2E-04	1.2E-04
			RDX			1.1E-08	1.1E-08	RDX	Prostate			2.4E-03	2.4E-03
			Aluminum					Aluminum	Body Weight			4.9E-04	4.9E-04
			Arsenic			2.5E-09	2.5E-09	Arsenic	Skin, Vascular			3.9E-04	3.9E-04
			Beryllium					Beryllium	Gastrointestinal			1.7E-02	1.7E-02
			Cadmium					Cadmium	Kidney			2.4E-03	2.4E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			1.0E-03	1.0E-03
			Iron					Iron	Liver, Blood, GI Tract			2.1E-02	2.1E-02
			Manganese					Manganese	CNS			1.5E+00	1.5E+00
			Nickel					Nickel	Decreased Organ/ Body Weights			1.2E-02	1.2E-02
			Thallium					Thallium	Liver			5.8E-04	5.8E-04
			Zinc					Zinc	Blood			2.3E-04	2.3E-04

Total Risk Across Surface Soil	5.8E-07
Total Risk Across Groundwater	1.4E-08
Total Risk Across All Media and All Exposure Routes	5.9E-07

Total Hazard Index Across All Media and All Exposure Routes	1.6E+00
Total Liver HI =	4.0E-02
Total Kidney HI =	2.4E-03
Total Vascular HI =	1.4E-03
Total GI Tract HI =	3.8E-02
Total Skin HI =	3.9E-04
Total Blood HI =	2.2E-02
Total CNS HI =	1.5E+00
Total Immune System HI =	1.0E-03
Total Body Weight HI =	1.2E-02
Total Prostate HI =	2.4E-03

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.3E-08		1.1E-08	2.4E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.4E-07		2.1E-07	4.5E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.4E-08		2.0E-08	4.4E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.9E-08		4.2E-08	9.1E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	5.1E-04		3.3E-04	8.4E-04
							Total Risk Across Surface Soil 6.1E-07						Total Hazard Index Across All Media and All Exposure Routes 8.4E-04

Total Risk Across All Media and All Exposure Routes 6.1E-07

Total Liver HI = 8.4E-04
Total Prostate HI = 0.0E+00

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.4E-07		1.2E-07	2.5E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.5E-06		2.2E-06	4.7E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.4E-07		2.1E-07	4.6E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	5.1E-07		4.4E-07	9.5E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	5.3E-03		3.5E-03	8.7E-03
							Total Risk Across Surface Soil 6.3E-06						Total Hazard Index Across All Media and All Exposure Routes 8.7E-03

Total Risk Across All Media and All Exposure Routes 6.3E-06

Total Liver HI = 8.7E-03
Total Prostate HI = 0.0E+00

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	3.4E-08		1.8E-08	5.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.3E-07		3.3E-07	9.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	6.1E-08		3.2E-08	9.3E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.3E-07		6.7E-08	1.9E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	1.1E-03		4.4E-04	1.5E-03
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	2.8E-03		5.4E-04	3.3E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	6.0E-03		1.2E-03	7.1E-03
			2,4,6-Trinitrotoluene	1.0E-08		5.4E-10	1.1E-08	2,4,6-Trinitrotoluene	Liver	1.6E-03		8.4E-05	1.7E-03
			RDX	3.5E-07		4.1E-08	3.9E-07	RDX	Prostate	2.4E-03		2.9E-04	2.7E-03
			Aluminum					Aluminum	Body Weight	2.0E-04		3.6E-05	2.4E-04
			Arsenic	1.9E-07		3.4E-08	2.2E-07	Arsenic	Skin, Vascular	9.6E-04		1.7E-04	1.1E-03
			Iron					Iron	Liver, Blood, GI Trac	9.6E-04		1.7E-04	1.1E-03
			Manganese					Manganese	CNS	1.9E-03		8.6E-03	1.0E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	1.5E-03		0.0E+00	1.5E-03
			ARSENIC	2.6E-06		7.1E-06	9.7E-06	ARSENIC	Skin, Vascular	1.3E-02		3.7E-02	5.0E-02
			CHROMIUM					CHROMIUM	NOAEL	2.6E-03		0.0E+00	2.6E-03
			IRON					IRON	Liver, Blood, GI Tract	3.3E-02		0.0E+00	3.3E-02
			MANGANESE					MANGANESE	CNS	1.1E-02		0.0E+00	1.1E-02
			VANADIUM					VANADIUM	NOAEL	1.1E-03		0.0E+00	1.1E-03

Total Risk Across Surface Soil	1.3E-06
Total Risk Across Surface Water	6.2E-07
Total Risk Across Sediment	9.7E-06
Total Risk Across All Media and All Exposure Routes	1.2E-05

Total Hazard Index Across All Media and All Exposure Routes	1.3E-01
Total Liver HI =	4.5E-02
Total Vascular HI =	5.1E-02
Total GI Tract HI =	3.4E-02
Total Skin HI =	5.1E-02
Total Blood HI =	3.4E-02
Total CNS HI =	2.1E-02
Total Body Weight HI =	1.7E-03
Total Prostate HI =	2.7E-03

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS

SWMU 10 - ROCKEYE

NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.0E-08		1.0E-08	2.0E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.9E-07		1.9E-07	3.7E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.8E-08		1.8E-08	3.6E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	3.8E-08		3.8E-08	7.6E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	8.9E-04		6.8E-04	1.6E-03
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	4.5E-04		1.8E-04	6.4E-04
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	9.7E-04		4.0E-04	1.4E-03
			2,4,6-Trinitrotoluene	6.3E-10		6.8E-11	6.9E-10	2,4,6-Trinitrotoluene	Liver	2.7E-04		2.9E-05	2.9E-04
			RDX	2.1E-08		5.1E-09	2.6E-08	RDX	Prostate	4.0E-04		9.8E-05	5.0E-04
			Aluminum					Aluminum	Body Weight	3.3E-05		1.2E-05	4.5E-05
			Arsenic	1.1E-08		4.2E-09	1.5E-08	Arsenic	Skin, Vascular	1.6E-04		6.0E-05	2.2E-04
			Iron					Iron	Liver, Blood, GI Trac	1.6E-04		6.0E-05	2.2E-04
			Manganese					Manganese	CNS	3.1E-04		2.9E-03	3.3E-03
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	1.2E-03		0.0E+00	1.2E-03
			ARSENIC	7.7E-07		1.8E-07	9.5E-07	ARSENIC	Skin, Vascular	1.1E-02		2.5E-03	1.3E-02
			CHROMIUM					CHROMIUM	NOAEL	2.1E-03		0.0E+00	2.1E-03
			IRON					IRON	Liver, Blood, GI Tract	2.7E-02		0.0E+00	2.7E-02
			MANGANESE					MANGANESE	CNS	8.7E-03		0.0E+00	8.7E-03
			VANADIUM					VANADIUM	NOAEL	9.3E-04		0.0E+00	9.3E-04

Total Risk Across Surface Soil	5.1E-07
Total Risk Across Surface Water	4.2E-08
Total Risk Across Sediment	9.5E-07
Total Risk Across All Media and All Exposure Routes	1.5E-06

Total Hazard Index Across All Media and All Exposure Routes	6.1E-02
Total Liver HI =	2.9E-02
Total Vascular HI =	1.4E-02
Total GI Tract HI =	2.7E-02
Total Skin HI =	1.4E-02
Total Blood HI =	2.7E-02
Total CNS HI =	1.2E-02
Total Body Weight HI =	1.3E-03
Total Prostate HI =	5.0E-04

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.8E-07		9.6E-08	2.8E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.4E-06		1.8E-06	5.2E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.3E-07		1.7E-07	5.0E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	6.9E-07		3.6E-07	1.0E-06	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	7.4E-03		3.0E-03	1.0E-02
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.9E-02		3.6E-03	2.2E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	4.0E-02		7.8E-03	4.8E-02
			2,4,6-Trinitrotoluene	5.6E-08		2.9E-09	5.9E-08	2,4,6-Trinitrotoluene	Liver	1.1E-02		5.6E-04	1.2E-02
			RDX	1.9E-06		2.2E-07	2.1E-06	RDX	Prostate	1.6E-02		1.9E-03	1.8E-02
			Aluminum					Aluminum	Body Weight	1.4E-03		2.5E-04	1.6E-03
			Arsenic	1.0E-06		1.8E-07	1.2E-06	Arsenic	Skin, Vascular	6.5E-03		1.2E-03	7.6E-03
			Iron					Iron	Liver, Blood, GI Trac	6.5E-03		1.2E-03	7.7E-03
			Manganese					Manganese	CNS	1.3E-02		5.8E-02	7.1E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	1.0E-02		0.0E+00	1.0E-02
			ARSENIC	1.4E-05		1.7E-06	1.6E-05	ARSENIC	Skin, Vascular	9.1E-02		1.1E-02	1.0E-01
			CHROMIUM					CHROMIUM	NOAEL	1.8E-02		0.0E+00	1.8E-02
			IRON					IRON	Liver, Blood, GI Tract	2.2E-01		0.0E+00	2.2E-01
			MANGANESE					MANGANESE	CNS	7.2E-02		0.0E+00	7.2E-02
			VANADIUM					VANADIUM	NOAEL	7.7E-03		0.0E+00	7.7E-03

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.9E+00		2.6E-02	1.9E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	3.0E+00		4.2E-02	3.0E+00
			2,4,6-Trinitrotoluene	4.5E-06		1.8E-08	4.5E-06	2,4,6-Trinitrotoluene	Liver	8.8E-01		3.4E-03	8.8E-01
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	1.5E-02		6.4E-04	1.6E-02
			HMX					HMX	Liver, Blood	1.3E-01		4.7E-04	1.3E-01
			RDX	1.2E-04		1.1E-06	1.2E-04	RDX	Prostate	1.0E+00		9.3E-03	1.1E+00
			Aluminum					Aluminum	Body Weight	2.0E-01		1.0E-03	2.0E-01
			Arsenic	2.4E-05		1.2E-07	2.4E-05	Arsenic	Skin, Vascular	1.6E-01		8.1E-04	1.6E-01
			Beryllium					Beryllium	Gastrointestinal	4.7E-02		3.5E-02	8.2E-02
			Cadmium					Cadmium	Kidney	4.7E-02		4.9E-03	5.2E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	4.1E-01		2.1E-03	4.1E-01
			Iron					Iron	Liver, Blood, GI Tract	8.6E+00		4.5E-02	8.6E+00
			Manganese					Manganese	CNS	2.5E+01		3.2E+00	2.8E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	9.5E-01		2.5E-02	9.8E-01
			Thallium					Thallium	Liver	2.3E-01		1.2E-03	2.3E-01
			Zinc					Zinc	Blood	1.5E-01		4.7E-04	1.5E-01

Total Risk Across Surface Soil	7.0E-06
Total Risk Across Surface Water	3.3E-06
Total Risk Across Sediment	1.6E-05
Total Risk Across Groundwater	1.5E-04
Total Risk Across All Media and All Exposure Routes	1.7E-04

Total Hazard Index Across All Media and All Exposure Routes	4.7E+01
Total Liver HI =	1.4E+01
Total Kidney HI =	5.2E-02
Total Vascular HI =	6.8E-01
Total GI Tract HI =	8.9E+00
Total Skin HI =	2.7E-01
Total Blood HI =	9.1E+00
Total CNS HI =	2.9E+01
Total Immune System HI =	4.1E-01
Total Body Weight HI =	1.2E+00
Total Prostate HI =	1.1E+00

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	4.2E-07		1.1E-07	5.3E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.9E-06		2.1E-06	1.0E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	7.7E-07		2.0E-07	9.7E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.6E-06		4.2E-07	2.0E-06	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	6.9E-02		1.4E-02	8.3E-02
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.7E-02		3.7E-03	2.1E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	3.7E-02		8.0E-03	4.5E-02
			2,4,6-Trinitrotoluene	1.3E-08		7.5E-10	1.4E-08	2,4,6-Trinitrotoluene	Liver	1.0E-02		5.8E-04	1.1E-02
			RDX	4.3E-07		5.6E-08	4.9E-07	RDX	Prostate	1.5E-02		2.0E-03	1.7E-02
			Aluminum					Aluminum	Body Weight	1.3E-03		2.5E-04	1.5E-03
			Arsenic	2.3E-07		4.6E-08	2.8E-07	Arsenic	Skin, Vascular	6.0E-03		1.2E-03	7.2E-03
			Iron					Iron	Liver, Blood, GI Trac	6.1E-03		1.2E-03	7.3E-03
			Manganese					Manganese	CNS	1.2E-02		5.9E-02	7.1E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	9.5E-02			9.5E-02
			ARSENIC	3.3E-05		2.0E-06	3.5E-05	ARSENIC	Skin, Vascular	8.5E-01		5.1E-02	9.0E-01
			CHROMIUM					CHROMIUM	NOAEL	1.6E-01			1.6E-01
			IRON					IRON	Liver, Blood, GI Tract	2.1E+00			2.1E+00
			MANGANESE					MANGANESE	CNS	6.7E-01			6.7E-01
			VANADIUM					VANADIUM	NOAEL	7.2E-02			7.2E-02

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	6.5E+00		5.8E-02	6.5E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.0E+01		9.3E-02	1.0E+01
			2,4,6-Trinitrotoluene	4.0E-06		9.9E-09	4.0E-06	2,4,6-Trinitrotoluene	Liver	3.1E+00		7.7E-03	3.1E+00
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	5.3E-02		1.4E-03	5.4E-02
		8.5E-06	HMX					HMX	Liver, Blood	4.6E-01		1.1E-03	4.6E-01
			RDX	1.0E-04		5.9E-07	1.0E-04	RDX	Prostate	3.7E+00		2.1E-02	3.7E+00
			Aluminum					Aluminum	Body Weight	6.8E-01		3.0E-03	6.9E-01
			Arsenic	2.1E-05		9.2E-08	2.1E-05	Arsenic	Skin, Vascular	5.4E-01		2.4E-03	5.5E-01
			Beryllium					Beryllium	Gastrointestinal	1.6E-01		1.0E-01	2.7E-01
			Cadmium					Cadmium	Kidney	1.7E-01		1.5E-02	1.8E-01
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	1.4E+00		6.3E-03	1.4E+00
			Iron					Iron	Liver, Blood, GI Tract	3.0E+01		1.3E-01	3.0E+01
			Manganese					Manganese	CNS	8.7E+01		9.6E+00	9.7E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	3.3E+00		7.3E-02	3.4E+00
			Thallium					Thallium	Liver	8.1E-01		3.6E-03	8.2E-01
			Zinc					Zinc	Blood	5.3E-01		1.4E-03	5.3E-01

Total Risk Across Surface Soil	1.3E-05
Total Risk Across Surface Water	7.8E-07
Total Risk Across Sediment	3.5E-05
Total Risk Across Groundwater	1.3E-04
Total Risk Across All Media and All Exposure Routes	1.8E-04

Total Hazard Index Across All Media and All Exposure Routes	1.6E+02
Total Liver HI =	5.4E+01
Total Kidney HI =	1.8E-01
Total Vascular HI =	2.9E+00
Total GI Tract HI =	3.2E+01
Total Skin HI =	1.4E+00
Total Blood HI =	3.3E+01
Total CNS HI =	9.9E+01
Total Immune System HI =	1.4E+00
Total Body Weight HI =	4.2E+00
Total Prostate HI =	3.7E+00

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS

SWMU 10 - ROCKEYE

NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	BENZO(A)ANTHRACENE	7.8E-09		2.1E-09	9.9E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.5E-07		3.9E-08	1.8E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.4E-08		3.8E-09	1.8E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	2.9E-08		8.0E-09	3.7E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	6.6E-03		1.4E-03	8.0E-03
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver			5.0E-03	5.0E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver			8.0E-03	8.0E-03
			2,4,6-Trinitrotoluene			1.4E-10	1.4E-10	2,4,6-Trinitrotoluene	Liver			6.5E-04	6.5E-04
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver			1.2E-04	1.2E-04
			HMX					HMX	Liver, Blood			9.0E-05	9.0E-05
			RDX			8.4E-09	8.4E-09	RDX	Prostate			1.8E-03	1.8E-03
			Aluminum					Aluminum	Body Weight			3.1E-04	3.1E-04
			Arsenic			1.6E-09	1.6E-09	Arsenic	Skin, Vascular			2.5E-04	2.5E-04
			Beryllium					Beryllium	Gastrointestinal			1.1E-02	1.1E-02
			Cadmium					Cadmium	Kidney			1.5E-03	1.5E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			6.6E-04	6.6E-04
			Iron					Iron	Liver, Blood, GI Tract			1.4E-02	1.4E-02
			Manganese					Manganese	CNS			1.0E+00	1.0E+00
			Nickel					Nickel	Decreased Organ/ Body Weights			7.7E-03	7.7E-03
			Thallium					Thallium	Liver			3.7E-04	3.7E-04
			Zinc					Zinc	Blood			1.5E-04	1.5E-04

Total Risk Across Surface Soil	2.5E-07
Total Risk Across Groundwater	1.0E-08
Total Risk Across All Media and All Exposure Routes	2.6E-07

Total Hazard Index Across All Media and All Exposure Routes	1.1E+00
Total Liver HI =	2.8E-02
Total Kidney HI =	1.5E-03
Total Vascular HI =	9.1E-04
Total GI Tract HI =	2.5E-02
Total Skin HI =	2.5E-04
Total Blood HI =	1.4E-02
Total CNS HI =	1.0E+00
Total Immune System HI =	6.6E-04
Total Body Weight HI =	8.0E-03
Total Prostate HI =	1.8E-03

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS

SWMU 10 - ROCKEYE

NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.2E-09		2.0E-10	1.4E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.2E-08		3.7E-09	2.6E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.1E-09		3.6E-10	2.5E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.4E-09		7.6E-10	5.2E-09	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	1.3E-04		1.7E-05	1.4E-04
						Total Risk Across Surface Soil	3.5E-08		Total Hazard Index Across All Media and All Exposure Routes				1.4E-04

Total Liver HI = 1.4E-04

Total Risk Across All Media and All Exposure Routes 3.5E-08

Total Prostate HI = 0.0E+00

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.1E-08		3.7E-09	2.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.0E-07		6.8E-08	4.7E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.9E-08		6.6E-09	4.5E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	8.0E-08		1.4E-08	9.4E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	2.3E-03		3.0E-04	2.6E-03
						Total Risk Across Surface Soil	6.3E-07		Total Hazard Index Across All Media and All Exposure Routes				2.6E-03

Total Liver HI = 2.6E-03

Total Risk Across All Media and All Exposure Routes 6.3E-07

Total Prostate HI = 0.0E+00

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.5E-09		3.3E-10	2.9E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.7E-08		6.1E-09	5.3E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.6E-09		6.0E-10	5.2E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	9.6E-09		1.2E-09	1.1E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	2.7E-04		2.7E-05	3.0E-04
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	7.0E-04		1.8E-04	8.8E-04
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.5E-03		3.9E-04	1.9E-03
			2,4,6-Trinitrotoluene	7.9E-10		5.7E-11	8.4E-10	2,4,6-Trinitrotoluene	Liver	4.1E-04		3.0E-05	4.4E-04
			RDX	2.6E-08		4.3E-09	3.0E-08	RDX	Prostate	6.1E-04		1.0E-04	7.1E-04
			Aluminum					Aluminum	Body Weight	5.0E-05		9.1E-06	5.9E-05
			Arsenic	1.4E-08		2.5E-09	1.6E-08	Arsenic	Skin, Vascular	2.4E-04		4.4E-05	2.8E-04
			Iron					Iron	Liver, Blood, GI Trac	2.4E-04		4.4E-05	2.8E-04
			Manganese					Manganese	CNS	4.7E-04		2.1E-03	2.6E-03
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.8E-04		0.0E+00	3.8E-04
			ARSENIC	1.9E-07		2.1E-07	4.1E-07	ARSENIC	Skin, Vascular	3.4E-03		3.7E-03	7.0E-03
			CHROMIUM					CHROMIUM	NOAEL	6.5E-04		0.0E+00	6.5E-04
			IRON					IRON	Liver, Blood, GI Tract	8.2E-03		0.0E+00	8.2E-03
			MANGANESE					MANGANESE	CNS	2.7E-03		0.0E+00	2.7E-03
			VANADIUM					VANADIUM	NOAEL	2.8E-04		0.0E+00	2.8E-04

Total Risk Across Surface Soil	7.2E-08
Total Risk Across Surface Water	4.7E-08
Total Risk Across Sediment	4.1E-07
Total Risk Across All Media and All Exposure Routes	5.3E-07

Total Hazard Index Across All Media and All Exposure Routes	2.7E-02
Total Liver HI =	1.1E-02
Total Vascular HI =	7.3E-03
Total GI Tract HI =	8.5E-03
Total Skin HI =	7.3E-03
Total Blood HI =	8.5E-03
Total CNS HI =	5.3E-03
Total Body Weight HI =	4.4E-04
Total Prostate HI =	7.1E-04

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.5E-09		8.1E-10	3.3E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.7E-08		1.5E-08	6.2E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.6E-09		1.5E-09	6.0E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	9.5E-09		3.1E-09	1.3E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	2.2E-04		5.5E-05	2.8E-04
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.1E-04		5.1E-05	1.6E-04
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	2.4E-04		1.1E-04	3.5E-04
			2,4,6-Trinitrotoluene	1.6E-10		1.9E-11	1.8E-10	2,4,6-Trinitrotoluene	Liver	6.6E-05		8.2E-06	7.5E-05
			RDX	5.2E-09		1.5E-09	6.6E-09	RDX	Prostate	9.9E-05		2.8E-05	1.3E-04
			Aluminum					Aluminum	Body Weight	8.2E-06		2.5E-06	1.1E-05
			Arsenic	2.8E-09		8.6E-10	3.6E-09	Arsenic	Skin, Vascular	3.9E-05		1.2E-05	5.1E-05
			Iron					Iron	Liver, Blood, GI Trac	3.9E-05		1.2E-05	5.1E-05
			Manganese					Manganese	CNS	7.7E-05		6.0E-04	6.7E-04
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.1E-04		0.0E+00	3.1E-04
			ARSENIC	1.9E-07		1.4E-08	2.1E-07	ARSENIC	Skin, Vascular	2.7E-03		2.0E-04	2.9E-03
			CHROMIUM					CHROMIUM	NOAEL	5.3E-04		0.0E+00	5.3E-04
			IRON					IRON	Liver, Blood, GI Tract	6.7E-03		0.0E+00	6.7E-03
			MANGANESE					MANGANESE	CNS	2.2E-03		0.0E+00	2.2E-03
			VANADIUM					VANADIUM	NOAEL	2.3E-04		0.0E+00	2.3E-04

Total Risk Across Surface Soil	8.4E-08
Total Risk Across Surface Water	1.0E-08
Total Risk Across Sediment	2.1E-07
Total Risk Across All Media and All Exposure Routes	3.0E-07

Total Hazard Index Across All Media and All Exposure Routes	1.5E-02
Total Liver HI =	7.3E-03
Total Vascular HI =	3.0E-03
Total GI Tract HI =	6.8E-03
Total Skin HI =	3.0E-03
Total Blood HI =	6.8E-03
Total CNS HI =	2.9E-03
Total Body Weight HI =	3.2E-04
Total Prostate HI =	1.3E-04

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.7E-08		3.4E-09	3.0E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	5.0E-07		6.4E-08	5.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.8E-08		6.2E-09	5.4E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.0E-07		1.3E-08	1.1E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	3.7E-03		3.7E-04	4.1E-03
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	6.3E-03		1.6E-03	7.9E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.3E-02		3.5E-03	1.7E-02
			2,4,6-Trinitrotoluene	5.5E-09		4.0E-10	5.9E-09	2,4,6-Trinitrotoluene	Liver	3.7E-03		2.7E-04	3.9E-03
			RDX	1.8E-07		3.0E-08	2.1E-07	RDX	Prostate	5.5E-03		9.1E-04	6.4E-03
			Aluminum					Aluminum	Body Weight	4.5E-04		8.2E-05	5.3E-04
			Arsenic	9.7E-08		1.8E-08	1.1E-07	Arsenic	Skin, Vascular	2.2E-03		3.9E-04	2.5E-03
			Iron					Iron	Liver, Blood, GI Trac	2.2E-03		3.9E-04	2.6E-03
			Manganese					Manganese	CNS	4.3E-03		1.9E-02	2.4E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.4E-03		0.0E+00	3.4E-03
			ARSENIC	1.4E-06		4.1E-08	1.4E-06	ARSENIC	Skin, Vascular	3.0E-02		9.1E-04	3.1E-02
			CHROMIUM					CHROMIUM	NOAEL	5.9E-03		0.0E+00	5.9E-03
			IRON					IRON	Liver, Blood, GI Tract	7.4E-02		0.0E+00	7.4E-02
			MANGANESE					MANGANESE	CNS	2.4E-02		0.0E+00	2.4E-02
			VANADIUM					VANADIUM	NOAEL	2.6E-03		0.0E+00	2.6E-03

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.3E+00		1.7E-02	1.3E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	2.1E+00		2.7E-02	2.1E+00
			2,4,6-Trinitrotoluene	9.2E-07		3.4E-09	9.3E-07	2,4,6-Trinitrotoluene	Liver	6.2E-01		2.2E-03	6.2E-01
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	1.1E-02		4.2E-04	1.1E-02
			HMX					HMX	Liver, Blood	9.2E-02		3.1E-04	9.2E-02
			RDX	2.4E-05		2.0E-07	2.4E-05	RDX	Prostate	7.3E-01		6.1E-03	7.4E-01
			Aluminum					Aluminum	Body Weight	1.4E-01		4.4E-04	1.4E-01
			Arsenic	4.9E-06		1.6E-08	4.9E-06	Arsenic	Skin, Vascular	1.1E-01		3.5E-04	1.1E-01
			Beryllium					Beryllium	Gastrointestinal	3.3E-02		1.5E-02	4.8E-02
			Cadmium					Cadmium	Kidney	3.3E-02		2.1E-03	3.5E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	2.9E-01		9.2E-04	2.9E-01
			Iron					Iron	Liver, Blood, GI Tract	6.0E+00		1.9E-02	6.0E+00
			Manganese					Manganese	CNS	1.7E+01		1.4E+00	1.9E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	6.7E-01		1.1E-02	6.8E-01
			Thallium					Thallium	Liver	1.6E-01		5.2E-04	1.6E-01
			Zinc					Zinc	Blood	1.1E-01		2.0E-04	1.1E-01

Total Risk Across Surface Soil	7.6E-07
Total Risk Across Surface Water	3.3E-07
Total Risk Across Sediment	1.4E-06
Total Risk Across Groundwater	3.0E-05
Total Risk Across All Media and All Exposure Routes	3.3E-05

Total Hazard Index Across All Media and All Exposure Routes	3.1E+01
Total Liver HI =	1.0E+01
Total Kidney HI =	3.5E-02
Total Vascular HI =	4.3E-01
Total GI Tract HI =	6.1E+00
Total Skin HI =	1.4E-01
Total Blood HI =	6.3E+00
Total CNS HI =	1.9E+01
Total Immune System HI =	2.9E-01
Total Body Weight HI =	8.2E-01
Total Prostate HI =	7.4E-01

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	4.7E-08		4.3E-09	5.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	8.8E-07		8.0E-08	9.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	8.6E-08		7.8E-09	9.3E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.8E-07		1.6E-08	1.9E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	2.3E-02		1.6E-03	2.5E-02
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	5.8E-03		1.5E-03	7.3E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.3E-02		3.2E-03	1.6E-02
			2,4,6-Trinitrotoluene	1.5E-09		1.0E-10	1.6E-09	2,4,6-Trinitrotoluene	Liver	3.4E-03		2.4E-04	3.7E-03
			RDX	4.8E-08		7.7E-09	5.6E-08	RDX	Prostate	5.1E-03		8.2E-04	5.9E-03
			Aluminum					Aluminum	Body Weight	4.2E-04		7.4E-05	5.0E-04
			Arsenic	2.6E-08		4.5E-09	3.0E-08	Arsenic	Skin, Vascular	2.0E-03		3.5E-04	2.4E-03
			Iron					Iron	Liver, Blood, GI Trac	2.0E-03		3.5E-04	2.4E-03
			Manganese					Manganese	CNS	4.0E-03		1.7E-02	2.1E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.2E-02			3.2E-02
			ARSENIC	3.6E-06		7.6E-08	3.7E-06	ARSENIC	Skin, Vascular	2.8E-01		5.9E-03	2.9E-01
			CHROMIUM					CHROMIUM	NOAEL	5.5E-02			5.5E-02
			IRON					IRON	Liver, Blood, GI Tract	6.9E-01			6.9E-01
			MANGANESE					MANGANESE	CNS	2.3E-01			2.3E-01
			VANADIUM					VANADIUM	NOAEL	2.4E-02			2.4E-02

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	2.9E+00		3.4E-02	2.9E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	4.6E+00		5.4E-02	4.6E+00
			2,4,6-Trinitrotoluene	5.8E-07		1.9E-09	5.8E-07	2,4,6-Trinitrotoluene	Liver	1.4E+00		4.4E-03	1.4E+00
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	2.3E-02		8.3E-04	2.4E-02
			HMX					HMX	Liver, Blood	2.0E-01		6.1E-04	2.0E-01
			RDX	1.5E-05		1.1E-07	1.5E-05	RDX	Prostate	1.6E+00		1.2E-02	1.6E+00
			Aluminum					Aluminum	Body Weight	3.0E-01		9.9E-04	3.0E-01
			Arsenic	3.1E-06		1.0E-08	3.1E-06	Arsenic	Skin, Vascular	2.4E-01		7.9E-04	2.4E-01
			Beryllium					Beryllium	Gastrointestinal	7.3E-02		3.4E-02	1.1E-01
			Cadmium					Cadmium	Kidney	7.3E-02		4.8E-03	7.8E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	6.3E-01		2.1E-03	6.3E-01
			Iron					Iron	Liver, Blood, GI Tract	1.3E+01		4.3E-02	1.3E+01
			Manganese					Manganese	CNS	3.8E+01		3.2E+00	4.1E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	1.5E+00		2.4E-02	1.5E+00
			Thallium					Thallium	Liver	3.6E-01		1.2E-03	3.6E-01
			Zinc					Zinc	Blood	2.3E-01		4.6E-04	2.3E-01

Total Risk Across Surface Soil	1.3E-06
Total Risk Across Surface Water	8.8E-08
Total Risk Across Sediment	3.7E-06
Total Risk Across Groundwater	1.9E-05
Total Risk Across All Media and All Exposure Routes	2.4E-05

Total Hazard Index Across All Media and All Exposure Routes	7.0E+01
Total Liver HI =	2.3E+01
Total Kidney HI =	7.8E-02
Total Vascular HI =	1.2E+00
Total GI Tract HI =	1.4E+01
Total Skin HI =	5.3E-01
Total Blood HI =	1.4E+01
Total CNS HI =	4.2E+01
Total Immune System HI =	6.3E-01
Total Body Weight HI =	1.8E+00
Total Prostate HI =	1.6E+00

RAGS-PART D TABLE 9'S – SWMU 4

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	METHYLENE CHLORIDE	7.5E-13			7.5E-13	METHYLENE CHLORIDE	Liver	1.2E-07			1.2E-07
			BENZO(A)ANTHRACENE	1.4E-07		6.6E-08	2.1E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.3E-06		6.2E-07	1.9E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.0E-07		9.3E-08	2.9E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	8.8E-08		4.2E-08	1.3E-07	INDENO(1,2,3-CD)PYRENE					
			DELTA-BHC	5.8E-10		8.5E-11	6.7E-10	DELTA-BHC					
			AROCLOR-1254	2.2E-08		1.1E-08	3.3E-08	AROCLOR-1254	mmunological, Nail	3.8E-02		1.9E-02	5.7E-02
			PENTACHLOROPHENOL	3.1E-10		2.8E-10	5.9E-10	PENTACHLOROPHENOL	Liver, Kidney	6.0E-06		5.5E-06	1.1E-05
			ANTIMONY					ANTIMONY	Lifespan	7.2E-03			7.2E-03
			ARSENIC	4.0E-07		4.3E-08	4.4E-07	ARSENIC	Skin, Vascular	6.2E-02		6.7E-03	6.9E-02
			BARIUM					BARIUM	Blood	2.4E-02			2.4E-02
			CADMIUM					CADMIUM	Kidney	5.0E-03		7.3E-04	5.8E-03
			CHROMIUM					CHROMIUM	NOAEL	1.6E-02			1.6E-02
			IRON					IRON	Liver, Blood, GI Tract	2.2E-01			2.2E-01
			MANGANESE					MANGANESE	CNS	2.6E-02			2.6E-02
			MERCURY					MERCURY	CNS	1.2E-03			1.2E-03
			NICKEL					NICKEL	Decreased Organ/ Body Weights	2.6E-03			2.6E-03
			SELENIUM					SELENIUM	Hair, Nail Loss	3.4E-04			3.4E-04
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight			3.5E-05	3.5E-05
			Arsenic			5.3E-09	5.3E-09	Arsenic	Skin, Vascular			8.2E-04	8.2E-04
			Iron					Iron	Liver, Blood, GI Tract			7.6E-03	7.6E-03
			Manganese					Manganese	CNS			1.4E-01	1.4E-01

Total Risk Across Surface Soil	3.0E-06
Total Risk Across Groundwater	5.3E-09
Total Risk Across All Media and All Exposure Routes	3.1E-06

Total Hazard Index Across All Media and All Exposure Routes	5.8E-01
Total Liver HI =	2.2E-01
Total Kidney HI =	5.8E-03
Total Vascular HI =	6.9E-02
Total GI Tract HI =	2.2E-01
Total Skin HI =	6.9E-02
Total Blood HI =	2.5E-01
Total CNS HI =	1.7E-01
Total Immune System HI =	5.7E-02
Total Body Weight HI =	2.6E-03
Total Lifespan HI =	7.2E-03
Total Hair, Nails HI =	5.7E-02

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	5.6E-13		0.0E+00	5.6E-13	METHYLENE CHLORIDE	Liver	3.5E-09		0.0E+00	3.5E-09
			BENZO(A)ANTHRACENE	6.9E-08		5.9E-08	1.3E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.3E-07		6.3E-07	1.4E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.2E-07		1.0E-07	2.2E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	5.4E-08		4.6E-08	1.0E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	8.9E-10		1.5E-09	2.3E-09	PENTACHLOROPHENOL	Liver, Kidney	6.9E-07		1.1E-06	1.8E-06
			CADMIUM					CADMIUM	Kidney	2.6E-04		6.9E-05	3.3E-04
						Total Risk Across Surface Soil	1.8E-06					Total Hazard Index Across All Media and All Exposure Routes	3.3E-04

Total Risk Across All Media and All Exposure Routes 1.8E-06

Total Liver HI = 1.8E-06
Total Kidney HI = 3.3E-04

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	5.8E-12		0.0E+00	5.8E-12	METHYLENE CHLORIDE	Liver	3.6E-08		0.0E+00	3.6E-08
			BENZO(A)ANTHRACENE	7.1E-07		6.1E-07	1.3E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.7E-06		6.6E-06	1.4E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.2E-06		1.1E-06	2.3E-06	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	5.6E-07		4.8E-07	1.0E-06	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	9.2E-09		1.5E-08	2.4E-08	PENTACHLOROPHENOL	Liver, Kidney	7.2E-06		1.2E-05	1.9E-05
			CADMIUM					CADMIUM	Kidney	2.7E-03		7.2E-04	3.4E-03
						Total Risk Across Surface Soil	1.9E-05					Total Hazard Index Across All Media and All Exposure Routes	3.4E-03

Total Risk Across All Media and All Exposure Routes: 1.9E-05

Total Liver HI = 1.9E-05
Total Kidney HI = 3.4E-03

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.4E-12		0.0E+00	1.4E-12	METHYLENE CHLORIDE	Liver	7.5E-09		0.0E+00	7.5E-09
			BENZO(A)ANTHRACENE	1.8E-07		9.4E-08	2.7E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.9E-06		1.0E-06	2.9E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.1E-07		1.6E-07	4.7E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.4E-07		7.4E-08	2.1E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	2.3E-09		2.3E-09	4.6E-09	PENTACHLOROPHENOL	Liver, Kidney	1.5E-06		1.5E-06	3.0E-06
			CADMIUM					CADMIUM	Kidney	5.6E-04		9.1E-05	6.5E-04
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	3.0E-04		5.4E-05	3.5E-04
			Arsenic	2.4E-07		4.3E-08	2.8E-07	Arsenic	Skin, Vascular	1.2E-03		2.2E-04	1.4E-03
			Barium					Barium	Blood	2.0E-03		5.2E-03	7.2E-03
			Manganese					Manganese	CNS	4.2E-03		1.9E-02	2.3E-02
Sediment	Sediment	Sediment	ARSENIC	6.1E-07		1.7E-06	2.3E-06	ARSENIC	Skin, Vascular	3.2E-03		8.7E-03	1.2E-02
			IRON					IRON	Liver, Blood, GI Tract	8.6E-03		0.0E+00	8.6E-03
			MANGANESE					MANGANESE	CNS	1.3E-03		0.0E+00	1.3E-03

Total Risk Across Surface Soil	3.9E-06
Total Risk Across Surface Water	2.8E-07
Total Risk Across Sediment	2.3E-06
Total Risk Across All Media and All Exposure Routes	6.4E-06

Total Hazard Index Across All Media and All Exposure Routes	5.5E-02
Total Liver HI =	8.6E-03
Total Kidney HI =	6.6E-04
Total Vascular HI =	1.3E-02
Total GI Tract HI =	8.6E-03
Total Skin HI =	1.3E-02
Total Blood HI =	1.6E-02
Total CNS HI =	2.5E-02
Total Body Weight HI =	3.5E-04
Total Thyroid HI =	0.0E+00

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	4.3E-13		0.0E+00	4.3E-13	METHYLENE CHLORIDE	Liver	6.1E-09		0.0E+00	6.1E-09
			BENZO(A)ANTHRACENE	5.3E-08		5.3E-08	1.1E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	5.7E-07		5.7E-07	1.1E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	9.1E-08		9.1E-08	1.8E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	4.2E-08		4.2E-08	8.3E-08	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	6.9E-10		1.3E-09	2.0E-09	PENTACHLOROPHENOL	Liver, Kidney	1.2E-06		2.3E-06	3.5E-06
			CADMIUM					CADMIUM	Kidney	4.6E-04		1.4E-04	6.0E-04
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	4.8E-05		1.8E-05	6.7E-05
			Arsenic	1.4E-08		5.4E-09	1.9E-08	Arsenic	Skin, Vascular	2.0E-04		7.6E-05	2.7E-04
			Barium					Barium	Blood	3.3E-04		1.8E-03	2.1E-03
			Manganese					Manganese	CNS	6.9E-04		6.6E-03	7.3E-03
Sediment	Sediment	Sediment	ARSENIC	1.8E-07		4.2E-08	2.3E-07	ARSENIC	Skin, Vascular	2.6E-03		5.9E-04	3.2E-03
			IRON					IRON	Liver, Blood, GI Tract	7.0E-03		0.0E+00	7.0E-03
			MANGANESE					MANGANESE	CNS	1.1E-03		0.0E+00	1.1E-03

Total Risk Across Surface Soil	1.5E-06
Total Risk Across Surface Water	1.9E-08
Total Risk Across Sediment	2.3E-07
Total Risk Across All Media and All Exposure Routes	1.8E-06

Total Hazard Index Across All Media and All Exposure Routes	2.2E-02
Total Liver HI =	7.0E-03
Total Kidney HI =	6.0E-04
Total Vascular HI =	3.5E-03
Total GI Tract HI =	7.0E-03
Total Skin HI =	3.5E-03
Total Blood HI =	9.1E-03
Total CNS HI =	8.3E-03
Total Body Weight HI =	6.7E-05
Total Thyroid HI =	0.0E+00

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	7.8E-12		0.0E+00	7.8E-12	METHYLENE CHLORIDE	Liver	5.0E-08		0.0E+00	5.0E-08
			BENZO(A)ANTHRACENE	9.6E-07		5.1E-07	1.5E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.0E-05		5.4E-06	1.6E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.6E-06		8.7E-07	2.5E-06	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	7.5E-07		4.0E-07	1.2E-06	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.2E-08		1.3E-08	2.5E-08	PENTACHLOROPHENOL	Liver, Kidney	1.0E-05		1.0E-05	2.0E-05
			CADMIUM					CADMIUM	Kidney	3.8E-03		6.2E-04	4.4E-03
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	2.0E-03		3.6E-04	2.4E-03
			Arsenic	1.3E-06		2.3E-07	1.5E-06	Arsenic	Skin, Vascular	8.2E-03		1.5E-03	9.7E-03
			Barium					Barium	Blood	1.3E-02		3.5E-02	4.8E-02
			Manganese					Manganese	CNS	2.8E-02		1.3E-01	1.6E-01
Sediment	Sediment	Sediment	ARSENIC	3.3E-06		4.0E-07	3.7E-06	ARSENIC	Skin, Vascular	2.1E-02		2.6E-03	2.4E-02
			IRON					IRON	Liver, Blood, GI Tract	5.8E-02		0.0E+00	5.8E-02
			MANGANESE					MANGANESE	CNS	8.9E-03		0.0E+00	8.9E-03
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	1.4E-02		7.3E-05	1.4E-02
			Arsenic	5.1E-05		2.6E-07	5.1E-05	Arsenic	Skin, Vascular	3.3E-01		1.7E-03	3.3E-01
			Iron					Iron	Liver, Blood, GI Tract	3.0E+00		1.6E-02	3.1E+00
			Manganese					Manganese	CNS	2.3E+00		3.0E-01	2.6E+00

Total Risk Across Surface Soil	2.1E-05
Total Risk Across Surface Water	1.5E-06
Total Risk Across Sediment	3.7E-06
Total Risk Across Groundwater	5.1E-05
Total Risk Across All Media and All Exposure Routes	7.7E-05

Total Hazard Index Across All Media and All Exposure Routes	6.3E+00
Total Liver HI =	3.1E+00
Total Kidney HI =	4.4E-03
Total Vascular HI =	3.6E-01
Total GI Tract HI =	3.1E+00
Total Skin HI =	3.6E-01
Total Blood HI =	3.2E+00
Total CNS HI =	2.7E+00
Total Body Weight HI =	1.6E-02
Total Thyroid HI =	0.0E+00

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.8E-11		0.0E+00	1.8E-11	METHYLENE CHLORIDE	Liver	4.7E-07		0.0E+00	4.7E-07
			BENZO(A)ANTHRACENE	2.2E-06		5.8E-07	2.8E-06	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.4E-05		6.2E-06	3.0E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.8E-06		1.0E-06	4.8E-06	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.8E-06		4.6E-07	2.2E-06	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	2.9E-08		1.4E-08	4.3E-08	PENTACHLOROPHENOL	Liver, Kidney	9.4E-05		4.7E-05	1.4E-04
			CADMIUM					CADMIUM	Kidney	3.5E-02		2.8E-03	3.8E-02
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	1.9E-03		3.7E-04	2.2E-03
			Arsenic	3.0E-07		5.9E-08	3.6E-07	Arsenic	Skin, Vascular	7.7E-03		1.5E-03	9.2E-03
			Barium					Barium	Blood	1.3E-02		3.6E-02	4.8E-02
			Manganese					Manganese	CNS	2.7E-02		1.3E-01	1.6E-01
Sediment	Sediment	Sediment	ARSENIC	7.7E-06		4.6E-07	8.2E-06	ARSENIC	Skin, Vascular	2.0E-01		1.2E-02	2.1E-01
			IRON					IRON	Liver, Blood, GI Tract	5.4E-01		0.0E+00	5.4E-01
			MANGANESE					MANGANESE	CNS	8.3E-02		0.0E+00	8.3E-02
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	4.9E-02		2.2E-04	4.9E-02
			Arsenic	4.4E-05		2.0E-07	4.5E-05	Arsenic	Skin, Vascular	1.2E+00		5.1E-03	1.2E+00
			Iron					Iron	Liver, Blood, GI Tract	1.1E+01		4.7E-02	1.1E+01
			Manganese					Manganese	CNS	8.0E+00		8.8E-01	8.9E+00

Total Risk Across Surface Soil	4.0E-05
Total Risk Across Surface Water	3.6E-07
Total Risk Across Sediment	8.2E-06
Total Risk Across Groundwater	4.5E-05
Total Risk Across All Media and All Exposure Routes	9.3E-05

Total Hazard Index Across All Media and All Exposure Routes	2.2E+01
Total Liver HI =	1.1E+01
Total Kidney HI =	3.8E-02
Total Vascular HI =	1.4E+00
Total GI Tract HI =	1.1E+01
Total Skin HI =	1.4E+00
Total Blood HI =	1.1E+01
Total CNS HI =	9.1E+00
Total Body Weight HI =	5.2E-02
Total Thyroid HI =	0.0E+00

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	METHYLENE CHLORIDE	3.7E-13			3.7E-13	METHYLENE CHLORIDE	Liver	5.8E-08			5.8E-08
			BENZO(A)ANTHRACENE	7.1E-08		1.9E-08	9.0E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.6E-07		1.8E-07	8.4E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	9.8E-08		2.7E-08	1.3E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	4.4E-08		1.2E-08	5.6E-08	INDENO(1,2,3-CD)PYRENE					
			DELTA-BHC	2.9E-10		2.4E-11	3.2E-10	DELTA-BHC					
			AROCLOR-1254	1.1E-08		3.2E-09	1.4E-08	AROCLOR-1254	Immunological, Nails	1.9E-02		5.5E-03	2.4E-02
			PENTACHLOROPHENOL	1.5E-10		8.1E-11	2.4E-10	PENTACHLOROPHENOL	Liver, Kidney	3.0E-06		1.6E-06	4.6E-06
			ANTIMONY					ANTIMONY	Lifespan	3.6E-03			3.6E-03
			ARSENIC	2.0E-07		1.2E-08	2.1E-07	ARSENIC	Skin, Vascular	3.1E-02		1.9E-03	3.3E-02
			BARIUM					BARIUM	Blood	1.2E-02			1.2E-02
			CADMIUM					CADMIUM	Kidney	2.5E-03		2.1E-04	2.7E-03
			CHROMIUM					CHROMIUM	NOAEL	8.1E-03			8.1E-03
			IRON					IRON	Liver, Blood, GI Tract	1.1E-01			1.1E-01
			MANGANESE					MANGANESE	CNS	1.3E-02			1.3E-02
			MERCURY					MERCURY	CNS	5.8E-04			5.8E-04
			NICKEL					NICKEL	Decreased Organ/ Body Weights	1.3E-03			1.3E-03
			SELENIUM					SELENIUM	Hair, Nail Loss	1.7E-04			1.7E-04
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight			2.3E-05	2.3E-05
			Arsenic			3.4E-09	3.4E-09	Arsenic	Skin, Vascular			5.3E-04	5.3E-04
			Iron					Iron	Liver, Blood, GI Tract			4.9E-03	4.9E-03
			Manganese					Manganese	CNS			9.2E-02	9.2E-02

Total Risk Across Surface Soil: 1.3E-06
Total Risk Across Groundwater: 3.4E-09

Total Risk Across All Media and All Exposure Routes: 1.3E-06

Total Hazard Index Across All Media and All Exposure Routes: 3.0E-01

Total Liver HI =	1.1E-01
Total Kidney HI =	2.7E-03
Total Vascular HI =	3.3E-02
Total GI Tract HI =	1.1E-01
Total Skin HI =	3.3E-02
Total Blood HI =	1.3E-01
Total CNS HI =	1.1E-01
Total Immune System HI =	2.4E-02
Total Body Weight HI =	1.3E-03
Total Lifespan HI =	3.6E-03
Total Thyroid HI =	
Total Hair, Nails HI =	2.5E-02

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	5.0E-14		0.0E+00	5.0E-14	METHYLENE CHLORIDE	Liver	8.6E-10		0.0E+00	8.6E-10
			BENZO(A)ANTHRACENE	6.2E-09		1.1E-09	7.2E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.6E-08		1.1E-08	7.7E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.1E-08		1.8E-09	1.2E-08	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	4.8E-09		8.3E-10	5.7E-09	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	8.0E-11		2.6E-11	1.1E-10	PENTACHLOROPHENOL	Liver, Kidney	1.7E-07		5.7E-08	2.3E-07
			CADMIUM					CADMIUM	Kidney	6.5E-05		3.4E-06	6.8E-05
						Total Risk Across Surface Soil	1.0E-07					Total Hazard Index Across All Media and All Exposure Routes	6.9E-05

Total Risk Across All Media and All Exposure Routes 1.0E-07

Total Liver HI =	2.3E-07
Total Kidney HI =	6.9E-05
Total Body Weight HI =	0.0E+00
Total Thyroid HI =	0.0E+00

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	9.1E-13		0.0E+00	9.1E-13	METHYLENE CHLORIDE	Liver	1.6E-08		0.0E+00	1.6E-08
			BENZO(A)ANTHRACENE	1.1E-07		1.9E-08	1.3E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.2E-06		2.1E-07	1.4E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.9E-07		3.3E-08	2.3E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	8.8E-08		1.5E-08	1.0E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.5E-09		4.8E-10	1.9E-09	PENTACHLOROPHENOL	Liver, Kidney	3.1E-06		1.0E-06	4.2E-06
			CADMIUM					CADMIUM	Kidney	1.2E-03		6.3E-05	1.2E-03
							Total Risk Across Surface Soil 1.9E-06						Total Hazard Index Across All Media and All Exposure Routes 1.3E-03

Total Risk Across All Media and All Exposure Routes 1.9E-06

Total Liver HI =	4.2E-06
Total Kidney HI =	1.3E-03
Total Body Weight HI =	0.0E+00
Total Thyroid HI =	0.0E+00

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.1E-13		0.0E+00	1.1E-13	METHYLENE CHLORIDE	Liver	1.9E-09		0.0E+00	1.9E-09
			BENZO(A)ANTHRACENE	1.3E-08		1.7E-09	1.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.4E-07		1.9E-08	1.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.3E-08		3.0E-09	2.6E-08	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.1E-08		1.4E-09	1.2E-08	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.7E-10		4.3E-11	2.2E-10	PENTACHLOROPHENOL	Liver, Kidney	3.7E-07		9.3E-08	4.7E-07
			CADMIUM					CADMIUM	Kidney	1.4E-04		5.6E-06	1.5E-04
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	7.4E-05		1.3E-05	8.8E-05
			Arsenic	1.8E-08		3.2E-09	2.1E-08	Arsenic	Skin, Vascular	3.1E-04		5.5E-05	3.6E-04
			Barium					Barium	Blood	5.0E-04		1.3E-03	1.8E-03
			Manganese					Manganese	CNS	1.1E-03		4.8E-03	5.8E-03
Sediment	Sediment	Sediment	ARSENIC	4.6E-08		5.0E-08	9.6E-08	ARSENIC	Skin, Vascular	8.0E-04		8.7E-04	1.7E-03
			IRON					IRON	Liver, Blood, GI Tract	2.2E-03		0.0E+00	2.2E-03
			MANGANESE					MANGANESE	CNS	3.3E-04		0.0E+00	3.3E-04

Total Risk Across Surface Soil	2.1E-07
Total Risk Across Surface Water	2.1E-08
Total Risk Across Sediment	9.6E-08
Total Risk Across All Media and All Exposure Routes	3.3E-07

Total Hazard Index Across All Media and All Exposure Routes	1.2E-02
Total Liver HI =	2.2E-03
Total Kidney HI =	1.5E-04
Total Vascular HI =	2.0E-03
Total GI Tract HI =	2.2E-03
Total Skin HI =	2.0E-03
Total Blood HI =	3.9E-03
Total CNS HI =	6.2E-03
Total Body Weight HI =	8.8E-05
Total Thyroid HI =	0.0E+00

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.1E-13		0.0E+00	1.1E-13	METHYLENE CHLORIDE	Liver	1.5E-09		0.0E+00	1.5E-09
			BENZO(A)ANTHRACENE	1.3E-08		4.3E-09	1.8E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.4E-07		4.6E-08	1.9E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.3E-08		7.4E-09	3.0E-08	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.0E-08		3.4E-09	1.4E-08	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.7E-10		1.1E-10	2.8E-10	PENTACHLOROPHENOL	Liver, Kidney	3.0E-07		1.9E-07	4.9E-07
			CADMIUM					CADMIUM	Kidney	1.1E-04		1.1E-05	1.3E-04
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	1.2E-05		3.7E-06	1.6E-05
			Arsenic	3.5E-09		1.1E-09	4.6E-09	Arsenic	Skin, Vascular	5.0E-05		1.5E-05	6.5E-05
			Barium					Barium	Blood	8.1E-05		3.6E-04	4.4E-04
			Manganese					Manganese	CNS	1.7E-04		1.3E-03	1.5E-03
Sediment	Sediment	Sediment	ARSENIC	4.6E-08		3.4E-09	4.9E-08	ARSENIC	Skin, Vascular	6.5E-04		4.8E-05	7.0E-04
			IRON					IRON	Liver, Blood, GI Tract	1.8E-03		0.0E+00	1.8E-03
			MANGANESE					MANGANESE	CNS	2.7E-04		0.0E+00	2.7E-04

Total Risk Across Surface Soil	2.5E-07
Total Risk Across Surface Water	4.6E-09
Total Risk Across Sediment	4.9E-08
Total Risk Across All Media and All Exposure Routes	3.0E-07

Total Hazard Index Across All Media and All Exposure Routes	4.9E-03
Total Liver HI =	1.8E-03
Total Kidney HI =	1.3E-04
Total Vascular HI =	7.6E-04
Total GI Tract HI =	1.8E-03
Total Skin HI =	7.6E-04
Total Blood HI =	2.2E-03
Total CNS HI =	1.8E-03
Total Body Weight HI =	1.6E-05
Total Thyroid HI =	0.0E+00

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.1E-12		0.0E+00	1.1E-12	METHYLENE CHLORIDE	Liver	2.5E-08		0.0E+00	2.5E-08
			BENZO(A)ANTHRACENE	1.4E-07		1.8E-08	1.6E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.5E-06		2.0E-07	1.7E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.4E-07		3.1E-08	2.7E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	1.1E-07		1.4E-08	1.2E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	1.8E-09		4.5E-10	2.3E-09	PENTACHLOROPHENOL	Liver, Kidney	5.0E-06		1.3E-06	6.3E-06
			CADMIUM					CADMIUM	Kidney	1.9E-03		7.6E-05	2.0E-03
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	6.7E-04		1.2E-04	7.9E-04
			Arsenic	1.2E-07		2.2E-08	1.5E-07	Arsenic	Skin, Vascular	2.7E-03		5.0E-04	3.2E-03
			Barium					Barium	Blood	4.5E-03		1.2E-02	1.6E-02
			Manganese					Manganese	CNS	9.5E-03		4.3E-02	5.3E-02
Sediment	Sediment	Sediment	ARSENIC	3.2E-07		9.7E-09	3.3E-07	ARSENIC	Skin, Vascular	7.2E-03		2.2E-04	7.4E-03
			IRON					IRON	Liver, Blood, GI Tract	1.9E-02		0.0E+00	1.9E-02
			MANGANESE					MANGANESE	CNS	3.0E-03		0.0E+00	3.0E-03
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	9.8E-03		3.2E-05	9.9E-03
			Arsenic	1.0E-05		3.3E-08	1.0E-05	Arsenic	Skin, Vascular	2.3E-01		7.4E-04	2.3E-01
			Iron					Iron	Liver, Blood, GI Tract	2.1E+00		6.8E-03	2.1E+00
			Manganese					Manganese	CNS	1.6E+00		1.3E-01	1.7E+00

Total Risk Across Surface Soil	2.3E-06
Total Risk Across Surface Water	1.5E-07
Total Risk Across Sediment	3.3E-07
Total Risk Across Groundwater	1.0E-05
Total Risk Across All Media and All Exposure Routes	1.3E-05

Total Hazard Index Across All Media and All Exposure Routes	4.2E+00
Total Liver HI =	2.2E+00
Total Kidney HI =	2.0E-03
Total Vascular HI =	2.4E-01
Total GI Tract HI =	2.2E+00
Total Skin HI =	2.4E-01
Total Blood HI =	2.2E+00
Total CNS HI =	1.8E+00
Total Body Weight HI =	1.1E-02
Total Thyroid HI =	0.0E+00

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 4 - McCOMISH GORGE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.0E-12		0.0E+00	2.0E-12	METHYLENE CHLORIDE	Liver	1.6E-07		0.0E+00	1.6E-07
			BENZO(A)ANTHRACENE	2.5E-07		2.3E-08	2.7E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.7E-06		2.4E-07	2.9E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.3E-07		3.9E-08	4.7E-07	BENZO(B)FLUORANTHENE					
			INDENO(1,2,3-CD)PYRENE	2.0E-07		1.8E-08	2.1E-07	INDENO(1,2,3-CD)PYRENE					
			PENTACHLOROPHENOL	3.2E-09		5.6E-10	3.8E-09	PENTACHLOROPHENOL	Liver, Kidney	3.1E-05		5.5E-06	3.7E-05
			CADMIUM					CADMIUM	Kidney	1.2E-02		3.3E-04	1.2E-02
Surface Water	Surface Water	Surface Water	Aluminum					Aluminum	Body Weight	6.2E-04		1.1E-04	7.3E-04
			Arsenic	3.3E-08		5.8E-09	3.9E-08	Arsenic	Skin, Vascular	2.6E-03		4.5E-04	3.0E-03
			Barium					Barium	Blood	4.2E-03		1.0E-02	1.5E-02
			Manganese					Manganese	CNS	8.9E-03		3.9E-02	4.8E-02
Sediment	Sediment	Sediment	ARSENIC	8.6E-07		1.8E-08	8.8E-07	ARSENIC	Skin, Vascular	6.7E-02		1.4E-03	6.8E-02
			IRON					IRON	Liver, Blood, GI Tract	1.8E-01		0.0E+00	1.8E-01
			MANGANESE					MANGANESE	CNS	2.8E-02		0.0E+00	2.8E-02
Groundwater	Water	Onsite	Aluminum					Aluminum	Body Weight	2.2E-02		7.1E-05	2.2E-02
			Arsenic	6.5E-06		2.1E-08	6.5E-06	Arsenic	Skin, Vascular	5.1E-01		1.7E-03	5.1E-01
			Iron					Iron	Liver, Blood, GI Tract	4.7E+00		1.5E-02	4.7E+00
			Manganese					Manganese	CNS	3.5E+00		2.9E-01	3.8E+00

Total Risk Across Surface Soil	3.9E-06
Total Risk Across Surface Water	3.9E-08
Total Risk Across Sediment	8.8E-07
Total Risk Across Groundwater	6.5E-06
Total Risk Across All Media and All Exposure Routes	1.1E-05

Total Hazard Index Across All Media and All Exposure Routes	9.4E+00
Total Liver HI =	4.9E+00
Total Kidney HI =	1.2E-02
Total Vascular HI =	5.8E-01
Total GI Tract HI =	4.9E+00
Total Skin HI =	5.8E-01
Total Blood HI =	4.9E+00
Total CNS HI =	3.9E+00
Total Body Weight HI =	2.2E-02
Total Thyroid HI =	0.0E+00

RAGS-PART D TABLE 9'S – SWMU 5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

TABLE 9.1 REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe Future
Receptor Population: Construction Workers
Receptor Age Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	1,1-DICHLOROTHENE	7.1E-11			7.1E-11	1,1-DICHLOROTHENE	Liver	9.2E-07			9.2E-07
			BENZENE	8.7E-12			8.7E-12	BENZENE		3.7E-06			3.7E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	6.2E-04			6.2E-04
			METHYLENE CHLORIDE	2.1E-12			2.1E-12	METHYLENE CHLORIDE	Liver	3.2E-07			3.2E-07
			TETRACHLOROETHENE	5.3E-12			5.3E-12	TETRACHLOROETHENE	Liver	7.1E-07			7.1E-07
			TRICHLOROETHENE	2.3E-09			2.3E-09	TRICHLOROETHENE	CNS	2.4E-03			2.4E-03
			VINYL CHLORIDE	4.0E-09			4.0E-09	VINYL CHLORIDE	Liver	6.3E-05			6.3E-05
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.9E-04			2.9E-04
			BENZO(A)ANTHRACENE	2.8E-08		1.3E-08	4.1E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.4E-07		1.1E-07	3.5E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.8E-08		1.3E-08	4.2E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	5.3E-08		2.5E-08	7.8E-08	DIBENZO(A,H)ANTHRACENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.7E-04		8.0E-05	2.5E-04
			DIELDRIN	3.6E-09		1.3E-09	4.9E-09	DIELDRIN	Liver	3.1E-04		1.1E-04	4.2E-04
			AROCLOR-1254	3.5E-08		1.8E-08	5.3E-08	AROCLOR-1254	Immunological, Nails	6.2E-02		3.1E-02	9.3E-02
			AROCLOR-1260	1.0E-08		5.2E-09	1.5E-08	AROCLOR-1260					
			PENTACHLOROPHENOL	4.8E-11		4.4E-11	9.2E-11	PENTACHLOROPHENOL	Liver and Kidney	9.3E-07		8.5E-07	1.8E-06
			2,3,7,8-TCDD TEQ	2.8E-06		3.0E-07	3.1E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	2.1E+00			2.1E+00
			ARSENIC	6.3E-07		6.9E-08	7.0E-07	ARSENIC	Skin, Vascular	9.9E-02		1.1E-02	1.1E-01
			BARIUM					BARIUM	Blood	6.5E-02			6.5E-02
			CADMIUM					CADMIUM	Kidney	1.8E-01		2.5E-02	2.0E-01
			CHROMIUM					CHROMIUM	NOAEL	6.1E-02			6.1E-02
			COPPER					COPPER		4.8E-01			4.8E-01
			IRON					IRON	Liver, Blood, GI Trac	4.4E-01			4.4E-01
			MANGANESE					MANGANESE	CNS	2.7E-02			2.7E-02
			MERCURY					MERCURY	CNS	1.2E-01			1.2E-01
			NICKEL					NICKEL	Decreased Organ/ Body Weights	4.3E-03			4.3E-03
			SILVER					SILVER	Argyria	4.1E-03			4.1E-03
			ZINC					ZINC	Blood	4.8E-02			4.8E-02
Groundwater	Water	Onsite	Chloroform			1.6E-11	1.6E-11	Chloroform	Liver			1.9E-05	1.9E-05
			Bis(2-ethylhexyl)phthalate			2.4E-08	2.4E-08	Bis(2-ethylhexyl)phthalate	Liver			5.9E-03	5.9E-03
			2,3,7,8-TCDD TEQ			2.7E-06	2.7E-06	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight			2.6E-05	2.6E-05
			Arsenic			1.4E-09	1.4E-09	Arsenic	Skin, Vascular			2.1E-04	2.1E-04
			Iron					Iron	Liver, Blood, GI Tract			7.0E-04	7.0E-04
			Manganese					Manganese	CNS			1.6E-01	1.6E-01
						Total Risk Across Surface Soil	4.4E-06		Total Hazard Index Across All Media and All Exposure Routes				3.9E+00
						Total Risk Across Groundwater	2.7E-06						

Total Risk Across All Media and All Exposure Routes: 7.1E-06

Total Liver HI =	4.4E-01
Total Kidney HI =	2.0E-01
Total Vascular HI =	1.1E-01
Total GI Tract HI =	4.4E-01
Total Skin HI =	1.1E-01
Total Blood HI =	5.5E-01
Total CNS HI =	3.1E-01
Total Immune System HI =	9.3E-02
Total Body Weight HI =	5.7E-04
Total Lifespan HI =	2.1E+00
Total Argyria HI =	4.1E-03

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 5 - OLD BURN.PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	2.6E-10		0.0E+00	2.6E-10	1,1-DICHLOROTHENE	Liver	1.4E-07		0.0E+00	1.4E-07
			BENZENE	9.2E-12		0.0E+00	9.2E-12	BENZENE		1.6E-07		0.0E+00	1.6E-07
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	2.6E-05		0.0E+00	2.6E-05
			METHYLENE CHLORIDE	1.0E-12		0.0E+00	1.0E-12	METHYLENE CHLORIDE	Liver	6.3E-09		0.0E+00	6.3E-09
			TETRACHLOROETHENE	1.2E-11		0.0E+00	1.2E-11	TETRACHLOROETHENE	Liver	6.6E-08		0.0E+00	6.6E-08
			TRICHLOROETHENE	1.9E-09		0.0E+00	1.9E-09	TRICHLOROETHENE	CNS	8.0E-05		0.0E+00	8.0E-05
			VINYL CHLORIDE	2.5E-10		0.0E+00	2.5E-10	VINYL CHLORIDE	Liver	1.6E-07		0.0E+00	1.6E-07
			BENZO(A)ANTHRACENE	2.3E-08		2.0E-08	4.3E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.0E-07		1.7E-07	3.7E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.9E-08		1.7E-08	3.6E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.4E-08		3.8E-08	8.2E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	1.6E-08		1.5E-08	3.1E-08	AROCLOR-1254	mmunological, Nails	1.1E-03		1.0E-03	2.2E-03
			PENTACHLOROPHENOL	4.8E-11		8.0E-11	1.3E-10	PENTACHLOROPHENOL	Liver and Kidney	3.8E-08		6.2E-08	1.0E-07
			2,3,7,8-TCDD TEQ	1.1E-06		2.3E-07	1.4E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	7.1E-02		0.0E+00	7.1E-02
			BARIUM					BARIUM	Blood	2.7E-03		0.0E+00	2.7E-03
			CADMIUM					CADMIUM	Kidney	5.8E-03		1.5E-03	7.4E-03
			CHROMIUM					CHROMIUM	NOAEL	3.5E-03		0.0E+00	3.5E-03
			COPPER					COPPER		3.8E-03		0.0E+00	3.8E-03
			IRON					IRON	Liver, Blood, GI Trac	3.3E-02		0.0E+00	3.3E-02
			MERCURY					MERCURY	CNS	1.3E-04		0.0E+00	1.3E-04
			SILVER					SILVER	Argyria	1.4E-04		0.0E+00	1.4E-04
			ZINC					ZINC	Blood	1.6E-03		0.0E+00	1.6E-03
						Total Risk Across Surface Soil	1.9E-06		Total Hazard Index Across All Media and All Exposure Routes				1.3E-01

Total Risk Across All Media and All Exposure Routes: 1.9E-06

Total Liver HI =	3.3E-02
Total Kidney HI =	7.4E-03
Total GI Tract HI =	3.3E-02
Total Blood HI =	3.7E-02
Total CNS HI =	2.1E-04
Total Immune System HI =	2.2E-03
Total Lifespan HI =	7.1E-02
Total Agyria HI =	1.4E-04

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	2.7E-09		0.0E+00	2.7E-09	1,1-DICHLOROTHENE	Liver	1.4E-06		0.0E+00	1.4E-06
			BENZENE	9.6E-11		0.0E+00	9.6E-11	BENZENE		1.6E-06		0.0E+00	1.6E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	2.7E-04		0.0E+00	2.7E-04
			METHYLENE CHLORIDE	1.0E-11		0.0E+00	1.0E-11	METHYLENE CHLORIDE	Liver	6.5E-08		0.0E+00	6.5E-08
			TETRACHLOROETHENE	1.3E-10		0.0E+00	1.3E-10	TETRACHLOROETHENE	Liver	6.8E-07		0.0E+00	6.8E-07
			TRICHLOROETHENE	2.0E-08		0.0E+00	2.0E-08	TRICHLOROETHENE	CNS	8.3E-04		0.0E+00	8.3E-04
			VINYL CHLORIDE	2.6E-09		0.0E+00	2.6E-09	VINYL CHLORIDE	Liver	1.6E-06		0.0E+00	1.6E-06
			BENZO(A)ANTHRACENE	2.4E-07		2.1E-07	4.5E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.1E-06		1.8E-06	3.9E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.0E-07		1.7E-07	3.7E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.6E-07		3.9E-07	8.5E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	1.7E-07		1.5E-07	3.2E-07	AROCLOR-1254	mmunological, Nails	1.2E-02		1.1E-02	2.3E-02
			PENTACHLOROPHENOL	5.0E-10		8.3E-10	1.3E-09	PENTACHLOROPHENOL	Liver and Kidney	3.9E-07		6.5E-07	1.0E-06
			2,3,7,8-TCDD TEQ	1.2E-05		2.3E-06	1.4E-05	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	7.4E-01		0.0E+00	7.4E-01
			BARIUM					BARIUM	Blood	2.8E-02		0.0E+00	2.8E-02
			CADMIUM					CADMIUM	Kidney	6.1E-02		1.6E-02	7.7E-02
			CHROMIUM					CHROMIUM	NOAEL	3.7E-02		0.0E+00	3.7E-02
			COPPER					COPPER		4.0E-02		0.0E+00	4.0E-02
			IRON					IRON	Liver, Blood, GI Trac	3.4E-01		0.0E+00	3.4E-01
			MERCURY					MERCURY	CNS	1.4E-03		0.0E+00	1.4E-03
			SILVER					SILVER	Argyria	1.5E-03		0.0E+00	1.5E-03
			ZINC					ZINC	Blood	1.7E-02		0.0E+00	1.7E-02
						Total Risk Across Surface Soil	2.0E-05					Total Hazard Index Across All Media and All Exposure Routes	1.3E+00

Total Risk Across All Media and All Exposure Routes: 2.0E-05

Total Liver HI =	3.4E-01
Total Kidney HI =	7.7E-02
Total GI Tract HI =	3.4E-01
Total Blood HI =	3.9E-01
Total CNS HI =	2.2E-03
Total Immune System HI =	2.3E-02
Total Lifespan HI =	7.4E-01
Total Agyria HI =	1.5E-03

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	6.8E-10			6.8E-10	1,1-DICHLOROTHENE	Liver	2.9E-07			2.9E-07
			BENZENE	2.4E-11			2.4E-11	BENZENE		3.4E-07			3.4E-07
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	5.7E-05			5.7E-05
			METHYLENE CHLORIDE	2.6E-12			2.6E-12	METHYLENE CHLORIDE	Liver	1.4E-08			1.4E-08
			TETRACHLOROETHENE	3.2E-11			3.2E-11	TETRACHLOROETHENE	Liver	1.4E-07			1.4E-07
			TRICHLOROETHENE	4.9E-09			4.9E-09	TRICHLOROETHENE	CNS	1.7E-04			1.7E-04
			VINYL CHLORIDE	6.5E-10			6.5E-10	VINYL CHLORIDE	Liver	3.4E-07			3.4E-07
			BENZO(A)ANTHRACENE	6.0E-08		3.2E-08	9.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	5.2E-07		2.8E-07	8.0E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	5.0E-08		2.7E-08	7.7E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.1E-07		6.0E-08	1.8E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	4.2E-08		2.4E-08	6.6E-08	AROCLOR-1254	Immunological, Nerv	2.4E-03		1.4E-03	3.8E-03
			PENTACHLOROPHENOL	1.3E-10		1.3E-10	2.5E-10	PENTACHLOROPHENOL	Liver and Kidney	8.1E-08		8.3E-08	1.6E-07
			2,3,7,8-TCDD TEQ	3.0E-06		3.6E-07	3.3E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	1.5E-01			1.5E-01
			BARIUM					BARIUM	Blood	5.0E-03			5.0E-03
			CADMIUM					CADMIUM	Kidney	1.3E-02		2.1E-03	1.5E-02
			CHROMIUM					CHROMIUM	NOAEL	7.6E-03			7.6E-03
			COPPER					COPPER		8.3E-03			8.3E-03
			IRON					IRON	Liver, Blood, GI Trac	7.1E-02			7.1E-02
			MERCURY					MERCURY	CNS	2.9E-04			2.9E-04
			SILVER					SILVER	Argyria	3.1E-04			3.1E-04
			ZINC					ZINC	Blood	3.5E-03			3.5E-03
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.2E-02		2.0E-02	3.2E-02
			Trichloroethene	8.4E-06		2.3E-05	3.2E-05	Trichloroethene	CNS	1.6E-01		4.5E-01	6.1E-01
			Vinyl Chloride	2.2E-05		2.6E-05	4.8E-05	Vinyl Chloride	Liver	1.2E-02		1.3E-02	2.5E-02
			Aluminum					Aluminum	Body Weight	8.3E-05		1.5E-05	9.8E-05
			Arsenic	1.7E-07		3.0E-08	2.0E-07	Arsenic	Skin, Vascular	8.7E-04		1.6E-04	1.0E-03
			Iron					Iron	Liver, Blood, GI Trac	2.1E-03		3.7E-04	2.4E-03
			Manganese					Manganese	CNS	5.3E-03		2.4E-02	3.0E-02
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	2.4E-07		6.5E-07	8.9E-07	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	2.4E-08			2.4E-08	TRICHLOROETHENE	CNS	4.7E-04			4.7E-04
			ALUMINUM					ALUMINUM	Body Weight	1.5E-03			1.5E-03
			ANTIMONY					ANTIMONY	Lifespan	3.0E-03			3.0E-03
			MANGANESE					MANGANESE	CNS	2.4E-03			2.4E-03

Total Risk Across Surface Soil	4.5E-06
Total Risk Across Surface Water	8.0E-05
Total Risk Across Sediment	9.2E-07
Total Risk Across All Media and All Exposure Routes	8.5E-05

Total Hazard Index Across All Media and All Exposure Routes	9.8E-01
Total Liver HI =	9.9E-02
Total Kidney HI =	1.5E-02
Total Vascular HI =	1.0E-03
Total GI Tract HI =	7.4E-02
Total Skin HI =	1.0E-03
Total Blood HI =	1.1E-01
Total CNS HI =	6.5E-01
Total Immune System HI =	3.8E-03
Total Body Weight HI =	1.6E-01
Total Lifespan HI =	1.6E-01
Total Argyria HI =	3.1E-04

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	2.0E-10			2.0E-10	1,1-DICHLOROTHENE	Liver	2.4E-07			2.4E-07
			BENZENE	7.2E-12			7.2E-12	BENZENE		2.8E-07			2.8E-07
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	4.6E-05			4.6E-05
			METHYLENE CHLORIDE	7.8E-13			7.8E-13	METHYLENE CHLORIDE	Liver	1.1E-08			1.1E-08
			TETRACHLOROETHENE	9.5E-12			9.5E-12	TETRACHLOROETHENE	Liver	1.2E-07			1.2E-07
			TRICHLOROETHENE	1.5E-09			1.5E-09	TRICHLOROETHENE	CNS	1.4E-04			1.4E-04
			VINYL CHLORIDE	2.0E-10			2.0E-10	VINYL CHLORIDE	Liver	2.8E-07			2.8E-07
			BENZO(A)ANTHRACENE	1.8E-08		1.8E-08	3.6E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.6E-07		1.5E-07	3.1E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.5E-08		1.5E-08	3.0E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	3.4E-08		3.4E-08	6.8E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	1.2E-08		1.3E-08	2.6E-08	AROCLOR-1254	Immunological, Nail	2.0E-03		2.1E-03	4.1E-03
			PENTACHLOROPHENOL	3.7E-11		7.2E-11	1.1E-10	PENTACHLOROPHENOL	Liver and Kidney	6.6E-08		1.3E-07	1.9E-07
			2,3,7,8-TCDD TEQ	8.8E-07		2.0E-07	1.1E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	1.2E-01			1.2E-01
			BARIUM					BARIUM	Blood	4.8E-03			4.8E-03
			CADMIUM					CADMIUM	Kidney	1.0E-02		3.1E-03	1.3E-02
			CHROMIUM					CHROMIUM	NOAEL	6.2E-03			6.2E-03
			COPPER					COPPER		6.8E-03			6.8E-03
			IRON					IRON	Liver, Blood, GI Trac	5.8E-02			5.8E-02
			MERCURY					MERCURY	CNS	2.4E-04			2.4E-04
			SILVER					SILVER	Argyria	2.5E-04			2.5E-04
			ZINC					ZINC	Blood	2.8E-03			2.8E-03
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.9E-03		6.8E-03	8.7E-03
			Trichloroethene	5.0E-07		2.9E-06	3.4E-06	Trichloroethene	CNS	2.7E-02		1.5E-01	1.8E-01
			Vinyl Chloride	1.3E-06		3.2E-06	4.6E-06	Vinyl Chloride	Liver	1.9E-03		4.6E-03	6.4E-03
			Aluminum					Aluminum	Body Weight	1.4E-05		5.2E-06	1.9E-05
			Arsenic	1.0E-08		3.8E-09	1.4E-08	Arsenic	Skin, Vascular	1.4E-04		5.4E-05	2.0E-04
			Iron					Iron	Liver, Blood, GI Trac	3.4E-04		1.3E-04	4.6E-04
			Manganese					Manganese	CNS	8.7E-04		8.3E-03	9.2E-03
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	7.2E-08		1.6E-08	8.8E-08	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	7.3E-09			7.3E-09	TRICHLOROETHENE	CNS	3.9E-04			3.9E-04
			ALUMINUM					ALUMINUM	Body Weight	1.3E-03			1.3E-03
			ANTIMONY					ANTIMONY	Lifespan	2.4E-03			2.4E-03
			MANGANESE					MANGANESE	CNS	1.9E-03			1.9E-03

Total Risk Across Surface Soil	1.6E-06
Total Risk Across Surface Water	8.0E-06
Total Risk Across Sediment	9.5E-08
Total Risk Across All Media and All Exposure Routes	9.6E-06

Total Hazard Index Across All Media and All Exposure Routes	4.3E-01
Total Liver HI =	6.5E-02
Total Kidney HI =	1.3E-02
Total Vascular HI =	2.0E-04
Total GI Tract HI =	5.8E-02
Total Skin HI =	2.0E-04
Total Blood HI =	7.5E-02
Total CNS HI =	1.9E-01
Total Immune System HI =	4.1E-03
Total Body Weight HI =	1.3E-03
Total Lifespan HI =	1.3E-01
Total Argyria HI =	2.5E-04

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	3.7E-09			3.7E-09	1,1-DICHLOROTHENE	Liver	2.0E-06			2.0E-06
			BENZENE	1.3E-10			1.3E-10	BENZENE		2.3E-06			2.3E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	3.8E-04			3.8E-04
			METHYLENE CHLORIDE	1.4E-11			1.4E-11	METHYLENE CHLORIDE	Liver	9.1E-08			9.1E-08
			TETRACHLOROETHENE	1.7E-10			1.7E-10	TETRACHLOROETHENE	Liver	9.6E-07			9.6E-07
			TRICHLOROETHENE	2.6E-08			2.6E-08	TRICHLOROETHENE	CNS	1.2E-03			1.2E-03
			VINYL CHLORIDE	3.5E-09			3.5E-09	VINYL CHLORIDE	Liver	2.3E-06			2.3E-06
			BENZO(A)ANTHRACENE	3.3E-07		1.7E-07	5.0E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.8E-06		1.5E-06	4.3E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.7E-07		1.4E-07	4.1E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	6.2E-07		3.3E-07	9.4E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	2.3E-07		1.3E-07	3.5E-07	AROCLOR-1254	Immunological, Nails	1.6E-02		9.3E-03	2.6E-02
			PENTACHLOROPHENOL	6.8E-10		6.9E-10	1.4E-09	PENTACHLOROPHENOL	Liver and Kidney	5.5E-07		5.6E-07	1.1E-06
			2,3,7,8-TCDD TEQ	1.6E-05		1.9E-06	1.8E-05	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	1.0E+00			1.0E+00
			BARIUM					BARIUM	Blood	4.0E-02			4.0E-02
			CADMIUM					CADMIUM	Kidney	8.5E-02		1.4E-02	9.9E-02
			CHROMIUM					CHROMIUM	NOAEL	5.1E-02			5.1E-02
			COPPER					COPPER		5.6E-02			5.6E-02
			IRON					IRON	Liver, Blood, GI Trac	4.8E-01			4.8E-01
			MERCURY					MERCURY	CNS	2.0E-03			2.0E-03
			SILVER					SILVER	Argyria	2.1E-03			2.1E-03
			ZINC					ZINC	Blood	2.3E-02			2.3E-02
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	7.9E-02		1.3E-01	2.1E-01
			Trichloroethene	4.5E-05		1.2E-04	1.696E-04	Trichloroethene	CNS	1.1E+00		3.0E+00	4.1E+00
			Vinyl Chloride	1.2E-04		1.4E-04	2.6E-04	Vinyl Chloride	Liver	7.8E-02		9.0E-02	1.7E-01
			Aluminum					Aluminum	Body Weight	5.6E-04		1.0E-04	6.6E-04
			Arsenic	9.0E-07		1.6E-07	1.1E-06	Arsenic	Skin, Vascular	5.8E-03		1.1E-03	6.9E-03
			Iron					Iron	Liver, Blood, GI Trac	1.4E-02		2.5E-03	1.6E-02
			Manganese					Manganese	CNS	3.6E-02		1.6E-01	2.0E-01

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	1.3E-06		1.6E-07	1.4E-06	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	1.3E-07			1.3E-07	TRICHLOROETHENE	CNS	3.2E-03			3.2E-03
			ALUMINUM					ALUMINUM	Body Weight	1.0E-02			1.0E-02
			ANTIMONY					ANTIMONY	Lifespan	2.0E-02			2.0E-02
			MANGANESE					MANGANESE	CNS	1.6E-02			1.6E-02
Groundwater	Water	Onsite	Chloroform	1.5E-08	5.2E-08	1.4E-09	6.8E-08	Chloroform	Liver	7.2E-04	2.2E-03	6.8E-05	3.0E-03
			Bis(2-ethylhexyl)phthalate	1.3E-06		2.2E-06	3.6E-06	Bis(2-ethylhexyl)phthalate	Liver	1.4E-02		2.3E-02	3.7E-02
			2,3,7,8-TCDD TEQ	1.1E-05		2.5E-04	2.6E-04	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight	1.0E-02		5.4E-05	1.0E-02
			Arsenic	1.3E-05		6.9E-08	1.3E-05	Arsenic	Skin, Vascular	8.5E-02		4.5E-04	8.6E-02
			Iron					Iron	Liver, Blood, GI Tract	2.8E-01		1.5E-03	2.8E-01
			Manganese					Manganese	CNS	2.6E+00		3.4E-01	2.9E+00

Total Risk Across Surface Soil	2.4E-05
Total Risk Across Surface Water	4.3E-04
Total Risk Across Sediment	1.6E-06
Total Risk Across Groundwater	2.8E-04
Total Risk Across All Media and All Exposure Routes	7.3E-04

Total Hazard Index Across All Media and All Exposure Routes	9.937E+00
Total Liver HI =	9.9E-01
Total Kidney HI =	9.9E-02
Total Vascular HI =	9.3E-02
Total GI Tract HI =	7.8E-01
Total Skin HI =	9.3E-02
Total Blood HI =	1.1E+00
Total CNS HI =	7.3E+00
Total Immune System HI =	2.6E-02
Total Body Weight HI =	2.2E-02
Total Lifespan HI =	1.1E+00
Total Agyria HI =	2.1E-03

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	8.5E-09			8.5E-09	1,1-DICHLOROTHENE	Liver	1.8E-05			1.8E-05
			BENZENE	3.0E-10			3.0E-10	BENZENE		2.1E-05			2.1E-05
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	3.6E-03			3.6E-03
			METHYLENE CHLORIDE	3.3E-11			3.3E-11	METHYLENE CHLORIDE	Liver	8.5E-07			8.5E-07
			TETRACHLOROETHENE	4.0E-10			4.0E-10	TETRACHLOROETHENE	Liver	8.9E-06			8.9E-06
			TRICHLOROETHENE	6.1E-08			6.1E-08	TRICHLOROETHENE	CNS	1.1E-02			1.1E-02
			VINYL CHLORIDE	8.2E-09			8.2E-09	VINYL CHLORIDE	Liver	2.1E-05			2.1E-05
			BENZO(A)ANTHRACENE	7.6E-07		2.0E-07	9.6E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.6E-06		1.7E-06	8.3E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	6.3E-07		1.6E-07	8.0E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.4E-06		3.7E-07	1.8E-06	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	5.3E-07		1.5E-07	6.7E-07	AROCLOR-1254	Immunological, Nails	1.5E-01		4.3E-02	2.0E-01
			PENTACHLOROPHENOL	1.6E-09		7.9E-10	2.4E-09	PENTACHLOROPHENOL	Liver and Kidney	5.1E-06		2.6E-06	7.7E-06
			2,3,7,8-TCDD TEQ	3.7E-05		2.2E-06	3.9E-05	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	9.6E+00			9.6E+00
			BARIUM					BARIUM	Blood	3.7E-01			3.7E-01
			CADMIUM					CADMIUM	Kidney	8.0E-01		6.4E-02	8.6E-01
			CHROMIUM					CHROMIUM	NOAEL	4.8E-01			4.8E-01
			COPPER					COPPER		5.2E-01			5.2E-01
			IRON					IRON	Liver, Blood, GI Trac	4.5E+00			4.5E+00
			MERCURY					MERCURY	CNS	1.8E-02			1.8E-02
			SILVER					SILVER	Argyria	1.9E-02			1.9E-02
			ZINC					ZINC	Blood	2.2E-01			2.2E-01
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	7.4E-02		1.4E-01	2.1E-01
			Trichloroethene	1.1E-05		3.2E-05	4.2564E-05	Trichloroethene	CNS	1.0E+00		3.1E+00	4.1E+00
			Vinyl Chloride	2.8E-05		3.6E-05	6.4E-05	Vinyl Chloride	Liver	7.2E-02		9.2E-02	1.6E-01
			Aluminum					Aluminum	Body Weight	5.2E-04		1.0E-04	6.3E-04
			Arsenic	2.1E-07		4.2E-08	2.5E-07	Arsenic	Skin, Vascular	5.5E-03		1.1E-03	6.5E-03
			Iron					Iron	Liver, Blood, GI Trac	1.3E-02		2.6E-03	1.6E-02
			Manganese					Manganese	CNS	3.4E-02		1.7E-01	2.0E-01

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	3.0E-06		1.8E-07	3.2E-06	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	3.1E-07			3.1E-07	TRICHLOROETHENE	CNS	3.0E-02			3.0E-02
			ALUMINUM					ALUMINUM	Body Weight	9.7E-02			9.7E-02
			ANTIMONY					ANTIMONY	Lifespan	1.9E-01			1.9E-01
			MANGANESE					MANGANESE	CNS	1.5E-01			1.5E-01
Groundwater	Water	Onsite	Chloroform	1.3E-08	6.0E-08	8.0E-10	7.4E-08	Chloroform	Liver	2.5E-03	1.0E-02	1.5E-04	1.3E-02
			Bis(2-ethylhexyl)phthalate	1.2E-06		1.2E-06	2.4E-06	Bis(2-ethylhexyl)phthalate	Liver	4.9E-02		5.2E-02	1.0E-01
			2,3,7,8-TCDD TEQ	1.0E-05		1.4E-04	1.5E-04	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight	3.6E-02		1.6E-04	3.7E-02
			Arsenic	1.2E-05		5.1E-08	1.2E-05	Arsenic	Skin, Vascular	3.0E-01		1.3E-03	3.0E-01
			Iron					Iron	Liver, Blood, GI Tract	9.9E-01		4.4E-03	9.9E-01
			Manganese					Manganese	CNS	9.1E+00		1.0E+00	1.0E+01

Total Risk Across Surface Soil	5.2E-05
Total Risk Across Surface Water	1.1E-04
Total Risk Across Sediment	3.5E-06
Total Risk Across Groundwater	1.7E-04
Total Risk Across All Media and All Exposure Routes	3.3E-04

Total Hazard Index Across All Media and All Exposure Routes	3.4E+01
Total Liver HI =	5.8E+00
Total Kidney HI =	8.6E-01
Total Vascular HI =	3.1E-01
Total GI Tract HI =	5.5E+00
Total Skin HI =	3.1E-01
Total Blood HI =	6.3E+00
Total CNS HI =	1.5E+01
Total Immune System HI =	2.0E-01
Total Body Weight HI =	1.3E-01
Total Lifespan HI =	9.8E+00
Total Agyria HI =	1.9E-02

TABLE 9 1a CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	1,1-DICHLOROTHENE	3.5E-11			3.5E-11	1,1-DICHLOROTHENE	Liver	4.6E-07			4.6E-07
			BENZENE	4.4E-12			4.4E-12	BENZENE		1.9E-06			1.9E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	3.1E-04			3.1E-04
			METHYLENE CHLORIDE	1.0E-12			1.0E-12	METHYLENE CHLORIDE	Liver	1.6E-07			1.6E-07
			TETRACHLOROETHENE	2.6E-12			2.6E-12	TETRACHLOROETHENE	Liver	3.5E-07			3.5E-07
			TRICHLOROETHENE	1.1E-09			1.1E-09	TRICHLOROETHENE	CNS	1.2E-03			1.2E-03
			VINYL CHLORIDE	2.0E-09			2.0E-09	VINYL CHLORIDE	Liver	3.1E-05			3.1E-05
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	1.5E-04			1.5E-04
			BENZO(A)ANTHRACENE	1.4E-08		3.8E-09	1.8E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.2E-07		3.3E-08	1.5E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.4E-08		3.8E-09	1.8E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	2.6E-08		7.2E-09	3.4E-08	DIBENZO(A,H)ANTHRACENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	8.5E-05		2.3E-05	1.1E-04
			DIELDRIN	1.8E-09		3.7E-10	2.2E-09	DIELDRIN	Liver	1.6E-04		3.2E-05	1.9E-04
			AROCLOR-1254	1.8E-08		5.2E-09	2.3E-08	AROCLOR-1254	Immunological, Nails	3.1E-02		9.0E-03	4.0E-02
			AROCLOR-1260	5.1E-09		1.5E-09	6.6E-09	AROCLOR-1260					
			PENTACHLOROPHENOL	2.4E-11		1.3E-11	3.7E-11	PENTACHLOROPHENOL	Liver and Kidney	4.7E-07		2.4E-07	7.1E-07
			2,3,7,8-TCDD TEQ	1.4E-06		8.8E-08	1.5E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	1.1E+00			1.1E+00
			ARSENIC	3.2E-07		2.0E-08	3.4E-07	ARSENIC	Skin, Vascular	4.9E-02		3.1E-03	5.2E-02
			BARIUM					BARIUM	Blood	3.3E-02			3.3E-02
			CADMIUM					CADMIUM	Kidney	8.8E-02		7.3E-03	9.5E-02
			CHROMIUM					CHROMIUM	NOAEL	3.1E-02			3.1E-02
			COPPER					COPPER		2.4E-01			2.4E-01
			IRON					IRON	Liver, Blood, GI Trac	2.2E-01			2.2E-01
			MANGANESE					MANGANESE	CNS	1.4E-02			1.4E-02
			MERCURY					MERCURY	CNS	5.9E-02			5.9E-02
			NICKEL					NICKEL	Decreased Organ/ Body Weights	2.1E-03			2.1E-03
			SILVER					SILVER	Argyria	2.0E-03			2.0E-03
			ZINC					ZINC	Blood	2.4E-02			2.4E-02
Groundwater	Water	Onsite	Chloroform			1.2E-11	1.2E-11	Chloroform	Liver			1.3E-05	1.3E-05
			Bis(2-ethylhexyl)phthalate			1.8E-08	1.8E-08	Bis(2-ethylhexyl)phthalate	Liver			4.4E-03	4.4E-03
			2,3,7,8-TCDD TEQ			2.0E-06	2.0E-06	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight			1.7E-05	1.7E-05
			Arsenic			8.8E-10	8.8E-10	Arsenic	Skin, Vascular			1.4E-04	1.4E-04
			Iron					Iron	Liver, Blood, GI Tract			4.5E-04	4.5E-04
			Manganese					Manganese	CNS			1.0E-01	1.0E-01

Total Risk Across Surface Soil: 2.1E-06
Total Risk Across Groundwater: 2.0E-06

Total Risk Across All Media and All Exposure Routes: 4.1E-06

Total Hazard Index Across All Media and All Exposure Routes: 2.0E+00

Total Liver HI =	2.2E-01
Total Kidney HI =	9.5E-02
Total Vascular HI =	5.3E-02
Total GI Tract HI =	2.2E-01
Total Skin HI =	5.3E-02
Total Blood HI =	2.7E-01
Total CNS HI =	1.8E-01
Total Immune System HI =	4.0E-02
Total Body Weight HI =	2.7E-04
Total Lifespan HI =	1.1E+00
Total Agyria HI =	2.0E-03

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	2.4E-11		0.0E+00	2.4E-11	1,1-DICHLOROTHENE	Liver	3.4E-08		0.0E+00	3.4E-08
			BENZENE	8.3E-13		0.0E+00	8.3E-13	BENZENE		3.9E-08		0.0E+00	3.9E-08
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	6.6E-06		0.0E+00	6.6E-06
			METHYLENE CHLORIDE	9.1E-14		0.0E+00	9.1E-14	METHYLENE CHLORIDE	Liver	1.6E-09		0.0E+00	1.6E-09
			TETRACHLOROETHENE	1.1E-12		0.0E+00	1.1E-12	TETRACHLOROETHENE	Liver	1.6E-08		0.0E+00	1.6E-08
			TRICHLOROETHENE	1.7E-10		0.0E+00	1.7E-10	TRICHLOROETHENE	CNS	2.0E-05		0.0E+00	2.0E-05
			VINYL CHLORIDE	2.3E-11		0.0E+00	2.3E-11	VINYL CHLORIDE	Liver	3.9E-08		0.0E+00	3.9E-08
			BENZO(A)ANTHRACENE	2.1E-09		3.6E-10	2.5E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.8E-08		3.1E-09	2.1E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.7E-09		3.0E-10	2.0E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.0E-09		6.8E-10	4.6E-09	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	1.4E-09		2.7E-10	1.7E-09	AROCLOR-1254	Immunological, Nail	2.8E-04		5.2E-05	3.3E-04
			PENTACHLOROPHENOL	4.3E-12		1.4E-12	5.8E-12	PENTACHLOROPHENOL	Liver and Kidney	9.4E-09		3.1E-09	1.2E-08
			2,3,7,8-TCDD TEQ	1.0E-07		4.1E-09	1.1E-07	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	1.8E-02		0.0E+00	1.8E-02
			BARIUM					BARIUM	Blood	6.8E-04		0.0E+00	6.8E-04
			CADMIUM					CADMIUM	Kidney	1.5E-03		7.7E-05	1.5E-03
			CHROMIUM					CHROMIUM	NOAEL	8.8E-04		0.0E+00	8.8E-04
			COPPER					COPPER		9.6E-04		0.0E+00	9.6E-04
			IRON					IRON	Liver, Blood, GI Trac	8.2E-03		0.0E+00	8.2E-03
			MERCURY					MERCURY	CNS	3.4E-05		0.0E+00	3.4E-05
			SILVER					SILVER	Argyria	3.5E-05		0.0E+00	3.5E-05
			ZINC					ZINC	Blood	4.0E-04		0.0E+00	4.0E-04
						Total Risk Across Surface Soil	1.4E-07					Total Hazard Index Across All Media and All Exposure Routes	3.1E-02

Total Risk Across All Media and All Exposure Routes: 1.4E-07

Total Liver HI =	8.2E-03
Total Kidney HI =	1.5E-03
Total GI Tract HI =	8.2E-03
Total Blood HI =	9.3E-03
Total CNS HI =	5.4E-05
Total Immune System HI =	3.3E-04
Total Lifespan HI =	1.8E-02
Total Agyria HI =	3.5E-05

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	4.3E-10		0.0E+00	4.3E-10	1,1-DICHLOROTHENE	Liver	6.2E-07		0.0E+00	6.2E-07
			BENZENE	1.5E-11		0.0E+00	1.5E-11	BENZENE		7.1E-07		0.0E+00	7.1E-07
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.2E-04		0.0E+00	1.2E-04
			METHYLENE CHLORIDE	1.7E-12		0.0E+00	1.7E-12	METHYLENE CHLORIDE	Liver	2.9E-08		0.0E+00	2.9E-08
			TETRACHLOROETHENE	2.0E-11		0.0E+00	2.0E-11	TETRACHLOROETHENE	Liver	3.0E-07		0.0E+00	3.0E-07
			TRICHLOROETHENE	3.1E-09		0.0E+00	3.1E-09	TRICHLOROETHENE	CNS	3.6E-04		0.0E+00	3.6E-04
			VINYL CHLORIDE	4.1E-10		0.0E+00	4.1E-10	VINYL CHLORIDE	Liver	7.1E-07		0.0E+00	7.1E-07
			BENZO(A)ANTHRACENE	3.8E-08		6.6E-09	4.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.3E-07		5.7E-08	3.9E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.2E-08		5.5E-09	3.7E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	7.2E-08		1.2E-08	8.5E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	2.6E-08		4.9E-09	3.1E-08	AROCLOR-1254	mmunological, Nails	5.1E-03		9.5E-04	6.1E-03
			PENTACHLOROPHENOL	7.9E-11		2.6E-11	1.1E-10	PENTACHLOROPHENOL	Liver and Kidney	1.7E-07		5.7E-08	2.3E-07
			2,3,7,8-TCDD TEQ	1.9E-06		7.4E-08	1.9E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	3.2E-01		0.0E+00	3.2E-01
			BARIUM					BARIUM	Blood	1.2E-02		0.0E+00	1.2E-02
			CADMIUM					CADMIUM	Kidney	2.7E-02		1.4E-03	2.8E-02
			CHROMIUM					CHROMIUM	NOAEL	1.6E-02		0.0E+00	1.6E-02
			COPPER					COPPER		1.8E-02		0.0E+00	1.8E-02
			IRON					IRON	Liver, Blood, GI Trac	1.5E-01		0.0E+00	1.5E-01
			MERCURY					MERCURY	CNS	6.1E-04		0.0E+00	6.1E-04
			SILVER					SILVER	Argyria	6.4E-04		0.0E+00	6.4E-04
			ZINC					ZINC	Blood	7.3E-03		0.0E+00	7.3E-03
						Total Risk Across Surface Soil	2.5E-06		Total Hazard Index Across All Media and All Exposure Routes				5.6E-01

Total Risk Across All Media and All Exposure Routes: 2.5E-06

Total Liver HI =	1.5E-01
Total Kidney HI =	2.8E-02
Total GI Tract HI =	1.5E-01
Total Blood HI =	1.7E-01
Total CNS HI =	9.8E-04
Total Immune System HI =	6.1E-03
Total Lifespan HI =	3.2E-01
Total Agyria HI =	6.4E-04

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	5.1E-11			5.1E-11	1,1-DICHLOROTHENE	Liver	7.3E-08			7.3E-08
			BENZENE	1.8E-12			1.8E-12	BENZENE		8.5E-08			8.5E-08
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.4E-05			1.4E-05
			METHYLENE CHLORIDE	2.0E-13			2.0E-13	METHYLENE CHLORIDE	Liver	3.4E-09			3.4E-09
			TETRACHLOROETHENE	2.4E-12			2.4E-12	TETRACHLOROETHENE	Liver	3.6E-08			3.6E-08
			TRICHLOROETHENE	3.7E-10			3.7E-10	TRICHLOROETHENE	CNS	4.3E-05			4.3E-05
			VINYL CHLORIDE	4.9E-11			4.9E-11	VINYL CHLORIDE	Liver	8.5E-08			8.5E-08
			BENZO(A)ANTHRACENE	4.5E-09		5.9E-10	5.1E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.9E-08		5.1E-09	4.4E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.8E-09		4.9E-10	4.3E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	8.6E-09		1.1E-09	9.7E-09	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	3.1E-09		4.4E-10	3.6E-09	AROCLOR-1254	Immunological, Nab	6.1E-04		8.5E-05	7.0E-04
			PENTACHLOROPHENOL	9.4E-12		2.4E-12	1.2E-11	PENTACHLOROPHENOL	Liver and Kidney	2.0E-08		5.1E-09	2.5E-08
			2,3,7,8-TCDD TEQ	2.2E-07		6.7E-09	2.3E-07	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	3.8E-02			3.8E-02
			BARIUM					BARIUM	Blood	1.5E-03			1.5E-03
			CADMIUM					CADMIUM	Kidney	3.2E-03		1.3E-04	3.3E-03
			CHROMIUM					CHROMIUM	NOAEL	1.9E-03			1.9E-03
			COPPER					COPPER		2.1E-03			2.1E-03
			IRON					IRON	Liver, Blood, GI Trac	1.8E-02			1.8E-02
			MERCURY					MERCURY	CNS	7.3E-05			7.3E-05
			SILVER					SILVER	Argyria	7.6E-05			7.6E-05
			ZINC					ZINC	Blood	8.7E-04			8.7E-04
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	3.0E-03		5.8E-03	8.7E-03
			Trichloroethene	6.3E-07		2.2E-06	2.8E-06	Trichloroethene	CNS	4.1E-02		1.4E-01	1.8E-01
			Vinyl Chloride	1.7E-06		2.1E-06	3.8E-06	Vinyl Chloride	Liver	2.9E-03		3.7E-03	6.6E-03
			Aluminum					Aluminum	Body Weight	2.1E-05		3.8E-06	2.5E-05
			Arsenic	1.3E-08		2.3E-09	1.5E-08	Arsenic	Skin, Vascular	2.2E-04		3.9E-05	2.6E-04
			Iron					Iron	Liver, Blood, GI Trac	5.2E-04		9.4E-05	6.1E-04
			Manganese					Manganese	CNS	1.3E-03		6.1E-03	7.4E-03
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	1.8E-08		2.0E-08	3.8E-08	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	1.8E-09			1.8E-09	TRICHLOROETHENE	CNS	1.2E-04			1.2E-04
			ALUMINUM					ALUMINUM	Body Weight	3.9E-04			3.9E-04
			ANTIMONY					ANTIMONY	Lifespan	7.4E-04			7.4E-04
			MANGANESE					MANGANESE	CNS	5.9E-04			5.9E-04

Total Risk Across Surface Soil	3.0E-07
Total Risk Across Surface Water	6.6E-06
Total Risk Across Sediment	3.9E-08
Total Risk Across All Media and All Exposure Routes	6.9E-06

Total Hazard Index Across All Media and All Exposure Routes	2.7E-01
Total Liver HI =	2.5E-02
Total Kidney HI =	3.3E-03
Total Vascular HI =	2.6E-04
Total GI Tract HI =	1.8E-02
Total Skin HI =	2.6E-04
Total Blood HI =	2.9E-02
Total CNS HI =	1.9E-01
Total Immune System HI =	7.0E-04
Total Body Weight HI =	4.1E-04
Total Lifespan HI =	3.9E-02
Total Argyria HI =	7.6E-05

TABLE 9.4a CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	5.1E-11			5.1E-11	1,1-DICHLOROTHENE	Liver	6.0E-08			6.0E-08
			BENZENE	1.8E-12			1.8E-12	BENZENE		6.0E-08			6.0E-08
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.2E-05			1.2E-05
			METHYLENE CHLORIDE	2.0E-13			2.0E-13	METHYLENE CHLORIDE	Liver	2.8E-09			2.8E-09
			TETRACHLOROETHENE	2.4E-12			2.4E-12	TETRACHLOROETHENE	Liver	2.9E-08			2.9E-08
			TRICHLOROETHENE	3.7E-10			3.7E-10	TRICHLOROETHENE	CNS	3.5E-05			3.5E-05
			VINYL CHLORIDE	4.9E-11			4.9E-11	VINYL CHLORIDE	Liver	6.9E-08			6.9E-08
			BENZO(A)ANTHRACENE	4.5E-09		1.5E-09	6.0E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.9E-08		1.3E-08	5.2E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.8E-09		1.2E-09	5.0E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	8.6E-09		2.8E-09	1.1E-08	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	3.1E-09		1.1E-09	4.2E-09	AROCLOR-1254	Immunological, Nervous	5.0E-04		1.7E-04	6.7E-04
			PENTACHLOROPHENOL	9.4E-12		5.8E-12	1.5E-11	PENTACHLOROPHENOL	Liver and Kidney	1.7E-08		1.0E-08	2.7E-08
			2,3,7,8-TCDD TEQ	2.2E-07		1.6E-08	2.4E-07	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	3.1E-02			3.1E-02
			BARIUM					BARIUM	Blood	1.2E-03			1.2E-03
			CADMIUM					CADMIUM	Kidney	2.6E-03		2.6E-04	2.8E-03
			CHROMIUM					CHROMIUM	NOAEL	1.5E-03			1.5E-03
			COPPER					COPPER		1.7E-03			1.7E-03
			IRON					IRON	Liver, Blood, GI Tract	1.4E-02			1.4E-02
			MERCURY					MERCURY	CNS	5.8E-05			5.8E-05
			SILVER					SILVER	Argyria	6.2E-05			6.2E-05
			ZINC					ZINC	Blood	7.1E-04			7.1E-04
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	4.8E-04		1.6E-03	2.1E-03
			Trichloroethene	1.2E-07		7.3E-07	8.6E-07	Trichloroethene	CNS	6.6E-03		3.9E-02	4.5E-02
			Vinyl Chloride	3.3E-07		7.3E-07	1.1E-06	Vinyl Chloride	Liver	4.7E-04		1.0E-03	1.5E-03
			Aluminum					Aluminum	Body Weight	3.4E-06		1.0E-06	4.4E-06
			Arsenic	2.5E-09		7.7E-10	3.3E-09	Arsenic	Skin, Vascular	3.5E-05		1.1E-05	4.6E-05
			Iron					Iron	Liver, Blood, GI Tract	8.4E-05		2.6E-05	1.1E-04
			Manganese					Manganese	CNS	2.2E-04		1.7E-03	1.9E-03
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	1.8E-08		1.3E-09	1.9E-08	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	1.8E-09			1.8E-09	TRICHLOROETHENE	CNS	9.7E-05			9.7E-05
			ALUMINUM					ALUMINUM	Body Weight	3.1E-04			3.1E-04
			ANTIMONY					ANTIMONY	Lifespan	6.0E-04			6.0E-04
			MANGANESE					MANGANESE	CNS	4.8E-04			4.8E-04

Total Risk Across Surface Soil	3.2E-07
Total Risk Across Surface Water	1.9E-06
Total Risk Across Sediment	2.1E-08
Total Risk Across All Media and All Exposure Routes	2.3E-06

Total Hazard Index Across All Media and All Exposure Routes	1.1E-01
Total Liver HI =	1.6E-02
Total Kidney HI =	2.8E-03
Total Vascular HI =	4.6E-05
Total GI Tract HI =	1.5E-02
Total Skin HI =	4.6E-05
Total Blood HI =	1.8E-02
Total CNS HI =	4.8E-02
Total Immune System HI =	6.7E-04
Total Body Weight HI =	3.2E-04
Total Lifespan HI =	3.2E-02
Total Argyria HI =	6.2E-05

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	5.3E-10			5.3E-10	1,1-DICHLOROTHENE	Liver	9.9E-07			9.9E-07
			BENZENE	1.9E-11			1.9E-11	BENZENE		1.1E-06			1.1E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.9E-04			1.9E-04
			METHYLENE CHLORIDE	2.1E-12			2.1E-12	METHYLENE CHLORIDE	Liver	4.6E-08			4.6E-08
			TETRACHLOROETHENE	2.5E-11			2.5E-11	TETRACHLOROETHENE	Liver	4.8E-07			4.8E-07
			TRICHLOROETHENE	3.8E-09			3.8E-09	TRICHLOROETHENE	CNS	5.8E-04			5.8E-04
			VINYL CHLORIDE	5.1E-10			5.1E-10	VINYL CHLORIDE	Liver	1.1E-06			1.1E-06
			BENZO(A)ANTHRACENE	4.8E-08		6.2E-09	5.4E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.1E-07		5.3E-08	4.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.0E-08		5.1E-09	4.5E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	9.0E-08		1.2E-08	1.0E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	3.3E-08		4.6E-09	3.7E-08	AROCLOR-1254	Immunological, Nails	8.2E-03		1.2E-03	9.4E-03
			PENTACHLOROPHENOL	9.9E-11		2.5E-11	1.2E-10	PENTACHLOROPHENOL	Liver and Kidney	2.7E-07		6.8E-08	3.4E-07
			2,3,7,8-TCDD TEQ	2.3E-06		7.0E-08	2.4E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	5.2E-01			5.2E-01
			BARIUM					BARIUM	Blood	2.0E-02			2.0E-02
			CADMIUM					CADMIUM	Kidney	4.3E-02		1.7E-03	4.4E-02
			CHROMIUM					CHROMIUM	NOAEL	2.6E-02			2.6E-02
			COPPER					COPPER		2.8E-02			2.8E-02
			IRON					IRON	Liver, Blood, GI Trac	1.2E-01			1.2E-01
			MERCURY					MERCURY	CNS	9.8E-04			9.8E-04
			SILVER					SILVER	Argyria	1.0E-03			1.0E-03
			ZINC					ZINC	Blood	1.2E-02			1.2E-02
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.7E-02		5.2E-02	7.9E-02
			Trichloroethene	4.4E-06		1.5E-05	1.9E-05	Trichloroethene	CNS	3.7E-01		1.3E+00	1.6E+00
			Vinyl Chloride	1.2E-05		1.5E-05	2.7E-05	Vinyl Chloride	Liver	2.6E-02		3.3E-02	5.9E-02
			Aluminum					Aluminum	Body Weight	1.9E-04		3.4E-05	2.2E-04
			Arsenic	8.8E-08		1.6E-08	1.0E-07	Arsenic	Skin, Vascular	2.0E-03		3.5E-04	2.3E-03
			Iron					Iron	Liver, Blood, GI Trac	4.6E-03		8.4E-04	5.5E-03
			Manganese					Manganese	CNS	1.2E-02		5.5E-02	6.7E-02

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	1.3E-07		3.8E-09	1.3E-07	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	1.3E-08			1.3E-08	TRICHLOROETHENE	CNS	1.1E-03			1.1E-03
			ALUMINUM					ALUMINUM	Body Weight	3.5E-03			3.5E-03
			ANTIMONY					ANTIMONY	Lifespan	6.6E-03			6.6E-03
			MANGANESE					MANGANESE	CNS	5.3E-03			5.3E-03
Groundwater	Water	Onsite	Chloroform	3.1E-09	5.6E-09	2.7E-10	8.9E-09	Chloroform	Liver	5.0E-04	8.0E-04	4.4E-05	1.4E-03
			Bis(2-ethylhexyl)phthalate	2.7E-07		4.3E-07	7.0E-07	Bis(2-ethylhexyl)phthalate	Liver	9.8E-03		1.5E-02	2.5E-02
			2,3,7,8-TCDD TEQ	2.3E-06		4.8E-05	5.0E-05	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight	7.3E-03		2.3E-05	7.3E-03
			Arsenic	2.7E-06		8.6E-09	2.7E-06	Arsenic	Skin, Vascular	6.0E-02		1.9E-04	6.0E-02
			Iron					Iron	Liver, Blood, GI Tract	2.0E-01		6.4E-04	2.0E-01
			Manganese					Manganese	CNS	1.8E+00		1.5E-01	2.0E+00

Total Risk Across Surface Soil	3.1E-06
Total Risk Across Surface Water	4.6E-05
Total Risk Across Sediment	1.4E-07
Total Risk Across Groundwater	5.4E-05
Total Risk Across All Media and All Exposure Routes	1.0E-04

Total Hazard Index Across All Media and All Exposure Routes	4.9E+00
Total Liver HI =	4.1E-01
Total Kidney HI =	4.4E-02
Total Vascular HI =	6.2E-02
Total GI Tract HI =	3.2E-01
Total Skin HI =	6.2E-02
Total Blood HI =	4.3E-01
Total CNS HI =	3.7E+00
Total Immune System HI =	9.4E-03
Total Body Weight HI =	1.1E-02
Total Lifespan HI =	5.2E-01
Total Agyria HI =	1.0E-03

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	1,1-DICHLOROTHENE	9.5E-10			9.5E-10	1,1-DICHLOROTHENE	Liver	6.2E-06			6.2E-06
			BENZENE	3.4E-11			3.4E-11	BENZENE		7.1E-06			7.1E-06
			CIS-1,2-DICHLOROETHENE					CIS-1,2-DICHLOROETHENE	Blood	1.2E-03			1.2E-03
			METHYLENE CHLORIDE	3.7E-12			3.7E-12	METHYLENE CHLORIDE	Liver	2.8E-07			2.8E-07
			TETRACHLOROETHENE	4.4E-11			4.4E-11	TETRACHLOROETHENE	Liver	3.0E-06			3.0E-06
			TRICHLOROETHENE	6.9E-09			6.9E-09	TRICHLOROETHENE	CNS	3.6E-03			3.6E-03
			VINYL CHLORIDE	9.2E-10			9.2E-10	VINYL CHLORIDE	Liver	7.1E-06			7.1E-06
			BENZO(A)ANTHRACENE	8.5E-08		7.7E-09	9.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.3E-07		6.6E-08	8.0E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	7.0E-08		6.4E-09	7.7E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.6E-07		1.5E-08	1.8E-07	DIBENZO(A,H)ANTHRACENE					
			AROCLOR-1254	5.9E-08		5.7E-09	6.4E-08	AROCLOR-1254	Immunological, Nails	5.1E-02		5.0E-03	5.6E-02
			PENTACHLOROPHENOL	1.8E-10		3.1E-11	2.1E-10	PENTACHLOROPHENOL	Liver and Kidney	1.7E-06		3.0E-07	2.0E-06
			2,3,7,8-TCDD TEQ	4.1E-06		8.7E-08	4.2E-06	2,3,7,8-TCDD TEQ					
			ANTIMONY					ANTIMONY	Lifespan	3.2E+00			3.2E+00
			BARIUM					BARIUM	Blood	1.2E-01			1.2E-01
			CADMIUM					CADMIUM	Kidney	2.7E-01		7.4E-03	2.7E-01
			CHROMIUM					CHROMIUM	NOAEL	1.6E-01			1.6E-01
			COPPER					COPPER		1.7E-01			1.7E-01
			IRON					IRON	Liver, Blood, GI Trac	1.5E+00			1.5E+00
			MERCURY					MERCURY	CNS	6.1E-03			6.1E-03
			SILVER					SILVER	Argyria	6.4E-03			6.4E-03
			ZINC					ZINC	Blood	7.3E-02			7.3E-02
Surface Water	Surface Water	Surface Water	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.5E-02		4.7E-02	7.2E-02
			Trichloroethene	1.2E-06		3.9E-06	5.0E-06	Trichloroethene	CNS	3.4E-01		1.1E+00	1.5E+00
			Vinyl Chloride	3.1E-06		3.8E-06	6.9E-06	Vinyl Chloride	Liver	2.4E-02		3.0E-02	5.4E-02
			Aluminum					Aluminum	Body Weight	1.7E-04		3.0E-05	2.0E-04
			Arsenic	2.3E-08		4.1E-09	2.8E-08	Arsenic	Skin, Vascular	1.8E-03		3.2E-04	2.1E-03
			Iron					Iron	Liver, Blood, GI Trac	4.3E-03		7.6E-04	5.1E-03
			Manganese					Manganese	CNS	1.1E-02		4.9E-02	6.0E-02

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 5 - OLD BURN PIT
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	Sediment	2,3,7,8-TCDD TEQ	3.4E-07		7.0E-09	3.4E-07	2,3,7,8-TCDD TEQ					
			TRICHLOROETHENE	3.4E-08			3.4E-08	TRICHLOROETHENE	CNS	1.0E-02			1.0E-02
			ALUMINUM					ALUMINUM	Body Weight	3.2E-02			3.2E-02
			ANTIMONY					ANTIMONY	Lifespan	6.2E-02			6.2E-02
			MANGANESE					MANGANESE	CNS	5.0E-02			5.0E-02
Groundwater	Water	Onsite	Chloroform	1.9E-09	7.5E-09	1.5E-10	9.5E-09	Chloroform	Liver	1.1E-03	3.7E-03	8.7E-05	4.9E-03
			Bis(2-ethylhexyl)phthalate	1.7E-07		2.4E-07	4.1E-07	Bis(2-ethylhexyl)phthalate	Liver	2.1E-02		3.0E-02	5.1E-02
			2,3,7,8-TCDD TEQ	1.5E-06		2.7E-05	2.9E-05	2,3,7,8-TCDD TEQ					
			Aluminum					Aluminum	Body Weight	1.6E-02		5.3E-05	1.6E-02
			Arsenic	1.7E-06		5.6E-09	1.7E-06	Arsenic	Skin, Vascular	1.3E-01		4.3E-04	1.3E-01
			Iron					Iron	Liver, Blood, GI Tract	4.4E-01		1.4E-03	4.4E-01
			Manganese					Manganese	CNS	4.0E+00		3.3E-01	4.3E+00

Total Risk Across Surface Soil	5.4E-06
Total Risk Across Surface Water	1.2E-05
Total Risk Across Sediment	3.8E-07
Total Risk Across Groundwater	3.1E-05
Total Risk Across All Media and All Exposure Routes	4.8E-05

Total Hazard Index Across All Media and All Exposure Routes	1.2E+01
Total Liver HI =	2.0E+00
Total Kidney HI =	2.7E-01
Total Vascular HI =	1.3E-01
Total GI Tract HI =	1.9E+00
Total Skin HI =	1.3E-01
Total Blood HI =	2.2E+00
Total CNS HI =	5.9E+00
Total Immune System HI =	5.6E-02
Total Body Weight HI =	4.9E-02
Total Lifespan HI =	3.3E+00
Total Agyria HI =	6.4E-03

RAGS-PART D TABLE 9'S – SWMU 9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	METHYLENE CHLORIDE	1.1E-12			1.1E-12	METHYLENE CHLORIDE	Liver	1.8E-07			1.8E-07
			TETRACHLOROETHENE	3.8E-12			3.8E-12	TETRACHLOROETHENE	Liver	5.1E-07			5.1E-07
			TRICHLOROETHENE	1.1E-12			1.1E-12	TRICHLOROETHENE	CNS	1.2E-06			1.2E-06
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	5.3E-06			5.3E-06
			BENZO(A)ANTHRACENE	7.3E-10		3.5E-10	1.1E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.6E-09		3.1E-09	9.8E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	3.6E-06		1.7E-06	5.3E-06
			AROCLOR-1254	3.1E-09		1.6E-09	4.7E-09	AROCLOR-1254	mmunological, Nail	5.5E-03		2.8E-03	8.3E-03
			PENTACHLOROPHENOL	4.5E-12		4.1E-12	8.6E-12	PENTACHLOROPHENOL	Liver and Kidney	8.8E-08		7.9E-08	1.7E-07
			ALUMINUM					ALUMINUM	Body Weight	2.7E-02			2.7E-02
			ANTIMONY					ANTIMONY	Lifespan	6.2E-03			6.2E-03
			BARIUM					BARIUM	Blood	3.4E-03			3.4E-03
			CHROMIUM					CHROMIUM	NOAEL	1.2E-02			1.2E-02
			IRON					IRON	Liver, Blood, GI Trac	1.9E-01			1.9E-01
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			9.6E-03	9.6E-03
			Methylene Chloride			3.0E-10	3.0E-10	Methylene Chloride	Liver			4.6E-05	4.6E-05
			Trichloroethene			7.5E-09	7.5E-09	Trichloroethene	CNS			8.0E-03	8.0E-03
			Dieldrin			1.7E-08	1.7E-08	Dieldrin	Liver			1.5E-03	1.5E-03
			Aluminum					Aluminum	Body Weight			2.4E-05	2.4E-05
			Arsenic			4.1E-09	4.1E-09	Arsenic	Skin, Vascular			6.3E-04	6.3E-04
			Barium					Barium	Blood			3.3E-03	3.3E-03
			Beryllium					Beryllium	Gastrointestinal			6.0E-03	6.0E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			3.7E-04	3.7E-04
			Iron					Iron	Liver, Blood, GI Tract			8.5E-03	8.5E-03
			Manganese					Manganese	CNS			5.6E-01	5.6E-01
			Nickel					Nickel	Decreased Organ/ Body Weights			4.4E-03	4.4E-03
						Total Risk Across Surface Soil	1.6E-08		Total Hazard Index Across All Media and All Exposure Routes				8.6E-01
						Total Risk Across Groundwater	2.9E-08						

Total Risk Across All Media and All Exposure Routes: 4.4E-08

Total Liver HI =	2.0E-01
Total Kidney HI =	1.7E-07
Total Vascular HI =	1.0E-03
Total GI Tract HI =	2.1E-01
Total Skin HI =	6.3E-04
Total Blood HI =	2.2E-01
Total CNS HI =	5.7E-01
Total Immune System HI =	8.7E-03
Total Body Weight HI =	3.2E-02
Total Lifespan HI =	6.2E-03
Total Nails HI =	8.3E-03

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.3E-12			1.3E-12	METHYLENE CHLORIDE	Liver	8.3E-09			8.3E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	4.8E-06			4.8E-06
			BENZO(A)ANTHRACENE	3.7E-09		3.2E-09	6.8E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.2E-08		2.7E-08	5.9E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.7E-06		1.5E-06	3.2E-06
			PENTACHLOROPHENOL	9.8E-12		1.6E-11	2.6E-11	PENTACHLOROPHENOL	Liver and Kidney	7.6E-09		1.3E-08	2.0E-08
			ANTIMONY					ANTIMONY	Lifespan	2.6E-04			2.6E-04
							Total Risk Across Surface Soil 6.6E-08						Total Hazard Index Across All Media and All Exposure Routes 2.6E-04

Total Risk Across All Media and All Exposure Routes 6.6E-08

Total Liver HI =	2.8E-08
Total Kidney HI =	2.0E-08
Total Body Weight HI =	8.0E-06
Total Lifespan HI =	2.6E-04

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.4E-11			1.4E-11	METHYLENE CHLORIDE	Liver	8.6E-08			8.6E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	5.0E-05			5.0E-05
			BENZO(A)ANTHRACENE	3.8E-08		3.3E-08	7.1E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.3E-07		2.8E-07	6.2E-07	BENZO(A)PYRENE					
			NAPHTHALENE				-	NAPHTHALENE	Body Weight	1.8E-05		1.5E-05	3.3E-05
			PENTACHLOROPHENOL	1.0E-10		1.7E-10	2.7E-10	PENTACHLOROPHENOL	Liver and Kidney	7.9E-08		1.3E-07	2.1E-07
			ANTIMONY					ANTIMONY	Lifespan	2.7E-03			2.7E-03
							Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes	2.7E-03

Total Risk Across All Media and All Exposure Routes: 6.9E-07

Total Liver HI =	3.0E-07
Total Kidney HI =	2.1E-07
Total Body Weight HI =	8.3E-05
Total Lifespan HI =	2.7E-03

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	3.5E-12			3.5E-12	METHYLENE CHLORIDE	Liver	1.8E-08			1.8E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	1.0E-05			1.0E-05
			BENZO(A)ANTHRACENE	9.6E-09		5.0E-09	1.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	8.3E-08		4.4E-08	1.3E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	3.7E-06		1.9E-06	5.6E-06
			PENTACHLOROPHENOL	2.5E-11		2.6E-11	5.1E-11	PENTACHLOROPHENOL	Liver and Kidney	1.7E-08		1.7E-08	3.3E-08
			ANTIMONY					ANTIMONY	Lifespan	5.5E-04			5.5E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	1.6E-03		2.0E-03	3.6E-03
Sediment	Sediment	Sediment	AROCLOR-1248	6.6E-08		8.4E-07	9.1E-07	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	2.2E-03			2.2E-03
			ARSENIC	8.0E-07		2.2E-06	3.0E-06	ARSENIC	Skin, Vascular	4.1E-03			4.1E-03
			IRON					IRON	Liver, Blood, GI Tract	1.3E-02		1.1E-02	2.4E-02
			MANGANESE					MANGANESE	CNS	3.8E-03			3.8E-03

Total Risk Across Surface Soil	1.4E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	3.9E-06
Total Risk Across All Media and All Exposure Routes	4.0E-06

Total Hazard Index Across All Media and All Exposure Routes	3.8E-02
Total Liver HI =	2.4E-02
Total Kidney HI =	3.3E-08
Total Vascular HI =	4.1E-03
Total GI Tract HI =	2.4E-02
Total Skin HI =	4.1E-03
Total Blood HI =	2.4E-02
Total CNS HI =	3.8E-03
Total Body Weight HI =	2.2E-03
Total Lifespan HI =	4.2E-03

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.0E-12			1.0E-12	METHYLENE CHLORIDE	Liver	1.5E-08			1.5E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	8.5E-06			8.5E-06
			BENZO(A)ANTHRACENE	2.9E-09		2.8E-09	5.7E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.5E-08		2.5E-08	4.9E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	3.0E-06		3.0E-06	6.0E-06
			PENTACHLOROPHENOL	7.6E-12		1.5E-11	2.2E-11	PENTACHLOROPHENOL	Liver and Kidney	1.3E-08		2.6E-08	3.9E-08
			ANTIMONY					ANTIMONY	Lifespan	4.5E-04			4.5E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	2.7E-04		6.8E-04	9.4E-04
Sediment	Sediment	Sediment	AROCLOR-1248	2.0E-08		2.1E-08	4.1E-08	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	1.8E-03			1.8E-03
			ARSENIC	2.4E-07		5.5E-08	2.9E-07	ARSENIC	Skin, Vascular	3.4E-03			3.4E-03
			IRON					IRON	Liver, Blood, GI Tract	1.0E-02		7.7E-04	1.1E-02
			MANGANESE					MANGANESE	CNS	3.1E-03			3.1E-03

Total Risk Across Surface Soil	5.5E-08
Total Risk Across Surface Water	
Total Risk Across Sediment	3.3E-07
Total Risk Across All Media and All Exposure Routes	3.9E-07

Total Hazard Index Across All Media and All Exposure Routes	2.1E-02
Total Liver HI =	1.1E-02
Total Kidney HI =	3.9E-08
Total Vascular HI =	3.4E-03
Total GI Tract HI =	1.1E-02
Total Skin HI =	3.4E-03
Total Blood HI =	1.1E-02
Total CNS HI =	3.1E-03
Total Body Weight HI =	1.8E-03
Total Lifespan HI =	1.4E-03

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.9E-11			1.9E-11	METHYLENE CHLORIDE	Liver	1.2E-07			1.2E-07
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	7.0E-05			7.0E-05
			BENZO(A)ANTHRACENE	5.1E-08		2.7E-08	7.9E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.5E-07		2.4E-07	6.8E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	2.5E-05		1.3E-05	3.8E-05
			PENTACHLOROPHENOL	1.4E-10		1.4E-10	2.8E-10	PENTACHLOROPHENOL	Liver and Kidney	1.1E-07		1.1E-07	2.2E-07
			ANTIMONY					ANTIMONY	Lifespan	3.7E-03			3.7E-03
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	1.1E-02		1.3E-02	2.4E-02
Sediment	Sediment	Sediment	AROCLOR-1248	3.6E-07		2.0E-07	5.6E-07	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	1.5E-02			1.5E-02
			ARSENIC	4.3E-06		5.2E-07	4.8E-06	ARSENIC	Skin, Vascular	2.8E-02			2.8E-02
			IRON					IRON	Liver, Blood, GI Tract	8.5E-02		3.4E-03	8.8E-02
			MANGANESE					MANGANESE	CNS	2.5E-02			2.5E-02
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	3.6E-01	1.0E-01	3.3E-02	4.9E-01
			Methylene Chloride	6.0E-07	4.4E-08	2.3E-08	6.7E-07	Methylene Chloride	Liver	3.9E-03		1.5E-04	4.1E-03
			Trichloroethene	3.8E-06	3.6E-05	6.7E-07	4.1E-05	Trichloroethene	CNS	1.7E-01	2.6E-02	3.0E-02	2.3E-01
			Dieldrin	2.1E-06		1.6E-06	3.6E-06	Dieldrin	Liver	7.6E-03		5.7E-03	1.3E-02
			Aluminum					Aluminum	Body Weight	9.6E-03		5.0E-05	9.6E-03
			Arsenic	3.9E-05		2.1E-07	3.9E-05	Arsenic	Skin, Vascular	2.5E-01		1.3E-03	2.6E-01
			Barium					Barium	Blood	9.2E-02		6.9E-03	9.9E-02
			Beryllium					Beryllium	Gastrointestinal	1.7E-02		1.3E-02	2.9E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	1.5E-01		7.8E-04	1.5E-01
			Iron					Iron	Liver, Blood, GI Tract	3.4E+00		1.8E-02	3.4E+00
			Manganese					Manganese	CNS	9.0E+00		1.2E+00	1.0E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	3.5E-01		9.2E-03	3.6E-01

Total Risk Across Surface Soil	7.6E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	5.4E-06
Total Risk Across Groundwater	8.4E-05
Total Risk Across All Media and All Exposure Routes	9.1E-05

Total Hazard Index Across All Media and All Exposure Routes	1.5E+01

Total Liver HI =	3.5E+00
Total Kidney HI =	2.2E-07
Total Vascular HI =	4.3E-01
Total GI Tract HI =	3.5E+00
Total Skin HI =	2.8E-01
Total Blood HI =	4.1E+00
Total CNS HI =	1.1E+01
Total Body Weight HI =	3.9E-01
Total Lifespan HI =	2.8E-02
Total Immune System HI =	1.5E-01

6.3E-06
1.5E-05
8.7E-05

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	4.4E-11			4.4E-11	METHYLENE CHLORIDE	Liver	1.1E-06			1.1E-06
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	6.5E-04			6.5E-04
			BENZO(A)ANTHRACENE	1.2E-07		3.1E-08	1.5E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.0E-06		2.7E-07	1.3E-06	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	2.3E-04		6.0E-05	2.9E-04
			PENTACHLOROPHENOL	3.2E-10		1.6E-10	4.8E-10	PENTACHLOROPHENOL	Liver and Kidney	1.0E-06		5.2E-07	1.6E-06
			ANTIMONY					ANTIMONY	Lifespan	3.5E-02			3.5E-02
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	1.0E-02		1.4E-02	2.4E-02
Sediment	Sediment	Sediment	AROCLOR-1248	8.3E-07		2.3E-07	1.1E-06	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	1.4E-01			1.4E-01
			ARSENIC	1.0E-05		6.0E-07	1.1E-05	ARSENIC	Skin, Vascular	2.6E-01			2.6E-01
			IRON					IRON	Liver, Blood, GI Tract	7.9E-01		1.6E-02	8.1E-01
			MANGANESE					MANGANESE	CNS	2.4E-01			2.4E-01
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	1.2E+00	4.7E-01	7.6E-02	1.8E+00
			Methylene Chloride	5.3E-07	5.2E-08	1.4E-08	5.9E-07	Methylene Chloride	Liver	1.4E-02		3.6E-04	1.4E-02
			Trichloroethene	3.4E-06	4.2E-05	3.8E-07	4.6E-05	Trichloroethene	CNS	5.9E-01	1.2E-01	6.7E-02	7.8E-01
			Dieldrin	1.8E-06		8.8E-07	2.7E-06	Dieldrin	Liver	2.6E-02		1.3E-02	3.9E-02
			Aluminum					Aluminum	Body Weight	3.4E-02		1.5E-04	3.4E-02
			Arsenic	3.4E-05		1.5E-07	3.5E-05	Arsenic	Skin, Vascular	8.9E-01		3.9E-03	8.9E-01
			Barium					Barium	Blood	3.2E-01		2.0E-02	3.4E-01
			Beryllium					Beryllium	Gastrointestinal	5.9E-02		3.7E-02	9.6E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	5.2E-01		2.3E-03	5.2E-01
			Iron					Iron	Liver, Blood, GI Tract	1.2E+01		5.2E-02	1.2E+01
			Manganese					Manganese	CNS	3.2E+01		3.5E+00	3.5E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	1.2E+00		2.7E-02	1.3E+00

Total Risk Across Surface Soil	1.5E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	1.2E-05
Total Risk Across Groundwater	8.4E-05
Total Risk Across All Media and All Exposure Routes	9.7E-05

Total Hazard Index Across All Media and All Exposure Routes	5.4E+01
Total Liver HI =	1.3E+01
Total Kidney HI =	1.6E-06
Total Vascular HI =	1.7E+00
Total GI Tract HI =	1.3E+01
Total Skin HI =	1.2E+00
Total Blood HI =	1.5E+01
Total CNS HI =	3.6E+01
Total Body Weight HI =	1.4E+00
Total Lifespan HI =	5.9E-02
Total Immune System HI =	5.2E-01

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	METHYLENE CHLORIDE	5.7E-13			5.7E-13	METHYLENE CHLORIDE	Liver	8.9E-08			8.9E-08
			TETRACHLOROETHENE	1.9E-12			1.9E-12	TETRACHLOROETHENE	Liver	2.5E-07			2.5E-07
			TRICHLOROETHENE	5.5E-13			5.5E-13	TRICHLOROETHENE	CNS	5.9E-07			5.9E-07
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.7E-06			2.7E-06
			BENZO(A)ANTHRACENE	3.7E-10		9.9E-11	4.7E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.3E-09		9.0E-10	4.2E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.8E-06		4.8E-07	2.3E-06
			AROCLOR-1254	1.6E-09		4.6E-10	2.0E-09	AROCLOR-1254	mmunological, Nail	2.8E-03		8.0E-04	3.6E-03
			PENTACHLOROPHENOL	2.3E-12		1.2E-12	3.4E-12	PENTACHLOROPHENOL	Liver and Kidney	4.4E-08		2.3E-08	6.7E-08
			ALUMINUM					ALUMINUM	Body Weight	1.4E-02			1.4E-02
			ANTIMONY					ANTIMONY	Lifespan	3.1E-03			3.1E-03
			BARIUM					BARIUM	Blood	1.7E-03			1.7E-03
			CHROMIUM					CHROMIUM	NOAEL	6.0E-03			6.0E-03
			IRON					IRON	iver, Blood, GI Trac	9.7E-02			9.7E-02
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood			6.8E-03	6.8E-03
			Methylene Chloride			2.1E-10	2.1E-10	Methylene Chloride	Liver			3.2E-05	3.2E-05
			Trichloroethene			5.5E-09	5.5E-09	Trichloroethene	CNS			5.8E-03	5.8E-03
			Dieldrin			1.3E-08	1.3E-08	Dieldrin	Liver			1.1E-03	1.1E-03
			Aluminum					Aluminum	Body Weight			1.5E-05	1.5E-05
			Arsenic			2.6E-09	2.6E-09	Arsenic	Skin, Vascular			4.1E-04	4.1E-04
			Barium					Barium	Blood			2.1E-03	2.1E-03
			Beryllium					Beryllium	Gastrointestinal			3.8E-03	3.8E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			2.4E-04	2.4E-04
			Iron					Iron	iver, Blood, GI Tract			5.5E-03	5.5E-03
			Manganese					Manganese	CNS			3.6E-01	3.6E-01
			Nickel					Nickel	Decreased Organ/ Body Weights			2.8E-03	2.8E-03

Total Risk Across Surface Soil: 6.7E-09
Total Risk Across Groundwater: 2.1E-08

Total Risk Across All Media and All Exposure Routes: 2.8E-08

Total Hazard Index Across All Media and All Exposure Routes: 5.2E-01

Total Liver HI =	1.0E-01
Total Kidney HI =	6.7E-08
Total Vascular HI =	6.5E-04
Total GI Tract HI =	1.1E-01
Total Skin HI =	4.1E-04
Total Blood HI =	1.1E-01
Total CNS HI =	3.7E-01
Total Immune System HI =	3.8E-03
Total Body Weight HI =	1.6E-02
Total Lifespan HI =	3.1E-03
Total Nails HI =	3.6E-03

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	1.2E-13			1.2E-13	METHYLENE CHLORIDE	Liver	2.1E-09			2.1E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	1.2E-06			1.2E-06
			BENZO(A)ANTHRACENE	3.3E-10		5.7E-11	3.9E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.9E-09		4.9E-10	3.4E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	4.3E-07		7.3E-08	5.0E-07
			PENTACHLOROPHENOL	8.8E-13		2.9E-13	1.2E-12	PENTACHLOROPHENOL	Liver and Kidney	1.9E-09		6.3E-10	2.5E-09
			ANTIMONY					ANTIMONY	Lifespan	6.4E-05			6.4E-05
						Total Risk Across Surface Soil	3.7E-09		Total Hazard Index Across All Media and All Exposure Routes				6.6E-05

Total Risk Across All Media and All Exposure Routes: 3.7E-09

Total Liver HI = 4.6E-09
Total Kidney HI = 2.5E-09
Total Body Weight HI = 1.7E-06
Total Lifespan HI = 6.4E-05

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.2E-12			2.2E-12	METHYLENE CHLORIDE	Liver	3.8E-08			3.8E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.2E-05			2.2E-05
			BENZO(A)ANTHRACENE	6.0E-09		1.0E-09	7.1E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	5.2E-08		9.0E-09	6.1E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	7.8E-06		1.3E-06	9.1E-06
			PENTACHLOROPHENOL	1.6E-11		5.3E-12	2.1E-11	PENTACHLOROPHENOL	Liver and Kidney	3.5E-08		1.1E-08	4.6E-08
			ANTIMONY					ANTIMONY	Lifespan	1.2E-03			1.2E-03
							Total Risk Across Surface Soil						Total Hazard Index Across All Media and All Exposure Routes
							6.8E-08						1.2E-03

Total Risk Across All Media and All Exposure Routes: 6.8E-08

Total Liver HI =	8.4E-08
Total Kidney HI =	4.6E-08
Total Body Weight HI =	3.1E-05
Total Lifespan HI =	1.2E-03

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.6E-13			2.6E-13	METHYLENE CHLORIDE	Liver	4.5E-09			4.5E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.6E-06			2.6E-06
			BENZO(A)ANTHRACENE	7.2E-10		9.3E-11	8.1E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.2E-09		8.1E-10	7.0E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	9.2E-07		1.2E-07	1.0E-06
			PENTACHLOROPHENOL	1.9E-12		4.8E-13	2.4E-12	PENTACHLOROPHENOL	Liver and Kidney	4.1E-09		1.0E-09	5.2E-09
			ANTIMONY					ANTIMONY	Lifespan	1.4E-04			1.4E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	4.1E-04		4.9E-04	9.0E-04
Sediment	Sediment	Sediment	AROCLOR-1248	5.0E-09		2.5E-08	3.0E-08	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	5.5E-04			5.5E-04
			ARSENIC	6.0E-08		6.5E-08	1.3E-07	ARSENIC	Skin, Vascular	1.0E-03			1.0E-03
			IRON					IRON	Liver, Blood, GI Tract	3.2E-03		1.1E-03	4.3E-03
			MANGANESE					MANGANESE	CNS	9.4E-04			9.4E-04

Total Risk Across Surface Soil	7.8E-09
Total Risk Across Surface Water	
Total Risk Across Sediment	1.6E-07
Total Risk Across All Media and All Exposure Routes	1.6E-07

Total Hazard Index Across All Media and All Exposure Routes	7.9E-03
Total Liver HI =	4.3E-03
Total Kidney HI =	5.2E-09
Total Vascular HI =	1.0E-03
Total GI Tract HI =	4.3E-03
Total Skin HI =	1.0E-03
Total Blood HI =	4.3E-03
Total CNS HI =	9.4E-04
Total Body Weight HI =	5.5E-04
Total Lifespan HI =	1.0E-03

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.6E-13			2.6E-13	METHYLENE CHLORIDE	Liver	3.7E-09			3.7E-09
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.1E-06			2.1E-06
			BENZO(A)ANTHRACENE	7.1E-10		2.3E-10	9.4E-10	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.2E-09		2.0E-09	8.2E-09	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	7.5E-07		2.4E-07	9.9E-07
			PENTACHLOROPHENOL	1.9E-12		1.2E-12	3.1E-12	PENTACHLOROPHENOL	Liver and Kidney	3.4E-09		2.1E-09	5.4E-09
			ANTIMONY					ANTIMONY	Lifespan	1.1E-04			1.1E-04
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	6.6E-05		1.4E-04	2.0E-04
Sediment	Sediment	Sediment	AROCLOR-1248	4.9E-09		1.7E-09	6.7E-09	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	4.5E-04			4.5E-04
			ARSENIC	6.0E-08		4.4E-09	6.4E-08	ARSENIC	Skin, Vascular	8.4E-04			8.4E-04
			IRON					IRON	Liver, Blood, GI Tract	2.6E-03		6.3E-05	2.6E-03
			MANGANESE					MANGANESE	CNS	7.7E-04			7.7E-04

Total Risk Across Surface Soil	9.1E-09
Total Risk Across Surface Water	
Total Risk Across Sediment	7.1E-08
Total Risk Across All Media and All Exposure Routes	8.0E-08

Total Hazard Index Across All Media and All Exposure Routes	5.0E-03
Total Liver HI =	2.6E-03
Total Kidney HI =	5.4E-09
Total Vascular HI =	8.4E-04
Total GI Tract HI =	2.6E-03
Total Skin HI =	8.4E-04
Total Blood HI =	2.6E-03
Total CNS HI =	7.7E-04
Total Body Weight HI =	4.5E-04
Total Lifespan HI =	3.2E-04

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	2.7E-12			2.7E-12	METHYLENE CHLORIDE	Liver	6.0E-08			6.0E-08
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	3.5E-05			3.5E-05
			BENZO(A)ANTHRACENE	7.5E-09		9.8E-10	8.5E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.5E-08		8.5E-09	7.3E-08	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	1.2E-05		1.6E-06	1.4E-05
			PENTACHLOROPHENOL	2.0E-11		5.0E-12	2.5E-11	PENTACHLOROPHENOL	Liver and Kidney	5.6E-08		1.4E-08	6.9E-08
			ANTIMONY					ANTIMONY	Lifespan	1.9E-03			1.9E-03
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	3.7E-03		4.4E-03	8.1E-03
Sediment	Sediment	Sediment	AROCLOR-1248	3.5E-08		4.9E-09	4.0E-08	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	4.9E-03			4.9E-03
			ARSENIC	4.2E-07		1.3E-08	4.3E-07	ARSENIC	Skin, Vascular	9.3E-03			9.3E-03
			IRON					IRON	Liver, Blood, GI Tract	2.8E-02		2.8E-04	2.9E-02
			MANGANESE					MANGANESE	CNS	8.5E-03			8.5E-03
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	2.5E-01	3.7E-02	2.1E-02	3.1E-01
			Methylene Chloride	1.2E-07	4.8E-09	4.5E-09	1.3E-07	Methylene Chloride	Liver	2.7E-03		1.0E-04	2.8E-03
			Trichloroethene	7.9E-07	3.9E-06	1.3E-07	4.8E-06	Trichloroethene	CNS	1.2E-01	9.7E-03	1.9E-02	1.5E-01
			Dieldrin	4.2E-07		3.0E-07	7.2E-07	Dieldrin	Liver	5.3E-03		3.8E-03	9.1E-03
			Aluminum					Aluminum	Body Weight	6.7E-03		2.2E-05	6.7E-03
			Arsenic	8.0E-06		2.6E-08	8.0E-06	Arsenic	Skin, Vascular	1.8E-01		5.7E-04	1.8E-01
			Barium					Barium	Blood	6.5E-02		3.0E-03	6.8E-02
			Beryllium					Beryllium	Gastrointestinal	1.2E-02		5.4E-03	1.7E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	1.0E-01		3.4E-04	1.0E-01
			Iron					Iron	Liver, Blood, GI Tract	2.4E+00		7.7E-03	2.4E+00
			Manganese					Manganese	CNS	6.3E+00		5.1E-01	6.8E+00
			Nickel					Nickel	Decreased Organ/ Body Weights	2.5E-01		4.0E-03	2.5E-01

Total Risk Across Surface Soil	8.2E-06
Total Risk Across Surface Water	
Total Risk Across Sediment	4.7E-07
Total Risk Across Groundwater	1.4E-05
Total Risk Across All Media and All Exposure Routes	1.4E-05

Total Hazard Index Across All Media and All Exposure Routes	1.0E+01
Total Liver HI =	2.4E+00
Total Kidney HI =	6.9E-08
Total Vascular HI =	2.9E-01
Total GI Tract HI =	2.4E+00
Total Skin HI =	1.9E-01
Total Blood HI =	2.8E+00
Total CNS HI =	7.1E+00
Total Body Weight HI =	2.6E-01
Total Lifespan HI =	1.0E-02
Total Immune System HI =	1.0E-01

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 9 - PESTICIDE CONTROL / R-150 TANK AREA
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	METHYLENE CHLORIDE	4.8E-12			4.8E-12	METHYLENE CHLORIDE	Liver	3.8E-07			3.8E-07
			2-METHYLNAPHTHALENE					2-METHYLNAPHTHALENE	Body Weight	2.2E-04			2.2E-04
			BENZO(A)ANTHRACENE	1.3E-08		1.2E-09	1.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.2E-07		1.1E-08	1.3E-07	BENZO(A)PYRENE					
			NAPHTHALENE					NAPHTHALENE	Body Weight	7.7E-05		7.0E-06	8.4E-05
			PENTACHLOROPHENOL	3.6E-11		6.2E-12	4.2E-11	PENTACHLOROPHENOL	Liver and Kidney	3.5E-07		6.0E-08	4.1E-07
			ANTIMONY					ANTIMONY	Lifespan	1.2E-02			1.2E-02
Surface Water	Surface Water	Surface Water	Antimony					Antimony	Lifespan	3.4E-03		4.0E-03	7.4E-03
Sediment	Sediment	Sediment	AROCLOR-1248	9.3E-08		9.1E-09	1.0E-07	AROCLOR-1248					
			ALUMINUM					ALUMINUM	Body Weight	4.6E-02			4.6E-02
			ARSENIC	1.1E-06		2.3E-08	1.1E-06	ARSENIC	Skin, Vascular	8.7E-02			8.7E-02
			IRON					IRON	Liver, Blood, GI Tract	2.6E-01		1.8E-03	2.7E-01
			MANGANESE					MANGANESE	CNS	7.9E-02			7.9E-02
Groundwater	Water	Onsite	cis-1,2-Dichloroethene					cis-1,2-Dichloroethene	Blood	5.5E-01	1.7E-01	4.2E-02	7.6E-01
			Methylene Chloride	7.8E-08	6.4E-09	2.5E-09	8.6E-08	Methylene Chloride	Liver	6.0E-03		2.0E-04	6.2E-03
			Trichloroethene	4.9E-07	5.2E-06	7.2E-08	5.8E-06	Trichloroethene	CNS	2.6E-01	4.5E-02	3.8E-02	3.5E-01
			Dieldrin	2.7E-07		1.7E-07	4.4E-07	Dieldrin	Liver	1.2E-02		7.4E-03	1.9E-02
			Aluminum					Aluminum	Body Weight	1.5E-02		4.9E-05	1.5E-02
			Arsenic	5.0E-06		1.7E-08	5.1E-06	Arsenic	Skin, Vascular	3.9E-01		1.3E-03	3.9E-01
			Barium					Barium	Blood	1.4E-01		6.7E-03	1.5E-01
			Beryllium					Beryllium	Gastrointestinal	2.6E-02		1.2E-02	3.8E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	2.3E-01		7.6E-04	2.3E-01
			Iron					Iron	Liver, Blood, GI Tract	5.2E+00		1.7E-02	5.3E+00
			Manganese					Manganese	CNS	1.4E+01		1.1E+00	1.5E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	5.4E-01		8.9E-03	5.5E-01

Total Risk Across Surface Soil	1.4E-07
Total Risk Across Surface Water	
Total Risk Across Sediment	1.2E-06
Total Risk Across Groundwater	1.1E-05
Total Risk Across All Media and All Exposure Routes	1.3E-05

Total Hazard Index Across All Media and All Exposure Routes	2.3E+01
Total Liver HI =	5.6E+00
Total Kidney HI =	4.1E-07
Total Vascular HI =	7.1E-01
Total GI Tract HI =	5.6E+00
Total Skin HI =	4.8E-01
Total Blood HI =	6.4E+00
Total CNS HI =	1.6E+01
Total Body Weight HI =	6.1E-01
Total Lifespan HI =	1.9E-02
Total Immune System HI =	2.3E-01

RAGS-PART D TABLE 9'S – SWMU 10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS

TABLE 9.1. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	BENZO(A)ANTHRACENE	1.6E-08		7.3E-09	2.3E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.9E-07		1.4E-07	4.3E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.8E-08		1.3E-08	4.2E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	5.9E-08		2.8E-08	8.6E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	1.3E-02		4.8E-03	1.8E-02
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver			6.7E-03	6.7E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver			1.1E-02	1.1E-02
			2,4,6-Trinitrotoluene			1.9E-10	1.9E-10	2,4,6-Trinitrotoluene	Liver			8.7E-04	8.7E-04
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver			1.6E-04	1.6E-04
			HMX					HMX	Liver, Blood			1.2E-04	1.2E-04
			RDX			1.1E-08	1.1E-08	RDX	Prostate			2.4E-03	2.4E-03
			Aluminum					Aluminum	Body Weight			4.9E-04	4.9E-04
			Arsenic			2.5E-09	2.5E-09	Arsenic	Skin, Vascular			3.9E-04	3.9E-04
			Beryllium					Beryllium	Gastrointestinal			1.7E-02	1.7E-02
			Cadmium					Cadmium	Kidney			2.4E-03	2.4E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			1.0E-03	1.0E-03
			Iron					Iron	Liver, Blood, GI Tract			2.1E-02	2.1E-02
			Manganese					Manganese	CNS			1.5E+00	1.5E+00
			Nickel					Nickel	Decreased Organ/ Body Weights			1.2E-02	1.2E-02
			Thallium					Thallium	Liver			5.8E-04	5.8E-04
			Zinc					Zinc	Blood			2.3E-04	2.3E-04

Total Risk Across Surface Soil	5.8E-07
Total Risk Across Groundwater	1.4E-08
Total Risk Across All Media and All Exposure Routes	5.9E-07
Total Hazard Index Across All Media and All Exposure Routes	1.6E+00

Total Liver HI =	4.0E-02
Total Kidney HI =	2.4E-03
Total Vascular HI =	1.4E-03
Total GI Tract HI =	3.8E-02
Total Skin HI =	3.9E-04
Total Blood HI =	2.2E-02
Total CNS HI =	1.5E+00
Total Immune System HI =	1.0E-03
Total Body Weight HI =	1.2E-02
Total Prostate HI =	2.4E-03

TABLE 9.2. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.3E-08		1.1E-08	2.4E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.4E-07		2.1E-07	4.5E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.4E-08		2.0E-08	4.4E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.9E-08		4.2E-08	9.1E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	5.1E-04		3.3E-04	8.4E-04
						Total Risk Across Surface Soil	6.1E-07					Total Hazard Index Across All Media and All Exposure Routes	8.4E-04

Total Risk Across All Media and All Exposure Routes 6.1E-07

Total Liver HI = 8.4E-04
Total Prostate HI = 0.0E+00

TABLE 9.3. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.4E-07		1.2E-07	2.5E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.5E-06		2.2E-06	4.7E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.4E-07		2.1E-07	4.6E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	5.1E-07		4.4E-07	9.5E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	5.3E-03		3.5E-03	8.7E-03
						Total Risk Across Surface Soil	6.3E-06					Total Hazard Index Across All Media and All Exposure Routes	8.7E-03

Total Risk Across All Media and All Exposure Routes 6.3E-06

Total Liver HI = 8.7E-03
Total Prostate HI = 0.0E+00

TABLE 9.4. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	3.4E-08		1.8E-08	5.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	6.3E-07		3.3E-07	9.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	6.1E-08		3.2E-08	9.3E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.3E-07		6.7E-08	1.9E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	1.1E-03		4.4E-04	1.5E-03
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	2.8E-03		5.4E-04	3.3E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	6.0E-03		1.2E-03	7.1E-03
			2,4,6-Trinitrotoluene	1.0E-08		5.4E-10	1.1E-08	2,4,6-Trinitrotoluene	Liver	1.6E-03		8.4E-05	1.7E-03
			RDX	3.5E-07		4.1E-08	3.9E-07	RDX	Prostate	2.4E-03		2.9E-04	2.7E-03
			Aluminum					Aluminum	Body Weight	2.0E-04		3.6E-05	2.4E-04
			Arsenic	1.9E-07		3.4E-08	2.2E-07	Arsenic	Skin, Vascular	9.6E-04		1.7E-04	1.1E-03
			Iron					Iron	Liver, Blood, GI Trac	9.6E-04		1.7E-04	1.1E-03
			Manganese					Manganese	CNS	1.9E-03		8.6E-03	1.0E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	1.5E-03		0.0E+00	1.5E-03
			ARSENIC	2.6E-06		7.1E-06	9.7E-06	ARSENIC	Skin, Vascular	1.3E-02		3.7E-02	5.0E-02
			CHROMIUM					CHROMIUM	NOAEL	2.6E-03		0.0E+00	2.6E-03
			IRON					IRON	Liver, Blood, GI Tract	3.3E-02		0.0E+00	3.3E-02
			MANGANESE					MANGANESE	CNS	1.1E-02		0.0E+00	1.1E-02
			VANADIUM					VANADIUM	NOAEL	1.1E-03		0.0E+00	1.1E-03

Total Risk Across Surface Soil	1.3E-06
Total Risk Across Surface Water	6.2E-07
Total Risk Across Sediment	9.7E-06
Total Risk Across All Media and All Exposure Routes	1.2E-05

Total Hazard Index Across All Media and All Exposure Routes	1.3E-01
Total Liver HI =	4.5E-02
Total Vascular HI =	5.1E-02
Total GI Tract HI =	3.4E-02
Total Skin HI =	5.1E-02
Total Blood HI =	3.4E-02
Total CNS HI =	2.1E-02
Total Body Weight HI =	1.7E-03
Total Prostate HI =	2.7E-03

TABLE 9.5. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.0E-08		1.0E-08	2.0E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.9E-07		1.9E-07	3.7E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.8E-08		1.8E-08	3.6E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	3.8E-08		3.8E-08	7.6E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	8.9E-04		6.8E-04	1.6E-03
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	4.5E-04		1.8E-04	6.4E-04
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	9.7E-04		4.0E-04	1.4E-03
			2,4,6-Trinitrotoluene	6.3E-10		6.8E-11	6.9E-10	2,4,6-Trinitrotoluene	Liver	2.7E-04		2.9E-05	2.9E-04
			RDX	2.1E-08		5.1E-09	2.6E-08	RDX	Prostate	4.0E-04		9.8E-05	5.0E-04
			Aluminum					Aluminum	Body Weight	3.3E-05		1.2E-05	4.5E-05
			Arsenic	1.1E-08		4.2E-09	1.5E-08	Arsenic	Skin, Vascular	1.6E-04		6.0E-05	2.2E-04
			Iron					Iron	Liver, Blood, GI Trac	1.6E-04		6.0E-05	2.2E-04
			Manganese					Manganese	CNS	3.1E-04		2.9E-03	3.3E-03
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	1.2E-03		0.0E+00	1.2E-03
			ARSENIC	7.7E-07		1.8E-07	9.5E-07	ARSENIC	Skin, Vascular	1.1E-02		2.5E-03	1.3E-02
			CHROMIUM					CHROMIUM	NOAEL	2.1E-03		0.0E+00	2.1E-03
			IRON					IRON	Liver, Blood, GI Tract	2.7E-02		0.0E+00	2.7E-02
			MANGANESE					MANGANESE	CNS	8.7E-03		0.0E+00	8.7E-03
			VANADIUM					VANADIUM	NOAEL	9.3E-04		0.0E+00	9.3E-04

Total Risk Across Surface Soil	5.1E-07
Total Risk Across Surface Water	4.2E-08
Total Risk Across Sediment	9.5E-07
Total Risk Across All Media and All Exposure Routes	1.5E-06

Total Hazard Index Across All Media and All Exposure Routes	6.1E-02
Total Liver HI =	2.9E-02
Total Vascular HI =	1.4E-02
Total GI Tract HI =	2.7E-02
Total Skin HI =	1.4E-02
Total Blood HI =	2.7E-02
Total CNS HI =	1.2E-02
Total Body Weight HI =	1.3E-03
Total Prostate HI =	5.0E-04

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.8E-07		9.6E-08	2.8E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	3.4E-06		1.8E-06	5.2E-06	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.3E-07		1.7E-07	5.0E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	6.9E-07		3.6E-07	1.0E-06	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	7.4E-03		3.0E-03	1.0E-02
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.9E-02		3.6E-03	2.2E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	4.0E-02		7.8E-03	4.8E-02
			2,4,6-Trinitrotoluene	5.6E-08		2.9E-09	5.9E-08	2,4,6-Trinitrotoluene	Liver	1.1E-02		5.6E-04	1.2E-02
			RDX	1.9E-06		2.2E-07	2.1E-06	RDX	Prostate	1.6E-02		1.9E-03	1.8E-02
			Aluminum					Aluminum	Body Weight	1.4E-03		2.5E-04	1.6E-03
			Arsenic	1.0E-06		1.8E-07	1.2E-06	Arsenic	Skin, Vascular	6.5E-03		1.2E-03	7.6E-03
			Iron					Iron	Liver, Blood, GI Trac	6.5E-03		1.2E-03	7.7E-03
			Manganese					Manganese	CNS	1.3E-02		5.8E-02	7.1E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	1.0E-02		0.0E+00	1.0E-02
			ARSENIC	1.4E-05		1.7E-06	1.6E-05	ARSENIC	Skin, Vascular	9.1E-02		1.1E-02	1.0E-01
			CHROMIUM					CHROMIUM	NOAEL	1.8E-02		0.0E+00	1.8E-02
			IRON					IRON	Liver, Blood, GI Tract	2.2E-01		0.0E+00	2.2E-01
			MANGANESE					MANGANESE	CNS	7.2E-02		0.0E+00	7.2E-02
			VANADIUM					VANADIUM	NOAEL	7.7E-03		0.0E+00	7.7E-03

TABLE 9.6. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.9E+00		2.6E-02	1.9E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	3.0E+00		4.2E-02	3.0E+00
			2,4,6-Trinitrotoluene	4.5E-06		1.8E-08	4.5E-06	2,4,6-Trinitrotoluene	Liver	8.8E-01		3.4E-03	8.8E-01
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	1.5E-02		6.4E-04	1.6E-02
			HMX					HMX	Liver, Blood	1.3E-01		4.7E-04	1.3E-01
			RDX	1.2E-04		1.1E-06	1.2E-04	RDX	Prostate	1.0E+00		9.3E-03	1.1E+00
			Aluminum					Aluminum	Body Weight	2.0E-01		1.0E-03	2.0E-01
			Arsenic	2.4E-05		1.2E-07	2.4E-05	Arsenic	Skin, Vascular	1.6E-01		8.1E-04	1.6E-01
			Beryllium					Beryllium	Gastrointestinal	4.7E-02		3.5E-02	8.2E-02
			Cadmium					Cadmium	Kidney	4.7E-02		4.9E-03	5.2E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	4.1E-01		2.1E-03	4.1E-01
			Iron					Iron	Liver, Blood, GI Tract	8.6E+00		4.5E-02	8.6E+00
			Manganese					Manganese	CNS	2.5E+01		3.2E+00	2.8E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	9.5E-01		2.5E-02	9.8E-01
			Thallium					Thallium	Liver	2.3E-01		1.2E-03	2.3E-01
			Zinc					Zinc	Blood	1.5E-01		4.7E-04	1.5E-01

Total Risk Across Surface Soil	7.0E-06
Total Risk Across Surface Water	3.3E-06
Total Risk Across Sediment	1.6E-05
Total Risk Across Groundwater	1.5E-04
Total Risk Across All Media and All Exposure Routes	1.7E-04

Total Hazard Index Across All Media and All Exposure Routes	4.7E+01
Total Liver HI =	1.4E+01
Total Kidney HI =	5.2E-02
Total Vascular HI =	6.8E-01
Total GI Tract HI =	8.9E+00
Total Skin HI =	2.7E-01
Total Blood HI =	9.1E+00
Total CNS HI =	2.9E+01
Total Immune System HI =	4.1E-01
Total Body Weight HI =	1.2E+00
Total Prostate HI =	1.1E+00

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	4.2E-07		1.1E-07	5.3E-07	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	7.9E-06		2.1E-06	1.0E-05	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	7.7E-07		2.0E-07	9.7E-07	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.6E-06		4.2E-07	2.0E-06	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	6.9E-02		1.4E-02	8.3E-02
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.7E-02		3.7E-03	2.1E-02
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	3.7E-02		8.0E-03	4.5E-02
			2,4,6-Trinitrotoluene	1.3E-08		7.5E-10	1.4E-08	2,4,6-Trinitrotoluene	Liver	1.0E-02		5.8E-04	1.1E-02
			RDX	4.3E-07		5.6E-08	4.9E-07	RDX	Prostate	1.5E-02		2.0E-03	1.7E-02
			Aluminum					Aluminum	Body Weight	1.3E-03		2.5E-04	1.5E-03
			Arsenic	2.3E-07		4.6E-08	2.8E-07	Arsenic	Skin, Vascular	6.0E-03		1.2E-03	7.2E-03
			Iron					Iron	Liver, Blood, GI Trac	6.1E-03		1.2E-03	7.3E-03
			Manganese					Manganese	CNS	1.2E-02		5.9E-02	7.1E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	9.5E-02			9.5E-02
			ARSENIC	3.3E-05		2.0E-06	3.5E-05	ARSENIC	Skin, Vascular	8.5E-01		5.1E-02	9.0E-01
			CHROMIUM					CHROMIUM	NOAEL	1.6E-01			1.6E-01
			IRON					IRON	Liver, Blood, GI Tract	2.1E+00			2.1E+00
			MANGANESE					MANGANESE	CNS	6.7E-01			6.7E-01
			VANADIUM					VANADIUM	NOAEL	7.2E-02			7.2E-02

TABLE 9.7. REASONABLE MAXIMUM EXPOSURE (RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	6.5E+00		5.8E-02	6.5E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.0E+01		9.3E-02	1.0E+01
			2,4,6-Trinitrotoluene	4.0E-06		9.9E-09	4.0E-06	2,4,6-Trinitrotoluene	Liver	3.1E+00		7.7E-03	3.1E+00
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	5.3E-02		1.4E-03	5.4E-02
		8.5E-06	HMX					HMX	Liver, Blood	4.6E-01		1.1E-03	4.6E-01
			RDX	1.0E-04		5.9E-07	1.0E-04	RDX	Prostate	3.7E+00		2.1E-02	3.7E+00
			Aluminum					Aluminum	Body Weight	6.8E-01		3.0E-03	6.9E-01
			Arsenic	2.1E-05		9.2E-08	2.1E-05	Arsenic	Skin, Vascular	5.4E-01		2.4E-03	5.5E-01
			Beryllium					Beryllium	Gastrointestinal	1.6E-01		1.0E-01	2.7E-01
			Cadmium					Cadmium	Kidney	1.7E-01		1.5E-02	1.8E-01
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	1.4E+00		6.3E-03	1.4E+00
			Iron					Iron	Liver, Blood, GI Tract	3.0E+01		1.3E-01	3.0E+01
			Manganese					Manganese	CNS	8.7E+01		9.6E+00	9.7E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	3.3E+00		7.3E-02	3.4E+00
			Thallium					Thallium	Liver	8.1E-01		3.6E-03	8.2E-01
			Zinc					Zinc	Blood	5.3E-01		1.4E-03	5.3E-01

Total Risk Across Surface Soil	1.3E-05
Total Risk Across Surface Water	7.8E-07
Total Risk Across Sediment	3.5E-05
Total Risk Across Groundwater	1.3E-04
Total Risk Across All Media and All Exposure Routes	1.8E-04

Total Hazard Index Across All Media and All Exposure Routes	1.6E+02
Total Liver HI =	5.4E+01
Total Kidney HI =	1.8E-01
Total Vascular HI =	2.9E+00
Total GI Tract HI =	3.2E+01
Total Skin HI =	1.4E+00
Total Blood HI =	3.3E+01
Total CNS HI =	9.9E+01
Total Immune System HI =	1.4E+00
Total Body Weight HI =	4.2E+00
Total Prostate HI =	3.7E+00

TABLE 9.1a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - CONSTRUCTION WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface and Subsurface Soil	BENZO(A)ANTHRACENE	7.8E-09		2.1E-09	9.9E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	1.5E-07		3.9E-08	1.8E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	1.4E-08		3.8E-09	1.8E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	2.9E-08		8.0E-09	3.7E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	6.6E-03		1.4E-03	8.0E-03
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver			5.0E-03	5.0E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver			8.0E-03	8.0E-03
			2,4,6-Trinitrotoluene			1.4E-10	1.4E-10	2,4,6-Trinitrotoluene	Liver			6.5E-04	6.5E-04
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver			1.2E-04	1.2E-04
			HMX					HMX	Liver, Blood			9.0E-05	9.0E-05
			RDX			8.4E-09	8.4E-09	RDX	Prostate			1.8E-03	1.8E-03
			Aluminum					Aluminum	Body Weight			3.1E-04	3.1E-04
			Arsenic			1.6E-09	1.6E-09	Arsenic	Skin, Vascular			2.5E-04	2.5E-04
			Beryllium					Beryllium	Gastrointestinal			1.1E-02	1.1E-02
			Cadmium					Cadmium	Kidney			1.5E-03	1.5E-03
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological			6.6E-04	6.6E-04
			Iron					Iron	Liver, Blood, GI Tract			1.4E-02	1.4E-02
			Manganese					Manganese	CNS			1.0E+00	1.0E+00
			Nickel					Nickel	Decreased Organ/ Body Weights			7.7E-03	7.7E-03
			Thallium					Thallium	Liver			3.7E-04	3.7E-04
			Zinc					Zinc	Blood			1.5E-04	1.5E-04
						Total Risk Across Surface Soil	2.5E-07		Total Hazard Index Across All Media and All Exposure Routes				1.1E+00
						Total Risk Across Groundwater	1.0E-08						
						Total Risk Across All Media and All Exposure Routes	2.6E-07						

Total Liver HI =	2.8E-02
Total Kidney HI =	1.5E-03
Total Vascular HI =	9.1E-04
Total GI Tract HI =	2.5E-02
Total Skin HI =	2.5E-04
Total Blood HI =	1.4E-02
Total CNS HI =	1.0E+00
Total Immune System HI =	6.6E-04
Total Body Weight HI =	8.0E-03
Total Prostate HI =	1.8E-03

TABLE 9.2a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - MAINTENANCE WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	1.2E-09		2.0E-10	1.4E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	2.2E-08		3.7E-09	2.6E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	2.1E-09		3.6E-10	2.5E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	4.4E-09		7.6E-10	5.2E-09	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	1.3E-04		1.7E-05	1.4E-04
						Total Risk Across Surface Soil	3.5E-08					Total Hazard Index Across All Media and All Exposure Routes	1.4E-04

Total Risk Across All Media and All Exposure Routes: 3.5E-08

Total Liver HI = 1.4E-04
Total Prostate HI = 0.0E+00

TABLE 9.3a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - OCCUPATIONAL WORKERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Occupational Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.1E-08		3.7E-09	2.5E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.0E-07		6.8E-08	4.7E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	3.9E-08		6.6E-09	4.5E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	8.0E-08		1.4E-08	9.4E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	2.3E-03		3.0E-04	2.6E-03
							Total Risk Across Surface Soil 6.3E-07						Total Hazard Index Across All Media and All Exposure Routes 2.6E-03

Total Risk Across All Media and All Exposure Routes 6.3E-07

Total Liver HI = 2.6E-03
Total Prostate HI = 0.0E+00

TABLE 9.4a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADULT RECREATIONAL USERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Recreational Users
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.5E-09		3.3E-10	2.9E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.7E-08		6.1E-09	5.3E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.6E-09		6.0E-10	5.2E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	9.6E-09		1.2E-09	1.1E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	2.7E-04		2.7E-05	3.0E-04
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	7.0E-04		1.8E-04	8.8E-04
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.5E-03		3.9E-04	1.9E-03
			2,4,6-Trinitrotoluene	7.9E-10		5.7E-11	8.4E-10	2,4,6-Trinitrotoluene	Liver	4.1E-04		3.0E-05	4.4E-04
			RDX	2.6E-08		4.3E-09	3.0E-08	RDX	Prostate	6.1E-04		1.0E-04	7.1E-04
			Aluminum					Aluminum	Body Weight	5.0E-05		9.1E-06	5.9E-05
			Arsenic	1.4E-08		2.5E-09	1.6E-08	Arsenic	Skin, Vascular	2.4E-04		4.4E-05	2.8E-04
			Iron					Iron	Liver, Blood, GI Trac	2.4E-04		4.4E-05	2.8E-04
			Manganese					Manganese	CNS	4.7E-04		2.1E-03	2.6E-03
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.8E-04		0.0E+00	3.8E-04
			ARSENIC	1.9E-07		2.1E-07	4.1E-07	ARSENIC	Skin, Vascular	3.4E-03		3.7E-03	7.0E-03
			CHROMIUM					CHROMIUM	NOAEL	6.5E-04		0.0E+00	6.5E-04
			IRON					IRON	Liver, Blood, GI Tract	8.2E-03		0.0E+00	8.2E-03
			MANGANESE					MANGANESE	CNS	2.7E-03		0.0E+00	2.7E-03
			VANADIUM					VANADIUM	NOAEL	2.8E-04		0.0E+00	2.8E-04

Total Risk Across Surface Soil	7.2E-08
Total Risk Across Surface Water	4.7E-08
Total Risk Across Sediment	4.1E-07
Total Risk Across All Media and All Exposure Routes	5.3E-07

Total Hazard Index Across All Media and All Exposure Routes	2.7E-02
Total Liver HI =	1.1E-02
Total Vascular HI =	7.3E-03
Total GI Tract HI =	8.5E-03
Total Skin HI =	7.3E-03
Total Blood HI =	8.5E-03
Total CNS HI =	5.3E-03
Total Body Weight HI =	4.4E-04
Total Prostate HI =	7.1E-04

TABLE 9.5a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - ADOLESCENT TRESPASSERS
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Current/Future
Receptor Population: Trespassers
Receptor Age: Adolescent (6 to 17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.5E-09		8.1E-10	3.3E-09	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	4.7E-08		1.5E-08	6.2E-08	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.6E-09		1.5E-09	6.0E-09	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	9.5E-09		3.1E-09	1.3E-08	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUENE	Liver	2.2E-04		5.5E-05	2.8E-04
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.1E-04		5.1E-05	1.6E-04
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	2.4E-04		1.1E-04	3.5E-04
			2,4,6-Trinitrotoluene	1.6E-10		1.9E-11	1.8E-10	2,4,6-Trinitrotoluene	Liver	6.6E-05		8.2E-06	7.5E-05
			RDX	5.2E-09		1.5E-09	6.6E-09	RDX	Prostate	9.9E-05		2.8E-05	1.3E-04
			Aluminum					Aluminum	Body Weight	8.2E-06		2.5E-06	1.1E-05
			Arsenic	2.8E-09		8.6E-10	3.6E-09	Arsenic	Skin, Vascular	3.9E-05		1.2E-05	5.1E-05
			Iron					Iron	Liver, Blood, GI Trac	3.9E-05		1.2E-05	5.1E-05
			Manganese					Manganese	CNS	7.7E-05		6.0E-04	6.7E-04
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.1E-04		0.0E+00	3.1E-04
			ARSENIC	1.9E-07		1.4E-08	2.1E-07	ARSENIC	Skin, Vascular	2.7E-03		2.0E-04	2.9E-03
			CHROMIUM					CHROMIUM	NOAEL	5.3E-04		0.0E+00	5.3E-04
			IRON					IRON	Liver, Blood, GI Tract	6.7E-03		0.0E+00	6.7E-03
			MANGANESE					MANGANESE	CNS	2.2E-03		0.0E+00	2.2E-03
			VANADIUM					VANADIUM	NOAEL	2.3E-04		0.0E+00	2.3E-04

Total Risk Across Surface Soil	8.4E-08
Total Risk Across Surface Water	1.0E-08
Total Risk Across Sediment	2.1E-07
Total Risk Across All Media and All Exposure Routes	3.0E-07

Total Hazard Index Across All Media and All Exposure Routes	1.5E-02
Total Liver HI =	7.3E-03
Total Vascular HI =	3.0E-03
Total GI Tract HI =	6.8E-03
Total Skin HI =	3.0E-03
Total Blood HI =	6.8E-03
Total CNS HI =	2.9E-03
Total Body Weight HI =	3.2E-04
Total Prostate HI =	1.3E-04

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	2.7E-08		3.4E-09	3.0E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	5.0E-07		6.4E-08	5.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	4.8E-08		6.2E-09	5.4E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.0E-07		1.3E-08	1.1E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	3.7E-03		3.7E-04	4.1E-03
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	6.3E-03		1.6E-03	7.9E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.3E-02		3.5E-03	1.7E-02
			2,4,6-Trinitrotoluene	5.5E-09		4.0E-10	5.9E-09	2,4,6-Trinitrotoluene	Liver	3.7E-03		2.7E-04	3.9E-03
			RDX	1.8E-07		3.0E-08	2.1E-07	RDX	Prostate	5.5E-03		9.1E-04	6.4E-03
			Aluminum					Aluminum	Body Weight	4.5E-04		8.2E-05	5.3E-04
			Arsenic	9.7E-08		1.8E-08	1.1E-07	Arsenic	Skin, Vascular	2.2E-03		3.9E-04	2.5E-03
			Iron					Iron	Liver, Blood, GI Trac	2.2E-03		3.9E-04	2.6E-03
			Manganese					Manganese	CNS	4.3E-03		1.9E-02	2.4E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.4E-03		0.0E+00	3.4E-03
			ARSENIC	1.4E-06		4.1E-08	1.4E-06	ARSENIC	Skin, Vascular	3.0E-02		9.1E-04	3.1E-02
			CHROMIUM					CHROMIUM	NOAEL	5.9E-03		0.0E+00	5.9E-03
			IRON					IRON	Liver, Blood, GI Tract	7.4E-02		0.0E+00	7.4E-02
			MANGANESE					MANGANESE	CNS	2.4E-02		0.0E+00	2.4E-02
			VANADIUM					VANADIUM	NOAEL	2.6E-03		0.0E+00	2.6E-03

TABLE 9.6a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE ADULT RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	1.3E+00		1.7E-02	1.3E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	2.1E+00		2.7E-02	2.1E+00
			2,4,6-Trinitrotoluene	9.2E-07		3.4E-09	9.3E-07	2,4,6-Trinitrotoluene	Liver	6.2E-01		2.2E-03	6.2E-01
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	1.1E-02		4.2E-04	1.1E-02
			HMX					HMX	Liver, Blood	9.2E-02		3.1E-04	9.2E-02
			RDX	2.4E-05		2.0E-07	2.4E-05	RDX	Prostate	7.3E-01		6.1E-03	7.4E-01
			Aluminum					Aluminum	Body Weight	1.4E-01		4.4E-04	1.4E-01
			Arsenic	4.9E-06		1.6E-08	4.9E-06	Arsenic	Skin, Vascular	1.1E-01		3.5E-04	1.1E-01
			Beryllium					Beryllium	Gastrointestinal	3.3E-02		1.5E-02	4.8E-02
			Cadmium					Cadmium	Kidney	3.3E-02		2.1E-03	3.5E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	2.9E-01		9.2E-04	2.9E-01
			Iron					Iron	Liver, Blood, GI Tract	6.0E+00		1.9E-02	6.0E+00
			Manganese					Manganese	CNS	1.7E+01		1.4E+00	1.9E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	6.7E-01		1.1E-02	6.8E-01
			Thallium					Thallium	Liver	1.6E-01		5.2E-04	1.6E-01
			Zinc					Zinc	Blood	1.1E-01		2.0E-04	1.1E-01

Total Risk Across Surface Soil	7.6E-07
Total Risk Across Surface Water	3.3E-07
Total Risk Across Sediment	1.4E-06
Total Risk Across Groundwater	3.0E-05
Total Risk Across All Media and All Exposure Routes	3.3E-05

Total Hazard Index Across All Media and All Exposure Routes	3.1E+01
Total Liver HI =	1.0E+01
Total Kidney HI =	3.5E-02
Total Vascular HI =	4.3E-01
Total GI Tract HI =	6.1E+00
Total Skin HI =	1.4E-01
Total Blood HI =	6.3E+00
Total CNS HI =	1.9E+01
Total Immune System HI =	2.9E-01
Total Body Weight HI =	8.2E-01
Total Prostate HI =	7.4E-01

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Surface Soil	BENZO(A)ANTHRACENE	4.7E-08		4.3E-09	5.2E-08	BENZO(A)ANTHRACENE					
			BENZO(A)PYRENE	8.8E-07		8.0E-08	9.6E-07	BENZO(A)PYRENE					
			BENZO(B)FLUORANTHENE	8.6E-08		7.8E-09	9.3E-08	BENZO(B)FLUORANTHENE					
			DIBENZO(A,H)ANTHRACENE	1.8E-07		1.6E-08	1.9E-07	DIBENZO(A,H)ANTHRACENE					
			2-AMINO-4,6-DINITROTOLUENE					2-AMINO-4,6-DINITROTOLUEN	Liver	2.3E-02		1.6E-03	2.5E-02
Surface Water	Surface Water	Surface Water	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	5.8E-03		1.5E-03	7.3E-03
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	1.3E-02		3.2E-03	1.6E-02
			2,4,6-Trinitrotoluene	1.5E-09		1.0E-10	1.6E-09	2,4,6-Trinitrotoluene	Liver	3.4E-03		2.4E-04	3.7E-03
			RDX	4.8E-08		7.7E-09	5.6E-08	RDX	Prostate	5.1E-03		8.2E-04	5.9E-03
			Aluminum					Aluminum	Body Weight	4.2E-04		7.4E-05	5.0E-04
			Arsenic	2.6E-08		4.5E-09	3.0E-08	Arsenic	Skin, Vascular	2.0E-03		3.5E-04	2.4E-03
			Iron					Iron	Liver, Blood, GI Trac	2.0E-03		3.5E-04	2.4E-03
			Manganese					Manganese	CNS	4.0E-03		1.7E-02	2.1E-02
Sediment	Sediment	Sediment	ALUMINUM					ALUMINUM	Body Weight	3.2E-02			3.2E-02
			ARSENIC	3.6E-06		7.6E-08	3.7E-06	ARSENIC	Skin, Vascular	2.8E-01		5.9E-03	2.9E-01
			CHROMIUM					CHROMIUM	NOAEL	5.5E-02			5.5E-02
			IRON					IRON	Liver, Blood, GI Tract	6.9E-01			6.9E-01
			MANGANESE					MANGANESE	CNS	2.3E-01			2.3E-01
			VANADIUM					VANADIUM	NOAEL	2.4E-02			2.4E-02

TABLE 9.7a. CENTRAL TENDENCY EXPOSURE (CTE)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs - FUTURE CHILD RESIDENT
SWMU 10 - ROCKEYE
NSWC CRANE, INDIANA

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0 to 6 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Water	Onsite	2-Amino-4,6-dinitrotoluene					2-Amino-4,6-dinitrotoluene	Liver	2.9E+00		3.4E-02	2.9E+00
			4-Amino-2,6-dinitrotoluene					4-Amino-2,6-dinitrotoluene	Liver	4.6E+00		5.4E-02	4.6E+00
			2,4,6-Trinitrotoluene	5.8E-07		1.9E-09	5.8E-07	2,4,6-Trinitrotoluene	Liver	1.4E+00		4.4E-03	1.4E+00
			2,6-Dinitrotoluene					2,6-Dinitrotoluene	Liver	2.3E-02		8.3E-04	2.4E-02
			HMX					HMX	Liver, Blood	2.0E-01		6.1E-04	2.0E-01
			RDX	1.5E-05		1.1E-07	1.5E-05	RDX	Prostate	1.6E+00		1.2E-02	1.6E+00
			Aluminum					Aluminum	Body Weight	3.0E-01		9.9E-04	3.0E-01
			Arsenic	3.1E-06		1.0E-08	3.1E-06	Arsenic	Skin, Vascular	2.4E-01		7.9E-04	2.4E-01
			Beryllium					Beryllium	Gastrointestinal	7.3E-02		3.4E-02	1.1E-01
			Cadmium					Cadmium	Kidney	7.3E-02		4.8E-03	7.8E-02
			Cobalt					Cobalt	Cardiovascular, Immunological, Neurological	6.3E-01		2.1E-03	6.3E-01
			Iron					Iron	Liver, Blood, GI Tract	1.3E+01		4.3E-02	1.3E+01
			Manganese					Manganese	CNS	3.8E+01		3.2E+00	4.1E+01
			Nickel					Nickel	Decreased Organ/ Body Weights	1.5E+00		2.4E-02	1.5E+00
			Thallium					Thallium	Liver	3.6E-01		1.2E-03	3.6E-01
			Zinc					Zinc	Blood	2.3E-01		4.6E-04	2.3E-01

Total Risk Across Surface Soil	1.3E-06
Total Risk Across Surface Water	8.8E-08
Total Risk Across Sediment	3.7E-06
Total Risk Across Groundwater	1.9E-05
Total Risk Across All Media and All Exposure Routes	2.4E-05

Total Hazard Index Across All Media and All Exposure Routes	7.0E+01
Total Liver HI =	2.3E+01
Total Kidney HI =	7.8E-02
Total Vascular HI =	1.2E+00
Total GI Tract HI =	1.4E+01
Total Skin HI =	5.3E-01
Total Blood HI =	1.4E+01
Total CNS HI =	4.2E+01
Total Immune System HI =	6.3E-01
Total Body Weight HI =	1.8E+00
Total Prostate HI =	1.6E+00

APPENDIX H

SUPPORTING MATERIALS FOR THE ECOLOGICAL RISK ASSESSMENT

APPENDIX H.1

CHEMICAL CLASS INFORMATION

APPENDIX H.1

This appendix presents a discussion of the different chemical classes that were detected at SWMUs 4, 5, 9, and 10, but not limited to, potential sources, toxicity information, and bioaccumulation potential.

Pesticides

Pesticides are used to control pestiferous invertebrates and, therefore, they are toxic to many soil and aquatic invertebrates. In addition, many pesticides are toxic to higher trophic level ecological receptors such as mammals and birds. For example, DDT compounds have been linked to eggshell thinning and subsequent decreased survival of several birds of prey (such as eagles and falcons). Other pesticides such as chlordanes, dieldrin, aldrin, endrin, and heptachlor also are very toxic to mammals and birds (Newell et al., 1987).

Organochlorine insecticides such as DDT, chlordane, aldrin, dieldrin, heptachlor, endosulfan, and endrin and their associated breakdown products generally degrade very slowly and tend to be soluble in lipids, which results in bioaccumulation and possible increases in concentrations through food webs (Newman, 1998). Pesticides have high Log K_{OC} values so they are expected to sorb strongly to soil and sediment particles when released to the environment. Consequently, these compounds are not easily displaced from their site of application, whether by runoff or leaching to groundwater. As a result, these compounds typically will not be taken up by plants.

DDT, DDE and DDD are highly lipid soluble, which, combined with an extremely long half-life, results in bioaccumulation (ATSDR, 1989b). When present in ambient water, DDT and its metabolites are concentrated in freshwater and marine plankton, insects, mollusks, and other invertebrates and fish (ATSDR, 1989b). As these organisms are part of the food chain, a progressive accumulation of residues may result in high levels of residues in organisms at the top of the food chain (ATSDR, 1989b). Moderate to significant in aquatic species has been reported for dieldrin, with BCFs ranging from 100 to 10,000 (Howard, 1991). Heptachlor also has been reported to bioconcentrate in aquatic species, with bioconcentration factors in fish up to about 20,000 (Howard, 1991). The BSAF values for these pesticides as reported in USEPA (1997) ranged from 1.67 to 7.7.

Chlordane will bioconcentrate in both marine and freshwater species (ATSDR, 1989c). In living organisms, chlordane concentrations are usually highest in samples collected near areas where chlordane was used to control termites or other pests, in predatory species, and in tissues with high lipid content (Eisler, 1990). Food chain biomagnification is low except in certain marine

mammals (Eisler, 1990). The BSAF values for chlordanes as reported by the USEPA (1997) ranged from 2 to 4.77. Note that the BSAFs for most other pesticides as reported by the USEPA (1997) was 1.8.

PCBs

The term PCBs commonly refers to a variety of mixtures of individual biphenyl isomers, each consisting of two joined benzene rings and up to 10 chlorine atoms. Mixtures of these isomers are known by their commercial designation of Aroclor. This trade name is followed by a four-digit number; the first two numbers indicate the type of isomer mixture and the last two numbers indicate the approximate weight percent of chlorine in the mixture (USEPA, 1985).

PCBs released into water adsorb to sediments and other organic matter. Typically, PCB concentrations are greater in the sediment and suspended material than in the water column. Substantial quantities of PCBs in aquatic sediments can act as an environmental reservoir from which PCBs may be released slowly over a long period of time (ATSDR, 1989d). For PCBs that exist in the dissolved state in water, volatilization becomes the primary fate process. PCBs have the capability to bioaccumulate and biomagnify (USEPA, 1985).

Degradation of PCBs in the environment is dependent upon the degree of chlorination. Generally, the more chlorinated the PCB molecule, the more persistent it will be in the environment. Factors that determine biodegradability include the amount of chlorination, concentration, type of microbial population, available nutrients, and the temperature (ATSDR, 1989d).

PCBs are expected to be highly immobile in the soil because of rapid and strong sorption (ATSDR, 1989d). Some data indicate that plants are capable of taking up PCBs and transferring them into polar metabolites or insoluble molecules (Donker et al., 1994). However, it is not very probable that uptake and transformation of these compounds occur to any great extent, because a large part (greater than 95 percent) will adsorb to the root surface (Donker et al., 1994). The transfer of vapor-phase PCBs from air to aerial plant parts may be the main source of vegetation contamination (ATSDR, 1989d).

Because PCBs are highly lipophilic, they can bioaccumulate in the lipid portions of animals. Bioconcentration factors in the thousands have been reported for various aquatic species (Eisler, 1986a). The BSAF value for chlordanes as reported by the USEPA (1997) was 1.85. PCBs also can accumulate in upper trophic level animals such as piscivorous birds and mammals that feed on contaminated prey items (Eisler, 1986a). Finally, Sample et al. (1998) calculated mean,

median, and 90th percentile reported soil-to-earthworm bioaccumulation factors (BAF) of 8.9, 6.7 and 15.9, respectively, indicating the PCBs can accumulate in soil invertebrates.

Adverse effects of PCBs on terrestrial wildlife include increased mortality, reproductive effects, and behavioral effects (USEPA, 1985). As a group, birds are more resistant to acutely toxic effects of PCBs than mammals (Eisler, 1986a). Among sensitive avian species, PCBs disrupt the normal pattern of growth, reproduction, metabolism, and behavior (Eisler, 1986a). Of the mammals, the mink is the most sensitive wildlife species tested for which data are available (Eisler, 1986a). Impacts to mink include anorexia, weight loss, lethargy, reproductive effects, and death (Eisler, 1986a).

Dioxins

Dioxin and dioxin-like compounds consist of the following chemical classes: polychlorinated dibenzo-p-dioxins (PCDDs or CDDs), polychlorinated dibenzofurans (PCDFs of CDFs), polybrominated dibenzodioxins (PBDDs or BDDs), polybrominated dibenzofurans (PBDFs or BDFs), and PCBs (USEPA, 1998). The CDDs and BDDs each include 75 individual compounds, and the CDFs BDFs each include 135 different compounds (USEPA, 1998). Of all these compounds, only 7 of the 75 congeners of CDDs or BDDs are thought to have dioxin-like toxicity, as are 10 of the 135 congeners of CDFs, or BDFs (USEPA, 1998). These are the ones with chlorine/bromine substitutions in, at least, the 2, 3, 7, and 8 positions (USEPA, 1998). Of the 209 PCB congeners, 13 are thought to have dioxin-like toxicity, which include the PCBs with four or more chlorines with just one or no substitution in the ortho position (USEPA, 1998).

There are very few toxicity data for dioxins except for 2,3,7,8-TCDD, which has been associated with lethal, carcinogenic, teratogenic, reproductive, mutagenic, histopathologic, and immunotoxic effects (Eisler, 1986b). 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic congener within these groups of compounds (Van den Berg et al., 1998). Because of this, toxicity equivalency factors (TEFs) have been developed to estimate the relative toxicity of the dioxin and dioxin-like compounds to 2,3,7,8-TCDD (Van den Berg et al., 1998). There are substantial inter- and intraspecific differences in sensitivity and toxic responses to 2,3,7,8-TCDD (Eisler, 1986b). Two species of earthworms showed no adverse effects at soil concentrations of 5 mg/kg; however, they died at 10 mg/kg of 2,3,7,8-TCDD (Eisler, 1986b). This indicates that terrestrial invertebrates may be resistant to 2,3,7,8-TCDD. Eisler (1986b) also reported that aquatic invertebrates, plants, and amphibians were comparatively resistant to 2,3,7,8-TCDD; however, accumulation from the aquatic environment was evident.

Although there presently is no evidence of biomagnification of PCDDs in birds, it is suspected that piscivorous birds have a greater potential to accumulate PCDDs than the fish that they eat (Eisler, 1986b).

Metals

Many metals are found naturally in the surface water, sediment, and/or soil at various concentrations due primarily to chemical weathering and fallout from volcanoes. Most metals are toxic to aquatic (i.e., fish, invertebrates) and terrestrial (i.e., plants, invertebrates, vertebrates) ecological receptors at certain concentrations, with some metals being toxic at lower concentrations than others. Also, different chemical forms of the metals may be more toxic than other forms. For example, hexavalent chromium is typically more toxic than trivalent chromium, and methylmercury is more toxic than inorganic mercury. In addition, the toxicity of several metals (cadmium, chromium, copper, lead, nickel, silver, and zinc) to aquatic receptors in freshwater systems decreases with increasing water hardness.

Only a portion of the total bulk concentration of metals in soils is bioavailable to ecological receptors. The uptake and accumulation of trace elements by plants are affected by several soil factors such as pH, Eh, clay content, organic matter content, cation exchange capacity, nutrient balance, concentration of other trace elements in soil, soil moisture, and temperature (Tarradellas et al., 1996). The bioavailability of the metals, however, is not known because there are other soil factors that influence uptake.

Many of these same factors also will influence the bioavailability of metals to invertebrates in sediment. One way to estimate the bioavailable portion of certain divalent metals (cadmium, copper, lead, nickel, and zinc) in sediment is to measure the amount of acid volatile sulfides (AVS) and simultaneously extracted metals (SEM) in a sediment sample. If the molar concentration of AVS is higher than the molar concentration of SEM, than all the SEM metals are expected to be unavailable to aquatic invertebrates and, therefore, nontoxic. AVS plays little or no role in determining interstitial water concentrations of metals in aerobic systems or those with low productivity (i.e., where the absence of organic carbon limits sulfate reduction) (Ankley et al., 1996), or when ingestion of sediments is the primary exposure route (Lee at al., 2000).

Of the 29 elements essential for plant growth, seven are micronutrients, including copper, iron, manganese, and zinc (Tarradellas et al., 1996). Also, the following metals may stimulate plant growth but are only essential for some plant species: aluminum, cobalt, nickel, sodium, selenium, and vanadium (Tarradellas et al., 1996). Finally, some elements such as lead, cadmium, and mercury are toxic elements with no known function in plant metabolism (Tarradellas et al., 1996).

ORNL (1998) has calculated soil-to-plant uptake factors for several metals based on a compilation of various studies. Cadmium, mercury, selenium, and zinc were the only metals (except for calcium and potassium) with mean uptake factors greater than one (1.02 to 2.25). None of the metals (except for calcium and potassium) have median uptake factors greater than one. Arsenic, cadmium, mercury, nickel, selenium, and zinc were the only metals (except for calcium, magnesium, and potassium) with upper 90th percentile uptake factors greater than one (1.1 to 5) (ORNL, 1998). This indicates that most metals will not biomagnify in plants. Finally, it is reported that for arsenic, copper, nickel, and zinc the plant-based food chain may be protected because the toxic concentrations of these metals in plants are higher than those for animals; cadmium and selenium are not toxic to plants at high concentrations and may be accumulated in plants at levels that may be toxic to animals (Cockerham and Shane, 1994). Other metals such as lead, cobalt and mercury can enter the food chain via plant uptake, but to a lesser extent (Cockerham and Shane, 1994).

Cadmium appears to accumulate in most species of earthworms at greater levels than any other metal (Satchell, 1983). This is supported by the high mean soil-to-plant uptake factor of 17 for cadmium, compared to mean uptake factors of 5.7 (zinc), 5.2 (mercury), 4.5 (silver), and 3.3 (lead) (Sample et al., 1998). The remaining metals (except potassium, sodium, and some radionuclides) had mean uptake factors of 1.8 or less (Sample et al., 1998). Cadmium, mercury, nickel, silver, and zinc are the only metals with median uptake factors greater than one (Sample et al., 1998). The upper 90th percentile uptake factors were 40.7, 20.6, 15.3, and 12.9 for cadmium, mercury, silver, and zinc (Sample et al., 1998). The remaining metals had upper 90th percentile uptake factors of 4.7 or less (Sample et al., 1998).

Semivolatile Organic Compounds

The most common semivolatile organic compounds that are found at naval facilities include polyaromatic hydrocarbons (PAHs) and phthalates. PAHs are a diverse group of compounds consisting of two or more substituted and unsubstituted polycyclic aromatic rings formed by the incomplete combustion of carbonaceous materials. PAHs are ubiquitous in the modern environment and commonly are constituents of coal tar, soot, vehicle exhaust, cigarette smoke, certain petroleum products, road tar, mineral oils, creosote, and many cooked foods. PAHs also are released to the environment through natural sources such as volcano and forest fire emissions. However, most of the emissions result from anthropogenic sources, largely wood burning for homes. Vehicular emissions are another primary source of PAHs. Hazardous waste sites can be a concentrated source on a local scale. Examples of such sites include former

manufactured gas sites (i.e., sources of coal tar) and abandoned wood treatment plants (i.e., sources of creosote) [Agency for Toxic Substances and Disease Registry (ATSDR), 1989a].

PAHs are transferred from surface water by volatilization and sorption to settling particles. The compounds are transformed in surface water by photooxidation, chemical oxidation, and microbial metabolism (ATSDR, 1989a). In soil and sediments, microbial metabolism is the major process for degradation of PAHs (ATSDR, 1989a). Although PAHs accumulate in terrestrial and aquatic plants, many organisms are able to metabolize and eliminate these compounds. Vertebrates can readily metabolize PAHs, but lower forms (insects and worms) cannot metabolize PAHs as quickly. Food chain uptake does not appear to be a major exposure source to PAHs for aquatic animals (ATSDR, 1989a).

Plants and vegetables can absorb PAHs from soils through their roots and translocate them to other plant parts such as developing shoots (Eisler, 1987). In general, however, PAHs are not readily taken up by plants because these compounds are strongly adsorbed onto soil organic particles and root uptake is very inefficient (Donker, et al., 1994). As such, lower molecular weight PAHs (which would be more water soluble) are absorbed by plants more readily than higher molecular weight PAHs. This is indicated by the low soil-to-plant uptake factors, which were calculated using the K_{OW} for the contaminants. Finally, many higher plants can catabolize benzo(a)pyrene and possibly other PAHs (Eisler, 1987).

PAHs vary substantially in their toxicity to aquatic organisms. In general, toxicity increases as molecular weight increases, with the exception of some high molecular weight PAHs that have low acute toxicity. Most species of aquatic organisms rapidly accumulate PAHs from low concentrations in the ambient medium. However, uptake of PAHs is highly species specific, it is higher in algae, mollusks, and other species that are incapable of metabolizing PAHs (Eisler, 1987). The ability of fish to metabolize PAHs may explain why benzo(a)pyrene is frequently not detected or is found at only very low levels in fish from environments heavily contaminated with PAHs (ATSDR, 1989a).

Phthalates are compounds that are used in production of plastics (ATSDR, 1993). Most phthalates are expected to sorb to soil or sediment particles after their release because of their high Log K_{OC} values (Howard, 1989). Some phthalates may bioconcentrate in aquatic organisms [Spectrum Laboratories, 1999; Howard, 1989; ATSDR, 1989a].

Volatile Organic Compounds

VOCs are usually very mobile in the environment because they are poorly adsorbed to soil and sediment particles. Also, because they are very volatile, they typically are only detected in surface waters and surface soils at low concentrations.

Most VOCs have very little potential to bioaccumulate in ecological receptors; therefore, biomagnification through the food chain does not appear to be significant. VOCs are not expected to biomagnify in plants and are typically only toxic to ecological receptors only at relatively high concentrations.

Explosives

Some of the more common explosives include nitroaromatic compounds such as 2,4,6-trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine, octahydro-1,3,5,7-tetranitro-1,3,5-tetrazocine, N-methyl-N,2,4,6-tetranitroaniline, and associated by-products and degradation products that may have been released to the environment during manufacturing and load, assembly, and pack processes at military facilities (Talmage et al., 1999). These explosives are moderately to highly toxic to freshwater organisms, with chronic screening values less than 1 mg/L, although some of the screening values are low because of the conservative methods used to develop them based on an absence of data (Talmage et al., 1999). Available data indicate that none of the compounds are expected to bioconcentrate (Talmage et al., 1999). Most of the explosives do not appear to be highly toxic to mammals. Terrestrial reference values (TRVs) are greater than 1 mg/kg-day.

Explosives have little to moderate potential to adsorb to soil and sediment (Talmage et al., 1999). Therefore, explosives will have moderate to high mobility in soils and sediment, and most of the explosives will be found in the water column (Talmage et al., 1999).

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APPENDIX H.2

RECEPTOR PROFILES

APPENDIX H.2

The following sections present the receptor profiles for the meadow vole, American robin, northern bobwhite quail, short-tailed shrew, raccoon, belted kingfisher, and little brown bat. The majority of the information for the profiles was obtained from the Wildlife Exposure Factors Handbook (USEPA, 1993). The data for the incidental soil ingestion rates were obtained from the Estimates of Soil Ingestion by Wildlife (Beyer, 1993) except for the shrew data, which was in Talmage and Walton (undated). The exposure parameters that were selected for this SERA work plan are based on animals collected in or near southern Indiana, when available.

The food and water ingestion rate are presented in g/g (of body weight)-day on a wet weight basis. The home ranges for all species are presented in hectares in USEPA (1993), but were converted to acres in this work plan by multiplying the number of hectares by 2.471. The only exception is the kingfisher's range, which is presented in km of shoreline. Also note that the estimated percent of soil in the diets are listed in dry weight, while the other exposure factors are in wet weight. The soil dry weight was not converted to a wet weight in this work plan because the percent moisture of the soils is not known. Also, incidental soil ingestion is only a small portion of the overall diet (2.0 to 13 percent).

The attached table presents the calculation of the exposure parameters. Note that in this table the ingestion rates in kg/day (or L/day) for the conservative scenario was calculated by multiply the maximum ingestion rate in g/g-day by the average body weight, while the ingestion rates in kg/day (or L/day) for the average scenario was calculated by multiplying the average ingestion rate in g/g-day by the average body weight. Typically, a minimum body weight is used in the conservative models. However, using the minimum body weight to calculate the maximum ingestion rate sometimes causes the conservative ingestion rate to be lower than the average ingestion rate. Therefore, the average body weight was selected to ensure that the ingestion rate for the conservative scenario was higher than the ingestion rate for the average scenario. The minimum body weight will be used in the dose equation for the conservative scenario. The only exceptions to this were for the food ingestion rate for the raccoon, and the water ingestion rates for the shrew, robin, and kingfisher. Because only one ingestion rate was available, the maximum body weights were used to calculate the conservative ingestion rates and the average body weights were used to calculate the average ingestion rates.

Meadow Vole *(Microtus pennsylvanicus)*

Meadow voles inhabit grassy fields, marshes, and bogs; however, they prefer fields with more grass, more cover, and fewer woody plants. They typically consume green succulent vegetation, sedges, seeds, roots, bark, fungi, insects, and animal matter. Green succulent vegetation makes up the majority of their diet.

The adult body weight for the vole in southern Indiana ranged from 0.0329 to 0.0391 kg with an average of 0.0366 kg. The only listed food ingestion rates were for voles in Russia, which ranged from 0.30 to 0.35 g/g-day, with an average of 0.325 g/g-day. The water ingestion rates are 0.14 (estimated) and 0.21 g/g-day, with an average of 0.175 g/g-day. Finally, the incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (2.4 percent) from Beyer (1993).

The home range for the meadow vole was calculated using data from a Michigan old field. The values ranged from 0.0297 to 1.06 acres with an average home range of 0.164 acres.

American Robin (*Turdus migratorius*)

American robins inhabit parks, lawns, moist forest, swamps, open woodland, and orchards. Robins forage on the ground in open areas, along habitat edges, or the edges of streams. They also may forage above ground in shrubs and within the lower branches of trees. In the months proceeding and during the breeding season, robins feed primarily on invertebrates and on some fruits. During the rest of the year their diet consists primarily of fruits.

The adult body weight for the American robin in New York woodlands and forests, and in Pennsylvania ranged from 0.0773 to 0.0862 kg with an average of 0.081 kg. The only listed food ingestion rates were for robin in Kansas (1.52 g/g-day) and California (0.89 g/g-day), with an average of 1.205 g/g-day. The water ingestion rate was estimated as 0.14 g/g-day. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (10.4 percent for a woodcock) from Beyer (1993).

The home range for the robin was calculated using data from an Ontario forest. The values ranged from 0.37 to 2 acres with an average home range of 1.19 acres.

Northern Bobwhite Quail (*Colinus virginianus*)

Quails inhabit grasslands, idle fields, pastures, and large clumps of grasses. Bobwhites forage in areas with open vegetation, some bare ground, and light litter. Seeds from weeds, woody plants, and grasses comprise the majority of an adult's diet, although green vegetation has been found to dominate their diet in winter in the south.

The adult body weight for the bobwhite quail in southern Illinois agricultural areas ranged from 0.162 to 0.1855 kg with an average of 0.177 kg. The listed food ingestion rates are for quails in Kansas and Texas lab studies, and in a captive study from Massachusetts. The values ranged from 0.067 to 0.093 g/g-day, with an average of 0.082 g/g-day. The water ingestion rate was estimated as 0.10 and 0.11 g/g-

day, and measured in a Texas lab (0.86 to 0.131 g/g-day), for an average water ingestion rate of 0.104 g/g-day. The incidental soil ingestion rate is calculated by multiplying the food ingestion rate by the percentage of soil that is incidentally ingested (0.082 percent for a Canada goose) from Beyer (1993).

The home range for the quail was calculated using data from southern Illinois idle farms, woods, brush, and cornfields. The values for individuals ranged from 15.8 to 41.3 acres with an average home range of 28.6 acres.

Short-Tailed Shrew *(Blarina brevicauda)*

Shrews inhabit a wide variety of habitats and are common in areas with abundant vegetative cover. They need cool, moist habitats because of their high metabolic and water-loss rates. The short-tailed shrew is primarily carnivorous, eating insects such as earthworms, slugs, and snails.

The adult body weigh for the short-tailed shrew in various Pennsylvania habitats ranged from 0.01525 to 0.01921 kg with an average of 0.01687 kg. The listed food ingestion rates are for shrews in labs on Ohio (0.49 g/g-day), Wisconsin (0.43 to 0.96 g/g-day), and Virginia (0.541 g/g-day), with an average of 0.61 g/g-day. The water ingestion rate was determined as 0.223 g/g-day in an Illinois laboratory. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (13 percent) from Talmage and Walton (undated).

The home range for the shrew was calculated using data from a tamarak bog in Manitoba (only value available). The value was 0.9699 acres.

Raccoon *(Procyon lotor)*

Raccoons are found near virtually every aquatic habitat, particularly in hardwood swamps, mangroves, floodplain forests, and freshwater and saltwater marshes. They are also common in suburban residential areas. They use surface waters for both drinking and foraging. They feed primarily on fleshy fruits, nuts, acorns, and corn, but also eat grains, insects, frogs, crayfish, eggs, and virtually any animal and vegetable matter.

The adult body weights based on data from Illinois, range from 5.34 to 8.86 kg, with an average of 6.865 kg. The average food ingestion rate of 0.3347 kg/day was calculated using the average body weight and the following equation from EPA (1993):

$$FI = (0.0687)\ (BW^{0.822})/0.25$$

Where: FI = Food ingestion rate (kg/day)

BW = Body weight in kg

To convert the food ingestion rate into a dry weight value, the mean percent solids content of bony fish (0.25) was incorporated into the equation (Sample et al., 1997).

The range of water ingestion rates is listed as 0.082 to 0.083 g/g-day. The incidental soil ingestion rate is calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingestion (0.094), as presented in Beyer (1993).

Based on data from Michigan, home range sizes for the raccoon range from 266.9 to 504.1 acres for an average home range of 385.5 acres.

Belted Kingfisher *(Ceryle alcyon)*

Belted kingfishers are typically found along rivers, streams, and the edges of lakes and ponds. They are also common along seacoasts and estuaries. They prefer water that is free of thick vegetation and overhanging trees that obscure the view of the water. Because kingfishers eat primarily fish that swim near the surface or in shallow water, they require relatively clear water to see and catch their prey. Although kingfishers feed predominantly on fish, they have been known to consume crayfish, crabs, mussels, lizards, frogs, toads, small snakes, turtles, insects, salamanders, newts, young birds, mice, and berries.

Based on data from Michigan, Pennsylvania, Ohio, and Minnesota, the adult body weights range from 0.136 to 0.170 kg, with an average of 0.152 kg. The listed food ingestion rates, based on data from Michigan, range from 0.41 to 0.5 g/g-day. The water ingestion rate is estimated as 0.11 g/g-day. The incidental soil ingestion rate was calculated by multiplying the ingestion rate by the percentage of soil that is incidentally ingested (2 percent), based on the mallard data presented in Beyer (1993).

The home range for the kingfisher ranges from 0.39 to 2.185 km of shoreline, based on data from streams in Pennsylvania and Ohio.

Little Brown Bat (*Myotis lucifugus*)/Indiana Bat (*Myotis sodalis*)

This receptor profile discusses both the Indiana bat and the Little Brown Bat. Although the Indiana bat is a Federally-listed endangered species, the Little Brown Bat is used as a surrogate species for the Indiana Bat because exposure parameters (e.g., ingestion rates) are available for the Little Brown Bat. Note that the home range discussed in the last paragraphs of this section is for the Indiana Bat, since this is really the species of concern.

The Indiana Bat hibernates during winter in caves and abandoned mines, and then migrates to summer roosts, which are generally in hardwood forests adjacent to streams and lakes (USDA, 1998). The most important characteristic of trees chosen as roost sites is not species, but structure. Bats choose trees with exfoliating bark that allows space for them to roost between the bark and the bole of the tree. The length and persistence of peeling bark varies with the species of tree and the severity of environmental factors to which it is subjected (USFWS, 1999). Indiana Bats weigh 4.5 to 9.5 grams and are approximately 7.6 to 8.9 cm n length (USDA, 1998). Indiana Bats are strict insectivores, and eat nuisance and pest insects such as alfalfa weevils and gypsy moths (USDA, 1998). Both aquatic and terrestrial insects are consumed. Diet varies seasonally and variation is observed among different ages, sexes, and reproductive-status groups (USFWS, 1999).

Little Brown Bats inhabit open areas, with strategic day, night, and hibernacula roosting sites in hollow trees, buildings, caves, and abandoned mines. The avoid areas with dense vegetation and other obstructions to flight. Like the Indiana Bat, Little Brown Bats are strict insectivores. Insects are generally captured in flight, or taken from the surface of water or vegetation. They forage primarily in open habitat, flood plain pastures, and frequently over bodies of water. Foraging along forest edges has also been observed (Sample et al., 1997).

The adult body weight of the Little Brown Bat in Indiana ranged from 6.03 to 12.27 grams, with an average weight of 7.2 grams. The only listed food ingestion rates for bats in New Hampshire ranged from 0.23 to 1.12 g/g-day, with an average of 0.61 g/g-day. The water ingestion rates ranges from 0.177 to 0.205 g/g-day with an average of 0.191 g/g-day. Because bats are aerial insectivores, soil ingestion is assumed to be negligible.

The extent of the foraging area used by an Indiana bat maternally colony has been reported to range from a linear strip of creek vegetation 0.8 km in length to a foraging area of 1.2 km in length (USFWS, 1999).

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TABLE H.2-1
EXPOSURE PARAMETERS FOR TEST SPECIES AND SURROGATE WILDLIFE SPECIES
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

Species	Body Weight (kg)			Food Ingestion Rate (kg/day)		Water Ingestion Rate (L/day)		Soil/Sediment Ingestion Rate (kg/day)		Home Range (acres) [8]		
	Avg.	Min.	Max.	Avg.	Conserv.	Avg.	Conserv.	Avg.	Conserv.	Avg.	Min.	Max.
Potential Test Species[1]												
Rat[2]	0.35	NA	NA	NA		NA		NA		NA		
Old field mouse[3]	0.014	NA	NA	NA		NA		NA		NA		
Mouse[2]	0.03	NA	NA	NA		NA		NA		NA		
Rabbit	3.8	NA	NA	NA		NA		NA		NA		
Mink[4]	1	NA	NA	NA		NA		NA		NA		
Rhesus monkey[4]	5	NA	NA	NA		NA		NA		NA		
Beagle[2]	10	NA	NA	NA		NA		NA		NA		
Surrogate Wildlife Species [6]												
Bobwhite Quail	0.177	0.162	0.1855	0.0144	0.0164	0.0184	0.0231	0.001181	0.001345	28.6	15.8	41.3
American Robin	0.081	0.0773	0.0862	0.0976	0.1231	0.0113	0.0121	0.01015	0.012802	1.19	0.37	2
Short-Tailed Shrew	0.01687	0.01525	0.01921	0.0103	0.0162	0.0038	0.0043	0.001339	0.002106	0.97	0.97	0.97
Meadow Vole	0.03663	0.0329	0.0391	0.0119	0.0128	0.0064	0.0077	0.000286	0.000307	0.03	0.164	1.06
Raccoon	6.865	5.34	8.86	1.3388	1.6512	0.5664	0.5698	0.125847	0.155213	385.5	266.9	504.1
Belted Kingfisher	0.152	0.136	0.17	0.0689	0.0758	0.0167	0.0187	0.001378	0.001516	2.862	0.964	5.399
Little Brown Bat[7]	0.0072	0.006	0.0103	0.0044	0.0081	0.0014	0.0015	NA	NA	1	0.8	1.2

Notes:
See Table H.2-2 for the source of calculation of the exposure factors.
NA - Not Applicable
1 - Only one value was provided so it was placed in the average column and some generic body weights may have been replaced by study-specific body weights.
2 - U.S. EPA, 1998
3 - Silva and Downing, 1996
5 - Barsotti et al, 1976
4 - U.S. EPA 1993
6 - U.S. EPA, 1993 for all factors except soil ingestion; Beyer (1993) or Talmage and Walton (in press) for soil ingestion rates.
7 - All of the exposure parameters are for the Little Brown Bat except for the home range, which is for the Indiana Bat.
8 - Home range for the kingfisher and Indiana Bat is presented in km of shoreline.

TABLE H.2-2

CALCULATION OF EXPOSURE PARAMETERS FOR WILDLIFE RECEPTORS
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

Exposure Parameters	Meadow Vole		Short-Tailed Shrew		Little Brown Bat	American Robin	Bobwhite Quail		Raccoon		Belted Kingfisher
Body Weights (g)	32.9	35.5	17.61	16.87	6.15	77.3	180	181	7090	6160	150
	39.1	39	17.33	15.58	6.15	80.8	168	183	7140	6440	136
			19.21	15.7	6.03	86.2	162	179	7600	5340	158
			17.4	15.25	6.99	83.6	175	175	6000	5620	147
					10.27	77.4	178	183.2	6400	8860	148
					7.77	80.6	179	185.5	7740	7560	170
							180	173	6560	7600	
							162.8	180.4			
Minimum	***32.9***		***15.25***		***6.03***	***77.3***	***162***		***5340***		***136***
Maximum	***39.1***		***19.21***		***10.27***	***86.2***	***185.5***		***8860.0***		***170.0***
Average	***36.63***		***16.87***		***7.2***	***81.0***	***177***		***6865***		***152***
Food Ingestion Rate (g/g-day) [1]	0.3	0.35	0.49	0.77	1.12	0.89	0.067	0.079			0.5
			0.62	0.55	0.23	1.52	0.072	0.093			0.41
			0.43	0.96	0.48		0.09	0.089			
			0.52	0.54							
Minimum	***0.3***		***0.43***		***0.23***	***0.89***	***0.067***				***0.41***
Maximum	***0.35***		***0.96***		***1.12***	***1.52***	***0.093***				***0.5***
Average	***0.325***		***0.61***		***0.61***	***1.205***	***0.082***				***0.455***
Food Ingestion Rate (kg/day)											
Conservative	***0.0128***		***0.0162***		***0.0081***	***0.1231***	***0.0164***		***1.6512***		***0.0758***
Average	***0.0119***		***0.0103***		***0.0044***	***0.0976***	***0.0144***		***1.3388***		***0.0689***
Water Ingestion Rate (g/g-day)	0.14	0.21	0.223		0.177	0.14	0.115	0.1	0.082	0.083	0.11
					0.205		0.106	0.131			
							0.093	0.101			
							0.086	0.102			
							0.11	0.1			
Minimum	***0.14***		***0.223***		***0.177***	***0.14***	***0.086***		***0.082***		***0.11***
Maximum	***0.21***		***0.223***		***0.205***	***0.14***	***0.131***		***0.083***		***0.11***
Average	***0.175***		***0.223***		***0.191***	***0.14***	***0.104***		***0.083***		***0.110***
Water Ingestion Rate (L/day)											
Conservative	***0.0077***		***0.0043***		***0.0015***	***0.0121***	***0.0231***		***0.5698***		***0.0187***
Average	***0.0064***		***0.0038***		***0.0014***	***0.0113***	***0.0184***		***0.5664***		***0.0167***
Home Range (Ha) [2]	0.43	0.097	0.3925		0.80	0.15	7.6	6.4	204	108	2.185
	0.019	0.041			1.20	0.81	16.7	15.6			1.028
	0.013	0.033									1.03
	0.012	0.013									0.39
	0.043	0.057									
	0.023	0.032									
	0.051	0.078									
	0.058	0.061									
Minimum (acres)[2]	***0.0297***		***0.9699***		***0.80***	***0.37***	***15.8***		***266.9***		***0.39***
Maximum (acres)[2]	***1.06***		***0.97***		***1.20***	***2.00***	***41.3***		***504.1***		***2.19***
Average (acres)[2]	***0.164***		***0.970***		***1.00***	***1.19***	***28.6***		***385.5***		***1.16***

Notes:
Source of data is EPA, 1993 except for the Little Brown Bat.
Source of the Little Brown Bat data is Sample et al., 1997 except for the home range, which is USFWS, 1999.
1 - Food Ingestion Rate (kg/day) for the raccoon was calculated using the following equation:
$FI = (0.0687)(BW^{0.822})/0.25$, where FI = Food Ingestion Rate (kg/day) and BW = Body Weight (kg).
2 - Home range for the kingfisher and Indiana Bat is presented in km of shoreline.
Ingestion Rates (kg/day or L/day) (if more than 1 ingestion rate is available)
- Conservative value = Max Ingestion Rate (g/g-day)* Avg. Body Weight
- Average value = Avg. Ingestion Rate (g/g-day)*Avg. Body Weight

Ingestion Rates (L/day) (if only 1 ingestion rate is available)
- Conservative value = Ingestion Rate (g/g-day)* Max. Body Weight
- Average value = Ingestion Rate (g/g-day)*Avg. Body Weight

APPENDIX H.3

TRV SOURCES

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameters	Concentration (mg/kd-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Semivolatiles Organics							
Acenaphthene	175	NOAEL	systemic	subchronic	mouse	USEPA, 1989a	IRIS, 2001
Acenaphthene	350	LOAEL	systemic	subchronic	mouse	USEPA, 1989a	IRIS, 2001
Anthracene	1000	NOAEL	systemic	subchronic	mouse	USEPA, 1989b	IRIS, 2001
Benzo(a)pyrene	10	LOAEL	reproductive	chronic	mouse	Mackenzie and Angevine, 1981	Sample et.al., 1996
Bis(2-ethylhexyl)phthalate	18.33	NOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Bis(2-ethylhexyl)phthalate	183.3	LOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Bis(2-ethylhexyl)phthalate	1.11	NOAEL	reproductive	chronic	ringed dove	Peakall, 1974	Sample et.al., 1996
Butylbenzylphthalate	159	NOAEL	systemic	subchronic	rat	NTP, 1985a	IRIS, 2001
Butylbenzylphthalate	470	LOAEL	systemic	subchronic	rat	NTP, 1985a	IRIS, 2001
1,2-Dichlorobenzene	120	NOAEL	systemic	chronic	rat	NTP, 1985b	IRIS, 1998
1,4-Dichlorobenzene	300	LOAEL	mortality	chronic	rat	NTP, 1987	ASTDR, 1991
2,4-D	1	NOAEL	systemic	chronic	rat	Dow Chemical, 1983	IRIS, 2001
2,4-D	5	LOAEL	systemic	chronic	rat	Dow Chemical, 1983	IRIS, 2001
Diethyl phthalate	4583	NOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Di-n-butylphthalate	550	NOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Di-n-butylphthalate	1833	LOAEL	reproductive	chronic	mouse	Lamb et al., 1987	Sample et.al., 1996
Di-n-butylphthalate	1.11	LOAEL	reproductive	chronic	ringed dove	Peakall, 1974	Sample et.al., 1996
Dinoseb	1	LOAEL	reproductive	chronic	rat	Dow Chemical, 1981a	IRIS, 2001
Fluoranthene	125	NOAEL	systemic	subchronic	mouse	USEPA, 1988	IRIS, 2001
Fluoranthene	250	LOAEL	systemic	subchronic	mouse	USEPA, 1988	IRIS, 2001
Fluorene	125	NOAEL	systemic	subchronic	mouse	USEPA, 1988	IRIS, 2001
Fluorene	250	LOAEL	systemic	subchronic	mouse	USEPA, 1988	IRIS, 2001
Hexachloroethane	1	NOAEL	systemic	subchronic	rat	Gorzinski, et al., 1985	IRIS, 2001
Hexachloroethane	15	LOAEL	systemic	subchronic	rat	Gorzinski, et al., 1985	IRIS, 2001
Isophorone	150	NOAEL	systemic	subchronic	dog	Nor Am Agric. Products, 1972	IRIS, 2001
Isophorone	179	LOAEL	systemic	chronic	rat	NTP, 1984	IRIS, 2001
2-Methylnaphthalene	41	NOAEL	mortality	chronic	rat	Schmahl, 1955	Used naphthalene value
Naphthalene	71	NOAEL	systemic	subchronic	rat	BCL, 1980	IRIS, 2001
Naphthalene	142	LOAEL	systemic	subchronic	rat	BCL, 1980	IRIS, 2001
Phenol	60	NOAEL	body weight	subchronic	rat	NTP, 1983	IRIS, 2001
Phenol	120	LOAEL	body weight	subchronic	rat	NTP, 1983	IRIS, 2001
Pyrene	75	NOAEL	systemic	subchronic	mouse	USEPA, 1989c	IRIS, 2001
Pyrene	125	LOAEL	systemic	subchronic	mouse	USEPA, 1989c	IRIS, 2001
2,4,5-T	3	NOAEL	reproductive	chronic	rat	Kociba et al, 1979	IRIS, 2001
2,4,5-T	10	LOAEL	reproductive	chronic	rat	Kociba et al, 1979	IRIS, 2001
2,4,5-Trichlorophenol	100	NOAEL	systemic	subchronic	rat	McCollister, et al., 1961	IRIS, 2001
2,4,5-Trichlorophenol	300	LOAEL	systemic	subchronic	rat	McCollister, et al., 1961	IRIS, 2001
2,4,6-Trichlorophenol	4.2	NOAEL	reproductive	subchronic	rat	Exon and Koller, 1985	ASTDR, 1989
2,4,6-Trichlorophenol	42	LOAEL	reproductive	subchronic	rat	Exon and Koller, 1985	ASTDR, 1989

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameters	Concentration (mg/kd-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Pesticides/PCBs							
Aldrin	0.2	NOAEL	reproductive	chronic	rat	Treon and Cleveland, 1995	Sample et.al., 1996
Aldrin	1	LOAEL	reproductive	chronic	rat	Treon and Cleveland, 1995	Sample et.al., 1996
Aldrin	0.025	LOAEL	systemic	chronic	rat	Fitzhugh et.al., 1964	IRIS, 1999
BHC (mixed isomers)	0.137	LOAEL	reproductive	chronic	mink	Bleavins et al., 1984	Sample et.al., 1996
BHC (mixed isomers)	0.563	NOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
BHC (mixed isomers)	2.25	LOAEL	reproductive	chronic	Japanese quail	Vos et al., 1971	Sample et.al., 1996
beta-BHC	4	NOAEL	systemic	subchronic	rat	Van Velsen et al., 1986	Sample et.al., 1996
beta-BHC	20	LOAEL	systemic	subchronic	rat	Van Velsen et al., 1986	Sample et.al., 1996
gamma-BHC (lindane)	8	NOAEL	reproductive	chronic	rat	Palmer et al., 1978	Sample et.al., 1996
gamma-BHC (lindane)	20	LOAEL	reproductive	chronic	mallard duck	Chakravarty and Lahiri, 1986	Sample et.al., 1996
Chlordane	2.14	NOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	10.7	LOAEL	mortality	chronic	red-winged blackbird	Stickel et al., 1983	Sample et.al., 1996
Chlordane	4.58	NOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
Chlordane	9.16	LOAEL	reproduction	chronic	mouse	WHO, 1984	Sample et.al., 1996
4,4'-DDT	0.8	NOAEL	reproductive	chronic	rat	Fitzhugh, 1948	Sample et.al., 1996
4,4'-DDT	4	LOAEL	reproductive	chronic	rat	Fitzhugh, 1948	Sample et.al., 1996
4-4'-DDT	0.028	LOAEL	reproduction	chronic	brown pelican	Anderson et al., 1975	Sample et.al., 1996
Dieldrin	0.077	NOAEL	reproduction	chronic	barn owl	Mendenhall et al., 1983	Sample et.al., 1996
Dieldrin	0.2	LOAEL	reproduction	chronic	rat	Treon and Cleveland, 1995	Sample et.al., 1996
Endosulfan	1.5	NOAEL	reproduction	subchronic	rat	Dikshith et al., 1984	Sample et.al., 1996
Endosulfan	10	NOAEL	reproduction	chronic	gray partridge	Abiola, 1992	Sample et.al., 1996
Endrin	0.92	LOAEL	reproduction	chronic	mouse	Good and Ware, 1969	Sample et.al., 1996
Endrin	0.1035	LOAEL	reproduction	chronic	screech owl	Fleming et al., 1982	Sample et.al., 1996
Heptachlor	1	LOAEL	reproduction	chronic	mink	Crum et al., 1993	Sample et.al., 1996
Methoxychlor	4	NOAEL	reproduction	chronic	rat	Gray et al., 1988	Sample et.al., 1996
Methoxychlor	8	LOAEL	reproduction	chronic	rat	Gray et al., 1988	Sample et.al., 1996
Toxaphene	8	NOAEL	reproduction	chronic	rat	Kennedy et al., 1973	Sample et.al., 1996
Aroclor-1242	0.685	LOAEL	reproduction	chronic	mink	Bleavins et al., 1980	Sample et.al., 1996
Aroclor-1242	0.41	NOAEL	reproduction	chronic	screech owl	McLane and Hughes, 1980	Sample et.al., 1996
Aroclor-1248	0.1	LOAEL	reproduction	chronic	rhesus monkey	Barsotti et al., 1976	Sample et.al., 1996
Aroclor-1254	1.8	LOAEL	reproductive	chronic	pheasant	Dahlgren et al., 1972	Sample et.al., 1996
Aroclor-1254	0.68	LOAEL	reproduction	chronic	mouse	McCoy et al., 1995	Sample et.al., 1996

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameters	Concentration (mg/kd-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Dioxins/Furans							
1,2,3,6,7,8-HXCDF	0.0016	NOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
1,2,3,6,7,8-HXCDF	0.016	LOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
1,2,3,4,8-PCDF	0.48	NOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
1,2,3,7,8-PCDF	0.0016	NOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
1,2,3,7,8-PCDF	0.016	LOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
2,3,4,7,8-PCDF	0.00016	NOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
2,3,4,7,8-PCDF	0.0016	LOAEL	systemic	subchronic	rat	Poiger et al., 1989	Sample et.al., 1996
2,3,7,8-TCDD	0.000001	NOAEL	reproduction	chronic	rat	Murray et al., 1979	Sample et.al., 1996
2,3,7,8-TCDD	0.00001	LOAEL	reproduction	chronic	rat	Murray et al., 1979	Sample et.al., 1996
2,3,7,8-TCDD	0.000014	NOAEL	reproduction	chronic	pheasant	Nosek et al., 1992	Sample et.al., 1996
2,3,7,8-TCDD	0.00014	LOAEL	reproduction	chronic	pheasant	Nosek et al., 1992	Sample et.al., 1996
Explosives							
1,3-Dinitrobenzene	0.4	NOAEL	reproduction	subchronic	rat	Cody et al., 1981	IRIS, 2001
1,3-Dinitrobenzene	1.07	NOAEL	reproduction	subchronic	rat	Cody et al., 1981	IRIS, 2001
2,4-Dinitrotoluene	0.2	NOAEL	neurotoxicity	chronic	dog	Ellis et al., 1985	IRIS, 2001
2,4-Dinitrotoluene	1.5	LOAEL	neurotoxicity	chronic	dog	Ellis et al., 1985	IRIS, 2001
m, o, and p-Nitrotoluene	200	LOAEL	systemic	chronic	rat	Ciss et al., 1980	USEPA, 1997 (HEAST)
HMX	30	NOAEL	mortality	subchronic	mouse	Everett and Maddock, 1985	Talmage et al., 1999
HMX	75	LOAEL	mortality	subchronic	mouse	Everett and Maddock, 1985	Talmage et al., 1999
RDX	7	NOAEL	reproduction	chronic	mouse	Lish et al., 1984	Talmage et al., 1999
RDX	35	LOAEL	reproduction	chronic	mouse	Lish et al., 1984	Talmage et al., 1999
Tetryl	13	NOAEL	reproduction	subchronic	rat	Reddy et al, 1994	Talmage et al., 1999
Tetryl	62	LOAEL	reproduction	subchronic	rat	Reddy et al, 1994	Talmage et al., 1999
1,3,5-Trinitrobenzene	2.64	NOAEL	systemic	chronic	rat	Reddy et al, 1996	IRIS, 2001
1,3,5-Trinitrobenzene	13.31	LOAEL	systemic	chronic	rat	Reddy et al, 1996	IRIS, 2001
2,4,6-Trinitrotoluene	160	LOAEL	reproduction	subchronic	rat	Dilley et al., 1982	Talmage et al., 1999

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameters	Concentration (mg/kd-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Inorganics							
Aluminum	109.7	NOAEL	reproduction	chronic	ringed dove	Carriere et al., 1986	Sample et.al., 1996
Aluminum	19.3	LOAEL	reproductive	chronic	mouse	Ondreicka et al., 1966	Sample et.al., 1996
Antimony	1.25	LOAEL	lifespan	chronic	mouse	Schroeder et al., 1968b	Sample et.al., 1996
Arsenic	1.261	LOAEL	reproductive	chronic	mouse	Schroeder and Mitchner, 1971	Sample et.al., 1996
Arsenic	2.46	NOAEL	mortality	chronic	brown-headed cowbird	USFWS, 1969	Sample et.al., 1996
Arsenic	7.38	LOAEL	mortality	chronic	brown-headed cowbird	USFWS, 1969	Sample et.al., 1996
Barium	5.1	NOAEL	growth	chronic	rat	Perry et al., 1983	Sample et.al., 1996
Barium	198	LOAEL	mortality	subchronic	rat	Borzelleca et al., 1988	Sample et.al., 1996
Barium	208.26	NOAEL	mortality	subchronic	chicks	Johnson et al., 1960	Sample et.al., 1996
Barium	416.53	LOAEL	mortality	subchronic	chicks	Johnson et al., 1960	Sample et.al., 1996
Beryllium	0.66	NOAEL	systemic	chronic	rat	Schroeder and Mitchner, 1975	Sample et.al., 1996
Cadmium	1	NOAEL	reproduction	chronic	rat	Sutou et al., 1980b	Sample et.al., 1996
Cadmium	10	LOAEL	reproduction	chronic	rat	Sutou et al., 1980b	Sample et.al., 1996
Cadmium	1.45	NOAEL	reproductive	chronic	mallard duck	White and Finely, 1978	Sample et.al., 1996
Cadmium	20	LOAEL	reproductive	chronic	mallard duck	White and Finely, 1978	Sample et.al., 1996
Chromium(III)	1	NOAEL	reproduction	chronic	black duck	Haseltine et al., unpubl.	Sample et.al., 1996
Chromium(III)	5	LOAEL	reproduction	chronic	black duck	Haseltine et al., unpubl.	Sample et.al., 1996
Chromium(VI)	3.28	NOAEL	BW/food cons.	chronic	rat	Mackenzie, 1958	Sample et.al., 1996
Chromium(VI)	131.4	LOAEL	mortality	subchronic	rat	Steven et al., 1976	Sample et.al., 1996
Cobalt	12	LOAEL	growth	chronic	rat	Domingo et al., 1985	Eng. Field Activity,1998
Copper	11.71	NOAEL	reproduction	chronic	mink	Aulerich et al., 1982	Sample et.al., 1996
Copper	15.14	LOAEL	reproduction	chronic	mink	Aulerich et al., 1982	Sample et.al., 1996
Copper	46.97	NOAEL	mortality	chronic	chicks	Mehring et al., 1960	Sample et.al., 1996
Copper	61.72	LOAEL	mortality	chronic	chicks	Mehring et al., 1960	Sample et.al., 1996
Cyanide	68.7	NOAEL	reproduction	chronic	rat	Tewe and Maner, 1981	Sample et.al., 1996
Iron	500	LOAEL	unknown	chronic	rabbit	NAS, 1980	
Iron	1000	LOAEL	unknown	chronic	poultry	NAS, 1980	
Lead	8	NOAEL	reproductive	chronic	rat	Azar et al., 1973	Sample et.al., 1996
Lead	80	LOAEL	reproductive	chronic	rat	Azar et al., 1973	Sample et.al., 1996
Lead	1.13	NOAEL	reproductive	chronic	Japanese quail	Edens et al., 1982	Sample et.al., 1996
Lead	11.3	LOAEL	reproductive	chronic	Japanese quail	Edens et al., 1982	Sample et.al., 1996
Manganese	997	NOAEL	growth	chronic	Japanese quail	Laskey and Edens, 1985	Sample et.al., 1996
Manganese	88	NOAEL	reproductive	chronic	rat	Laskey et al., 1982	Sample et.al., 1996
Manganese	284	LOAEL	reproductive	chronic	rat	Laskey et al., 1982	Sample et.al., 1996
Mercury	0.064	LOAEL	reproductive	chronic	mallard duck	Heinze, 1979	Sample et.al., 1996
Mercury	0.032	NOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996
Mercury	0.16	LOAEL	reproductive	chronic	rat	Verschuuren et al., 1976	Sample et.al., 1996

SOURCES AND ENDPOINTS FOR NOAELS AND LOAELS FOR TERRESTRIAL WILDLIFE
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameters	Concentration (mg/kd-day)	Endpoint	Effect	Chronic/ Subchronic	Species	Primary Reference	Source of Reference
Nickel	40	NOAEL	reproductive	chronic	rat	Ambrose et al., 1976	Sample et.al., 1996
Nickel	80	LOAEL	reproductive	chronic	rat	Ambrose et al., 1976	Sample et.al., 1996
Nickel	77.4	NOAEL	mortality	chronic	mallard duck	Cain and Pafford, 1981	Sample et.al., 1996
Nickel	107	LOAEL	mortality	chronic	mallard duck	Cain and Pafford, 1981	Sample et.al., 1996
Selenium	0.5	NOAEL	reproductive	chronic	mallard duck	Heinz, et al., 1987	Sample et.al., 1996
Selenium	1	LOAEL	reproductive	chronic	mallard duck	Heinz, et al., 1987	Sample et.al., 1996
Selenium	0.2	NOAEL	reproductive	chronic	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Selenium	0.33	LOAEL	reproductive	chronic	rat	Rosenfeld and Beath, 1954	Sample et.al., 1996
Silver	18.1	NOAEL	systemic	subchronic	mouse	Rungby, 1984	ATSDR, 1989
Thallium	0.74	LOAEL	reproductive	subchronic	rat	Formigli et al., 1986	Sample et.al., 1996
Tin	23.4	NOAEL	reproductive	chronic	mouse	Davis et al., 1987	Sample et.al., 1996
Tin	35	LOAEL	reproductive	chronic	mouse	Davis et al., 1987	Sample et.al., 1996
Tin	6.76	NOAEL	reproductive	chronic	Japanese quail	Schlatterer et al., 1993	Sample et.al., 1996
Tin	16.9	LOAEL	reproductive	chronic	Japanese quail	Schlatterer et al., 1993	Sample et.al., 1996
Vanadium	2.1	LOAEL	reproductive	chronic	rat	Domingo et al., 1986	Sample et.al., 1996
Vanadium	11.38	NOAEL	mortality,BW	chronic	mallard duck	White and Dieter, 1978	Sample et.al., 1996
Zinc	160	NOAEL	reproductive	chronic	rat	Schlicker and Cox, 1986	Sample et.al., 1996
Zinc	320	LOAEL	reproductive	chronic	rat	Schlicker and Cox, 1986	Sample et.al., 1996
Zinc	14.49	NOAEL	reproductive	chronic	white leghorn hen	Stahl et al., 1990	Sample et.al., 1996
Zinc	130.9	LOAEL	reproductive	chronic	white leghorn hen	Stahl et al., 1990	Sample et.al., 1996

Notes: The NOAELS and LOAELS for the PAHs that do not have values will be based on the benzo(a)pyrene values.
The NOAELS and LOAELS for the PAHs for birds was based on a study by Trust et.al., 1995 that was referenced in an ecological risk assessment prepared by USEPA Environmental Response Team for the AVTEX Fibers Site in Front Royal, Virginia.

NOAELS AND LOAELS FOR BIRDS
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[2]	Birds[1] NOAEL (mg/kg-day)	Birds[1] LOAEL (mg/kg-day)
SEMIVOLATILES		
2,2'-Oxybis(1-chloropropane)	NV	NV
2,4-D	NV	NV
2,4,5-Trichlorophenol	NV	NV
2,4,5-T	NV	NV
2,4,6-Trichlorophenol	NV	NV
2-Methylnaphthalene	2	20
2-Methylphenol	NV	NV
4-Nitroaniline	NV	NV
4-Nitrophenol	NV	NV
Acenaphthene	2	20
Acenaphthylene	2	20
Anthracene	2	20
Benzo(a)anthracene	2	20
Benzo(a)pyrene	2	20
Benzo(b)fluoranthene	2	20
Benzo(g,h,i)perylene	2	20
Benzo(k)fluoranthene	2	20
Bis(2-Ethylhexyl)phthalate	1.11	11.1
Butylbenzyl Phthalate	NV	NV
Carbazole	2	20
Chrysene	2	20
Dibenzo(a,h)anthracene	2	20
Dibenzofuran	NV	NV
Diethyl Phthalate	1.11	11.1
Di-n-butyl phthalate	0.11	1.1
Di-n-octyl phthalate	NV	NV
Fluoranthene	2	20
Fluorene	2	20
Hexachloroethane	NV	NV
Indeno(1,2,3-cd)pyrene	2	20
Isophorone	NV	NV
Naphthalene	2	20
Phenanthrene	2	20
Phenol	NV	NV
Pyrene	2	20
PESTICIDES/PCBs		
4,4'-DDD	0.0028	0.028
4,4'-DDE	0.0028	0.028
4,4'-DDT	0.0028	0.028
Aldrin	NV	NV
alpha-BHC	0.56	2.25
Alpha-Chlordane	2.14	10.7
Aroclor-1232	0.18	1.8
Aroclor-1242	0.41	4.1
Aroclor-1248	NV	NV
Aroclor-1254	0.18	1.8

NOAELS AND LOAELS FOR BIRDS
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[2]	Birds[1] NOAEL (mg/kg-day)	Birds[1] LOAEL (mg/kg-day)
Aroclor-1260	0.18	1.8
beta-BHC	0.56	2.25
delta-BHC	0.56	2.25
Dieldrin	0.077	0.77
Endosulfan I	10	100
Endosulfan II	10	100
Endosulfan Sulfate	10	100
Endrin	0.01	0.1
Endrin Aldehyde	0.01	0.1
Endrin Ketone	0.01	0.1
Gamma-BHC (Lindane)	2	20
Gamma-Chlordane	2.14	10.7
Heptachlor	NV	NV
Heptachlor Epoxide	NV	NV
Methoxychlor	NV	NV
Toxaphene	NV	NV
DIOXINS AND FURANS		
1,2,3,4,6,7,8-HpCDD	0.014	0.14
1,2,3,4,6,7,8-HpCDF	0.0014	0.014
1,2,3,4,7,8,9-HPCDF	0.0014	0.014
1,2,3,4,7,8-HXCDD	0.00028	0.0028
1,2,3,4,7,8-HxCDF	0.00014	0.0014
1,2,3,6,7,8-HxCDD	0.0014	0.014
1,2,3,6,7,8-HxCDF	0.00014	0.0014
1,2,3,7,8,9-HXCDF	0.00014	0.0014
1,2,3,7,8,9-HxCDD	0.00014	0.0014
1,2,3,4,6,7,8,9-OCDD	0.14	1.4
1,2,3,4,6,7,8,9-OCDF	0.14	1.4
2,3,4,6,7,8-HxCDF	0.00014	0.0014
1,2,3,7,8-PECDD	0.000014	0.00014
1,2,3,7,8-PECDF	0.00014	0.0014
2,3,4,7,8-PECDF	0.000014	0.00014
2,3,7,8-TCDD	0.000014	0.00014
2,3,7,8-TCDF	0.000014	0.00014
OCDD	0.14	1.4
OCDF	0.14	1.4
TOTAL HpCDD	0.014	0.14
TOTAL HxCDD	0.00014	0.0014
TOTAL PeCDD	0.000014	0.00014
Total HpCDF	0.0014	0.014
Total HxCDF	0.00014	0.0014
Total PeCDF	0.000014	0.00014
Total TCDD	0.000014	0.00014
Total TCDF	0.000014	0.00014
EXPLOSIVES		
1,3 Dinitrobenzene	NV	NV
1,3,5-Trinitrobenzene	NV	NV

NOAELS AND LOAELS FOR BIRDS
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[2]	Birds[1] NOAEL (mg/kg-day)	LOAEL (mg/kg-day)
2,4-Dinitrotoluene	NV	NV
2,4,6-Trinitrotoluene	NV	NV
2-Amino-4,6-dinitrotoluene	NV	NV
2-Nitrotoluene	NV	NV
3-Nitrotoluene	NV	NV
4-Amino-2,6-dinitrotoluene	NV	NV
4-Nitrotoluene	NV	NV
Ammonia	NV	NV
HMX	NV	NV
Nitrobenzene (exp)	NV	NV
RDX	NV	NV
Tetryl	NV	NV
INORGANICS		
Aluminum	109.7	1097
Antimony	NV	NV
Arsenic	2.46	7.38
Barium	20.8	41.7
Beryllium	NV	NV
Cadmium	1.45	20
Chromium	1	5
Hexavalent Chromium	1	5
Cobalt	NV	NV
Copper	46.97	61.72
Cyanide	NV	NV
Iron	100	1000
Lead	1.13	11.3
Manganese	997	9970
Mercury	0.0064	0.064
Nickel	77.4	107
Selenium	0.4	0.8
Silver	NV	NV
Thallium	NV	NV
Vanadium	11.38	113.8
Zinc	14.49	130.9

1 - The sources of these NOAELS and LOAELS are presented in the table titled "Sources and Endpoints for NOAELS and LOAELS for Terrestrial Wildlife" in this appendix. The NOAELS and LOAELS in the source table were divided by 10 if a subchronic study was the basis for the value. Also, if only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL and if only a LOAEL was available, the value was divided by 10 to estimate the NOAEL

2 - Note that all of the parameters listed on this table may not have been included in the Food Chain Models for SWMUs 4, 5, 9, and 10.

DERIVATIONS OF MAMMAL TRVS
USING MAXIMUM BODY WEIGHT
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[1]	Mammals				Short-tailed Shrew		Meadow Vole		Raccoon		Brown Bat	
	NOAEL[2]	LOAEL[2]	Test Species	Body Weight (kg)	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
SEMIVOLATILES (mg/kg)												
2,2'-Oxybis(1-chloropropane)	NV	NV	NA	NA								
2,4-D	1	5	rat	0.35	2.1	10.3	1.7	8.6	0.4	2.2	2.4	12.1
2,4,5-Trichlorophenol	10	30	rat	0.35	20.7	62.0	17.3	51.9	4.5	13.4	24.1	72.4
2,4,5-T	3	10	rat	0.35	6.2	20.7	5.2	17.3	1.3	4.5	7.2	24.1
2,4,6-Trichlorophenol	0.42	4.2	rat	0.35	0.87	8.68	0.73	7.3	0.19	1.9	1.0	10.1
2-Methylnaphthalene	7	179	rat	0.35	14.5	369.8	12.1	309.6	3.1	79.8	16.9	432.2
2-Methylphenol	5	15	rat	0.35	10.3	31.0	8.6	25.9	2.2	6.7	12.1	36.2
4-Nitroaniline	NV	NV	NA	NA								
4-Nitrophenol	NV	NV	NA	NA								
Acenaphthene	17.5	35	mouse	0.03	19.6	39.1	16.4	32.8	4.2	8.4	22.9	45.7
Acenaphthylene	1	10	mouse	0.03	1.1	11.2	0.9	9.4	0.2	2.4	1.3	13.1
Anthracene	100	1000	mouse	0.03	112	1118	94	935.9	24	241	131	1306
Benzo(a)anthracene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Benzo(a)pyrene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Benzo(b)fluoranthene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Benzo(g,h,i)perylene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Benzo(k)fluoranthene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Bis(2-Ethylhexyl)phthalate	18.3	183	mouse	0.03	20.5	205	17.1	171.3	4.4	44.1	23.9	239
Butylbenzyl Phthalate	159	470	rat	0.35	328	971	275	813.0	71	210	384	1135
Carbazole	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Chrysene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Dibenzo(a,h)anthracene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Dibenzofuran	NV	NV	NA	NA								
Diethyl Phthalate	4583	45830	mouse	0.03	5123	51233	4289	42893.0	1106	11055	5987	59872
Di-n-butyl phthalate	550	1833	mouse	0.03	615	2049	515	1715.5	133	442	719	2395
Di-n-octyl phthalate	NV	NV	NA	NA								
Dinoseb	0.1	1	rat	0.35	0.21	2.07	0.17	1.7	0.04	0.45	0.24	2.41
Fluoranthene	12.5	25	mouse	0.03	14.0	27.9	11.7	23.4	3.0	6.0	16.3	32.7
Fluorene	12.5	25	mouse	0.03	14.0	27.9	11.7	23.4	3.0	6.0	16.3	32.7
Hexachloroethane	0.1	1.5	rat	0.35	0.21	3.1	0.17	2.6	0.04	0.67	0.24	3.6
Indeno(1,2,3-cd)pyrene	1	10	mouse	0.03	1.1	11.2	0.94	9.4	0.24	2.4	1.3	13.1
Isophorone	15	179	beagle	10	71.6	855	60.0	715.8	15.5	184	83.7	999
Naphthalene	7.1	14.2	rat	0.35	14.7	29.3	12.3	24.6	3.2	6.3	17.1	34.3
Phenanthrene	1	10	mouse	0.03	1.1	11.2	0.9	9.4	0.2	2.4	1.3	13.1
Phenol	6	12	rat	0.35	12.4	24.8	10.4	20.8	2.7	5.3	14.5	29.0
Pyrene	7.5	12.5	mouse	0.03	8.4	14.0	7.0	11.7	1.8	3.0	9.8	16.3
PESTICIDES/PCB (mg/kg)												
4,4'-DDD	0.8	4	rat	0.35	1.7	8.3	1.4	6.9	0.36	1.8	1.9	9.7
4,4'-DDE	0.8	4	rat	0.35	1.7	8.3	1.4	6.9	0.36	1.8	1.9	9.7

DERIVATIONS OF MAMMAL TRVS
USING MAXIMUM BODY WEIGHT
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[1]	Mammals				Short-tailed Shrew		Meadow Vole		Raccoon		Brown Bat	
	NOAEL[2]	LOAEL[2]	Test Species	Body Weight (kg)	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
4,4'-DDT	0.8	4	rat	0.35	1.7	8.3	1.4	6.9	0.36	1.8	1.9	9.7
Aldrin	0.2	1	rat	0.35	0.41	2.1	0.35	1.7	0.09	0.45	0.48	2.4
alpha-BHC	0.014	0.14	mink	1	0.04	0.38	0.03	0.3	0.01	0.08	0.04	0.44
Alpha-Chlordane	4.58	9.16	mouse	0.03	5.1	10.2	4.3	8.6	1.1	2.2	6.0	12.0
Aroclor-1232	0.068	0.68	Oldfield mouse	0.014	0.06	0.63	0.05	0.5	0.01	0.14	0.07	0.73
Aroclor-1242	0.069	0.69	mink	1	0.19	1.9	0.16	1.6	0.04	0.4	0.2	2.2
Aroclor-1248	0.01	0.1	Rhesus monkey	5	0.04	0.40	0.03	0.3	0.01	0.09	0.05	0.47
Aroclor-1254	0.068	0.68	Oldfield mouse	0.014	0.06	0.63	0.05	0.5	0.01	0.14	0.07	0.73
Aroclor-1260	0.068	0.68	Oldfield mouse	0.014	0.06	0.63	0.05	0.5	0.01	0.14	0.07	0.73
beta-BHC	0.4	2	rat	0.35	0.83	4.1	0.69	3.5	0.18	0.89	0.97	4.83
delta-BHC	1.6	3.2	rat	0.35	3.3	6.6	2.8	5.5	0.7	1.4	3.9	7.7
Dieldrin	0.02	0.2	rat	0.35	0.04	0.41	0.03	0.3	0.01	0.09	0.05	0.48
Endosulfan I	0.15	1.5	rat	0.35	0.31	3.1	0.26	2.6	0.07	0.67	0.36	3.6
Endosulfan II	0.15	1.5	rat	0.35	0.31	3.1	0.26	2.6	0.07	0.67	0.36	3.6
Endosulfan Sulfate	0.15	1.5	rat	0.35	0.31	3.1	0.26	2.6	0.07	0.67	0.36	3.6
Endrin	0.092	0.92	mouse	0.03	0.10	1.0	0.09	0.9	0.02	0.22	0.12	1.2
Endrin Aldehyde	0.092	0.92	mouse	0.03	0.10	1.0	0.09	0.9	0.02	0.22	0.12	1.2
Endrin Ketone	0.092	0.92	mouse	0.03	0.10	1.0	0.09	0.9	0.02	0.22	0.12	1.2
Gamma-BHC (Lindane)	8	80	rat	0.35	16.5	165.3	13.8	138.4	3.6	35.7	19.3	193.2
Gamma-Chlordane	4.58	9.16	mouse	0.03	5.1	10.2	4.3	8.6	1.1	2.2	6.0	12.0
Heptachlor	0.1	1	mink	1	0.27	2.7	0.22	2.2	0.06	0.58	0.31	3.1
Heptachlor Epoxide	0.1	1	mink	1	0.27	2.7	0.22	2.2	0.06	0.58	0.31	3.1
Methoxychlor	4	8	rat	0.35	8.3	16.5	6.9	13.8	1.8	3.6	9.7	19.3
Toxaphene	8	80	rat	0.35	16.5	165	13.8	138.4	3.6	35.7	19.3	193
DIOXINS AND FURANS (mg/kg)												
1,2,3,4,6,7,8-HpCDD	0.0016	0.016	rat	0.35	3.3E-03	3.3E-02	2.8E-03	2.8E-02	7.1E-04	7.1E-03	3.9E-03	3.9E-02
1,2,3,4,6,7,8-HpCDF	0.0016	0.016	rat	0.35	3.3E-03	3.3E-02	2.8E-03	2.8E-02	7.1E-04	7.1E-03	3.9E-03	3.9E-02
1,2,3,4,7,8,9-HPCDF	0.0016	0.016	rat	0.35	3.3E-03	3.3E-02	2.8E-03	2.8E-02	7.1E-04	7.1E-03	3.9E-03	3.9E-02
1,2,3,4,7,8-HXCDD	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
1,2,3,4,7,8-HxCDF	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
1,2,3,6,7,8-HxCDD	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
1,2,3,6,7,8-HxCDF	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
1,2,3,7,8,9-HxCDD	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
1,2,3,7,8,9-HXCDF	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
2,3,4,6,7,8-HxCDF	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
1,2,3,7,8-PECDD	0.000001	0.00001	rat	0.35	2.1E-06	2.1E-05	1.7E-06	1.7E-05	4.5E-07	4.5E-06	2.4E-06	2.4E-05
1,2,3,7,8-PECDF	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
2,3,4,7,8-PECDF	0.000016	0.00016	rat	0.35	3.3E-05	3.3E-04	2.8E-05	2.8E-04	7.1E-06	7.1E-05	3.9E-05	3.9E-04
2,3,7,8-TCDD	0.000001	0.00001	rat	0.35	2.1E-06	2.1E-05	1.7E-06	1.7E-05	4.5E-07	4.5E-06	2.4E-06	2.4E-05
2,3,7,8-TCDF	0.00001	0.0001	rat	0.35	2.1E-05	2.1E-04	1.7E-05	1.7E-04	4.5E-06	4.5E-05	2.4E-05	2.4E-04
1,2,3,4,6,7,8,9-OCDD	0.01	0.1	rat	0.35	2.1E-02	2.1E-01	1.7E-02	1.7E-01	4.5E-03	4.5E-02	2.4E-02	2.4E-01

DERIVATIONS OF MAMMAL TRVS
USING MAXIMUM BODY WEIGHT
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[1]	Mammals				Short-tailed Shrew		Meadow Vole		Raccoon		Brown Bat	
	NOAEL[2]	LOAEL[2]	Test Species	Body Weight (kg)	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
1,2,3,4,6,7,8,9-OCDF	0.01	0.1	rat	0.35	2.1E-02	2.1E-01	1.7E-02	1.7E-01	4.5E-03	4.5E-02	2.4E-02	2.4E-01
TOTAL HpCDD	0.0016	0.016	rat	0.35	3.3E-03	3.3E-02	2.8E-03	2.8E-02	7.1E-04	7.1E-03	3.9E-03	3.9E-02
TOTAL HxCDD	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
TOTAL PeCDD	0.000001	0.00001	rat	0.35	2.1E-06	2.1E-05	1.7E-06	1.7E-05	4.5E-07	4.5E-06	2.4E-06	2.4E-05
Total HpCDF	0.0016	0.016	rat	0.35	3.3E-03	3.3E-02	2.8E-03	2.8E-02	7.1E-04	7.1E-03	3.9E-03	3.9E-02
Total HxCDF	0.00016	0.0016	rat	0.35	3.3E-04	3.3E-03	2.8E-04	2.8E-03	7.1E-05	7.1E-04	3.9E-04	3.9E-03
Total PeCDF	0.000016	0.00016	rat	0.35	3.3E-05	3.3E-04	2.8E-05	2.8E-04	7.1E-06	7.1E-05	3.9E-05	3.9E-04
Total TCDD	0.000001	0.00001	rat	0.35	2.1E-06	2.1E-05	1.7E-06	1.7E-05	4.5E-07	4.5E-06	2.4E-06	2.4E-05
Total TCDF	0.00001	0.0001	rat	0.35	2.1E-05	2.1E-04	1.7E-05	1.7E-04	4.5E-06	4.5E-05	2.4E-05	2.4E-04
EXPLOSIVES (mg/kg)												
1,3 Dinitrobenzene	0.04	0.107	rat	0.35	0.08	0.22	0.07	0.2	0.02	0.05	0.10	0.26
1,3,5-Trinitrobenzene	2.64	13.31	rat	0.35	5.5	27.5	4.6	23.0	1.2	5.9	6.4	32.1
2,4-Dinitrotoluene	0.2	1.5	beagle	10	1.0	7.2	0.80	6.0	0.21	1.5	1.1	8.4
2,4,6-Trinitrotoluene	1.6	16	rat	0.35	3.31	33.1	2.8	27.7	0.71	7.1	3.9	38.6
2-Amino-4,6-dinitrotoluene	NV	NV	NA	NA								
2-Nitrotoluene	20	200	rat	0.35	41.3	413	34.6	345.9	8.9	89.2	48.3	483
3-Nitrotoluene	20	200	rat	0.35	41.3	413	34.6	345.9	8.9	89.2	48.3	483
4-Amino-2,6-dinitrotoluene	NV	NV	NA	NA								
4-Nitrotoluene	20	200	rat	0.35	41.3	413	34.6	345.9	8.9	89.2	48.3	483
Ammonia	NV	NV	NA	NA								
HMX	3	7.5	mouse	0.03	3.4	8.4	2.8	7.0	0.7	1.8	3.9	9.8
Nitrobenzene (exp)	NV	NV	NA	NA								
RDX	7	35	mouse	0.03	7.8	39.1	6.6	32.8	1.7	8.4	9.1	45.7
Tetryl	1.3	13	rat	0.35	2.7	26.9	2.2	22.5	0.58	5.8	3.1	31.4
INORGANICS (mg/kg)												
Aluminum	1.93	19.3	mouse	0.03	2.2	21.6	1.8	18.1	0.5	4.7	2.5	25.2
Antimony	0.125	1.25	mouse	0.03	0.14	1.4	0.12	1.2	0.03	0.30	0.16	1.6
Arsenic	0.126	1.26	mouse	0.03	0.14	1.4	0.12	1.2	0.03	0.30	0.16	1.6
Barium	5.1	19.8	rat	0.435/0.35[3]	11.1	40.9	9.3	34.2	2.4	8.8	13.0	47.8
Beryllium	0.66	6.6	rat	0.35	1.4	13.6	1.1	11.4	0.3	2.9	1.6	15.9
Cadmium	1	10	rat	0.303	2.0	19.9	1.7	16.7	0.4	4.3	2.3	23.3
Chromium	3.28	13.14	rat	0.35	6.8	27.1	5.7	22.7	1.5	5.9	7.9	31.7
Hexavalent Chromium	3.28	13.14	rat	0.35	6.8	27.1	5.7	22.7	1.5	5.9	7.9	31.7
Cobalt	1.2	12	rat	0.35	2.5	24.8	2.1	20.8	0.5	5.3	2.9	29.0
Copper	11.71	15.14	mink	1	31.5	40.7	26.3	34.0	6.8	8.8	36.8	47.5
Cyanide	68.7	687	rat	0.273	133	1334	112	1116.7	29	288	156	1559
Iron	50	500	rabbit	3.8	188	1875	157	1569.9	40	405	219	2191
Lead	8	80	rat	0.35	16.5	165	13.8	138.4	3.6	35.7	19.3	193
Manganese	88	284	rat	0.35	182	587	152	491.2	39	127	212	686
Mercury	0.015	0.025	mink	1	0.0	0.1	0.0	0.1	0.0	0.0	0.0471	0.0785
Nickel	40	80	rat	0.35	82.6	165	69.2	138.4	17.8	35.7	96.6	193.2

DERIVATIONS OF MAMMAL TRVS
USING MAXIMUM BODY WEIGHT
NAVAL SURFACE WARFACE CENTER, CRANE, INDIANA

Parameter[1]	Mammals				Short-tailed Shrew		Meadow Vole		Raccoon		Brown Bat	
	NOAEL[2]	LOAEL[2]	Test Species	Body Weight (kg)	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Selenium	0.2	0.33	rat	0.35	0.4	0.7	0.3	0.6	0.1	0.1	0.5	0.8
Silver	1.81	18.1	mouse	0.03	2.0	20.2	1.7	16.9	0.4	4.4	2.4	23.6
Thallium	0.0074	0.074	rat	0.365	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.2
Vanadium	0.21	2.1	rat	0.26	0.4	4.0	0.3	3.4	0.1	0.9	0.5	4.7
Zinc	160	320	rat	0.35	330.6	661	277	553.5	71.3	143	386	773

Not s:

NV - No Value Established

1 - Note that all of the parameters listed on this table may not have been included in the Food Chain Models for SWMUs 4, 5, 9, and 10.

2 - The sources of these NOAELS and LOAELS are presented in the table titled "Sources and Endpoints for NOAELS and LOAELS for Terrestrial Wildlife" in this appendix. The NOAELS and LOAELS in the source table were divided by 10 if a subchronic study was the basis for the value. Also, if only a NOAEL was available, the value was multiplied by 10 to estimate the LOAEL and if only a LOAEL was available, the value was divided by 10 to estimate the NOAEL.

3 - Two separate studies were performed. The average body weight was 0.435 for the NOAEL and 0.35 for the LOAEL.

Derivation NOAEL/LOAEL Equation:

Derived NOAEL = NOAEL*(test species bw/surrogate species maximum body weight)^0.25
Derived LOAEL = LOAEL*(test species bw/surrogate species maximum body weight)^0.25

Maximum body weight for surrogate wildlife species can be found in Appendix H.2.

APPENDIX H.4

FOOD CHAIN MODEL CALCULATIONS

APPENDIX H.4

Literature-derived soil to earthworm wet weight bioaccumulation factors (BAF) are incorporated into the food chain model for several pesticides and PAHs because not values were available in Sample et al., (1998).

The average wet-weight BAFs for pesticides were calculated from field studies summarized in Beyer (1990) (Appendix Table H.4-1). BAFs were calculated by dividing the worm concentration by the soil concentration (if the BAFs were not calculated within the study). Wet weight BAFs were derived by multiplying the dry weight BAF by 0.16 which is the percent solids of soil invertebrates (Sample et. al., 1997). The compost studies were not used in the calculation of the average BAFs because properties of the compost may be different than soil. For DDT, the BAFs that were used in the calculation ranged from 0.8 to 4.9 yielding an average of 2.09. For dieldrin, BAFs ranged from 0.14 to 4 with an average of 1.06. Gamma-BHC had an average BAF of 2.85 from data that ranged from 1.5 to 4.2. For heptachlor an 11-year field study resulted in an average BAF of 1.6. For all of these pesticides, the average BAF was used in both conservative and average input food chain models, primarily because of the limited data that were available.

The average soil to earthworm BAF used to estimate PAH concentration was 0.097 from Ma et al. (1998). This value is based on the worm wet weight and is normalized for percent organic carbon in the soil and percent lipids of the worms (1.2%). The BAFs that were used to calculate the average ranged from 0.026 to 0.257 (Appendix Table H.4-2). These BAFs are consistent with other values found in the literature. For example, BAFs for individual PAHs in Beyer (1990) ranged from 0.0082 to 0.107 (wet weight) with an average BAF of 0.41 (Appendix Table H.4-2). For the conservative food chain model, 0.257 [the maximum BAF from Ma et al. (1998)] was used while the average BAF of 0.097 was used for the average food chain model.

For evaluating risks to piscivorous wildlife (i.e., belted kingfisher and raccoon), fish concentrations were estimated from sediment concentrations using Biota Sediment Accumulation Factors BSAFs). However, a limited number of parameters were only detected in the surface water. Therefore, fish concentrations were estimated by multiplying the surface water concentrations by bioconcentration factors (BCFs). The following BCFs were incorporated into the food chain model for piscivorous wildlife (ORNL, 2001):

Parameter	BCF
RDX	190
2,4,6-Trinitrotoluene	33
2,4-D	47

Appendix Table H.4-3 presents the BAFs and BSAFs for plants, earthworms, fish, and sediment invertebrates.

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TABLE H.4-1

EARTHWORM BAFS FOR PESTICIDES
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA
PAGE 1 OF 1

Parameter	Worm Conc. (dry weight)	Worm Conc. (wet weight)	Soil Conc. (dry weight)	Dry Weight BAF	Wet Weight[1] BAF	Reference	Comments
DDT	NA	NA	NA	5	0.80	1	soil type unknown (11-year field study)
	0.5	NA	1	0.5	0.080	2	compost (lab)
	6.9	NA	4	1.7	0.28	2	compost (lab)
	37	NA	16	2.3	0.37	2	compost (lab)
	159	NA	64	2.5	0.40	2	compost (lab)
	NA	NA	NA	9	1.44	3	agricultural soil (1.36 ppm DDT in soil)
	NA	NA	NA	NA	1.2-4.9	4	agricultural soil (0.94 ppm DDT in soil)
Average wet weight BAF from field studies[2]				***NA***	***2.09***		
Dieldrin	NA	NA	NA	8	1.28	1	soil type unknown (11-year field study)
	NA	NA	NA	2.4	0.38	2	compost (lab) (17 ppm dieldrin in compost)
	NA	NA	NA	5.6	0.90	2	compost (lab) (17 ppm dieldrin in compost)
	NA	18.4	25	NA	0.74	5	compost (20-day lab study)
	NA	24.4	25	NA	0.98	5	compost (20-day lab study)
	NA	4.6	10	NA	0.46	6	90-day lab study
	NA	9.7	30	NA	0.32	6	90-day lab study
	NA	12.4	50	NA	0.25	6	90-day lab study
	NA	13.9	100	NA	0.14	6	90-day lab study
	NA	NA	NA	NA	0.97-4	4	agricultural soil (1.36 ppm total aldrin and dieldrin in soil)
Average wet weight BAF from field studies[2]				***NA***	***1.06***		
gamma-BHC	NA	NA	NA	5	1.5-4.2	4	agricultural soil (0.004 ppm gamma-BHC in soil)
Average wet weight BAF from field studies				***NA***	***2.85***		
Heptachlor	NA	NA	NA	10	1.6	4	soil type unknown (11-year field study)
Average wet weight BAF from field studies				***NA***	***1.6***		

BAF - bioaccumulation factor = worm concentration/soil concentration
1 - Wet weight BAF was calculated by multiplying the dry weight BAF by 0.16 [percent solids of soil invertebrates (Sample et al., 1997)].
2 - The compost studies were not used in calculation of average BAF because the properties of the compost may be different than soil. The compost studies were presented for informational purposes only.

References

1 - Beyer and Gish, 1980 and Beyer and Krynitsky, 1989
2 - Davis, 1971
3 - Gish, 1970
4 - Wheatly and Hardman, 1968
5 - Jeffries and Davis, 1968
6 - Venter and Reinecke, 1985

TABLE H.4-2

LITERATURE DERIVED EARTHWORM BAFS FOR PAHS
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

STUDY USED FOR FOOD CHAIN MODEL

Soil	Wet-Weight BAFs[1]	Dry-Weight BAFs[2]	Soil Type
OT1	0.081	0.506	Silty clay loam
OT2	0.026	0.163	Light sandy loam
OT3	0.105	0.656	Silty clay loam
OT4	0.257	1.606	Silty clay loam
OT5	0.192	1.200	Silty clay loam
OT6	0.091	0.569	Silty clay loam
GP1	0.069	0.431	Silty clay loam
GP2	0.072	0.450	Silty clay loam
GP3	0.062	0.388	Silty clay loam
GP4	0.11	0.688	Silty clay
GP5	0.042	0.263	Silty clay
GP6	0.062	0.388	Silty clay
Minimum BAF	**0.026**	**0.163**	
Maximum BAF	**0.257**	**1.606**	
Average BAF	**0.097**	**0.609**	

Not s:
Source of data is Ma et al., (1998).
1 - BAFs from the study are based on wet weight and normalized to the percent of organic carbon and percent lipids.
2 - These BAFs were calculated by dividing the dry weight BAF by 0.16 (percent solids of an earthworm).

	Earthworm Bioaccuumulation Factors[1]			
Chemical	**Soil Concentration (mg/kg)**	**Earthworm Concentration (mg/kg)**	**BAF (dry weight)**	**BAF (wet weight)[2]**
Acenaphthylene	ND	ND	ND	ND
Anthanthrene	1.2	0.11	0.092	0.015
Anthracene	0.92	0.047	0.051	0.008
Benzo(a)anthracene	2	0.25	0.13	0.020
Benzo(a)pryene	3.8	1.3	0.34	0.055
Benzo(b)fluoranthene	2.6	0.83	0.32	0.051
Benzo(e)pryene	2.1	0.91	0.43	0.069
Benzo(g,h,i)perylene	4.5	1.1	0.24	0.039
Benzo(k)fluoranthene	1.5	0.38	0.25	0.041
Chrysene	2	0.35	0.18	0.028
Dibenzo(a,i)pyrene	1.4	0.44	0.31	0.050
Dibenzo(a,j)anthracene	0.87	0.32	0.37	0.059
Fluoranthene	2.4	0.19	0.079	0.013
Fluorene	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	3.1	1.3	0.42	0.067
Naphthalene	ND	ND	ND	ND
Perylene	1.2	0.3	0.25	0.040
Phenanthrene	2.3	0.28	0.12	0.019
Pyrene	2.5	0.23	0.092	0.015
Triphenylene	1.3	0.87	0.67	0.107
		Minimum BAF	**0.051**	**0.0082**
		Maximum BAF	**0.669**	**0.107**
		Average BAF	**0.256**	**0.041**

Notes:
1 - Source of data is Table 25 in Beyer (1990).
2 - Wet-weight BAF was calculated by multiplying the dry weight BAF by 0.16 (percent solids of an earthworm).
ND - No data available

TABLE H.4-3

BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, FISH, AND SEDIMENT INVERTEBRATES
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

Chemicals	Plant BAFs[1,2]		Earthworm BAFs[3]		Fish BAFs/BSAFs[5]		Sediment Invertebrate BAFs/BSAFs[5]	
	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]
Volatile Organics								
Acetone	1.10E+01	1.10E+01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Benzene	4.70E-01	4.70E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Bromodichloromethane	4.70E-01	4.70E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2-Butanone	5.40E+00	5.40E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Carbon Disulfide	4.10E-01	4.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Carbon Tetrachloride	1.80E-01	1.80E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Chloroform	5.30E-01	5.30E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Chlorobenzene	1.80E-01	1.80E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Chloromethane	2.30E+00	2.30E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,1-Dichloroethane	7.00E-01	7.00E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,1-Dichloroethene	7.00E-01	7.00E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,2-Dichloroethene (Total)	4.10E+00	4.10E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
cis-1,2-Dichloroethene	6.10E-01	6.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Ethylbenzene	1.20E-01	1.20E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Isophorone	8.00E-01	8.00E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Methylene Chloride	1.40E+00	1.40E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Styrene	1.60E-01	1.60E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tetrachloroethene	2.40E-01	2.40E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Toluene	2.10E-01	2.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,1,1-Trichloroethane	2.70E-01	2.70E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,1,2,2-Tetrachloroethane	3.10E-01	3.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,1,2-Trichloroethane	5.30E-01	5.30E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2-Hexanone	1.20E+00	1.20E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Methyl-2-pentanone	1.60E+00	1.60E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Trichloroethene	3.10E-01	3.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vinyl Chloride	1.20E+00	1.20E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Xylenes, Total	1.10E-01	1.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Semivolatile Organics								
1,2-Dichlorobenzene	8.20E-02	8.20E-02	2.57E-01	9.70E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,4-Dichlorobenzene	8.20E-02	8.20E-02	2.57E-01	9.70E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2,2'-Oxybis(1-Chloropropane)	2.50E-01	2.50E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2,4-D	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2-Methylnaphthalene	4.20E-02	4.20E-02	2.57E-01	9.70E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2-Methylphenol	6.10E-01	6.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Chloro-3-Methylphenol	1.23E-01	1.23E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitroaniline	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrophenol	6.10E-01	6.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2,4,5-Trichlorophenol	4.80E-02	4.80E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2,4,6-Trichlorophenol	5.50E-02	5.50E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2,4,5-T	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Acenaphthene	2.50E-02	2.50E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Acenaphthylene	5.50E-02	5.50E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Anthracene	2.20E-02	2.20E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(a)anthracene	3.80E-03	3.80E-03	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(a)pyrene	2.20E-03	2.20E-03	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00

TABLE H.4-3

BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, FISH, AND SEDIMENT INVERTEBRATES
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

Chemicals	Plant BAFs[1,2]		Earthworm BAFs[3]		Fish BAFs/BSAFs[5]		Sediment Invertebrate BAFs/BSAFs[5]	
	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]
Benzo(b)fluoranthene	2.20E-03	2.20E-03	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(g,h,i)perylene	1.10E-03	1.10E-03	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Benzo(k)Fluoranthene	8.80E-04	8.80E-04	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Bis(2-ethylhexyl)phthalate	1.10E-02	1.10E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Butylbenzyl Phthalate	1.10E-02	1.10E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Carbazole	4.80E-02	4.80E-02	1.00E+00	1.00E+00	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Chrysene	3.80E-03	3.80E-03	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Dibenzo(a,h)Anthracene	8.80E-04	8.80E-04	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Dibenzofuran	3.14E-02	3.14E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Diethylphthalate	2.70E-01	2.70E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Di-n-butyl Phthalate	1.10E-02	1.10E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Di-n-octyl Phthalate	3.60E-05	3.60E-05	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Dinoseb	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Fluoranthene	1.10E-02	1.10E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Fluorene	2.20E-02	2.20E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Hexachloroethane	4.20E-02	4.20E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Indeno(1,2,3-cd)pyrene	1.10E-03	1.10E-03	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Naphthalene	9.40E-02	9.40E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Pentachlorophenol	2.90E-03	2.90E-03	1.00E+00	1.00E+00			1.00E+00	1.00E+00
Phenanthrene	1.70E-02	1.70E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Phenol	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Pyrene	1.10E-02	1.10E-02	2.57E-01	9.70E-02	2.90E-01	2.90E-01	1.00E+00	1.00E+00
Pesticides/ PCBs								
4,4'-DDD	3.30E-03	3.30E-03	1.00E+00	1.00E+00	2.80E-01	2.80E-01	1.00E+00	1.00E+00
4,4'-DDE	3.80E-03	3.80E-03	1.00E+00	1.00E+00	7.70E+00	7.70E+00	1.00E+00	1.00E+00
4,4'-DDT	1.60E-03	1.60E-03	2.09E+00	2.09E+00	1.67E+00	1.67E+00	1.00E+00	1.00E+00
Aldrin	1.40E-01	1.40E-01	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Alpha-Chlordane	5.00E-03	5.00E-03	1.00E+00	1.00E+00	4.77E+00	4.77E+00	1.00E+00	1.00E+00
Aroclor-1232	1.10E-01	1.10E-01	2.55E+00	1.07E+00	1.85E+00	1.85E+00	1.86E+01	1.05E+01
Aroclor-1242	3.20E-02	3.20E-02	2.55E+00	1.07E+00	1.85E+00	1.85E+00	1.86E+01	1.05E+01
Aroclor-1248	3.30E-03	3.30E-03	2.55E+00	1.07E+00	1.85E+00	1.85E+00	1.86E+01	1.05E+01
Aroclor-1254	2.50E-03	2.50E-03	2.55E+00	1.07E+00	1.85E+00	1.85E+00	1.86E+01	1.05E+01
Aroclor-1260	5.90E-04	5.90E-04	2.55E+00	1.07E+00	1.85E+00	1.85E+00	1.86E+01	1.05E+01
Dieldrin	1.70E-02	1.70E-02	1.06E+00	1.06E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Gamma-Chlordane	5.00E-03	5.00E-03	1.00E+00	1.00E+00	2.22E+00	2.22E+00	1.00E+00	1.00E+00
Heptachlor	2.50E-02	2.50E-02	1.60E+00	1.60E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endosulfan I	6.70E-02	6.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endosulfan II	6.70E-02	6.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endosulfan Sulfate	6.70E-02	6.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin	1.70E-02	1.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin Aldehyde	1.70E-02	1.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Endrin Ketone	1.70E-02	1.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Heptachlor Epoxide	5.70E-03	5.70E-03	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Methoxychlor	2.20E-02	2.20E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
alpha-BHC	4.20E-02	4.20E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
beta-BHC	3.70E-02	3.70E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00

TABLE H.4-3

BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, FISH, AND SEDIMENT INVERTEBRATES
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA
PAGE 3 OF 4

Chemicals	Plant BAFs[1,2]		Earthworm BAFs[3]		Fish BAFs/BSAFs[5]		Sediment Invertebrate BAFs/BSAFs[5]	
	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]
delta-BHC	1.80E-01	1.80E-01	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
gamma-BHC (Lindane)	5.50E-02	5.50E-02	2.85E+00	2.85E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Toxaphene	1.30E-02	1.30E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Explosives								
2,4,6-Trinitrotoluene	3.60E-01	3.60E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2-Nitrotoluene	3.60E-01	3.60E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,3,5-Trinitrobenzene	1.60E+00	1.60E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Nitrotoluene	3.10E-01	3.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
RDX	9.40E-02	9.40E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
4-Amino-2,6-dinitrotoluene	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
HMX	3.50E+00	3.50E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Nitrobenzene (exp)	7.00E-01	7.00E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
1,3 Dinitrobenzene	9.10E-01	9.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2-Amino-4,6-dinitrotoluene	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tetryl	5.30E-01	5.30E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
3-Nitrotoluene	3.10E-01	3.10E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
2,4-Dinitrotoluene	5.30E-01	5.30E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Dioxins								
1,2,3,4,6,7,8-HPCDD	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,4,6,7,8-HPCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,4,7,8,9-HPCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,4,7,8-HXCDD	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,4,7,8-HXCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,6,7,8-HXCDD	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,6,7,8-HXCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,7,8,9-HXCDD	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,7,8,9-HxCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,7,8-PECDD	1.30E-03	1.30E-03	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,7,8-Pecdf	8.90E-04	8.90E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
2,3,4,6,7,8-HXCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
2,3,4,7,8-PECDF	7.50E-04	7.50E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
2,3,7,8-TCDD	8.80E-04	8.80E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
2,3,7,8-TCDF	3.20E-03	3.20E-03	3.56E+00	1.76E+00	5.90E-02	5.90E-02	1.00E+00	1.00E+00
1,2,3,4,6,7,8,9-OCDD	6.20E-05	6.20E-05	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
1,2,3,4,6,7,8,9-OCDF	7.90E-05	7.90E-05	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
TOTAL HPCDD	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
TOTAL HXCDD	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
TOTAL PECDD	1.30E-03	1.30E-03	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
Total HPCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
Total HXCDF	2.40E-04	2.40E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
Total PECDF	8.90E-04	8.90E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
Total TCDD	8.80E-04	8.80E-04	3.56E+00	1.76E+00	2.50E-02	2.50E-02	1.00E+00	1.00E+00
Total TCDF	3.20E-03	3.20E-03	3.56E+00	1.76E+00	5.90E-02	5.90E-02	1.00E+00	1.00E+00
Organophosphorus Pesticides								
Chlorpyrifos	6.50E-03	6.50E-03	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00
Diazinon	4.75E-02	4.75E-02	1.00E+00	1.00E+00	1.80E+00	1.80E+00	1.00E+00	1.00E+00

TABLE H.4-3

BAFS AND/OR BSAFS FOR PLANTS, EARTHWORMS, FISH, AND SEDIMENT INVERTEBRATES
NAVAL SURFACE WARFARE CENTER, CRANE, INDIANA

Chemicals	Plant BAFs[1,2]		Earthworm BAFs[3]		Fish BAFs/BSAFs[5]		Sediment Invertebrate BAFs/BSAFs[5]	
	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]	Conservative[6]	Average[6]
Inorganics								
Aluminum	1.50E-03	8.61E-04	1.89E-02	6.88E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Antimony	3.42E-03	3.06E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Arsenic	3.31E-01	1.13E-02	8.37E-02	3.58E-02	1.00E+00	1.00E+00	2.00E-01	4.15E-02
Barium	1.43E-01	4.68E-02	2.56E-02	1.46E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Beryllium	2.50E-03	2.50E-03	1.89E-01	7.20E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Cadmium	9.75E-01	1.76E-01	6.51E+00	1.23E+00	1.00E+00	1.00E+00	2.32E+00	1.74E-01
Calcium	1.81E+00	3.56E-01	3.03E-01	6.74E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Chromium	2.52E-02	1.23E-02	5.06E-01	4.90E-02	1.00E+00	1.00E+00	1.36E-01	2.90E-02
Cobalt	7.44E-03	2.24E-03	4.66E-02	1.95E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Copper	1.88E-01	3.72E-02	2.45E-01	8.24E-02	1.00E+00	1.00E+00	1.52E+00	4.51E-01
Hexavalent Chromium	2.52E-02	1.23E-02	5.06E-01	4.90E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Cyanide	1.80E+00	1.80E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Iron	3.00E-03	1.28E-03	1.25E-02	5.76E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Lead	1.40E-01	1.17E-02	2.44E-01	4.26E-02	1.00E+00	1.00E+00	1.76E-01	2.06E-02
Magnesium	6.18E-01	2.43E-01	6.80E-02	2.70E-02	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Manganese	7.02E-02	2.38E-02	1.98E-02	8.64E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Mercury	1.50E+00	1.96E-01	3.30E+00	2.71E-01	1.00E+00	1.00E+00	8.32E-01	3.29E-01
Nickel	4.23E-01	5.40E-03	7.57E-01	1.69E-01	1.00E+00	1.00E+00	6.73E-01	1.41E-01
Potassium	3.38E+00	1.68E+00	9.54E-01	2.79E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Selenium	9.04E-01	2.02E-01	2.14E-01	1.58E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Silver	1.10E-02	4.20E-03	2.45E+00	3.27E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Sodium	2.46E-01	5.76E-02	1.03E+01	6.92E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Thallium	1.00E-03	1.00E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Tin	3.00E-01	3.00E-01	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Vanadium	2.91E-03	1.46E-03	1.41E-02	6.72E-03	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Zinc	5.46E-01	1.10E-01	2.06E+00	5.12E-01	1.00E+00	1.00E+00	2.18E+00	5.61E-01

Notes:
BAF - Bioaccumulation Factor
BSAF - Biota Sediment Accumulation Factor
1 - ORNL (2001) for organics; only one value is available for conservative and average exposures.
2 - Sample et al., (1997) for inorganics; conservative value is 90th percentile; average value is median value.
3 - ORNL (September, 1998) for all chemicals; conservative value is 90th percentile; average value is median value.
4 - U.S. EPA, September 1997; only one value is available for conservative and average exposures.
5 - ORNL (August, 1998) for all chemicals; conservative value is 90th percentile; average value is median value.
6 - Conservative and average refers to the exposure scenarios for which the uptake factors are used.

The plant and invertebrate uptake factors from Sample (1997) and ORNL (September 1998) were multiplied by 0.3 and 0.16 to convert the uptake factors for plants and earthworms, respectively, from dry weight to wet weight.

Default value of 1 is assigned to parameters without uptake factors.

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF 1

CLIENT: NSWC CRANE	JOB NUMBER:
SUBJECT: PERCENT LIPID CALCULATION FOR FISH	
BASED ON: USEPA, 1997. The Incidence and Severity of Sediment Contamination in Surface Waters of the US.	DRAWING NUMBER: EPA 823-R-97-006
BY: J. VERBANIC / CHECKED BY: YMB	APPROVED BY: / DATE: 2-23-08

Percent Lipid Content in Fish:

Species	Whole Fish Lipid* Content (Percent)
Redbreast Sunfish	3.6
Green Sunfish	3.2
Pumpkinseed	3.9
Longear Sunfish	2.8
Bluegill Sunfish	3.5
Bluegill Sunfish	4.4
	3.5666 ≈ 3.6% LIPID FOR FISH

* Values taken from Appendix C, Table C-3b, USEPA (1997) The Incidence and Severity of Sediment Contamination in Surface Waters of the United States

SWMU 4 – McComish Gorge

Body Weight = BW	0.136	kg
Food Ingestion Rate = If	0.07580	kg/day
Water Ingestion Rate = Iw	0.01870	L/day
Soil Ingestion Rate - Is	0.00152	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Conservative Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Semi-Volatiles									
BENZO(A)ANTHRACENE	4.20E-02	0.00E+00	2.90E-01	3.69E-02	2.10E-02	2.00E+00	2.00E+01	1.05E-02	1.05E-03
BENZO(A)PYRENE	4.70E-02	0.00E+00	2.90E-01	4.13E-02	2.35E-02	2.00E+00	2.00E+01	1.18E-02	1.18E-03
DIBENZO(A,H)ANTHRACENE	1.40E-02	0.00E+00	2.90E-01	1.23E-02	7.01E-03	2.00E+00	2.00E+01	3.50E-03	3.50E-04
PYRENE	7.00E-02	0.00E+00	2.90E-01	6.15E-02	3.50E-02	2.00E+00	2.00E+01	1.75E-02	1.75E-03

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.152	kg
Food Ingestion Rate = (If)	0.069	kg/day
Water Ingestion Rate = (Iw)	0.017	L/day
Sediment Ingestion Rate = (Is)	0.001378	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Average Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Semi-Volatiles									
BENZO(A)ANTHRACENE	2.11E-02	0.00E+00	2.90E-01	1.85E-03	1.03E-03	2.00E+00	2.00E+01	5.15E-04	5.15E-05
BENZO(A)PYRENE	2.25E-02	0.00E+00	2.90E-01	1.98E-03	1.10E-03	2.00E+00	2.00E+01	5.50E-04	5.50E-05
DIBENZO(A,H)ANTHRACENE	7.70E-03	0.00E+00	2.90E-01	6.76E-04	3.76E-04	2.00E+00	2.00E+01	1.88E-04	1.88E-05
PYRENE	3.63E-02	0.00E+00	2.90E-01	3.19E-03	1.77E-03	2.00E+00	2.00E+01	8.87E-04	8.87E-05

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.1620000 kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	0.0164000 kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	0.0231000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0013450 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	3.00E+00	0.00E+00	2.20E-03	6.60E-03	2.56E-02	2.00E+00	2.00E+01	1.28E-02	1.28E-03
Pesticides									
4,4'-DDT	3.21E-02	0.00E+00	1.60E-03	5.13E-05	2.71E-04	2.80E-03	2.80E-02	9.69E-02	9.69E-03
Herbicides									
2,4-D	4.50E-02	0.00E+00	1.00E+00	4.50E-02	4.93E-03	NV	NV	#VALUE!	#VALUE!
Pentachlorophenol	2.20E-01	0.00E+00	2.90E-03	6.38E-04	1.89E-03	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	1.40E+00	0.00E+00	9.75E-01	1.37E+00	1.50E-01	1.45E+00	2.00E+01	1.03E-01	7.49E-03
Copper	1.79E+01	2.50E-03	1.88E-01	3.35E+00	4.88E-01	4.70E+01	6.17E+01	1.04E-02	7.91E-03
Zinc	9.01E+01	2.05E-02	5.46E-01	4.92E+01	5.73E+00	1.45E+01	1.31E+02	3.95E-01	4.38E-02

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.1770000 kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	0.0144000 kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	0.0184000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0011810 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	5.48E-01	0.00E+00	2.20E-03	1.21E-03	3.75E-03	2.00E+00	2.00E+01	1.88E-03	1.88E-04
Pesticides									
4,4'-DDT	1.30E-02	0.00E+00	1.60E-03	2.07E-05	8.82E-05	2.80E-03	2.80E-02	3.15E-02	3.15E-03
Herbicides									
2,4-D	1.36E-02	0.00E+00	1.00E+00	1.36E-02	1.20E-03	NV	NV	#VALUE!	#VALUE!
Pentachlorophenol	3.00E-02	0.00E+00	2.90E-03	8.69E-05	2.07E-04	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	9.01E-01	0.00E+00	1.76E-01	1.58E-01	1.89E-02	1.45E+00	2.00E+01	1.30E-02	9.45E-04
Copper	1.42E+01	1.38E-03	3.72E-02	5.27E-01	1.37E-01	4.70E+01	6.17E+01	2.93E-03	2.23E-03
Zinc	6.61E+01	8.88E-03	1.10E-01	7.26E+00	1.03E+00	1.45E+01	1.31E+02	7.13E-02	7.89E-03

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	5.34E+00	kg	Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW
Food Ingestion Rate = (If)	1.65E+00	kg/day	
Water Ingestion Rate = (Iw)	5.70E-01	L/day	Cs = Contaminant concentration in sediment
Soil/Sediment Ingestion Rate = (Is)	1.55E-01	kg/day	Cw = Contaminant concentration in water
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Contaminated Area = (CA)	Assume equal to home range		Average % TOC is not in the Cv equation for inorganics
			H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Conservative Inputs

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Semi-Volatiles									
BENZO(A)ANTHRACENE	4.20E-02	0.00E+00	2.90E-01	3.69E-02	1.26E-02	3.39E-03	3.39E-02	3.73E+00	3.73E-01
BENZO(A)PYRENE	4.70E-02	0.00E+00	2.90E-01	4.13E-02	1.41E-02	3.39E-03	3.39E-02	4.17E+00	4.17E-01
DIBENZO(A,H)ANTHRACENE	1.40E-02	0.00E+00	2.90E-01	1.23E-02	4.21E-03	3.39E-03	3.39E-02	1.24E+00	1.24E-01
PYRENE	7.00E-02	0.00E+00	2.90E-01	6.15E-02	2.10E-02	2.54E-02	4.23E-02	8.28E-01	4.97E-01

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	6.86E+00	kg
Food Ingestion Rate = (If)	1.34E+00	kg/day
Water Ingestion Rate = (Iw)	5.66E-01	L/day
Soil/Sediment Ingestion Rate = (Is)	1.26E-01	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW

Raccoon
Average Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Semi-Volatiles									
BENZO(A)ANTHRACENE	2.11E-02	0.00E+00	2.90E-01	1.85E-02	4.00E-03	4.37E-03	4.37E-02	9.15E-01	9.15E-02
BENZO(A)PYRENE	2.25E-02	0.00E+00	2.90E-01	1.98E-02	4.27E-03	4.37E-03	4.37E-02	9.76E-01	9.76E-02
DIBENZO(A,H)ANTHRACENE	7.70E-03	0.00E+00	2.90E-01	6.76E-03	1.46E-03	4.37E-03	4.37E-02	3.34E-01	3.34E-02
PYRENE	3.63E-02	0.00E+00	2.90E-01	3.19E-02	6.88E-03	3.28E-02	5.46E-02	2.10E-01	1.26E-01

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	7.730E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	1.231E-01	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	1.210E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.280E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	3.00E+00	0.00E+00	2.57E-01	7.71E-01	1.72E+00	2.00E+00	2.00E+01	8.62E-01	8.62E-02
Pesticides									
4,4'-DDT	3.21E-02	0.00E+00	2.09E+00	6.70E-02	1.12E-01	2.80E-03	2.80E-02	4.00E+01	4.00E+00
Herbicides									
2,4-D	4.50E-02	0.00E+00	1.00E+00	4.50E-02	7.91E-02	NV	NV	#VALUE!	#VALUE!
Pentachlorophenol	2.20E-01	0.00E+00	1.00E+00	2.20E-01	3.87E-01	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	1.40E+00	0.00E+00	6.51E+00	9.11E+00	1.47E+01	1.45E+00	2.00E+01	1.02E+01	7.37E-01
Copper	1.79E+01	2.50E-03	2.45E-01	4.38E+00	9.94E+00	4.70E+01	6.17E+01	2.12E-01	1.61E-01
Zinc	9.01E+01	2.05E-02	2.06E+00	1.86E+02	3.11E+02	1.45E+01	1.31E+02	2.14E+01	2.37E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	8.100E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	9.760E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1.130E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.015E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	5.48E-01	0.00E+00	9.70E-02	5.31E-02	1.33E-01	2.00E+00	2.00E+01	6.63E-02	6.63E-03
Pesticides									
4,4'-DDT	1.30E-02	0.00E+00	2.09E+00	2.71E-02	3.43E-02	2.80E-03	2.80E-02	1.22E+01	1.22E+00
Herbicides									
2,4-D	1.36E-02	0.00E+00	1.00E+00	1.36E-02	1.81E-02	NV	NV	#VALUE!	#VALUE!
Pentachlorophenol	3.00E-02	0.00E+00	1.00E+00	3.00E-02	3.99E-02	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	9.01E-01	0.00E+00	1.23E+00	1.11E+00	1.45E+00	1.45E+00	2.00E+01	1.00E+00	7.26E-02
Copper	1.42E+01	1.38E-03	8.24E-02	1.17E+00	3.18E+00	4.70E+01	6.17E+01	6.77E-02	5.15E-02
Zinc	6.61E+01	8.88E-03	5.12E-01	3.39E+01	4.91E+01	1.45E+01	1.31E+02	3.39E+00	3.75E-01

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0152500 kg	
Food Ingestion Rate = (If)	0.0162000 kg/day	
Water Ingestion Rate = (Iw)	0.0043000 L/day	
Soil Ingestion Rate = (Is)	0.0021060 kg/day	
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)
H=HR/CA (Assume = to 1 for maximum exposure)

Short-Tailed Shrew
Conservative Inputs

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	3.00E+00	0.00E+00	2.57E-01	7.71E-01	1.23E+00	1.56E+00	1.56E+01	7.90E-01	7.90E-02
Pesticides									
4,4'-DDT	3.21E-02	0.00E+00	2.09E+00	6.70E-02	7.56E-02	1.46E+01	7.29E+01	5.19E-03	1.04E-03
Herbicides									
2,4-D	4.50E-02	0.00E+00	1.00E+00	4.50E-02	5.40E-02	1.82E+01	9.11E+01	2.96E-03	5.93E-04
Pentachlorophenol	2.20E-01	0.00E+00	1.00E+00	2.20E-01	2.64E-01	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	1.40E+00	0.00E+00	6.51E+00	9.11E+00	9.88E+00	1.58E+01	1.58E+02	6.26E-01	6.26E-02
Copper	1.79E+01	2.50E-03	2.45E-01	4.38E+00	7.12E+00	6.10E+02	7.88E+02	1.17E-02	9.04E-03
Zinc	9.01E+01	2.05E-02	2.06E+00	1.86E+02	2.10E+02	2.92E+03	5.83E+03	7.19E-02	3.60E-02

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0168700 kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	0.0103000 kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	0.0038000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0013390 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	5.48E-01	0.00E+00	9.70E-02	5.31E-02	7.59E-02	1.78E+00	1.78E+01	4.27E-02	4.27E-03
Pesticides									
4,4'-DDT	1.30E-02	0.00E+00	2.09E+00	2.71E-02	1.76E-02	1.66E+01	8.30E+01	1.06E-03	2.12E-04
Herbicides									
2,4-D	1.36E-02	0.00E+00	1.00E+00	1.36E-02	9.40E-03	2.07E+01	1.04E+02	4.53E-04	9.06E-05
Pentachlorophenol	3.00E-02	0.00E+00	1.00E+00	3.00E-02	2.07E-02	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	9.01E-01	0.00E+00	1.23E+00	1.11E+00	7.50E-01	1.80E+01	1.80E+02	4.18E-02	4.18E-03
Copper	1.42E+01	1.38E-03	8.24E-02	1.17E+00	1.84E+00	6.94E+02	8.97E+02	2.65E-03	2.05E-03
Zinc	6.61E+01	8.88E-03	5.12E-01	3.39E+01	2.59E+01	3.32E+03	6.64E+03	7.81E-03	3.91E-03

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0329000 kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	0.0128000 kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	0.0077000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0003070 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	3.00E+00	0.00E+00	2.20E-03	6.60E-03	3.06E-02	7.67E-01	7.67E+00	3.98E-02	3.98E-03
Pesticides									
4,4'-DDT	3.21E-02	0.00E+00	1.60E-03	5.13E-05	3.19E-04	7.16E+00	3.58E+01	4.46E-05	8.91E-06
Herbicides									
2,4-D	4.50E-02	0.00E+00	1.00E+00	4.50E-02	1.79E-02	8.95E+00	4.48E+01	2.00E-03	4.01E-04
Pentachlorophenol	2.20E-01	0.00E+00	2.90E-03	6.38E-04	2.30E-03	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	1.40E+00	0.00E+00	9.75E-01	1.37E+00	5.44E-01	7.75E+00	7.75E+01	7.02E-02	7.02E-03
Copper	1.79E+01	2.50E-03	1.88E-01	3.35E+00	1.47E+00	2.99E+02	3.87E+02	4.91E-03	3.80E-03
Zinc	9.01E+01	2.05E-02	5.46E-01	4.92E+01	2.00E+01	1.43E+03	2.86E+03	1.39E-02	6.97E-03

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0366300 kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	0.0119000 kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	0.0064000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0002860 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 4 - MCCOMISH GORGE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Semi-Volatiles									
Benzo(a)pyrene	5.48E-01	0.00E+00	2.20E-03	1.21E-03	4.67E-03	8.19E-01	8.19E+00	5.70E-03	5.70E-04
Pesticides									
4,4'-DDT	1.30E-02	0.00E+00	1.60E-03	2.07E-05	1.08E-04	7.64E+00	3.82E+01	1.41E-05	2.82E-06
Herbicides									
2,4-D	1.36E-02	0.00E+00	1.00E+00	1.36E-02	4.53E-03	9.56E+00	4.78E+01	4.74E-04	9.48E-05
Pentachlorophenol	3.00E-02	0.00E+00	2.90E-03	8.69E-05	2.62E-04	NV	NV	#VALUE!	#VALUE!
Inorganics									
Cadmium	9.01E-01	0.00E+00	1.76E-01	1.58E-01	5.85E-02	8.27E+00	8.27E+01	7.07E-03	7.07E-04
Copper	1.42E+01	1.38E-03	3.72E-02	5.27E-01	2.82E-01	3.20E+02	4.13E+02	8.82E-04	6.82E-04
Zinc	6.61E+01	8.88E-03	1.10E-01	7.26E+00	2.88E+00	1.53E+03	3.06E+03	1.88E-03	9.41E-04

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

SWMU 5 – Old Burn Pit

Body Weight = BW	0.136	kg
Food Ingestion Rate = If	0.07580	kg/day
Water Ingestion Rate = Iw	0.01870	L/day
Soil Ingestion Rate - Is	0.00152	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Conservative Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Dioxins									
1,2,3,4,6,7,8,9-OCDD	6.11E-03	0.00E+00	2.50E-02	9.89E-04	6.19E-04	1.40E-01	1.40E+00	4.42E-03	4.42E-04
1,2,3,4,6,7,8,9-OCDF	2.23E-04	0.00E+00	2.50E-02	3.61E-05	2.26E-05	1.40E-01	1.40E+00	1.61E-04	1.61E-05
1,2,3,4,6,7,8-HPCDD	2.03E-04	0.00E+00	2.50E-02	3.28E-05	2.06E-05	1.40E-02	1.40E-01	1.47E-03	1.47E-04
1,2,3,4,6,7,8-HPCDF	8.61E-05	0.00E+00	2.50E-02	1.39E-05	8.73E-06	1.40E-03	1.40E-02	6.23E-03	6.23E-04
1,2,3,4,7,8-HXCDD	2.70E-06	0.00E+00	2.50E-02	4.37E-07	2.74E-07	2.80E-04	2.80E-03	9.77E-04	9.77E-05
1,2,3,4,7,8-HXCDF	2.10E-05	0.00E+00	2.50E-02	3.40E-06	2.13E-06	1.40E-04	1.40E-03	1.52E-02	1.52E-03
1,2,3,6,7,8-HXCDD	7.20E-06	0.00E+00	2.50E-02	1.17E-06	7.30E-07	1.40E-03	1.40E-02	5.21E-04	5.21E-05
1,2,3,6,7,8-HXCDF	8.30E-06	0.00E+00	2.50E-02	1.34E-06	8.41E-07	1.40E-04	1.40E-03	6.01E-03	6.01E-04
1,2,3,7,8,9-HXCDD	7.70E-06	0.00E+00	2.50E-02	1.25E-06	7.80E-07	1.40E-04	1.40E-03	5.57E-03	5.57E-04
1,2,3,7,8-PECDD	2.20E-06	0.00E+00	2.50E-02	3.56E-07	2.23E-07	1.40E-05	1.40E-04	1.59E-02	1.59E-03
1,2,3,7,8-PECDF	5.90E-06	0.00E+00	2.50E-02	9.55E-07	5.98E-07	1.40E-04	1.40E-03	4.27E-03	4.27E-04
2,3,4,6,7,8-HXCDF	1.07E-05	0.00E+00	2.50E-02	1.73E-06	1.08E-06	1.40E-04	1.40E-03	7.75E-03	7.75E-04
2,3,4,7,8-PECDF	9.30E-06	0.00E+00	2.50E-02	1.50E-06	9.42E-07	1.40E-05	1.40E-04	6.73E-02	6.73E-03
2,3,7,8-TCDD	3.70E-06	0.00E+00	2.50E-02	5.99E-07	3.75E-07	1.40E-05	1.40E-04	2.68E-02	2.68E-03
2,3,7,8-TCDF	7.00E-06	0.00E+00	5.90E-02	2.67E-06	1.57E-06	1.40E-05	1.40E-04	1.12E-01	1.12E-02
TOTAL HPCDD	4.22E-04	0.00E+00	2.50E-02	6.83E-05	4.28E-05	1.40E-02	1.40E-01	3.05E-03	3.05E-04
TOTAL HPCDF	1.07E-04	0.00E+00	2.50E-02	1.73E-05	1.08E-05	1.40E-03	1.40E-02	7.75E-03	7.75E-04
Semi-Volatiles									
DIBENZO(A,H)ANTHRACENE	1.60E-02	0.00E+00	2.90E-01	3.00E-02	1.69E-02	2.00E+00	2.00E+01	8.46E-03	8.46E-04
PCBs									
AROCLOR-1260	1.70E-01	0.00E+00	1.85E+00	2.04E+00	1.14E+00	1.80E-01	1.80E+00	6.31E+00	6.31E-01
Inorganics									
CADMIUM	2.50E+00	0.00E+00	1.00E+00	8.90E-02	7.75E-02	1.45E+00	2.00E+01	5.34E-02	3.87E-03
COPPER	3.71E+01	2.70E-03	1.00E+00	1.32E+00	1.15E+00	4.70E+01	6.17E+01	2.45E-02	1.86E-02
LEAD	1.30E+02	0.00E+00	1.00E+00	4.63E+00	4.03E+00	1.13E+00	1.13E+01	3.57E+00	3.57E-01
ZINC	2.43E+02	1.99E-02	1.00E+00	8.65E+00	7.53E+00	1.45E+01	1.31E+02	5.20E-01	5.75E-02

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.152	kg
Food Ingestion Rate = (If)	0.069	kg/day
Water Ingestion Rate = (Iw)	0.017	L/day
Sediment Ingestion Rate = (Is)	0.001378	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Average Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Dioxins									
1,2,3,4,6,7,8,9-OCDD	2.77E-03	0.00E+00	2.50E-02	4.49E-04	2.28E-04	1.40E-01	1.40E+00	1.63E-03	1.63E-04
1,2,3,4,6,7,8,9-OCDF	8.52E-05	0.00E+00	2.50E-02	1.38E-05	7.02E-06	1.40E-01	1.40E+00	5.01E-05	5.01E-06
1,2,3,4,6,7,8-HPCDD	1.01E-04	0.00E+00	2.50E-02	1.64E-05	8.35E-06	1.40E-02	1.40E-01	5.96E-04	5.96E-05
1,2,3,4,6,7,8-HPCDF	4.06E-05	0.00E+00	2.50E-02	6.57E-06	3.34E-06	1.40E-03	1.40E-02	2.39E-03	2.39E-04
1,2,3,4,7,8-HXCDD	1.54E-06	0.00E+00	2.50E-02	2.49E-07	1.27E-07	2.80E-04	2.80E-03	4.53E-04	4.53E-05
1,2,3,4,7,8-HXCDF	1.08E-05	0.00E+00	2.50E-02	1.75E-06	8.92E-07	1.40E-04	1.40E-03	6.37E-03	6.37E-04
1,2,3,6,7,8-HXCDD	3.93E-06	0.00E+00	2.50E-02	6.36E-07	3.24E-07	1.40E-03	1.40E-02	2.31E-04	2.31E-05
1,2,3,6,7,8-HXCDF	4.45E-06	0.00E+00	2.50E-02	7.20E-07	3.67E-07	1.40E-04	1.40E-03	2.62E-03	2.62E-04
1,2,3,7,8,9-HXCDD	4.38E-06	0.00E+00	2.50E-02	7.08E-07	3.61E-07	1.40E-04	1.40E-03	2.58E-03	2.58E-04
1,2,3,7,8-PECDD	1.18E-06	0.00E+00	2.50E-02	1.91E-07	9.71E-08	1.40E-05	1.40E-04	6.94E-03	6.94E-04
1,2,3,7,8-PECDF	2.83E-06	0.00E+00	2.50E-02	4.57E-07	2.33E-07	1.40E-04	1.40E-03	1.66E-03	1.66E-04
2,3,4,6,7,8-HXCDF	5.48E-06	0.00E+00	2.50E-02	8.86E-07	4.51E-07	1.40E-04	1.40E-03	3.22E-03	3.22E-04
2,3,4,7,8-PECDF	4.63E-06	0.00E+00	2.50E-02	7.48E-07	3.81E-07	1.40E-05	1.40E-04	2.72E-02	2.72E-03
2,3,7,8-TCDD	1.35E-06	0.00E+00	2.50E-02	2.18E-07	1.11E-07	1.40E-05	1.40E-04	7.92E-03	7.92E-04
2,3,7,8-TCDF	3.95E-06	0.00E+00	5.90E-02	1.51E-06	7.20E-07	1.40E-05	1.40E-04	5.14E-02	5.14E-03
TOTAL HPCDD	2.16E-04	0.00E+00	2.50E-02	3.50E-05	1.78E-05	1.40E-02	1.40E-01	1.27E-03	1.27E-04
TOTAL HPCDF	6.84E-05	0.00E+00	2.50E-02	1.11E-05	5.64E-06	1.40E-03	1.40E-02	4.03E-03	4.03E-04
Semi-Volatiles									
DIBENZO(A,H)ANTHRACENE	8.25E-03	0.00E+00	2.90E-01	1.55E-02	7.09E-03	2.00E+00	2.00E+01	3.55E-03	3.55E-04
PCBs									
AROCLOR-1260	6.33E-02	0.00E+00	1.85E+00	7.57E-01	3.44E-01	1.80E-01	1.80E+00	1.91E+00	1.91E-01
Inorganics									
CADMIUM	1.10E+00	0.00E+00	1.00E+00	3.92E-02	2.77E-02	1.45E+00	2.00E+01	1.91E-02	1.39E-03
COPPER	2.15E+01	1.78E-03	1.00E+00	7.65E-01	5.41E-01	4.70E+01	6.17E+01	1.15E-02	8.77E-03
LEAD	4.86E+01	0.00E+00	1.00E+00	1.73E+00	1.22E+00	1.13E+00	1.13E+01	1.08E+00	1.08E-01
ZINC	1.16E+02	1.24E-02	1.00E+00	4.11E+00	2.91E+00	1.45E+01	1.31E+02	2.01E-01	2.22E-02

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.62E-01	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	1.64E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	2.31E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.35E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	5.05E-03	0.00E+00	6.20E-05	3.13E-07	4.20E-05	1.40E-01	1.40E+00	3.00E-04	3.00E-05
1,2,3,4,6,7,8,9-OCDF	3.13E-04	0.00E+00	7.90E-05	2.47E-08	2.60E-06	1.40E-01	1.40E+00	1.86E-05	1.86E-06
1,2,3,4,6,7,8-HPCDD	3.59E-04	0.00E+00	2.40E-04	8.62E-08	2.99E-06	1.40E-02	1.40E-01	2.14E-04	2.14E-05
1,2,3,4,6,7,8-HPCDF	5.41E-04	0.00E+00	2.40E-04	1.30E-07	4.50E-06	1.40E-03	1.40E-02	3.22E-03	3.22E-04
1,2,3,4,7,8,9-HPCDF	5.75E-05	0.00E+00	2.40E-04	1.38E-08	4.79E-07	1.40E-03	1.40E-02	3.42E-04	3.42E-05
1,2,3,4,7,8-HXCDD	2.17E-05	0.00E+00	2.40E-04	5.21E-09	1.81E-07	2.80E-04	2.80E-03	6.45E-04	6.45E-05
1,2,3,4,7,8-HXCDF	3.61E-04	0.00E+00	2.40E-04	8.66E-08	3.01E-06	1.40E-04	1.40E-03	2.15E-02	2.15E-03
1,2,3,6,7,8-HXCDD	5.30E-05	0.00E+00	2.40E-04	1.27E-08	4.41E-07	1.40E-03	1.40E-02	3.15E-04	3.15E-05
1,2,3,6,7,8-HXCDF	1.28E-04	0.00E+00	2.40E-04	3.07E-08	1.07E-06	1.40E-04	1.40E-03	7.61E-03	7.61E-04
1,2,3,7,8,9-HXCDD	6.91E-05	0.00E+00	2.40E-04	1.66E-08	5.75E-07	1.40E-04	1.40E-03	4.11E-03	4.11E-04
1,2,3,7,8-PECDD	2.21E-05	0.00E+00	1.30E-03	2.87E-08	1.86E-07	1.40E-05	1.40E-04	1.33E-02	1.33E-03
1,2,3,7,8-PECDF	1.05E-04	0.00E+00	8.90E-04	9.35E-08	8.81E-07	1.40E-04	1.40E-03	6.29E-03	6.29E-04
2,3,4,6,7,8-HXCDF	1.46E-04	0.00E+00	2.40E-04	3.50E-08	1.22E-06	1.40E-04	1.40E-03	8.68E-03	8.68E-04
2,3,4,7,8-PECDF	1.43E-04	0.00E+00	7.50E-04	1.07E-07	1.20E-06	1.40E-05	1.40E-04	8.56E-02	8.56E-03
2,3,7,8-TCDD	6.10E-06	0.00E+00	8.80E-04	5.37E-09	5.12E-08	1.40E-05	1.40E-04	3.66E-03	3.66E-04
2,3,7,8-TCDF	3.25E-04	0.00E+00	3.20E-03	1.04E-06	2.80E-06	1.40E-05	1.40E-04	2.00E-01	2.00E-02
TOTAL HPCDD	8.03E-04	0.00E+00	2.40E-04	1.93E-07	6.69E-06	1.40E-02	1.40E-01	4.78E-04	4.78E-05
TOTAL HPCDF	7.92E-04	0.00E+00	2.40E-04	1.90E-07	6.59E-06	1.40E-03	1.40E-02	4.71E-03	4.71E-04
TOTAL HXCDD	8.90E-04	0.00E+00	2.40E-04	2.14E-07	7.41E-06	1.40E-04	1.40E-03	5.29E-02	5.29E-03
TOTAL HXCDF	2.54E-05	0.00E+00	2.40E-04	6.10E-09	2.11E-07	1.40E-04	1.40E-03	1.51E-03	1.51E-04
TOTAL TCDD	4.04E-04	0.00E+00	8.80E-04	3.56E-07	3.39E-06	1.40E-05	1.40E-04	2.42E-01	2.42E-02
TOTAL TCDF	5.24E-05	0.00E+00	3.20E-03	1.68E-07	4.52E-07	1.40E-05	1.40E-04	3.23E-02	3.23E-03
Inorganics									
Cadmium	3.11E+01	0.00E+00	9.75E-01	3.03E+01	3.33E+00	1.45E+00	2.00E+01	2.30E+00	1.66E-01
Chromium	1.12E+02	0.00E+00	2.52E-02	2.82E+00	1.22E+00	1.00E+00	5.00E+00	1.22E+00	2.43E-01
Copper	1.52E+03	2.70E-03	1.88E-01	2.85E+02	4.15E+01	4.70E+01	6.17E+01	8.83E-01	6.72E-01
Lead	1.69E+04	0.00E+00	1.40E-01	2.37E+03	3.81E+02	1.13E+00	1.13E+01	3.37E+02	3.37E+01
Mercury	4.30E-01	0.00E+00	1.50E+00	6.45E-01	6.89E-02	6.40E-03	6.40E-02	1.08E+01	1.08E+00
Silver	7.50E+00	0.00E+00	1.10E-02	8.26E-02	7.06E-02	NV	NV	#VALUE!	#VALUE!
Zinc	5.11E+03	1.99E-02	5.46E-01	2.79E+03	3.25E+02	1.45E+01	1.31E+02	2.24E+01	2.48E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.77E-01	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	1.44E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1.84E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.18E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	1.50E-03	0.00E+00	6.20E-05	9.27E-08	9.98E-06	1.40E-01	1.40E+00	7.13E-05	7.13E-06
1,2,3,4,6,7,8,9-OCDF	8.83E-05	0.00E+00	7.90E-05	6.97E-09	5.90E-07	1.40E-01	1.40E+00	4.21E-06	4.21E-07
1,2,3,4,6,7,8-HPCDD	1.07E-04	0.00E+00	2.40E-04	2.58E-08	7.18E-07	1.40E-02	1.40E-01	5.13E-05	5.13E-06
1,2,3,4,6,7,8-HPCDF	1.14E-04	0.00E+00	2.40E-04	2.74E-08	7.63E-07	1.40E-03	1.40E-02	5.45E-04	5.45E-05
1,2,3,4,7,8,9-HPCDF	1.08E-05	0.00E+00	2.40E-04	2.60E-09	7.25E-08	1.40E-03	1.40E-02	5.18E-05	5.18E-06
1,2,3,4,7,8-HXCDD	4.48E-06	0.00E+00	2.40E-04	1.07E-09	2.99E-08	2.80E-04	2.80E-03	1.07E-04	1.07E-05
1,2,3,4,7,8-HXCDF	6.52E-05	0.00E+00	2.40E-04	1.57E-08	4.36E-07	1.40E-04	1.40E-03	3.12E-03	3.12E-04
1,2,3,6,7,8-HXCDD	1.19E-05	0.00E+00	2.40E-04	2.85E-09	7.96E-08	1.40E-03	1.40E-02	5.69E-05	5.69E-06
1,2,3,6,7,8-HXCDF	2.36E-05	0.00E+00	2.40E-04	5.66E-09	1.58E-07	1.40E-04	1.40E-03	1.13E-03	1.13E-04
1,2,3,7,8,9-HXCDD	1.47E-05	0.00E+00	2.40E-04	3.53E-09	9.85E-08	1.40E-04	1.40E-03	7.04E-04	7.04E-05
1,2,3,7,8-PECDD	4.64E-06	0.00E+00	1.30E-03	6.04E-09	3.15E-08	1.40E-05	1.40E-04	2.25E-03	2.25E-04
1,2,3,7,8-PECDF	1.74E-05	0.00E+00	8.90E-04	1.55E-08	1.17E-07	1.40E-04	1.40E-03	8.36E-04	8.36E-05
2,3,4,6,7,8-HXCDF	2.75E-05	0.00E+00	2.40E-04	6.59E-09	1.84E-07	1.40E-04	1.40E-03	1.31E-03	1.31E-04
2,3,4,7,8-PECDF	2.75E-05	0.00E+00	7.50E-04	2.06E-08	1.85E-07	1.40E-05	1.40E-04	1.32E-02	1.32E-03
2,3,7,8-TCDD	1.36E-06	0.00E+00	8.80E-04	1.20E-09	9.16E-09	1.40E-05	1.40E-04	6.54E-04	6.54E-05
2,3,7,8-TCDF	5.41E-05	0.00E+00	3.20E-03	1.73E-07	3.75E-07	1.40E-05	1.40E-04	2.68E-02	2.68E-03
TOTAL HPCDD	2.27E-04	0.00E+00	2.40E-04	5.44E-08	1.52E-06	1.40E-02	1.40E-01	1.08E-04	1.08E-05
TOTAL HPCDF	1.76E-04	0.00E+00	2.40E-04	4.22E-08	1.18E-06	1.40E-03	1.40E-02	8.41E-04	8.41E-05
TOTAL HXCDD	1.71E-04	0.00E+00	2.40E-04	4.09E-08	1.14E-06	1.40E-04	1.40E-03	8.15E-03	8.15E-04
TOTAL HXCDF	1.38E-04	0.00E+00	2.40E-04	3.30E-08	9.20E-07	1.40E-04	1.40E-03	6.57E-03	6.57E-04
TOTAL TCDD	7.57E-05	0.00E+00	8.80E-04	6.67E-08	5.11E-07	1.40E-05	1.40E-04	3.65E-02	3.65E-03
TOTAL TCDF	2.16E-04	0.00E+00	3.20E-03	6.92E-07	1.50E-06	1.40E-05	1.40E-04	1.07E-01	1.07E-02
Inorganics									
Cadmium	6.25E+00	0.00E+00	1.76E-01	1.10E+00	1.31E-01	1.45E+00	2.00E+01	9.05E-02	6.56E-03
Chromium	3.40E+01	0.00E+00	1.23E-02	4.18E-01	2.61E-01	1.00E+00	5.00E+00	2.61E-01	5.22E-02
Copper	2.69E+02	1.78E-03	3.72E-02	1.00E+01	2.61E+00	4.70E+01	6.17E+01	5.56E-02	4.23E-02
Lead	2.28E+03	0.00E+00	1.17E-02	2.66E+01	1.73E+01	1.13E+00	1.13E+01	1.53E+01	1.53E+00
Mercury	1.70E-01	0.00E+00	1.96E-01	3.33E-02	3.84E-03	6.40E-03	6.40E-02	6.00E-01	6.00E-02
Silver	1.78E+00	0.00E+00	4.20E-03	7.49E-03	1.25E-02	NV	NV	#VALUE!	#VALUE!
Zinc	9.57E+02	1.24E-02	1.10E-01	1.05E+02	1.49E+01	1.45E+01	1.31E+02	1.03E+00	1.14E-01

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	5.34E+00	kg	Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW
Food Ingestion Rate = (If)	1.65E+00	kg/day	
Water Ingestion Rate = (Iw)	5.70E-01	L/day	Cs = Contaminant concentration in sediment
Soil/Sediment Ingestion Rate = (Is)	1.55E-01	kg/day	Cw = Contaminant concentration in water
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Contaminated Area = (CA)	Assume equal to home range		Average % TOC is not in the Cv equation for inorganics
			H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Conservative Inputs

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Dioxins									
1,2,3,4,6,7,8,9-OCDD	6.11E-03	0.00E+00	2.50E-02	9.89E-04	4.83E-04	3.95E-04	3.95E-03	1.22E+00	1.22E-01
1,2,3,4,6,7,8,9-OCDF	2.23E-04	0.00E+00	2.50E-02	3.61E-05	1.76E-05	3.95E-04	3.95E-03	4.47E-02	4.47E-03
1,2,3,4,6,7,8-HPCDD	2.03E-04	0.00E+00	2.50E-02	3.28E-05	1.61E-05	6.32E-05	6.32E-04	2.54E-01	2.54E-02
1,2,3,4,6,7,8-HPCDF	8.61E-05	0.00E+00	2.50E-02	1.39E-05	6.81E-06	6.32E-05	6.32E-04	1.08E-01	1.08E-02
1,2,3,4,7,8,9-HPCDF	6.50E-06	0.00E+00	2.50E-02	1.05E-06	5.14E-07	6.32E-05	6.32E-04	8.13E-03	8.13E-04
1,2,3,4,7,8-HXCDD	2.70E-06	0.00E+00	2.50E-02	4.37E-07	2.14E-07	6.32E-06	6.32E-05	3.38E-02	3.38E-03
1,2,3,6,7,8-HXCDD	7.20E-06	0.00E+00	2.50E-02	1.17E-06	5.70E-07	6.32E-06	6.32E-05	9.01E-02	9.01E-03
1,2,3,6,7,8-HXCDF	8.30E-06	0.00E+00	2.50E-02	1.34E-06	6.57E-07	6.32E-06	6.32E-05	1.04E-01	1.04E-02
1,2,3,7,8,9-HXCDD	7.70E-06	0.00E+00	2.50E-02	1.25E-06	6.09E-07	6.32E-06	6.32E-05	9.64E-02	9.64E-03
1,2,3,7,8,9-HXCDF	1.40E-06	0.00E+00	2.50E-02	2.27E-07	1.11E-07	6.32E-06	6.32E-05	1.75E-02	1.75E-03
1,2,3,7,8-PECDD	2.20E-06	0.00E+00	2.50E-02	3.56E-07	1.74E-07	3.95E-08	3.95E-07	4.41E+00	4.41E-01
2,3,4,6,7,8-HXCDF	1.07E-05	0.00E+00	2.50E-02	1.73E-06	8.46E-07	6.32E-06	6.32E-05	1.34E-01	1.34E-02
2,3,4,7,8-PECDF	9.30E-06	0.00E+00	2.50E-02	1.50E-06	7.36E-07	6.32E-07	6.32E-06	1.16E+00	1.16E-01
2,3,7,8-TCDD	3.70E-06	0.00E+00	2.50E-02	5.99E-07	2.93E-07	3.95E-08	3.95E-07	7.41E+00	7.41E-01
2,3,7,8-TCDF	7.00E-06	0.00E+00	5.90E-02	2.67E-06	1.03E-06	3.95E-07	3.95E-06	2.61E+00	2.61E-01
TOTAL HPCDD	4.22E-04	0.00E+00	2.50E-02	6.83E-05	3.34E-05	6.32E-05	6.32E-04	5.28E-01	5.28E-02
TOTAL HPCDF	1.07E-04	0.00E+00	2.50E-02	1.73E-05	8.46E-06	6.32E-05	6.32E-04	1.34E-01	1.34E-02
Semi-Volatiles									
DIBENZO(A,H)ANTHRACENE	1.60E-02	0.00E+00	2.90E-01	3.00E-02	9.75E-03	3.39E-03	3.39E-02	2.88E+00	2.88E-01
PCBs									
AROCLOR-1260	1.70E-01	0.00E+00	1.85E+00	2.04E+00	6.34E-01	1.07E-04	1.07E-03	5.90E+03	5.90E+02
Inorganics									
CADMIUM	2.50E+00	0.00E+00	1.00E+00	2.50E+00	8.46E-01	3.42E-02	3.42E-01	2.47E+01	2.47E+00
LEAD	1.30E+02	0.00E+00	1.00E+00	1.30E+02	4.40E+01	3.16E-01	3.16E+00	1.39E+02	1.39E+01
ZINC	2.43E+02	1.99E-02	1.00E+00	2.43E+02	8.22E+01	6.32E+00	1.26E+01	1.30E+01	6.50E+00

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW) 6.86E+00 kg
Food Ingestion Rate = (If) 1.34E+00 kg/day
Water Ingestion Rate = (Iw) 5.66E-01 L/day
Soil/Sediment Ingestion Rate = (Is) 1.26E-01 kg/day
Home Range = (HR) Assume 100% on site
Contaminated Area = (CA) Assume equal to home range

Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Average Inputs

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Dioxins									
1,2,3,4,6,7,8,9-OCDD	2.77E-03	0.00E+00	2.50E-02	4.49E-04	1.38E-04	5.10E-04	5.10E-03	2.71E-01	2.71E-02
1,2,3,4,6,7,8,9-OCDF	8.52E-05	0.00E+00	2.50E-02	1.38E-05	4.25E-06	5.10E-04	5.10E-03	8.33E-03	8.33E-04
1,2,3,4,6,7,8-HPCDD	1.01E-04	0.00E+00	2.50E-02	1.64E-05	5.06E-06	8.16E-05	8.16E-04	6.20E-02	6.20E-03
1,2,3,4,6,7,8-HPCDF	4.06E-05	0.00E+00	2.50E-02	6.57E-06	2.02E-06	8.16E-05	8.16E-04	2.48E-02	2.48E-03
1,2,3,4,7,8,9-HPCDF	2.87E-06	0.00E+00	2.50E-02	4.64E-07	1.43E-07	8.16E-05	8.16E-04	1.75E-03	1.75E-04
1,2,3,4,7,8-HXCDD	1.54E-06	0.00E+00	2.50E-02	2.49E-07	7.67E-08	8.16E-06	8.16E-05	9.40E-03	9.40E-04
1,2,3,6,7,8-HXCDD	3.93E-06	0.00E+00	2.50E-02	6.36E-07	1.96E-07	8.16E-06	8.16E-05	2.40E-02	2.40E-03
1,2,3,6,7,8-HXCDF	4.45E-06	0.00E+00	2.50E-02	7.20E-07	2.22E-07	8.16E-06	8.16E-05	2.72E-02	2.72E-03
1,2,3,7,8,9-HXCDD	4.38E-06	0.00E+00	2.50E-02	7.08E-07	2.18E-07	8.16E-06	8.16E-05	2.68E-02	2.68E-03
1,2,3,7,8,9-HXCDF	7.00E-07	0.00E+00	2.50E-02	1.13E-07	3.49E-08	8.16E-06	8.16E-05	4.28E-03	4.28E-04
1,2,3,7,8-PECDD	1.18E-06	0.00E+00	2.50E-02	1.91E-07	5.88E-08	5.10E-08	5.10E-07	1.15E+00	1.15E-01
2,3,4,6,7,8-HXCDF	5.48E-06	0.00E+00	2.50E-02	8.86E-07	2.73E-07	8.16E-06	8.16E-05	3.35E-02	3.35E-03
2,3,4,7,8-PECDF	4.63E-06	0.00E+00	2.50E-02	7.48E-07	2.31E-07	8.16E-06	8.16E-05	2.83E-02	2.83E-03
2,3,7,8-TCDD	1.35E-06	0.00E+00	2.50E-02	2.18E-07	6.71E-08	5.10E-08	5.10E-07	1.32E+00	1.32E-01
2,3,7,8-TCDF	3.95E-06	0.00E+00	5.90E-02	1.51E-06	3.67E-07	5.10E-07	5.10E-06	7.19E-01	7.19E-02
TOTAL HPCDD	2.16E-04	0.00E+00	2.50E-02	3.50E-05	1.08E-05	8.16E-05	8.16E-04	1.32E-01	1.32E-02
TOTAL HPCDF	6.84E-05	0.00E+00	2.50E-02	1.11E-05	3.41E-06	8.16E-05	8.16E-04	4.18E-02	4.18E-03
Semi-Volatiles									
DIBENZO(A,H)ANTHRACENE	8.25E-03	0.00E+00	2.90E-01	1.55E-02	3.17E-03	4.37E-03	4.37E-02	7.26E-01	7.26E-02
PCBs									
AROCLOR-1260	6.33E-02	0.00E+00	1.85E+00	7.57E-01	1.49E-01	1.39E-04	1.39E-03	1.07E+03	1.07E+02
Inorganics									
CADMIUM	1.10E+00	0.00E+00	1.00E+00	1.10E+00	2.35E-01	4.41E-02	4.41E-01	5.32E+00	5.32E-01
LEAD	4.86E+01	0.00E+00	1.00E+00	4.86E+01	1.04E+01	4.08E-01	4.08E+00	2.54E+01	2.54E+00
ZINC	1.16E+02	1.24E-02	1.00E+00	1.16E+02	2.46E+01	8.16E+00	1.63E+01	3.02E+00	1.51E+00

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	7.730E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	1.231E-01	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	1.210E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.280E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure).	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	5.05E-03	0.00E+00	3.56E+00	1.80E-02	2.94E-02	1.40E-01	1.40E+00	2.10E-01	2.10E-02
1,2,3,4,6,7,8,9-OCDF	3.13E-04	0.00E+00	3.56E+00	1.11E-03	1.82E-03	1.40E-01	1.40E+00	1.30E-02	1.30E-03
1,2,3,4,6,7,8-HPCDD	3.59E-04	0.00E+00	3.56E+00	1.28E-03	2.09E-03	1.40E-02	1.40E-01	1.49E-01	1.49E-02
1,2,3,4,6,7,8-HPCDF	5.41E-04	0.00E+00	3.56E+00	1.92E-03	3.15E-03	1.40E-03	1.40E-02	2.25E+00	2.25E-01
1,2,3,4,7,8,9-HPCDF	5.75E-05	0.00E+00	3.56E+00	2.05E-04	3.35E-04	1.40E-03	1.40E-02	2.39E-01	2.39E-02
1,2,3,4,7,8-HXCDD	2.17E-05	0.00E+00	3.56E+00	7.72E-05	1.27E-04	2.80E-04	2.80E-03	4.52E-01	4.52E-02
1,2,3,4,7,8-HXCDF	3.61E-04	0.00E+00	3.56E+00	1.28E-03	2.10E-03	1.40E-04	1.40E-03	1.50E+01	1.50E+00
1,2,3,6,7,8-HXCDD	5.30E-05	0.00E+00	3.56E+00	1.89E-04	3.09E-04	1.40E-03	1.40E-02	2.21E-01	2.21E-02
1,2,3,6,7,8-HXCDF	1.28E-04	0.00E+00	3.56E+00	4.55E-04	7.46E-04	1.40E-04	1.40E-03	5.33E+00	5.33E-01
1,2,3,7,8,9-HXCDD	6.91E-05	0.00E+00	3.56E+00	2.46E-04	4.03E-04	1.40E-04	1.40E-03	2.88E+00	2.88E-01
1,2,3,7,8-PECDD	2.21E-05	0.00E+00	3.56E+00	7.86E-05	1.29E-04	1.40E-05	1.40E-04	9.20E+00	9.20E-01
1,2,3,7,8-PECDF	1.05E-04	0.00E+00	3.56E+00	3.73E-04	6.12E-04	1.40E-04	1.40E-03	4.37E+00	4.37E-01
2,3,4,6,7,8-HXCDF	1.46E-04	0.00E+00	3.56E+00	5.19E-04	8.51E-04	1.40E-04	1.40E-03	6.08E+00	6.08E-01
2,3,4,7,8-PECDF	1.43E-04	0.00E+00	3.56E+00	5.09E-04	8.34E-04	1.40E-05	1.40E-04	5.95E+01	5.95E+00
2,3,7,8-TCDD	6.10E-06	0.00E+00	3.56E+00	2.17E-05	3.56E-05	1.40E-05	1.40E-04	2.54E+00	2.54E-01
2,3,7,8-TCDF	3.25E-04	0.00E+00	3.56E+00	1.16E-03	1.89E-03	1.40E-05	1.40E-04	1.35E+02	1.35E+01
TOTAL HPCDD	8.03E-04	0.00E+00	3.56E+00	2.86E-03	4.68E-03	1.40E-02	1.40E-01	3.34E-01	3.34E-02
TOTAL HPCDF	7.92E-04	0.00E+00	3.56E+00	2.82E-03	4.62E-03	1.40E-03	1.40E-02	3.30E+00	3.30E-01
TOTAL HXCDD	8.90E-04	0.00E+00	3.56E+00	3.17E-03	5.19E-03	1.40E-04	1.40E-03	3.71E+01	3.71E+00
TOTAL HXCDF	2.54E-05	0.00E+00	3.56E+00	9.03E-05	1.48E-04	1.40E-04	1.40E-03	1.06E+00	1.06E-01
TOTAL TCDD	4.04E-04	0.00E+00	3.56E+00	1.44E-03	2.36E-03	1.40E-05	1.40E-04	1.68E+02	1.68E+01
TOTAL TCDF	5.24E-05	0.00E+00	3.56E+00	1.86E-04	3.05E-04	1.40E-05	1.40E-04	2.18E+01	2.18E+00
Inorganics									
Cadmium	3.11E+01	0.00E+00	6.51E+00	2.02E+02	3.28E+02	1.45E+00	2.00E+01	2.26E+02	1.64E+01
Chromium	1.12E+02	0.00E+00	5.06E-01	5.67E+01	1.09E+02	1.00E+00	5.00E+00	1.09E+02	2.18E+01
Copper	1.52E+03	2.70E-03	2.45E-01	3.72E+02	8.45E+02	4.70E+01	6.17E+01	1.80E+01	1.37E+01
Lead	1.69E+04	0.00E+00	2.44E-01	4.12E+03	9.35E+03	1.13E+00	1.13E+01	8.28E+03	8.28E+02
Mercury	4.30E-01	0.00E+00	3.30E+00	1.42E+00	2.33E+00	6.40E-03	6.40E-02	3.64E+02	3.64E+01
Silver	7.50E+00	0.00E+00	2.45E+00	1.84E+01	3.06E+01	NV	NV	#VALUE!	#VALUE!
Zinc	5.11E+03	1.99E-02	2.06E+00	1.05E+04	1.76E+04	1.45E+01	1.31E+02	1.22E+03	1.35E+02

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	8.100E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	9.760E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1.130E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.015E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	1.50E-03	0.00E+00	1.76E+00	2.63E-03	3.36E-03	1.40E-01	1.40E+00	2.40E-02	2.40E-03
1,2,3,4,6,7,8,9-OCDF	8.83E-05	0.00E+00	1.76E+00	1.56E-04	1.98E-04	1.40E-01	1.40E+00	1.42E-03	1.42E-04
1,2,3,4,6,7,8-HPCDD	1.07E-04	0.00E+00	1.76E+00	1.89E-04	2.41E-04	1.40E-02	1.40E-01	1.72E-02	1.72E-03
1,2,3,4,6,7,8-HPCDF	1.14E-04	0.00E+00	1.76E+00	2.01E-04	2.56E-04	1.40E-03	1.40E-02	1.83E-01	1.83E-02
1,2,3,4,7,8,9-HPCDF	1.08E-05	0.00E+00	1.76E+00	1.91E-05	2.44E-05	1.40E-03	1.40E-02	1.74E-02	1.74E-03
1,2,3,4,7,8-HXCDD	4.48E-06	0.00E+00	1.76E+00	7.88E-06	1.01E-05	2.80E-04	2.80E-03	3.59E-02	3.59E-03
1,2,3,4,7,8-HXCDF	6.52E-05	0.00E+00	1.76E+00	1.15E-04	1.47E-04	1.40E-04	1.40E-03	1.05E+00	1.05E-01
1,2,3,6,7,8-HXCDD	1.19E-05	0.00E+00	1.76E+00	2.10E-05	2.67E-05	1.40E-03	1.40E-02	1.91E-02	1.91E-03
1,2,3,6,7,8-HXCDF	2.36E-05	0.00E+00	1.76E+00	4.16E-05	5.30E-05	1.40E-04	1.40E-03	3.79E-01	3.79E-02
1,2,3,7,8,9-HXCDD	1.47E-05	0.00E+00	1.76E+00	2.59E-05	3.31E-05	1.40E-04	1.40E-03	2.36E-01	2.36E-02
1,2,3,7,8-PECDD	4.64E-06	0.00E+00	1.76E+00	8.18E-06	1.04E-05	1.40E-05	1.40E-04	7.46E-01	7.46E-02
1,2,3,7,8-PECDF	1.74E-05	0.00E+00	1.76E+00	3.06E-05	3.90E-05	1.40E-04	1.40E-03	2.79E-01	2.79E-02
2,3,4,6,7,8-HXCDF	2.75E-05	0.00E+00	1.76E+00	4.84E-05	6.18E-05	1.40E-04	1.40E-03	4.41E-01	4.41E-02
2,3,4,7,8-PECDF	2.75E-05	0.00E+00	1.76E+00	4.84E-05	6.18E-05	1.40E-05	1.40E-04	4.41E+00	4.41E-01
2,3,7,8-TCDD	1.36E-06	0.00E+00	1.76E+00	2.39E-06	3.05E-06	1.40E-05	1.40E-04	2.18E-01	2.18E-02
2,3,7,8-TCDF	5.41E-05	0.00E+00	1.76E+00	9.53E-05	1.22E-04	1.40E-05	1.40E-04	8.68E+00	8.68E-01
TOTAL HPCDD	2.27E-04	0.00E+00	1.76E+00	3.99E-04	5.09E-04	1.40E-02	1.40E-01	3.64E-02	3.64E-03
TOTAL HPCDF	1.76E-04	0.00E+00	1.76E+00	3.10E-04	3.96E-04	1.40E-03	1.40E-02	2.83E-01	2.83E-02
TOTAL HXCDD	1.71E-04	0.00E+00	1.76E+00	3.00E-04	3.83E-04	1.40E-04	1.40E-03	2.74E+00	2.74E-01
TOTAL HXCDF	1.38E-04	0.00E+00	1.76E+00	2.42E-04	3.09E-04	1.40E-04	1.40E-03	2.21E+00	2.21E-01
TOTAL TCDD	7.57E-05	0.00E+00	1.76E+00	1.33E-04	1.70E-04	1.40E-05	1.40E-04	1.22E+01	1.22E+00
TOTAL TCDF	2.16E-04	0.00E+00	1.76E+00	3.81E-04	4.86E-04	1.40E-05	1.40E-04	3.47E+01	3.47E+00
Inorganics									
Cadmium	6.25E+00	0.00E+00	1.23E+00	7.71E+00	1.01E+01	1.45E+00	2.00E+01	6.95E+00	5.04E-01
Chromium	3.40E+01	0.00E+00	4.90E-02	1.66E+00	6.27E+00	1.00E+00	5.00E+00	6.27E+00	1.25E+00
Copper	2.69E+02	1.78E-03	8.24E-02	2.22E+01	6.05E+01	4.70E+01	6.17E+01	1.29E+00	9.80E-01
Lead	2.28E+03	0.00E+00	4.26E-02	9.69E+01	4.02E+02	1.13E+00	1.13E+01	3.56E+02	3.56E+01
Mercury	1.70E-01	0.00E+00	2.71E-01	4.60E-02	7.68E-02	6.40E-03	6.40E-02	1.20E+01	1.20E+00
Silver	1.78E+00	0.00E+00	3.27E-01	5.83E-01	9.26E-01	NV	NV	#VALUE!	#VALUE!
Zinc	9.57E+02	1.24E-02	5.12E-01	4.90E+02	7.11E+02	1.45E+01	1.31E+02	4.90E+01	5.43E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.53E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	1.62E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	4.30E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	2.11E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	5.05E-03	0.00E+00	3.56E+00	1.80E-02	1.98E-02	1.82E-01	1.82E+00	1.09E-01	1.09E-02
1,2,3,4,6,7,8,9-OCDF	3.13E-04	0.00E+00	3.56E+00	1.11E-03	1.23E-03	1.82E-01	1.82E+00	6.73E-03	6.73E-04
1,2,3,4,6,7,8-HPCDD	3.59E-04	0.00E+00	3.56E+00	1.28E-03	1.41E-03	2.92E-02	2.92E-01	4.82E-02	4.82E-03
1,2,3,4,6,7,8-HPCDF	5.41E-04	0.00E+00	3.56E+00	1.92E-03	2.12E-03	2.92E-02	2.92E-01	7.27E-02	7.27E-03
1,2,3,4,7,8,9-HPCDF	5.75E-05	0.00E+00	3.56E+00	2.05E-04	2.25E-04	2.92E-02	2.92E-01	7.72E-03	7.72E-04
1,2,3,4,7,8-HXCDD	2.17E-05	0.00E+00	3.56E+00	7.72E-05	8.50E-05	2.92E-03	2.92E-02	2.92E-02	2.92E-03
1,2,3,4,7,8-HXCDF	3.61E-04	0.00E+00	3.56E+00	1.28E-03	1.41E-03	2.92E-03	2.92E-02	4.85E-01	4.85E-02
1,2,3,6,7,8-HXCDD	5.30E-05	0.00E+00	3.56E+00	1.89E-04	2.08E-04	2.92E-03	2.92E-02	7.12E-02	7.12E-03
1,2,3,6,7,8-HXCDF	1.28E-04	0.00E+00	3.56E+00	4.55E-04	5.01E-04	2.92E-03	2.92E-02	1.72E-01	1.72E-02
1,2,3,7,8,9-HXCDD	6.91E-05	0.00E+00	3.56E+00	2.46E-04	2.71E-04	2.92E-03	2.92E-02	9.28E-02	9.28E-03
1,2,3,7,8-PECDD	2.21E-05	0.00E+00	3.56E+00	7.86E-05	8.66E-05	1.82E-05	1.82E-04	4.75E+00	4.75E-01
1,2,3,7,8-PECDF	1.05E-04	0.00E+00	3.56E+00	3.73E-04	4.11E-04	2.92E-03	2.92E-02	1.41E-01	1.41E-02
2,3,4,6,7,8-HXCDF	1.46E-04	0.00E+00	3.56E+00	5.19E-04	5.72E-04	2.92E-03	2.92E-02	1.96E-01	1.96E-02
2,3,4,7,8-PECDF	1.43E-04	0.00E+00	3.56E+00	5.09E-04	5.60E-04	2.92E-04	2.92E-03	1.92E+00	1.92E-01
2,3,7,8-TCDD	6.10E-06	0.00E+00	3.56E+00	2.17E-05	2.39E-05	1.82E-05	1.82E-04	1.31E+00	1.31E-01
2,3,7,8-TCDF	3.25E-04	0.00E+00	3.56E+00	1.16E-03	1.27E-03	1.82E-04	1.82E-03	6.99E+00	6.99E-01
TOTAL HPCDD	8.03E-04	0.00E+00	3.56E+00	2.86E-03	3.14E-03	2.92E-02	2.92E-01	1.08E-01	1.08E-02
TOTAL HPCDF	7.92E-04	0.00E+00	3.56E+00	2.82E-03	3.10E-03	2.92E-02	2.92E-01	1.06E-01	1.06E-02
TOTAL HXCDD	8.90E-04	0.00E+00	3.56E+00	3.17E-03	3.49E-03	2.92E-03	2.92E-02	1.20E+00	1.20E-01
TOTAL HXCDF	2.54E-05	0.00E+00	3.56E+00	9.03E-05	9.95E-05	2.92E-03	2.92E-02	3.41E-02	3.41E-03
TOTAL TCDD	4.04E-04	0.00E+00	3.56E+00	1.44E-03	1.58E-03	1.82E-05	1.82E-04	8.68E+01	8.68E+00
TOTAL TCDF	5.24E-05	0.00E+00	3.56E+00	1.86E-04	2.05E-04	1.82E-04	1.82E-03	1.13E+00	1.13E-01
Inorganics									
Cadmium	3.11E+01	0.00E+00	6.51E+00	2.02E+02	2.19E+02	1.58E+01	1.58E+02	1.39E+01	1.39E+00
Chromium	1.12E+02	0.00E+00	5.06E-01	5.67E+01	7.57E+01	5.98E+01	2.39E+02	1.27E+00	3.16E-01
Copper	1.52E+03	2.70E-03	2.45E-01	3.72E+02	6.05E+02	6.10E+02	7.88E+02	9.93E-01	7.68E-01
Lead	1.69E+04	0.00E+00	2.44E-01	4.12E+03	6.71E+03	1.46E+02	1.46E+03	4.60E+01	4.60E+00
Mercury	4.30E-01	0.00E+00	3.30E+00	1.42E+00	1.57E+00	7.81E-01	1.30E+00	2.01E+00	1.20E+00
Silver	7.50E+00	0.00E+00	2.45E+00	1.84E+01	2.06E+01	2.83E+00	2.83E+01	7.28E+00	7.28E-01
Zinc	5.11E+03	1.99E-02	2.06E+00	1.05E+04	1.19E+04	2.92E+03	5.83E+03	4.08E+00	2.04E+00

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.69E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	1.03E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	3.80E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.34E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	1.50E-03	0.00E+00	1.76E+00	2.63E-03	1.73E-03	2.07E-01	2.07E+00	8.32E-03	8.32E-04
1,2,3,4,6,7,8,9-OCDF	8.83E-05	0.00E+00	1.76E+00	1.56E-04	1.02E-04	2.07E-01	2.07E+00	4.92E-04	4.92E-05
1,2,3,4,6,7,8-HPCDD	1.07E-04	0.00E+00	1.76E+00	1.89E-04	1.24E-04	3.32E-02	3.32E-01	3.73E-03	3.73E-04
1,2,3,4,6,7,8-HPCDF	1.14E-04	0.00E+00	1.76E+00	2.01E-04	1.32E-04	3.32E-02	3.32E-01	3.97E-03	3.97E-04
1,2,3,4,7,8,9-HPCDF	1.08E-05	0.00E+00	1.76E+00	1.91E-05	1.25E-05	3.32E-02	3.32E-01	3.77E-04	3.77E-05
1,2,3,4,7,8-HXCDD	4.48E-06	0.00E+00	1.76E+00	7.88E-06	5.17E-06	3.32E-03	3.32E-02	1.56E-03	1.56E-04
1,2,3,4,7,8-HXCDF	6.52E-05	0.00E+00	1.76E+00	1.15E-04	7.53E-05	3.32E-03	3.32E-02	2.27E-02	2.27E-03
1,2,3,6,7,8-HXCDD	1.19E-05	0.00E+00	1.76E+00	2.10E-05	1.37E-05	3.32E-03	3.32E-02	4.14E-03	4.14E-04
1,2,3,6,7,8-HXCDF	2.36E-05	0.00E+00	1.76E+00	4.16E-05	2.72E-05	3.32E-03	3.32E-02	8.21E-03	8.21E-04
1,2,3,7,8,9-HXCDD	1.47E-05	0.00E+00	1.76E+00	2.59E-05	1.70E-05	3.32E-03	3.32E-02	5.12E-03	5.12E-04
1,2,3,7,8-PECDD	4.64E-06	0.00E+00	1.76E+00	8.18E-06	5.36E-06	2.07E-05	2.07E-04	2.59E-01	2.59E-02
1,2,3,7,8-PECDF	1.74E-05	0.00E+00	1.76E+00	3.06E-05	2.01E-05	3.32E-04	3.32E-03	6.04E-02	6.04E-03
2,3,4,6,7,8-HXCDF	2.75E-05	0.00E+00	1.76E+00	4.84E-05	3.17E-05	3.32E-03	3.32E-02	9.56E-03	9.56E-04
2,3,4,7,8-PECDF	2.75E-05	0.00E+00	1.76E+00	4.84E-05	3.17E-05	3.32E-03	3.32E-02	9.56E-03	9.56E-04
2,3,7,8-TCDD	1.36E-06	0.00E+00	1.76E+00	2.39E-06	1.57E-06	2.07E-05	2.07E-04	7.56E-02	7.56E-03
2,3,7,8-TCDF	5.41E-05	0.00E+00	1.76E+00	9.53E-05	6.25E-05	2.07E-04	2.07E-03	3.01E-01	3.01E-02
TOTAL HPCDD	2.27E-04	0.00E+00	1.76E+00	3.99E-04	2.62E-04	3.32E-02	3.32E-01	7.88E-03	7.88E-04
TOTAL HPCDF	1.76E-04	0.00E+00	1.76E+00	3.10E-04	2.03E-04	3.32E-02	3.32E-01	6.12E-03	6.12E-04
TOTAL HXCDD	1.71E-04	0.00E+00	1.76E+00	3.00E-04	1.97E-04	3.32E-03	3.32E-02	5.93E-02	5.93E-03
TOTAL HXCDF	1.38E-04	0.00E+00	1.76E+00	2.42E-04	1.59E-04	3.32E-03	3.32E-02	4.79E-02	4.79E-03
TOTAL TCDD	7.57E-05	0.00E+00	1.76E+00	1.33E-04	8.75E-05	2.07E-05	2.07E-04	4.22E+00	4.22E-01
TOTAL TCDF	2.16E-04	0.00E+00	1.76E+00	3.81E-04	2.50E-04	2.07E-04	2.07E-03	1.20E+00	1.20E-01
Inorganics									
Cadmium	6.25E+00	0.00E+00	1.23E+00	7.71E+00	5.21E+00	1.80E+01	1.80E+02	2.90E-01	2.90E-0
Chromium	3.40E+01	0.00E+00	4.90E-02	1.66E+00	3.71E+00	6.80E+01	2.73E+02	5.46E-02	1.36E-0
Copper	2.69E+02	1.78E-03	8.24E-02	2.22E+01	3.49E+01	6.94E+02	8.97E+02	5.03E-02	3.89E-02
Lead	2.28E+03	0.00E+00	4.26E-02	9.69E+01	2.40E+02	1.66E+02	1.66E+03	1.44E+00	1.44E-01
Mercury	1.70E-01	0.00E+00	2.71E-01	4.60E-02	4.16E-02	8.89E-01	1.48E+00	4.68E-02	2.81E-02
Silver	1.78E+00	0.00E+00	3.27E-01	5.83E-01	4.98E-01	3.22E+00	3.22E+01	1.55E-01	1.55E-02
Zinc	9.57E+02	1.24E-02	5.12E-01	4.90E+02	3.75E+02	3.32E+03	6.64E+03	1.13E-01	5.65E-02

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0329000 kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	0.0128000 kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	0.0077000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0003070 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	5.05E-03	0.00E+00	6.20E-05	3.13E-07	4.72E-05	8.95E-02	8.95E-01	5.28E-04	5.28E-05
1,2,3,4,6,7,8,9-OCDF	3.13E-04	0.00E+00	7.90E-05	2.47E-08	2.93E-06	8.95E-02	8.95E-01	3.27E-05	3.27E-06
1,2,3,4,6,7,8-HPCDD	3.59E-04	0.00E+00	2.40E-04	8.62E-08	3.38E-06	1.43E-02	1.43E-01	2.36E-04	2.36E-05
1,2,3,4,6,7,8-HPCDF	5.41E-04	0.00E+00	2.40E-04	1.30E-07	5.10E-06	1.43E-02	1.43E-01	3.56E-04	3.56E-05
1,2,3,4,7,8,9-HPCDF	5.75E-05	0.00E+00	2.40E-04	1.38E-08	5.42E-07	1.43E-02	1.43E-01	3.78E-05	3.78E-06
1,2,3,4,7,8-HXCDD	2.17E-05	0.00E+00	2.40E-04	5.21E-09	2.05E-07	1.43E-03	1.43E-02	1.43E-04	1.43E-05
1,2,3,4,7,8-HXCDF	3.61E-04	0.00E+00	2.40E-04	8.66E-08	3.40E-06	1.43E-03	1.43E-02	2.38E-03	2.38E-04
1,2,3,6,7,8-HXCDD	5.30E-05	0.00E+00	2.40E-04	1.27E-08	5.00E-07	1.43E-03	1.43E-02	3.49E-04	3.49E-05
1,2,3,6,7,8-HXCDF	1.28E-04	0.00E+00	2.40E-04	3.07E-08	1.21E-06	1.43E-03	1.43E-02	8.42E-04	8.42E-05
1,2,3,7,8,9-HXCDD	6.91E-05	0.00E+00	2.40E-04	1.66E-08	6.51E-07	1.43E-03	1.43E-02	4.55E-04	4.55E-05
1,2,3,7,8-PECDD	2.21E-05	0.00E+00	1.30E-03	2.87E-08	2.17E-07	8.95E-06	8.95E-05	2.43E-02	2.43E-03
1,2,3,7,8-PECDF	1.05E-04	0.00E+00	8.90E-04	9.35E-08	1.02E-06	1.43E-03	1.43E-02	7.09E-04	7.09E-05
2,3,4,6,7,8-HXCDF	1.46E-04	0.00E+00	2.40E-04	3.50E-08	1.38E-06	1.43E-03	1.43E-02	9.61E-04	9.61E-05
2,3,4,7,8-PECDF	1.43E-04	0.00E+00	7.50E-04	1.07E-07	1.38E-06	1.43E-04	1.43E-03	9.61E-03	9.61E-04
2,3,7,8-TCDD	6.10E-06	0.00E+00	8.80E-04	5.37E-09	5.90E-08	8.95E-06	8.95E-05	6.59E-03	6.59E-04
2,3,7,8-TCDF	3.25E-04	0.00E+00	3.20E-03	1.04E-06	3.44E-06	8.95E-05	8.95E-04	3.84E-02	3.84E-03
TOTAL HPCDD	8.03E-04	0.00E+00	2.40E-04	1.93E-07	7.57E-06	1.43E-02	1.43E-01	5.28E-04	5.28E-05
TOTAL HPCDF	7.92E-04	0.00E+00	2.40E-04	1.90E-07	7.46E-06	1.43E-02	1.43E-01	5.21E-04	5.21E-05
TOTAL HXCDD	8.90E-04	0.00E+00	2.40E-04	2.14E-07	8.39E-06	1.43E-03	1.43E-02	5.86E-03	5.86E-04
TOTAL HXCDF	2.54E-05	0.00E+00	2.40E-04	6.10E-09	2.39E-07	1.43E-03	1.43E-02	1.67E-04	1.67E-05
TOTAL PECDD	0.00E+00	9.40E-09	1.30E-03	0.00E+00	2.20E-09	8.95E-06	8.95E-05	2.46E-04	2.46E-05
TOTAL TCDD	4.04E-04	0.00E+00	8.80E-04	3.56E-07	3.91E-06	8.95E-06	8.95E-05	4.37E-01	4.37E-02
TOTAL TCDF	5.24E-05	0.00E+00	3.20E-03	1.68E-07	5.54E-07	8.95E-05	8.95E-04	6.19E-03	6.19E-04
Inorganics									
Cadmium	3.11E+01	0.00E+00	9.75E-01	3.03E+01	1.21E+01	7.75E+00	7.75E+01	1.56E+00	1.56E-01
Chromium	1.12E+02	0.00E+00	2.52E-02	2.82E+00	2.14E+00	2.94E+01	1.18E+02	7.30E-02	1.82E-02
Copper	1.52E+03	2.70E-03	1.88E-01	2.85E+02	1.25E+02	2.99E+02	3.87E+02	4.18E-01	3.23E-01
Lead	1.69E+04	0.00E+00	1.40E-01	2.37E+03	1.08E+03	7.16E+01	7.16E+02	1.51E+01	1.51E+00
Mercury	4.30E-01	0.00E+00	1.50E+00	6.45E-01	2.55E-01	3.84E-01	6.39E-01	6.65E-01	3.99E-01
Silver	7.50E+00	0.00E+00	1.10E-02	8.26E-02	1.02E-01	1.39E+00	1.39E+01	7.35E-02	7.35E-03
Zinc	5.11E+03	1.99E-02	5.46E-01	2.79E+03	1.13E+03	1.43E+03	2.86E+03	7.91E-01	3.96E-01

Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0366300 kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	0.0119000 kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	0.0064000 L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	0.0002860 kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site	Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range	H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 5 - OLD BURN PIT
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Dioxins									
1,2,3,4,6,7,8,9-OCDD	1.50E-03	0.00E+00	6.20E-05	9.27E-08	1.17E-05	9.56E-02	9.56E-01	1.22E-04	1.22E-05
1,2,3,4,6,7,8,9-OCDF	8.83E-05	0.00E+00	7.90E-05	6.97E-09	6.92E-07	9.56E-02	9.56E-01	7.24E-06	7.24E-07
1,2,3,4,6,7,8-HPCDD	1.07E-04	0.00E+00	2.40E-04	2.58E-08	8.46E-07	1.53E-02	1.53E-01	5.54E-05	5.54E-06
1,2,3,4,6,7,8-HPCDF	1.14E-04	0.00E+00	2.40E-04	2.74E-08	8.99E-07	1.53E-02	1.53E-01	5.88E-05	5.88E-06
1,2,3,4,7,8,9-HPCDF	1.08E-05	0.00E+00	2.40E-04	2.60E-09	8.55E-08	1.53E-02	1.53E-01	5.59E-06	5.59E-07
1,2,3,4,7,8-HXCDD	4.48E-06	0.00E+00	2.40E-04	1.07E-09	3.53E-08	1.53E-03	1.53E-02	2.31E-05	2.31E-06
1,2,3,4,7,8-HXCDF	6.52E-05	0.00E+00	2.40E-04	1.57E-08	5.14E-07	1.53E-03	1.53E-02	3.36E-04	3.36E-05
1,2,3,6,7,8-HXCDD	1.19E-05	0.00E+00	2.40E-04	2.85E-09	9.38E-08	1.53E-03	1.53E-02	6.13E-05	6.13E-06
1,2,3,6,7,8-HXCDF	2.36E-05	0.00E+00	2.40E-04	5.66E-09	1.86E-07	1.53E-03	1.53E-02	1.22E-04	1.22E-05
1,2,3,7,8,9-HXCDD	1.47E-05	0.00E+00	2.40E-04	3.53E-09	1.16E-07	1.53E-03	1.53E-02	7.59E-05	7.59E-06
1,2,3,7,8-PECDD	4.64E-06	0.00E+00	1.30E-03	6.04E-09	3.82E-08	9.56E-06	9.56E-05	4.00E-03	4.00E-04
1,2,3,7,8-PECDF	1.74E-05	0.00E+00	8.90E-04	1.55E-08	1.41E-07	1.53E-04	1.53E-03	9.20E-04	9.20E-05
2,3,4,6,7,8-HXCDF	2.75E-05	0.00E+00	2.40E-04	6.59E-09	2.17E-07	1.53E-03	1.53E-02	1.42E-04	1.42E-05
2,3,4,7,8-PECDF	2.75E-05	0.00E+00	7.50E-04	2.06E-08	2.21E-07	1.53E-03	1.53E-02	1.45E-04	1.45E-05
2,3,7,8-TCDD	1.36E-06	0.00E+00	8.80E-04	1.20E-09	1.10E-08	9.56E-06	9.56E-05	1.15E-03	1.15E-04
2,3,7,8-TCDF	5.41E-05	0.00E+00	3.20E-03	1.73E-07	4.78E-07	9.56E-05	9.56E-04	5.01E-03	5.01E-04
TOTAL HPCDD	2.27E-04	0.00E+00	2.40E-04	5.44E-08	1.79E-06	1.53E-02	1.53E-01	1.17E-04	1.17E-05
TOTAL HPCDF	1.76E-04	0.00E+00	2.40E-04	4.22E-08	1.39E-06	1.53E-02	1.53E-01	9.08E-05	9.08E-06
TOTAL HXCDD	1.71E-04	0.00E+00	2.40E-04	4.09E-08	1.34E-06	1.53E-03	1.53E-02	8.80E-04	8.80E-05
TOTAL HXCDF	1.38E-04	0.00E+00	2.40E-04	3.30E-08	1.08E-06	1.53E-03	1.53E-02	7.09E-04	7.09E-05
TOTAL PECDD	0.00E+00	5.00E-09	1.30E-03	0.00E+00	8.74E-10	9.56E-06	9.56E-05	9.14E-05	9.14E-06
TOTAL TCDD	7.57E-05	0.00E+00	8.80E-04	6.67E-08	6.13E-07	9.56E-06	9.56E-05	6.42E-02	6.42E-03
TOTAL TCDF	2.16E-04	0.00E+00	3.20E-03	6.92E-07	1.91E-06	9.56E-05	9.56E-04	2.00E-02	2.00E-03
Inorganics									
Cadmium	6.25E+00	0.00E+00	1.76E-01	1.10E+00	4.06E-01	8.27E+00	8.27E+01	4.91E-02	4.91E-03
Chromium	3.40E+01	0.00E+00	1.23E-02	4.18E-01	4.01E-01	3.13E+01	1.26E+02	1.28E-02	3.20E-03
Copper	2.69E+02	1.78E-03	3.72E-02	1.00E+01	5.36E+00	3.20E+02	4.13E+02	1.68E-02	1.30E-02
Lead	2.28E+03	0.00E+00	1.17E-02	2.66E+01	2.64E+01	7.64E+01	7.64E+02	3.45E-01	3.45E-02
Mercury	1.70E-01	0.00E+00	1.96E-01	3.33E-02	1.21E-02	4.10E-01	6.83E-01	2.96E-02	1.78E-02
Silver	1.78E+00	0.00E+00	4.20E-03	7.49E-03	1.63E-02	1.48E+00	1.48E+01	1.10E-02	1.10E-03
Zinc	9.57E+02	1.24E-02	1.10E-01	1.05E+02	4.16E+01	1.53E+03	3.06E+03	2.72E-02	1.36E-02

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

SWMU 9 – Pesticide Control/R-150 Tank Area

Body Weight = BW	0.136	kg
Food Ingestion Rate = If	0.07580	kg/day
Water Ingestion Rate = Iw	0.01870	L/day
Soil Ingestion Rate - Is	0.00152	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Conservative Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
PCBs									
AROCLOR-1248	3.80E-01	0.00E+00	1.85E+00	3.49E+00	1.95E+00	1.80E-01	1.80E+00	1.08E+01	1.08E+00
Herbicides									
2,4-D	0.00E+00	1.80E-04	4.70E+01	0.00E+00	2.48E-05	NV	NV	#VALUE!	#VALUE!
Inorganics									
ARSENIC	6.10E+00	1.90E-03	1.00E+00	2.17E-01	1.89E-01	2.46E+00	7.38E+00	7.69E-02	2.56E-02
COPPER	2.77E+01	1.24E-02	1.00E+00	9.86E-01	8.60E-01	4.70E+01	6.17E+01	1.83E-02	1.39E-02
LEAD	2.27E+01	3.60E-03	1.00E+00	8.08E-01	7.04E-01	1.13E+00	1.13E+01	6.23E-01	6.23E-02

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4-D) were only detected in the surface water

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.152	kg
Food Ingestion Rate = (If)	0.069	kg/day
Water Ingestion Rate = (Iw)	0.017	L/day
Sediment Ingestion Rate = (Is)	0.001378	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Average Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
PCBs									
AROCLOR-1248	1.11E-01	0.00E+00	1.85E+00	1.02E+00	4.64E-01	1.80E-01	1.80E+00	2.58E+00	2.58E-01
Herbicides									
2,4-D	0.00E+00	7.50E-05	4.70E+01	0.00E+00	8.24E-06	NV	NV	#VALUE!	#VALUE!
Inorganics									
ARSENIC	4.19E+00	8.88E-04	1.00E+00	1.49E-01	1.06E-01	2.46E+00	7.38E+00	4.30E-02	1.43E-02
COPPER	1.40E+01	3.85E-03	1.00E+00	4.99E-01	3.54E-01	4.70E+01	6.17E+01	7.53E-03	5.73E-03
LEAD	1.35E+01	1.28E-03	1.00E+00	4.80E-01	3.40E-01	1.13E+00	1.13E+01	3.01E-01	3.01E-02

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4-D) were only detected in the surface water

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.62E-01	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	1.64E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	2.31E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.35E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.36E-02	0.00E+00	2.20E-02	3.00E-04	1.44E-04	NV	NV	#VALUE!	#VALUE!
Inorganics									
Copper	1.40E+01	1.24E-02	1.88E-01	2.63E+00	3.84E-01	4.70E+01	6.17E+01	8.17E-03	6.22E-03
Lead	2.40E+01	3.60E-03	1.40E-01	3.37E+00	5.40E-01	1.13E+00	1.13E+01	4.78E-01	4.78E-02
Zinc	6.49E+01	1.19E-02	5.46E-01	3.54E+01	4.13E+00	1.45E+01	1.31E+02	2.85E-01	3.15E-02

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.77E-01	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	1.44E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1.84E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.18E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.16E-02	0.00E+00	2.20E-02	2.56E-04	9.85E-05	NV	NV	#VALUE!	#VALUE!
Inorganics									
Copper	1.20E+01	3.85E-03	3.72E-02	4.45E-01	1.17E-01	4.70E+01	6.17E+01	2.48E-03	1.89E-03
Lead	1.89E+01	1.28E-03	1.17E-02	2.21E-01	1.44E-01	1.13E+00	1.13E+01	1.28E-01	1.28E-02
Zinc	5.18E+01	6.73E-03	1.10E-01	5.69E+00	8.09E-01	1.45E+01	1.31E+02	5.58E-02	6.18E-03

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	5.34E+00	kg	Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW
Food Ingestion Rate = (If)	1.65E+00	kg/day	
Water Ingestion Rate = (Iw)	5.70E-01	L/day	Cs = Contaminant concentration in sediment
Soil/Sediment Ingestion Rate = (Is)	1.55E-01	kg/day	Cw = Contaminant concentration in water
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Contaminated Area = (CA)	Assume equal to home range		Average % TOC is not in the Cv equation for inorganics
			H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Conservative Inputs

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
PCBs									
AROCLOR-1248	3.80E-01	0.00E+00	1.85E+00	3.49E+00	1.09E+00	5.64E-03	5.64E-02	1.93E+02	1.93E+01
Herbicides									
2,4-D	0.00E+00	4.70E+01	1.00E+00	0.00E+00	5.02E+00	3.95E-02	1.98E-01	1.27E+02	2.54E+01
Inorganics									
ARSENIC	6.10E+00	1.90E-03	1.00E+00	6.10E+00	2.06E+00	4.27E-04	4.27E-03	4.84E+03	4.84E+02
COPPER	2.77E+01	1.24E-02	1.00E+00	2.77E+01	9.37E+00	1.32E+00	1.71E+00	7.09E+00	5.48E+00
LEAD	2.27E+01	3.60E-03	1.00E+00	2.27E+01	7.68E+00	3.16E-01	3.16E+00	2.43E+01	2.43E+00

Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4-D) were only detected in the surface water

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	6.864 kg	
Food Ingestion Rate = (If)	1.3388 kg/day	
Water Ingestion Rate = (Iw)	0.5664 L/day	
Soil/Sediment Ingestion Rate = (Is)	0.1258472 kg/day	
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Average Inputs

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
PCBs									
AROCLOR-1248	1.11E-01	0.00E+00	1.85E+00	1.02E+00	2.01E-01	7.28E-03	7.28E-02	2.77E+01	2.77E+00
Herbicides									
2,4-D	0.00E+00	7.50E-05	4.70E+01	0.00E+00	6.19E-06	5.10E-02	2.55E-01	1.21E-04	2.43E-05
Inorganics									
ARSENIC	4.19E+00	8.88E-04	1.00E+00	4.19E+00	8.95E-01	5.51E-04	5.51E-03	1.62E+03	1.62E+02
COPPER	1.40E+01	3.85E-03	1.00E+00	1.40E+01	2.99E+00	1.71E+00	2.21E+00	1.75E+00	1.36E+00
LEAD	1.35E+01	1.28E-03	1.00E+00	1.35E+01	2.88E+00	4.08E-01	4.08E+00	7.05E+00	7.05E-01

Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4-D) were only detected in the surface water

Definitions:
HQ - Hazard Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	7.730E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	1.231E-01	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	1.210E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.280E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to **1** for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.36E-02	0.00E+00	1.00E+00	1.36E-02	2.40E-02	NV	NV	#VALUE!	#VALUE!
Inorganics									
Copper	1.40E+01	1.24E-02	2.45E-01	3.43E+00	7.79E+00	4.70E+01	6.17E+01	1.66E-01	1.26E-01
Lead	2.40E+01	3.60E-03	2.44E-01	5.84E+00	1.33E+01	1.13E+00	1.13E+01	1.17E+01	1.17E+00
Zinc	6.49E+01	1.19E-02	2.06E+00	1.34E+02	2.24E+02	1.45E+01	1.31E+02	1.54E+01	1.71E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	8.100E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	9.760E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1.130E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.015E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.16E-02	0.00E+00	1.00E+00	1.16E-02	1.55E-02	NV	NV	#VALUE!	#VALUE!
Inorganics									
Copper	1.20E+01	3.85E-03	8.24E-02	9.87E-01	2.69E+00	4.70E+01	6.17E+01	5.73E-02	4.36E-02
Lead	1.89E+01	1.28E-03	4.26E-02	8.04E-01	3.34E+00	1.13E+00	1.13E+01	2.95E+00	2.95E-01
Zinc	5.18E+01	6.73E-03	5.12E-01	2.65E+01	3.85E+01	1.45E+01	1.31E+02	2.65E+00	2.94E-01

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.53E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	1.62E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	4.30E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	2.11E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.36E-02	0.00E+00	1.00E+00	1.36E-02	1.64E-02	7.29E+01	1.46E+02	2.25E-04	1.12E-04
Inorganics									
Copper	1.40E+01	1.24E-02	2.45E-01	3.43E+00	5.58E+00	6.10E+02	7.88E+02	9.16E-03	7.08E-03
Lead	2.40E+01	3.60E-03	2.44E-01	5.84E+00	9.52E+00	1.46E+02	1.46E+03	6.53E-02	6.53E-03
Zinc	6.49E+01	1.19E-02	2.06E+00	1.34E+02	1.51E+02	2.92E+03	5.83E+03	5.18E-02	2.59E-02

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.69E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	1.03E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	3.80E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.34E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.16E-02	0.00E+00	1.00E+00	1.16E-02	8.03E-03	8.30E+01	1.66E+02	9.67E-05	4.84E-05
Inorganics									
Copper	1.20E+01	3.85E-03	8.24E-02	9.87E-01	1.55E+00	6.94E+02	8.97E+02	2.24E-03	1.73E-03
Lead	1.89E+01	1.28E-03	4.26E-02	8.04E-01	1.99E+00	1.66E+02	1.66E+03	1.20E-02	1.20E-03
Zinc	5.18E+01	6.73E-03	5.12E-01	2.65E+01	2.03E+01	3.32E+03	6.64E+03	6.12E-03	3.06E-03

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	3.29E-02	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	1.28E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	7.70E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	3.07E-04	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.36E-02	0.00E+00	2.20E-02	3.00E-04	2.44E-04	3.58E+01	7.16E+01	6.82E-06	3.41E-06
Inorganics									
Copper	1.40E+01	1.24E-02	1.88E-01	2.63E+00	1.16E+00	2.99E+02	3.87E+02	3.86E-03	2.98E-03
Lead	2.40E+01	3.60E-03	1.40E-01	3.37E+00	1.53E+00	7.16E+01	7.16E+02	2.14E-02	2.14E-03
Zinc	6.49E+01	1.19E-02	5.46E-01	3.54E+01	1.44E+01	1.43E+03	2.86E+03	1.00E-02	5.02E-03

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	3.66E-02	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	1.19E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	6.40E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	2.86E-04	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 9 - PESTICIDE CONTROL/R-150 TANK AREA
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Pesticides									
Methoxychlor	1.16E-02	0.00E+00	2.20E-02	2.56E-04	1.74E-04	3.82E+01	7.64E+01	4.55E-06	2.28E-06
Inorganics									
Copper	1.20E+01	3.85E-03	3.72E-02	4.45E-01	2.39E-01	3.20E+02	4.13E+02	7.47E-04	5.78E-04
Lead	1.89E+01	1.28E-03	1.17E-02	2.21E-01	2.19E-01	7.64E+01	7.64E+02	2.87E-03	2.87E-04
Zinc	5.18E+01	6.73E-03	1.10E-01	5.69E+00	2.25E+00	1.53E+03	3.06E+03	1.47E-03	7.37E-04

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

SWMU 10 – Rockeye

Body Weight = (BW)	0.006	kg
Food Ingestion Rate = (If)	0.008	kg/day
Water Ingestion Rate = (Iw)	0.002	L/day
Soil Ingestion Rate = (Is)	0.000E+00	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW

Little Brown Bat
Conservative Inputs

Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Cv = Contaminant conc. in sediment invertebrate (=soil conc. * Biotransfer Factor)
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
LITTLE BROWN BAT - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to inv)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-TRINITROTOLUENE	0.00E+00	2.00E-03	1.00E+00	0.00E+00	5.01E-04	5.44E+01	5.44E+02	9.22E-06	9.22E-07
2-AMINO-4,6-DINITROTOLUENE	0.00E+00	4.10E-04	1.00E+00	0.00E+00	1.03E-04	NV	NV	#VALUE!	#VALUE!
4-AMINO-2,6-DINITROTOLUENE	0.00E+00	8.78E-04	1.00E+00	0.00E+00	2.20E-04	NV	NV	#VALUE!	#VALUE!
HMX	7.95E-03	2.20E-02	1.00E+00	7.95E-03	1.62E-02	8.74E+00	2.18E+01	1.86E-03	7.43E-04
RDX	0.00E+00	1.80E-02	1.00E+00	0.00E+00	4.50E-03	2.04E+01	1.02E+02	2.21E-04	4.41E-05
Inorganics									
ALUMINUM	7.43E+03	4.93E-01	1.00E+00	7.43E+03	1.00E+04	5.62E+00	5.62E+01	1.78E+03	1.78E+02
ANTIMONY	1.22E+00	0.00E+00	1.00E+00	1.22E+00	1.64E+00	3.64E-01	3.64E+00	4.52E+00	4.52E-01
ARSENIC	1.98E+01	7.07E-04	2.00E-01	3.97E+00	5.36E+00	3.67E-01	3.67E+00	1.46E+01	1.46E+00
BERYLLIUM	1.64E+00	0.00E+00	1.00E+00	1.64E+00	2.22E+00	2.24E+01	2.24E+02	9.88E-02	9.88E-03
CADMIUM	1.42E+00	0.00E+00	2.32E+00	3.30E+00	4.45E+00	2.94E+01	2.94E+02	1.51E-01	1.51E-02
CHROMIUM	3.84E+01	0.00E+00	1.36E-01	5.21E+00	7.03E+00	1.11E+02	4.47E+02	6.31E-02	1.57E-02
COBALT	3.55E+01	0.00E+00	1.00E+00	3.55E+01	4.79E+01	4.08E+01	4.08E+02	1.17E+00	1.17E-01
COPPER	1.19E+01	1.21E-03	1.52E+00	1.82E+01	2.46E+01	1.14E+03	1.47E+03	2.16E-02	1.67E-02
IRON	4.86E+04	7.10E-01	1.00E+00	4.86E+04	6.56E+04	1.84E+04	1.84E+05	3.56E+00	3.56E-01
LEAD	2.68E+01	0.00E+00	1.76E-01	4.72E+00	6.38E+00	2.72E+02	2.72E+03	2.35E-02	2.35E-03
MANGANESE	3.69E+03	1.12E-01	1.00E+00	3.69E+03	4.98E+03	2.99E+03	9.65E+03	1.67E+00	5.16E-01
NICKEL	3.39E+01	0.00E+00	6.73E-01	2.28E+01	3.08E+01	1.36E+03	2.72E+03	2.27E-02	1.13E-02
VANADIUM	3.92E+01	0.00E+00	1.00E+00	3.92E+01	5.29E+01	5.30E+00	5.30E+01	9.98E+00	9.98E-01
ZINC	1.17E+02	2.23E-02	2.18E+00	2.55E+02	3.44E+02	5.44E+03	1.09E+04	6.33E-02	3.17E-02

NV - No Value Established
#VALUE! - Value could not be calculated
[illegible]are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.0072	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW
Food Ingestion Rate = (If)	0.0044	kg/day	
Water Ingestion Rate = (Iw)	0.0014	L/day	Cs = Contaminant concentration in soil
Soil Ingestion Rate = (Is)	0.000	kg/day	Cw = Contaminant concentration in water
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in sediment invertebrate (=soil conc. * Biotransfer Factor)
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)

Little Brown Bat
Average Inputs

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
LITTLE BROWN BAT - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Avg. Sed. Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (sed to inv)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-TRINITROTOLUENE	0.00E+00	1.08E-03	1.00E+00	0.00E+00	2.10E-04	7.78E+01	7.78E+02	2.70E-06	2.70E-07
2-AMINO-4,6-DINITROTOLUENE	0.00E+00	4.37E-04	1.00E+00	0.00E+00	8.50E-05	NV	NV	#VALUE!	#VALUE!
4-AMINO-2,6-DINITROTOLUENE	0.00E+00	6.51E-04	1.00E+00	0.00E+00	1.27E-04	NV	NV	#VALUE!	#VALUE!
HMX	4.48E-03	8.06E-03	1.00E+00	4.48E-03	4.30E-03	1.25E+01	3.13E+01	3.44E-04	1.38E-04
RDX	0.00E+00	4.24E-03	1.00E+00	0.00E+00	8.24E-04	2.92E+01	1.46E+02	2.82E-05	5.65E-06
Inorganics									
ALUMINUM	6.67E+03	3.50E-01	1.00E+00	6.67E+03	4.08E+03	8.04E+00	8.04E+01	5.07E+02	5.07E+01
ANTIMONY	8.57E-01	0.00E+00	1.00E+00	8.57E-01	5.24E-01	5.21E-01	5.21E+00	1.01E+00	1.01E-01
ARSENIC	1.16E+01	5.08E-04	4.15E-02	4.83E-01	2.95E-01	5.25E-01	5.25E+00	5.62E-01	5.62E-02
BERYLLIUM	1.03E+00	0.00E+00	1.00E+00	1.03E+00	6.31E-01	3.21E+01	3.21E+02	1.97E-02	1.97E-03
CADMIUM	9.40E-01	0.00E+00	1.74E-01	1.64E-01	1.00E-01	4.21E+01	4.21E+02	2.38E-03	2.38E-04
CHROMIUM	2.35E+01	0.00E+00	2.90E-02	6.80E-01	4.16E-01	1.59E+02	6.39E+02	2.61E-03	6.51E-04
COBALT	2.09E+01	0.00E+00	1.00E+00	2.09E+01	1.28E+01	5.83E+01	5.83E+02	2.19E-01	2.19E-02
COPPER	1.03E+01	1.08E-03	4.51E-01	4.67E+00	2.85E+00	1.63E+03	2.10E+03	1.75E-03	1.36E-03
IRON	3.15E+04	5.10E-01	1.00E+00	3.15E+04	1.93E+04	2.64E+04	2.64E+05	7.30E-01	7.30E-02
LEAD	2.22E+01	0.00E+00	2.06E-02	4.57E-01	2.79E-01	3.89E+02	3.89E+03	7.19E-04	7.19E-05
MANGANESE	1.54E+03	4.88E-02	1.00E+00	1.54E+03	9.43E+02	4.28E+03	1.38E+04	2.20E-01	6.83E-02
NICKEL	2.10E+01	0.00E+00	1.41E-01	2.96E+00	1.81E+00	1.94E+03	3.89E+03	9.29E-04	4.64E-04
VANADIUM	2.83E+01	0.00E+00	1.00E+00	2.83E+01	1.73E+01	7.58E+00	7.58E+01	2.28E+00	2.28E-01
ZINC	8.20E+01	1.45E-02	5.61E-01	4.61E+01	2.81E+01	7.78E+03	1.56E+04	3.62E-03	1.81E-03

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Le

Body Weight = BW	0.136	kg
Food Ingestion Rate = If	0.07580	kg/day
Water Ingestion Rate = Iw	0.01870	L/day
Soil Ingestion Rate - Is	0.00152	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Conservative Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQn	LOAEL HQl
Energetics									
2,4,6-TRINITROTOLUENE	0.00E+00	2.00E-03	3.30E+01	0.00E+00	2.76E-04	NV	NV	#VALUE!	#VALUE!
2-AMINO-4,6-DINITROTOLUENE	0.00E+00	4.10E-04	1.00E+00	0.00E+00	5.64E-05	NV	NV	#VALUE!	#VALUE!
4-AMINO-2,6-DINITROTOLUENE	0.00E+00	8.78E-04	1.00E+00	0.00E+00	1.21E-04	NV	NV	#VALUE!	#VALUE!
HMX	7.95E-03	2.20E-02	1.00E+00	2.57E-02	1.75E-02	NV	NV	#VALUE!	#VALUE!
RDX	0.00E+00	1.80E-02	1.90E+02	0.00E+00	2.48E-03	NV	NV	#VALUE!	#VALUE!
Inorganics									
ARSENIC	1.98E+01	7.07E-04	1.00E+00	7.06E-01	6.15E-01	2.46E+00	7.38E+00	2.50E-01	8.33E-02
CADMIUM	1.42E+00	0.00E+00	1.00E+00	5.06E-02	4.41E-02	1.45E+00	2.00E+01	3.04E-02	2.20E-03
CHROMIUM	3.84E+01	0.00E+00	1.00E+00	1.37E+00	1.19E+00	1.00E+00	5.00E+00	1.19E+00	2.38E-01
COPPER	1.19E+01	1.21E-03	1.00E+00	4.25E-01	3.70E-01	4.70E+01	6.17E+01	7.88E-03	6.00E-03
LEAD	2.68E+01	0.00E+00	1.00E+00	9.55E-01	8.32E-01	1.13E+00	1.13E+01	7.36E-01	7.36E-02
NICKEL	3.39E+01	0.00E+00	1.00E+00	1.21E+00	1.05E+00	7.74E+01	1.07E+02	1.36E-02	9.82E-03
ZINC	1.17E+02	2.23E-02	1.00E+00	4.16E+00	3.62E+00	1.45E+01	1.31E+02	2.50E-01	2.77E-02

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4,6-Trinitrotoluene, RDX) were only detected in the surface water.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	0.152	kg
Food Ingestion Rate = (If)	0.069	kg/day
Water Ingestion Rate = (Iw)	0.017	L/day
Sediment Ingestion Rate = (Is)	0.001378	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Belted Kingfisher
Average Inputs

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
BELTED KINGFISHER - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Energetics									
2,4,6-TRINITROTOLUENE	0.00E+00	1.08E-03	3.30E+01	0.00E+00	1.19E-04	NV	NV	#VALUE!	#VALUE!
2-AMINO-4,6-DINITROTOLUENE	0.00E+00	4.37E-04	1.00E+00	0.00E+00	4.80E-05	NV	NV	#VALUE!	#VALUE!
4-AMINO-2,6-DINITROTOLUENE	0.00E+00	6.51E-04	1.00E+00	0.00E+00	7.16E-05	NV	NV	#VALUE!	#VALUE!
HMX	4.48E-03	8.06E-03	1.00E+00	1.45E-02	7.50E-03	NV	NV	#VALUE!	#VALUE!
RDX	0.00E+00	4.24E-03	1.90E+02	0.00E+00	4.66E-04	NV	NV	#VALUE!	#VALUE!
Inorganics									
ARSENIC	1.16E+01	5.08E-04	1.00E+00	4.14E-01	2.93E-01	2.46E+00	7.38E+00	1.19E-01	3.98E-02
CADMIUM	9.40E-01	0.00E+00	1.00E+00	3.35E-02	2.37E-02	1.45E+00	2.00E+01	1.63E-02	1.19E-03
CHROMIUM	2.35E+01	0.00E+00	1.00E+00	8.35E-01	5.91E-01	1.00E+00	5.00E+00	5.91E-01	1.18E-01
COPPER	1.03E+01	1.08E-03	1.00E+00	3.68E-01	2.61E-01	4.70E+01	6.17E+01	5.55E-03	4.22E-03
LEAD	2.22E+01	0.00E+00	1.00E+00	7.91E-01	5.60E-01	1.13E+00	1.13E+01	4.95E-01	4.95E-02
NICKEL	2.10E+01	0.00E+00	1.00E+00	7.46E-01	5.28E-01	7.74E+01	1.07E+02	6.83E-03	4.94E-03
ZINC	8.20E+01	1.45E-02	1.00E+00	2.92E+00	2.07E+00	1.45E+01	1.31E+02	1.43E-01	1.58E-02

NV - No Value Established
#VALUE! - Value could not be calculated
Fish BCFs were used when parameters (2,4,6-Trinitrotoluene, RDX) were only detected in the surface water.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.62E-01	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	1.64E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	2.31E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.35E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	sume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	ıe equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	3.22E-01	2.00E-03	3.60E-01	1.16E-01	1.47E-02	NV	NV	#VALUE!	#VALUE!
2-amino-4,6-dinitrotoluene	3.23E-01	4.10E-04	1.00E+00	3.23E-01	3.54E-02	NV	NV	#VALUE!	#VALUE!
HMX	5.50E+01	2.20E-02	3.50E+00	1.93E+02	1.99E+01	NV	NV	#VALUE!	#VALUE!
RDX	6.91E-01	1.80E-02	9.40E-02	6.50E-02	1.49E-02	NV	NV	#VALUE!	#VALUE!
Inorganics									
Zinc	4.28E+01	2.23E-02	5.46E-01	2.33E+01	2.72E+00	1.45E+01	1.31E+02	1.88E-01	2.08E-02

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.77E-01	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Bobwhite Quail**
Food Ingestion Rate = (If)	1.44E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1.84E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.18E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	sume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	ıe equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
BOBWHITE QUAIL - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	2.78E-01	1.08E-03	3.60E-01	1.00E-01	1.01E-02	NV	NV	#VALUE!	#VALUE!
2-amino-4,6-dinitrotoluene	2.78E-01	4.37E-04	1.00E+00	2.78E-01	2.45E-02	NV	NV	#VALUE!	#VALUE!
HMX	1.11E+01	8.06E-03	3.50E+00	3.89E+01	3.24E+00	NV	NV	#VALUE!	#VALUE!
RDX	4.30E-01	4.24E-03	9.40E-02	4.04E-02	6.60E-03	NV	NV	#VALUE!	#VALUE!
Inorganics									
Zinc	3.40E+01	1.45E-02	1.10E-01	3.74E+00	5.33E-01	1.45E+01	1.31E+02	3.68E-02	4.07E-03

NV - No Value Established
#VALUE! - Value could not be calculated

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	5.34E+00	kg
Food Ingestion Rate = (If)	1.65E+00	kg/day
Water Ingestion Rate = (Iw)	5.70E-01	L/day
Soil/Sediment Ingestion Rate = (Is)	1.55E-01	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Conservative Inputs

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQn	LOAEL HQl
Energetics									
2,4,6-TRINITROTOLUENE	0.00E+00	2.00E-03	3.30E+01	0.00E+00	2.14E-04	6.32E-02	6.32E-01	3.38E-03	3.38E-04
2-AMINO-4,6-DINITROTOLUENE	0.00E+00	4.10E-04	1.00E+00	0.00E+00	4.37E-05	NV	NV	#VALUE!	#VALUE!
4-AMINO-2,6-DINITROTOLUENE	0.00E+00	8.78E-04	1.00E+00	0.00E+00	9.37E-05	NV	NV	#VALUE!	#VALUE!
HMX	7.95E-03	2.20E-02	1.00E+00	2.57E-02	1.05E-02	1.02E-02	2.54E-02	1.04E+00	4.15E-01
RDX	0.00E+00	1.80E-02	1.90E+02	0.00E+00	1.92E-03	2.37E-02	1.19E-01	8.10E-02	1.62E-02
Inorganics									
ARSENIC	1.98E+01	7.07E-04	1.00E+00	1.98E+01	6.71E+00	4.27E-04	4.27E-03	1.57E+04	1.57E+03
CADMIUM	1.42E+00	0.00E+00	1.00E+00	1.42E+00	4.81E-01	3.42E-02	3.42E-01	1.41E+01	1.41E+00
CHROMIUM	3.84E+01	0.00E+00	1.00E+00	3.84E+01	1.30E+01	1.30E-01	5.19E-01	1.00E+02	2.50E+01
COPPER	1.19E+01	1.21E-03	1.00E+00	1.19E+01	4.04E+00	1.32E+00	1.71E+00	3.06E+00	2.36E+00
LEAD	2.68E+01	0.00E+00	1.00E+00	2.68E+01	9.08E+00	3.16E-01	3.16E+00	2.87E+01	2.87E+00
NICKEL	3.39E+01	0.00E+00	1.00E+00	3.39E+01	1.15E+01	1.58E+00	3.16E+00	7.26E+00	3.63E+00
ZINC	1.17E+02	2.23E-02	1.00E+00	1.17E+02	3.95E+01	6.32E+00	1.26E+01	6.25E+00	3.13E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4,6-Trinitrotoluene, RDX) were only detected in the surface water.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	6.864 kg	
Food Ingestion Rate = (If)	1.3388 kg/day	
Water Ingestion Rate = (Iw)	0.5664 L/day	
Soil/Sediment Ingestion Rate = (Is)	0.1258472 kg/day	
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(Iv*Cv+Ii*Ci+Is*Cs+Iw*Cw)H]/BW

Cs = Contaminant concentration in sediment
Cw = Contaminant concentration in water
Cv = Contaminant conc. in fish (=sed conc.* Biotransfer Factor*% lipid)/average % TOC
Average % TOC is not in the Cv equation for inorganics
H=HR/CA (Assume = to 1 for maximum exposure)

Raccoon
Average Inputs

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL HAZARD QUOTIENT CALCULATION
RACCOON - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameters	Max. Sed. Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (sed to fish)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQn	LOAEL HQl
Energetics									
2,4,6-TRINITROTOLUENE	0.00E+00	1.08E-03	3.30E+01	0.00E+00	8.91E-05	8.16E-02	8.16E-01	1.09E-03	1.09E-04
2-AMINO-4,6-DINITROTOLUENE	0.00E+00	4.37E-04	1.00E+00	0.00E+00	3.61E-05	NV	NV	#VALUE!	#VALUE!
4-AMINO-2,6-DINITROTOLUENE	0.00E+00	6.51E-04	1.00E+00	0.00E+00	5.37E-05	NV	NV	#VALUE!	#VALUE!
HMX	4.48E-03	8.06E-03	1.00E+00	1.45E-02	3.57E-03	1.31E-02	3.28E-02	2.73E-01	1.09E-01
RDX	0.00E+00	4.24E-03	1.90E+02	0.00E+00	3.50E-04	3.06E-02	1.53E-01	1.14E-02	2.29E-03
Inorganics									
ARSENIC	1.16E+01	5.08E-04	1.00E+00	1.16E+01	2.48E+00	5.51E-04	5.51E-03	4.51E+03	4.51E+02
CADMIUM	9.40E-01	0.00E+00	1.00E+00	9.40E-01	2.01E-01	4.41E-02	4.41E-01	4.55E+00	4.55E-01
CHROMIUM	2.35E+01	0.00E+00	1.00E+00	2.35E+01	5.00E+00	1.67E-01	6.70E-01	2.99E+01	7.47E+00
COPPER	1.03E+01	1.08E-03	1.00E+00	1.03E+01	2.21E+00	1.71E+00	2.21E+00	1.29E+00	1.00E+00
LEAD	2.22E+01	0.00E+00	1.00E+00	2.22E+01	4.74E+00	4.08E-01	4.08E+00	1.16E+01	1.16E+00
NICKEL	2.10E+01	0.00E+00	1.00E+00	2.10E+01	4.47E+00	2.04E+00	4.08E+00	2.19E+00	1.10E+00
ZINC	8.20E+01	1.45E-02	1.00E+00	8.20E+01	1.75E+01	8.16E+00	1.63E+01	2.15E+00	1.07E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.
Fish BCFs were used when parameters (2,4,6-Trinitrotoluene, RDX) were only detected in the surface water.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	7.73E-02	kg
Food Ingestion Rate = (If)	1.23E-01	kg/day
Water Ingestion Rate = (Iw)	1.21E-02	L/day
Soil Ingestion Rate = (Is)	1.28E-02	kg/day
Home Range = (HR)	Assume 100% on site	
Contaminated Area = (CA)	Assume equal to home range	

Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW

Cs = Contaminant concentration in soil
Cw = Contaminant concentration in water
Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)
H=HR/CA (Assume = to 1 for maximum exposure)

American Robin
Conservative Inputs

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to Inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	3.22E-01	2.00E-03	1.00E+00	3.22E-01	5.67E-01	NV	NV	#VALUE!	#VALUE!
2-amino-4,6-dinitrotoluene	3.23E-01	4.10E-04	1.00E+00	3.23E-01	5.67E-01	NV	NV	#VALUE!	#VALUE!
HMX	5.50E+01	2.20E-02	1.00E+00	5.50E+01	9.67E+01	NV	NV	#VALUE!	#VALUE!
RDX	6.91E-01	1.80E-02	1.00E+00	6.91E-01	1.22E+00	NV	NV	#VALUE!	#VALUE!
Inorganics									
Zinc	4.28E+01	2.23E-02	2.06E+00	8.81E+01	1.47E+02	1.45E+01	1.31E+02	1.02E+01	1.13E+00

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	8.10E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**American Robin**
Food Ingestion Rate = (If)	9.76E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	1:13E-02	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.02E-02	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
AMERICAN ROBIN - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	2.78E-01	1.08E-03	1.00E+00	2.78E-01	3.70E-01	NV	NV	#VALUE!	#VALUE!
2-amino-4,6-dinitrotoluene	2.78E-01	4.37E-04	1.00E+00	2.78E-01	3.70E-01	NV	NV	#VALUE!	#VALUE!
HMX	1.11E+01	8.06E-03	1.00E+00	1.11E+01	1.48E+01	NV	NV	#VALUE!	#VALUE!
RDX	4.30E-01	4.24E-03	1.00E+00	4.30E-01	5.73E-01	NV	NV	#VALUE!	#VALUE!
Inorganics									
Zinc	3.40E+01	1.45E-02	5.12E-01	1.74E+01	2.53E+01	1.45E+01	1.31E+02	1.74E+00	1.93E-01

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.53E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	1.62E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	4.30E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	2.11E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	3.22E-01	2.00E-03	1.00E+00	3.22E-01	3.88E-01	2.92E+01	2.92E+02	1.33E-02	1.33E-03
2-amino-4,6-dinitrotoluene	3.23E-01	4.10E-04	1.00E+00	3.23E-01	3.87E-01	NV	NV	#VALUE!	#VALUE!
HMX	5.50E+01	2.20E-02	1.00E+00	5.50E+01	6.60E+01	4.69E+00	1.17E+01	1.41E+01	5.64E+00
RDX	6.91E-01	1.80E-02	1.00E+00	6.91E-01	8.35E-01	1.09E+01	5.47E+01	7.64E-02	1.53E-02
Inorganics									
Zinc	4.28E+01	2.23E-02	2.06E+00	8.81E+01	9.95E+01	2.92E+03	5.83E+03	3.41E-02	1.71E-02

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	1.69E-02	kg	Dose=[(If*Ci+Is*Cs+Iw*Cw)H]/BW	**Short-Tailed Shrew**
Food Ingestion Rate = (If)	1.03E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	3.80E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	1.34E-03	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Ci = Contaminant conc. in soil invertebrates (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
SHORT-TAILED SHREW - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to inv.)	Invertebrate Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	2.78E-01	1.08E-03	1.00E+00	2.78E-01	1.92E-01	3.32E+01	3.32E+02	5.79E-03	5.79E-04
2-amino-4,6-dinitrotoluene	2.78E-01	4.37E-04	1.00E+00	2.78E-01	1.92E-01	NV	NV	#VALUE!	#VALUE!
HMX	1.11E+01	8.06E-03	1.00E+00	1.11E+01	7.66E+00	5.33E+00	1.33E+01	1.44E+00	5.74E-01
RDX	4.30E-01	4.24E-03	1.00E+00	4.30E-01	2.98E-01	1.24E+01	6.22E+01	2.39E-02	4.78E-03
Inorganics									
Zinc	3.40E+01	1.45E-02	5.12E-01	1.74E+01	1.33E+01	3.32E+03	6.64E+03	4.02E-03	2.01E-03

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	3.29E-02	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)H]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	1.28E-02	kg/day		**Conservative Inputs**
Water Ingestion Rate = (Iw)	7.70E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	3.07E-04	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - CONSERVATIVE INPUTS
NSWC CRANE, INDIANA

Parameter	Max. Soil Concentration (mg/kg)	Max. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	3.22E-01	2.00E-03	3.60E-01	1.16E-01	4.86E-02	1.43E+01	1.43E+02	3.40E-03	3.40E-04
2-amino-4,6-dinitrotoluene	3.23E-01	4.10E-04	1.00E+00	3.23E-01	1.29E-01	NV	NV	#VALUE!	#VALUE!
HMX	5.50E+01	2.20E-02	3.50E+00	1.93E+02	7.54E+01	2.30E+00	5.75E+00	3.28E+01	1.31E+01
RDX	6.91E-01	1.80E-02	9.40E-02	6.50E-02	3.59E-02	5.37E+00	2.69E+01	6.69E-03	1.34E-03
Inorganics									
Zinc	4.28E+01	2.23E-02	5.46E-01	2.33E+01	9.49E+00	1.43E+03	2.86E+03	6.62E-03	3.31E-03

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

Body Weight = (BW)	3.66E-02	kg	Dose=[(If*Cv+Is*Cs+Iw*Cw)(H)]/BW	**Meadow Vole**
Food Ingestion Rate = (If)	1.19E-02	kg/day		**Average Inputs**
Water Ingestion Rate = (Iw)	6.40E-03	L/day	Cs = Contaminant concentration in soil	
Soil Ingestion Rate = (Is)	2.86E-04	kg/day	Cw = Contaminant concentration in water	
Home Range = (HR)	Assume 100% on site		Cv = Contaminant conc. in vegetation (=soil conc. * Biotransfer Factor)	
Contaminated Area = (CA)	Assume equal to home range		H=HR/CA (Assume = to 1 for maximum exposure)	

SWMU 10 - ROCKEYE
TERRESTRIAL WILDLIFE MODEL ECOLOGICAL EFFECTS QUOTIENT CALCULATION
MEADOW VOLE - AVERAGE INPUTS
NSWC CRANE, INDIANA

Parameter	Avg. All Soil Concentration (mg/kg)	Avg. SW Concentration (mg/L)	Biotransfer Factor (soil to veg.)	Vegetation Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL EEQn	LOAEL EEQl
Energetics									
2,4,6-trinitrotoluene	2.78E-01	1.08E-03	3.60E-01	1.00E-01	3.49E-02	1.53E+01	1.53E+02	2.28E-03	2.28E-04
2-amino-4,6-dinitrotoluene	2.78E-01	4.37E-04	1.00E+00	2.78E-01	9.26E-02	NV	NV	#VALUE!	#VALUE!
HMX	1.11E+01	8.06E-03	3.50E+00	3.89E+01	1.27E+01	2.46E+00	6.14E+00	5.17E+00	2.07E+00
RDX	4.30E-01	4.24E-03	9.40E-02	4.04E-02	1.72E-02	5.73E+00	2.87E+01	3.01E-03	6.01E-04
Inorganics									
Zinc	3.40E+01	1.45E-02	1.10E-01	3.74E+00	1.48E+00	1.53E+03	3.06E+03	9.70E-04	4.85E-04

NV - No Value Established
#VALUE! - Value could not be calculated
Cells are shaded if the EEQ is greater than 1.0.

Definitions:
EEQ - Ecological Effects Quotient
NOAEL - No Observed Adverse Effects Level
LOAEL - Lowest Observed Adverse Effects Level

APPENDIX H.5

CHECKLISTS FOR ECOLOGICAL ASSESSMENTS

Checklist for Ecological Assessment/Sampling

I. SITE DESCRIPTION

1. Site Name: NSWC CRANE

   Location: SWMU 4 - McCOMISH GORGE

   County: MARTIN City: CRANE State: INDIANA

2. Latitude: ~38° 53' N Longitude: ~ 86° 54' E

3. What is the approximate area of the site? 10.3 ACRES

4. Is this the first site visit? ☐ yes ☑ no If no, attach trip report of previous site visit(s), if available.

   Date(s) of previous site visit(s): 12-17-00 SURFACE WATER + SEDIMENT SAMPLING

5. Please attach to the checklist USGS topographic map(s) of the site, if available.

   SEE FIGURE 1-1 OF the NSWC CRANE RFI REPORT OF WHICH THIS ASSESSMENT IS AN APPENDIX.

6. Are aerial or other site photographs available? ☑ yes ☐ no If yes, please attach any available photo(s) to the site map at the conclusion of this section.

   SEE FIGURES 1-4, 1-5 & 1-6 OF the NSWC CRANE RFI REPORT OF WHICH THIS ASSESSMENT IS AN APPENDIX.

7. The land use on the site is:

_____% Urban

_____% Rural

_____% Residential

_____% Industrial (☐ light ☐ heavy)

_____% Agricultural

(Crops:_____)

_____% Recreational

(Describe; note if it is a park, etc.)

_____

_____

57 % ~~Undisturbed~~ FORESTED

43 % Other :
31% OLD FIELD
12% MAINTAINED GRASS

The area surrounding the site is:
_____ mile radius

_____% Urban

_____% Rural

_____% Residential

~~_____% Industrial (☐ light ☐ heavy)~~

_____% Agricultural

(Crops:_____)

_____% Recreational

(Describe; note if it is a park, etc.)

_____

_____

_____% Undisturbed

_____% Other

8. Has any movement of soil taken place at the site? ☑ yes ☐ no. If yes, please identify the most likely cause of this disturbance:

_____ Agricultural Use	✓ Heavy Equipment	_____ Mining
_____ Natural Events	✓ Erosion	_____ Other

Please describe:

THIS SITE WAS A FORMER DUMP SITE.

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

Two wetlands appear in the NW portion of the SWMU (see Figure 1-5). They are outside of the "Estimated Limits of Disposal" and are separated from the disposal area by a steep ridge.
A third wetlands area is located just E of the SWMU & is discussed further in Section 1

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

SWMU is outside of FEMAs floodplain (Zone A).

10. What type of facility is located at the site?

☐ Chemical ☐ Manufacturing ☐ Mixing ☑ Waste disposal

☐ Other (specify)_____

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

Volatiles, semivolatiles, pesticides, PCBs, herbicides & metals (Ca, Fe, Mg, K, & Na) + Cyanide. See sections 1.6 & 4.4 of the NSWC Crane RFI Report of which this assessment is an Appendix for detailed information.

12. Check any potential routes of off-site migration of contaminants observed at the site:

☐ Swales ☐ Depressions ☐ Drainage ditches

☐ Runoff ☐ Windblown particulates ☐ Vehicular traffic

☐ Other (specify) Intermittent stream South of Jeep Trail

13. If known, what is the approximate depth to the water table? Water level Range = 6' – 33'
~6' @ Low elevations & ~30' @ higher elevations

14. Is the direction of surface runoff apparent from site observations? ☑ yes ☐ no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

☑ Surface water ☐ Groundwater ☐ Sewer ☐ Collection impoundment

South portion of site only; Major portion of disposal area is contained

15. Is there a navigable waterbody or tributary to a navigable waterbody? ☐ yes ☒ no

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist – Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist – Flowing Systems.

☑ yes (approx. distance_____) ☐ no

↳ Culpepper Branch Northern SWMU Boundary

17. Is there evidence of flooding? ☐ yes ☒ no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use a blank sheet if additional space is needed for text.]

NA

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐ yes ☐ no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

The Indiana Bat has been observed on NSWC Crane, Although not @ McComish Gorge

20. Record weather conditions at the time this checklist was prepared:

DATE: 3-11-02

33-44°F Temperature (°C/°F)

52.6°F Normal daily high temperature Source Martin Co. Soil Survey

South Wind (direction/speed)

None Precipitation (rain, snow)

Clear Cloud cover

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

Old field comprises 31% (3.2 acres) of SWMU 4 and approximately 65% of the estimated dumpsite disposal area while wooded areas comprise 57% (5.9 acres) of SWMU 4 and approximately 35% of the estimated dumpsite disposal area. Approximately 12% (1.2 acres) of SWMU 4 is vegetated with maintained grass along access roads (Jeep Trail 1 and Highway 140).

The forested area, although it makes up a large portion of SWMU 4, occurs for the most part along the perimeter of the estimated disposal area. Transitional old field comprises most of the disposal area and is dominated by grasses and forbs (goldenrod, etc.) with scattered woody plant species (honey locust, sycamore, etc.) making up < 10% of the total cover.

The SWMU's northern boundary is Culpepper Branch, however there's a steep wooded ridg running between and separating Culpepper Branch from the former site disposal area. Th eastern site boundary is an elevated road and railroad (Highway 140 and Railroad 140). Furthermore, the majority of the disposal area is an oval shaped bowl with elevated sides thus preventing any surface water drainage from leaving the portion of the former disposal area north of Jeep Trail 1. However, there is an intermittent stream that runs west to east in the small wooded portion of the estimated former disposal area just south of Jeep Trail 1. This stream parallels the Jeep Tail and eventually flows under Highway 140, there on the east side of Highway 140 it turns and flows north toward a small bowl shaped marshy area where drainage is confined by elevated Highway 140 and the raised south bank of Culpepper Branch. Therefore, most site drainage is either confined to the site or to the small marshy area just east of the site along Highway 140.

At the time of this assessment the intermittent stream south of Jeep Trail 1 was dry and Culpepper Branch had a low to moderate flow. Culpepper Branch flows into First Creek, which eventually flows off of NSWC Crane property into Daviess County. The occurrence of aquatic receptors (i.e. fish, and sediment invertebrates) would be unlikely within the estimated limits of the disposal area, however, they could occur along the northern boundary of SWMU 4 in Culpepper Branch. Surface water flow would probably only occur during extended periods of heavy rain and spring thaw in the intermittent stream in the southern portion of SWMU 4 south of Jeep Trail 1. Furthermore, SWMU 4 is located outside of FEMAs flood hazard area (Zone A). Additionally, the Martin County soil survey considers most of SWMU 4 a poor to very poor site for wetland plants. The exception to this is the strip of bottomland along Culpepper Branch. This strip of land received a fair rating for wetland plants.

See the 1998 aerial photograph shown in Figure 1-4, the marked up SWMU 4 base map showing the location and direction of site photographs in Figure 1-5 and the nine (9) site photographs presented in Figure 1-6 of this RFI Report to enhance site familiarity.

Completed by TERRY ROJAHN Affiliation T+NUS

Additional Preparers KEITH SIMPSON

Site Manager U.S. NAVY

Date 3-11-02

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? ☑ yes ☐ no If no, go to Section IIB: Shrub/Scrub.

2. What percentage or area of the site is wooded? (57 % 5.9 acres). Indicate the wooded area on the site map which is attached to a copy of this checklist. Please identify what information was used to determine the wooded area of the site. 1998 Aerial photography

3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen/Deciduous/ Mixed) Provide a photograph, if available.

   Dominant plant, if known:_____

4. What is the predominant size of the trees at the site? Use diameter at breast height.

   ☐ 0-6 in. ☐ 6-12 in. ☐ > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.

Time Restricted

IIB. SHRUB/SCRUB

1. Is shrub/scrub vegetation present at the site? ☐ yes ☑ no If no, go to Section IIC: Open Field.

2. What percentage of the site is covered by scrub/shrub vegetation? (_____% _____ acres). Indicate the areas of shrub/scrub on the site map. Please identify what information was used to determine this area.

3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph, if available.

4. What is the approximate average height of the scrub/shrub vegetation?

   ☐ 0-2 ft. ☐ 2-5 ft. ☐ > 5 ft.

5. Based on site observations, how dense is the scrub/shrub vegetation?

☐ Dense ☐ Patchy ☐ Sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? ☐ yes ☐ no If yes, please indicate the type below:

☐ Prairie/plains ☐ Savannah ☑ Old field ☐ Other (specify)_____

2. What percentage of the site is open field? (31 % 3.2 acres). Indicate the open fields on the site map.

3. What is/are the dominant plant(s)? Provide a photograph, if available.

<10% Tree canopy - Honey locust & Sycamore
Dominant shrubs - Rubus sp & Multi flora Rose
Dominant Herbaceous - Grasses & Forbs (Goldenrod)
Grasses = Dominant species

4. What is the approximate average height of the dominant plant? 6"

5. Describe the vegetation cover: ☑ Dense ☐ Sparse ☐ Patchy

IID. MISCELLANEOUS

1. Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub, and open field? ☑ yes ☐ no If yes, identify and describe them below.

Maintained grass - along access roads

2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.?

NONE - DUE to TIME RESTRICTIONS.

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

III. AQUATIC HABITAT CHECKLIST – NON-FLOWING SYSTEMS NA

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type of open-water, non-flowing system is present at the site?

   ☐ Natural (pond, lake)
   ☐ Artificially created (lagoon, reservoir, canal, impoundment)

2. If known, what is the name(s) of the waterbody(ies) on or adjacent to the site?

   _____

3. If a waterbody is present, what are its known uses (e.g.: recreation, navigation, etc.)?

4. What is the approximate size of the waterbody(ies)? _____ acre(s).

5. Is any aquatic vegetation present? ☐ yes ☐ no If yes, please identify the type of vegetation present if known.

   ☐ Emergent ☐ Submergent ☐ Floating

6. If known, what is the depth of the water? _____

7. What is the general composition of the substrate? Check all that apply.

   ☐ Bedrock ☐ Sand (coarse) ☐ Muck (fine/black)
   ☐ Boulder (>10 in.) ☐ Silt (fine) ☐ Debris
   ☐ Cobble (2.5-10 in.) ☐ Marl (shells) ☐ Detritus
   ☐ Gravel (0.1-2.5 in.) ☐ Clay (slick) ☐ Concrete
   ☐ Other (specify)_____

8. What is the source of water in the waterbody?

   ☐ River/Stream/Creek ☐ Groundwater ☐ Other (specify)_____
   ☐ Industrial discharge ☐ Surface runoff

9. Is there a discharge from the site to the waterbody? ☐ yes ☐ no If yes, please describe this discharge and its path.

10. Is there a discharge from the waterbody? ☐ yes ☐ no If yes, and the information is available, identify from the list below the environment into which the waterbody discharges.

☐ River/Stream/Creek	☐ onsite	☐ offsite	Distance_____
☐ Groundwater	☐ onsite	☐ offsite	
☐ Wetland	☐ onsite	☐ offsite	Distance_____
☐ Impoundment	☐ onsite	☐ offsite	

11. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected provide the measurement and the units of measure below:

_____ Area

_____ Depth (average)

_____ ~~Temperature (depth of the water at which the reading was taken)~~ _____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)

_____ Other (specify)

12. Describe observed color and area of coloration.

13. Mark the open-water, non-flowing system on the site map attached to this checklist.

14. What observations, if any, were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

IV. AQUATIC HABITAT CHECKLIST – FLOWING SYSTEMS

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type(s) of flowing water system(s) is (are) present at the site?

☐ River	☑ Stream	☐ Creek
☐ Dry wash	☐ Arroyo	☐ Brook
☐ Artificially created (ditch, etc.)	☑ Intermittent Stream	☐ Channeling
	☐ Other (specify)_____	

2. If known, what is the name of the waterbody? CULPEPPER BRANCH

3. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)?
☑ yes ☐ no If yes, please describe indicators that were observed.
Culvert under Highway 140

4. What is the general composition of the substrate? Check all that apply.

☐ Bedrock	☑ Sand (coarse)	☐ Muck (fine/black)
☑ Boulder (>10 in.)	☑ Silt (fine)	☐ Debris
☑ Cobble (2.5-10 in.)	☐ Marl (shells)	☐ Detritus
☑ Gravel (0.1-2.5 in.)	☑ Clay (slick)	☐ Concrete
☐ Other (specify)_____		

5. What is the condition of the bank (e.g., height, slope, extent of vegetative cover)?
HT - 2-4' FOR THE MOST PART
SLOPE - GENTLE
VEG - NONE

6. Is the system influenced by tides? ☐ yes ☑ no What information was used to make this determination?

7. Is the flow intermittent? ☐ yes ☐ no If yes, please note the information that was used in making this determination.

Possibly – but there was flow during both visits 12/17/00 & 3/11/02.

12/17/00 → Flow was measured @ 2,000 - 4,000 gpm

3/11/02 → Flow was low to moderate (visual)

8. Is there a discharge from the site to the waterbody? ☐ yes ☐ no If yes, please describe the discharge and its path.

SEE SECTION 1A

9. Is there a discharge from the waterbody? ☑ yes ☐ no If yes, and the information is available, please identify what the waterbody discharges to and whether the discharge is on site or off site.

Culpepper Branch → First Creek

First Creek flows off NSWC Crane property into Daviess County, Indiana.

10. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected, provide the measurement and the units of measure in the appropriate space below:

8.3' → 19.7'	Width (ft.)
0.35' → 1.5'	Depth (ft.)
2,000 → 4,000	Velocity (specify units): gpm
0.25° → 0.43°C	Temperature (depth of the water at which the reading was taken MID ~6")
7.67 → 8.40	pH
12.69 → 14.21	Dissolved oxygen mg/L
NA	Salinity
5.4-6.5 NTUs	Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth NA)
-36 → +73.6 mV	Other (specify) ORP
0.209 → 0.213 mS/cm	Specific Cond.

Sampled Culpepper Branch @ three locations on 12/17/00 the information presented is the range for those three locations.

11. Describe observed color and area of coloration.

CLEAR

12. Is any aquatic vegetation present? ☐ yes ☑ no If yes, please identify the type of vegetation present, if known.

☐ Emergent ☐ Submergent ☐ Floating

13. Mark the flowing water system on the attached site map.

14. What observations were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

NONE

V. WETLAND HABITAT CHECKLIST

1. Based on observations and/or available information, are designated or known wetlands definitely present at the site?
☑ yes ☐ no

SOURCE!

Please note the sources of observations and information used (e.g. USGS Topographic Maps, National Wetland Inventory, Federal or State Agency, etc.) to make this determination.

SHOWN ON FIGURE 1-5 OF THE NSWC CRANE RFI REPORT OF WHICH THIS ASSESSMENT IS AN APPENDIX.
SEE ALSO CHECKLIST QUESTION I9 OF THIS ASSESSMENT.
WETLANDS WERE NOT VISITED DUE TO TIME CONSTRAINTS.

2. Based on the location of the site (e.g., along a waterbody, in a floodplain) and site conditions (e.g., standing water; dark, wet soils; mud cracks; debris line; water marks), are wetland habitats suspected?
☐ yes ☐ no If yes, proceed with the remainder of the wetland habitat identification checklist.

3. What type(s) of vegetation are present in the wetland?

☐ Submergent ☐ Emergent
☐ Scrub/Shrub ☐ Wooded

☐ Other (specify)_____

4. Provide a general description of the vegetation present in and around the wetland (height, color, etc.). Provide a photograph of the known or suspected wetlands, if available.

5. Is standing water present? ☐ yes ☐ no If yes, is this water: ☐ Fresh ☐ Brackish
What is the approximate area of the water (sq. ft.)?_____
Please complete questions 4, 11, 12 in Checklist III - Aquatic Habitat -- Non-Flowing Systems.

6. Is there evidence of flooding at the site? What observations were noted?

☐ Buttressing ☐ Water marks ☐ Mud cracks

☐ Debris line ☐ Other (describe below)

7. If known, what is the source of the water in the wetland?

☐ Stream/River/Creek/Lake/Pond ☐ Groundwater

☐ Flooding ☐ Surface Runoff

8. Is there a discharge from the site to a known or suspected wetland? ☒ yes ☐ no If yes, please describe.

Just East of SWMU.
Discussed in Section IA of this Assessment.

9. Is there a discharge from the wetland? ☐ yes ☒ no. If yes, to what waterbody is discharge released?

☐ Surface Stream/River ☒ Groundwater ☐ Lake/Pond ☐ Marine
↳ Possible

10. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response.

Color (blue/gray, brown, black, mottled) Brown, Silt, Trace Sand Abundant organics

Water content (dry, wet, saturated/unsaturated) Saturated

11. Mark the observed wetland area(s) on the attached site map.

See photograph #3 Figure 1-6 of the NSWC Crane RFI Report of which this Assessment is an Appendix.

Checklist for Ecological Assessment/Sampling

I. SITE DESCRIPTION

1. Site Name: NSWC CRANE

   Location: SWMU 5 - OLD BURN PIT

   County: MARTIN City: CRANE State: INDIANA

2. Latitude: ~38° 53'N Longitude: ~86° 54' E

3. What is the approximate area of the site? 28.5 ACRES

4. Is this the first site visit? ☐ yes ☑ no If no, attach trip report of previous site visit(s), if available.

   Date(s) of previous site visit(s): 12/19/00 SURFACE WATER & SEDIMENT SAMPLING

5. Please attach to the checklist USGS topographic map(s) of the site, if available.
   SEE FIGURE 1-1 OF THE NSWC CRANE RFI REPORT OF WHICH THIS ASSESSMENT IS AN APPENDIX.

6. Are aerial or other site photographs available? ☐ yes ☐ no If yes, please attach any available photo(s) to the site map at the conclusion of this section.
   SEE FIGURES 1-7, 1-8 & 1-9 OF THE NSWC CRANE RFI REPORT OF WHICH THIS ASSESSMENT IS AN APPENDIX.

7. The land use on the site is:

The area surrounding the site is:
_____ mile radius

____% Urban	____% Urban
____% Rural	____% Rural
____% Residential	____% Residential
10 % Industrial (☑ light ☐ heavy)	____% ~~Industrial (☐ light ☐ heavy)~~
____% Agricultural	____% Agricultural
(Crops:_____)	*(Crops:_____)*
____% Recreational	____% Recreational
(Describe; note if it is a park, etc.)	*(Describe; note if it is a park, etc.)*
_____	_____
_____	_____
64 % ~~Undisturbed~~ FORESTED	____% Undisturbed
26 % Other GRASSY (MAINTAINED)	____% Other

8. Has any movement of soil taken place at the site? ☐ yes ☐ no. If yes, please identify the most likely cause of this disturbance:

____ Agricultural Use	✓ Heavy Equipment	____ Mining
____ Natural Events	✓ Erosion	✓ Other

Please describe:

THIS SITE WAS A FORMER BURING AREA & BURIAL SITE

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

No

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

SWMU is outside of FEMA's floodplain (Zone A). Martin Co. soil survey considers this SWMU a very poor site for wetland plants.

10. What type of facility is located at the site?

☐ Chemical ☐ Manufacturing ☐ Mixing ☑ Waste disposal

☐ Other (specify)_____

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

Volitiles, SVOCs, Pesticides, PCB, Herbicides, Metals, Cyanide Dioxins & Furans are discussed in Section 1.6 & 5.4 of the NSWC Crane RFI Report of which this assessment is an appendix.

12. Check any potential routes of off-site migration of contaminants observed at the site:

☑ Swales ☐ Depressions ☐ Drainage ditches

☐ Runoff ☐ Windblown particulates ☐ Vehicular traffic

☐ Other (specify) Streams

13. If known, what is the approximate depth to the water table? 5' BGS in low elevations ~20' BGS in higher elevations

14. Is the direction of surface runoff apparent from site observations? ☑ yes ☐ no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

☑ Surface water ☐ Groundwater ☐ Sewer ☐ Collection impoundment

→ Culpepper Branch

15. Is there a navigable waterbody or tributary to a navigable waterbody? ☐ yes ☒ no

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist – Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist – Flowing Systems.

☑ yes (approx. distance <2,000') ☐ no

↳ Culpepper BRANCH

17. Is there evidence of flooding? ☐ yes ☒ no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use a blank sheet if additional space is needed for text.]

NA

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐ yes ☐ no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

THE INDIANA BAT HAS BEEN OBSERVED ON NSWC CRANE, ALTHOUGH NOT @ OLD BURN PIT SWMU.

20. Record weather conditions at the time this checklist was prepared:

DATE: 3-11-02

33-44°F Temperature (°C/°F)

52.6°F Normal daily high temperature

SOURCE: MARTIN CO SOIL SURVEY

SOUTH Wind (direction/speed)

NONE Precipitation (rain, snow)

CLEAR Cloud cover

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

SWMU 5 is comprised of 64% (18.4 acres) forested, 26% (7.4 acres) grassy and 10% (2.7 acres) light industry. Grassy areas consist of maintained grass along Highway 331, cleared areas providing access to groundwater monitoring wells, and transmission line corridors. Light industry areas consist of gravel parking areas (former burning pit location) for delivery trailers.

The forested area, for the most part, consisted of mixed hardwoods. Canopy species encounter include maples (red, sugar and boxelder maple), sycamore, oaks, hickories, black cherry, yellow poplar (tulip tree), and American elm with black locust as the dominant species in highly disturbed areas. Commonly encountered understory species included maples, white ash, bitternut hickory, flowering dogwood, multiflora rose, and poison ivy.

There are three drainage systems within the confines of SWMU 5 all of which drain away from nearby Lake Oberlin. The first drainage system enters the north central portion of the site and drains from the northeast in a southwest direction and collects in a bowl shaped depression with no apparent discharge point. The second drainage system enters the northwest portion of the site and flows south - exiting the site by flowing under Highway 331 via a 4.5' culvert into a tributary of Culpepper Branch. This drainage system flows through a steep gully littered with metal scrap. The third and final drainage system originates in the southwest corner of the site. It exits the site via a concrete swale and crosses under Highway 331 via a culvert where it eventually flows into a tributary of Culpepper Branch.

At the time of this assessment the first drainage system was dry while the second and third drainage systems had low flows. The latter two streams as mentioned earlier flow into Culpepper Branch tributaries, which flow into Culpepper Branch, which discharges into First Creek. First Creek eventually flows off of NSWC Crane property into Daviess County. SWMU 5 is located outside of FEMAs flood hazard area (Zone A). Additionally, the Martin County soil survey considers SWMU 5 a very poor site for wetland plants.

Spring peepers were vocally confirmed in the area of the second drainage system and wild turkey tracks were observed near the drainage system in the southwest corner of SWMU 5.

See the 1998 aerial photograph shown in Figure 1-7, the marked up SWMU 5 base map showing the location and direction of site photographs in Figure 1-8 and the nine (9) site photographs presented in Figure 1-9 of this RFI Report to enhance site familiarity.

Completed by TERRY ROSAHN Affiliation T+NUS

Additional Preparers KEITH SIMPSON

Site Manager U.S. NAVY

Date 3-11-02

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? ☒ yes ☐ no If no, go to Section IIB: Shrub/Scrub.

2. What percentage or area of the site is wooded? (64 % 18.4 acres). Indicate the wooded area on the site map which is attached to a copy of this checklist. Please identify what information was used to determine the wooded area of the site. 1998 AERIAL PHOTOGRAPHY

3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen/Deciduous/ Mixed) Provide a photograph, if available.

   Dominant plant, if known: BLACK LOCUST IN HEAVILY DISTURBED AREAS

4. What is the predominant size of the trees at the site? Use diameter at breast height.

   ☐ 0-6 in. ☒ 6-12 in. ☐ > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.
   MAPLES, OAKS, WHITE ASH, BITTERNUT HICKORY, FLOWERING DOGWOOD, MULTIFLORA ROSE & POISON IVY.

IIB. SHRUB/SCRUB (NA)

1. Is shrub/scrub vegetation present at the site? ☐ yes ☒ no If no, go to Section IIC: Open Field.

2. What percentage of the site is covered by scrub/shrub vegetation? (_____% _____ acres). Indicate the areas f shrub/scrub on the site map. Please identify what information was used to determine this area.

3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph, if available.

4. What is the approximate average height of the scrub/shrub vegetation?

   ☐ 0-2 ft. ☐ 2-5 ft. ☐ > 5 ft.

5. Based on site observations, how dense is the scrub/shrub vegetation?

☐ Dense ☐ Patchy ☐ Sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? ☑ yes ☐ no If yes, please indicate the type below:

☐ Prairie/plains ☐ Savannah ☐ Old field ☑ Other (specify) MAINTAINED GRASS

2. What percentage of the site is open field? (26 % 7.4 acres). Indicate the open fields on the site map.

3. What is/are the dominant plant(s)? Provide a photograph, if available.

GRASSES

4. What is the approximate average height of the dominant plant? 4-6"

5. Describe the vegetation cover: ☑ Dense ☐ Sparse ☐ Patchy

IID. MISCELLANEOUS

~~1. Are other types of terrestrial habitats present at the~~ site, other than woods, scrub/shrub, and open field? ☐ yes ☑ no If yes, identify and describe them below.

2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.?

Wild Turkey tracks observed & Spring peepers confirmed vocally.

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

III. AQUATIC HABITAT CHECKLIST -- NON-FLOWING SYSTEMS N/A

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type of open-water, non-flowing system is present at the site?

   ☐ Natural (pond, lake)
   ☐ Artificially created (lagoon, reservoir, canal, impoundment)

2. If known, what is the name(s) of the waterbody(ies) on or adjacent to the site?

   _____

3. If a waterbody is present, what are its known uses (e.g.: recreation, navigation, etc.)?

4. What is the approximate size of the waterbody(ies)? _____ acre(s).

5. Is any aquatic vegetation present? ☐ yes ☐ no If yes, please identify the type of vegetation present if known.

   ☐ Emergent ☐ Submergent ☐ Floating

6. If known, what is the depth of the water? _____

7. What is the general composition of the substrate? Check all that apply.

   ☐ Bedrock ☐ Sand (coarse) ☐ Muck (fine/black)
   ☐ Boulder (>10 in.) ☐ Silt (fine) ☐ Debris
   ☐ Cobble (2.5-10 in.) ☐ Marl (shells) ☐ Detritus
   ☐ Gravel (0.1-2.5 in.) ☐ Clay (slick) ☐ Concrete
   ☐ Other (specify)_____

8. What is the source of water in the waterbody?

   ☐ River/Stream/Creek ☐ Groundwater ☐ Other (specify)_____
   ☐ Industrial discharge ☐ Surface runoff

9. Is there a discharge from the site to the waterbody? ☐ yes ☐ no If yes, please describe this discharge and its path.

10. Is there a discharge from the waterbody? ☐ yes ☐ no If yes, and the information is available, identify from the list below the environment into which the waterbody discharges.

☐ River/Stream/Creek	☐ onsite	☐ offsite	Distance_____
☐ Groundwater	☐ onsite	☐ offsite	
☐ Wetland	☐ onsite	☐ offsite	Distance_____
☐ Impoundment	☐ onsite	☐ offsite	

11. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected provide the measurement and the units of measure below:

_____ Area

_____ Depth (average)

_____ ~~Temperature (depth of the water at which the reading was taken)~~ _____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)

_____ Other (specify)

12. Describe observed color and area of coloration.

13. Mark the open-water, non-flowing system on the site map attached to this checklist.

14. What observations, if any, were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

IV. AQUATIC HABITAT CHECKLIST – FLOWING SYSTEMS

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type(s) of flowing water system(s) is (are) present at the site?

☐ River	☑ Stream (possibly perennial)	☐ Creek
☐ Dry wash	☐ Arroyo	☐ Brook
☑ Artificially created (ditch, etc.)	☑ Intermittent Stream	☐ Channeling
	☐ Other (specify)_____	

2. If known, what is the name of the waterbody? TRIBUTARY to CULPEPPER BRANCH

3. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)?
☑ yes ☐ no If yes, please describe indicators that were observed.

Culverts, concrete swale.

4. What is the general composition of the substrate? Check all that apply.

☐ Bedrock	☑ Sand (coarse)	☐ Muck (fine/black)
☐ Boulder (>10 in.)	☑ Silt (fine)	☐ Debris
☐ Cobble (2.5-10 in.)	☐ Marl (shells)	☐ Detritus
☐ Gravel (0.1-2.5 in.)	☐ Clay (slick)	☐ Concrete
☐ Other (specify)_____		

5. What is the condition of the bank (e.g., height, slope, extent of vegetative cover)?

Ht = 2-3'
Slope = Gradual to somewhat steep
Veg. = None

6. Is the system influenced by tides? ☐ yes ☑ no What information was used to make this determination?

7. Is the flow intermittent? ☑ yes ☐ no If yes, please note the information that was used in making this determination.

WITH the possible EXCEPTION of the drainage SYSTEM IN the NW CORNER of the SWMU - possible perennial stream

8. Is there a discharge from the site to the waterbody? ☑ yes ☐ no If yes, please describe the discharge and its path.

Tributary → CULPEPPER BRANCH

9. Is there a discharge from the waterbody? ☐ yes ☐ no If yes, and the information is available, please identify what the waterbody discharges to and whether the discharge is on site or off site.

CULPEPPER BRANCH → First Creek → OFF NSWC CRANE PROPERTY into DAVIESS COUNTY

10. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected, provide the measurement and the units of measure in the appropriate space below:

2-3'	Width (ft.)
.35'	Depth (ft.)
92	Velocity (specify units): gpm
0.09 °C	Temperature (depth of the water at which the reading was taken MID)
7.99	pH
14.07 mg/l	Dissolved oxygen
—	Salinity
3.8 NTUs	Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth NA)
+24 mV 0.255 mS/cm	Other (specify) ORP Sp. Cond.

Data From drainage system IN the NW CORNER of SWMU Collected 12/19/00

11. Describe observed color and area of coloration.

CLEAR

12. Is any aquatic vegetation present? ☐ yes ☑ no If yes, please identify the type of vegetation present, if known.

☐ Emergent ☐ Submergent ☐ Floating

13. Mark the flowing water system on the attached site map.

14. What observations were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

SEE IA

No FISH OR INVERTEBRATES WERE OBSERVED.

V. WETLAND HABITAT CHECKLIST

1. Based on observations and/or available information, are designated or known wetlands definitely present at the site?
☐ yes ☒ no

   Please note the sources of observations and information used (e.g., USGS Topographic Maps, National Wetland Inventory, Federal or State Agency, etc.) to make this determination.

2. Based on the location of the site (e.g., along a waterbody, in a floodplain) and site conditions (e.g., standing water; dark, wet soils; mud cracks; debris line; water marks), are wetland habitats suspected?
☐ yes ☐ no If yes, proceed with the remainder of the wetland habitat identification checklist.

3. What type(s) of vegetation are present in the wetland?

   ☐ Submergent ☐ Emergent
   ☐ Scrub/Shrub ☐ Wooded

   ☐ Other (specify)_____

4. Provide a general description of the vegetation present in and around the wetland (height, color, etc.). Provide a photograph of the known or suspected wetlands, if available.

5. Is standing water present? ☐ yes ☐ no If yes, is this water: ☐ Fresh ☐ Brackish
   What is the approximate area of the water (sq. ft.)?_____
   Please complete questions 4, 11, 12 in Checklist III - Aquatic Habitat -- Non-Flowing Systems.

6. Is there evidence of flooding at the site? What observations were noted?

   ☐ Buttressing ☐ Water marks ☐ Mud cracks

   ☐ Debris line ☐ Other (describe below)

7. If known, what is the source of the water in the wetland?

☐ Stream/River/Creek/Lake/Pond ☐ Groundwater

☐ Flooding ☐ Surface Runoff

8. Is there a discharge from the site to a known or suspected wetland? ☐ yes ☐ no If yes, please describe.

9. Is there a discharge from the wetland? ☐ yes ☐ no. If yes, to what waterbody is discharge released?

☐ Surface Stream/River ☐ Groundwater ☐ Lake/Pond ☐ Marine

10. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response.

Color (blue/gray, brown, black, mottled) _____

Water content (dry, wet, saturated/unsaturated) _____

11. Mark the observed wetland area(s) on the attached site map.

Checklist for Ecological Assessment/Sampling

I. SITE DESCRIPTION

1. Site Name: NSWC CRANE

   Location: SWMU 9 - PESTICIDE CONTROL/ R-150 TANK

   County: MARTIN City: CRANE State: INDIANA

2. Latitude: ~38°51'N Longitude: ~86°50'E

3. What is the approximate area of the site? 11.8 ACRES

4. Is this the first site visit? ☐ yes ☑ no If no, attach trip report of previous site visit(s), if available.

   Date(s) of previous site visit(s): 12/13/00 SURFACE WATER & SEDIMENT SAMPLING

5. Please attach to the checklist USGS topographic map(s) of the site, if available.

   SEE FIGURE 1-1 OF the NSWC CRANE RFI REPORT OF WHICH this ASSESSMENT IS AN APPENDIX.

6. Are aerial or other site photographs available? ☐ yes ☐ no If yes, please attach any available photo(s) to the site map at the conclusion of this section.

   SEE FIGURES 1-10, 1-11 & 1-12 OF the NSWC CRANE RFI REPORT OF WHICH this ASSESSMENT IS AN APPENDIX.

7. The land use on the site is:

_____% Urban

_____% Rural

_____% Residential

33 % Industrial (☑ light ☐ heavy)

_____% Agricultural

(Crops:_____)

_____% Recreational

(Describe; note if it is a park, etc.)

_____

_____

12 % ~~Undisturbed~~ FORESTED

55 % Other : GRASSY

The area surrounding the site is:
_____ mile radius

_____% Urban

_____% Rural

_____% Residential

~~_____% Industrial (☐ light ☐ heavy)~~

_____% Agricultural

(Crops:_____)

_____% Recreational

(Describe; note if it is a park, etc.)

_____

_____

_____% Undisturbed

_____% Other

8. Has any movement of soil taken place at the site? ☐ yes ☑ no. If yes, please identify the most likely cause of this disturbance:

_____ Agricultural Use _____ Heavy Equipment _____ Mining

_____ Natural Events _____ Erosion _____ Other

Please describe:

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

No

Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

SWMU is well outside of FEMAs floodplain (Zone A). Martin Co. soil survey considers this SWMU a very poor to poor site for wetland plants.

10. What type of facility is located at the site?

☑ Chemical ☐ Manufacturing ☐ Mixing ☐ Waste disposal

☐ Other (specify) Pesticide Control

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

See Section 1.6 & 6.4 of the NSWC Crane RFI Report of which this assessment is an appendix.

12. Check any potential routes of off-site migration of contaminants observed at the site:

☑ Swales ☐ Depressions ☑ Drainage ditches

☐ Runoff ☐ Windblown particulates ☐ Vehicular traffic

☐ Other (specify)

13. If known, what is the approximate depth to the water table? 5 ft bgs in low elevations & 25 ft bgs in higher elevations

14. Is the direction of surface runoff apparent from site observations? ☑ yes ☐ no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

☑ Surface water ☐ Groundwater ☐ Sewer ☐ Collection impoundment

15. Is there a navigable waterbody or tributary to a navigable waterbody? ☐ yes ☑ no

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist -- Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist -- Flowing Systems.

☑ yes (approx. distance >10,000') ☐ no

↳ Boggs creek

17. Is there evidence of flooding? ☐ yes ☑ no *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use a blank sheet if additional space is needed for text.]

NA

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐ yes ☐ no *If yes, you are required to verify this information with the U.S. Fish and Wildlife Service.* If species' identities are known, please list them next.

THE INDIANA BAT has been observed ON NSWC CRANE, Although Not @ SWMU 9

20. Record weather conditions at the time this checklist was prepared:

DATE: 3-11-02

33-44°F Temperature (°C/°F)

52.6°F Normal daily high temperature

Source: Martin Co. Soil Survey

SOUTH Wind (direction/speed)

NONE Precipitation (rain, snow)

CLEAR Cloud cover

IA. SUMMARY OF OBSERVATIONS AND SITE SETTING

SWMU 9 is comprised of 55% (6.5 acres) grassy, 33% (3.9 acres) light industry and 12% (1.4 acres) forested. Grassy areas consist of maintained grass along Highway 45 (east boundary) and Highway 349, cleared areas providing access to groundwater monitoring wells, transmission line corridors, and general landscaping near buildings. Light industry include a large concrete slab surrounded by asphalt (the site of the former pesticide control building #2189), what appears to have been a gravel parking lot for the former pesticide control building (located just south of the concrete slab), and a large gravel storage area (former site of the R-150 tank).

The forested area is made up of mixed hardwoods. SWMU 9 has been stocked with black locust in the past.

SWMU 9 drains to the south and west. The only natural drainage system within the site boundary originates within the wooded area located in the western most portion of SWMU 9. All other site drainage involves artificially created ditches and swales running along Highways 45 and 349.

All site drainage flows into tributaries of Boggs Creek. Boggs Creek flows into Lake Gallimore near the southern boundary of NSWC Crane then continues to flow out of Lake Gallimore until it eventually discharges into the East Fork of White River. SWMU 9 is located outside of FEMAs flood hazard area (Zone A). Additionally, the Martin County soil survey considers SWMU 9 a very poor to poor site for wetland plants.

See the 1998 aerial photograph shown in Figure 1-10, the marked up SWMU 9 base map showing the location and direction of site photographs in Figure 1-11 and the six (6) site photographs presented in Figure 1-12 of this RFI Report to enhance site familiarity.

Completed by TERRY ROJAHN Affiliation T+NUS

Additional Preparers KEITH SIMPSON

Site Manager U.S. NAVY

Date 3-11-02

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? ☑ yes ☐ no If no, go to Section IIB: Shrub/Scrub.

2. What percentage or area of the site is wooded? (12 % 1.4 acres). Indicate the wooded area on the site map which is attached to a copy of this checklist. Please identify what information was used to determine the wooded area of the site.

3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen/Deciduous/ Mixed) Provide a photograph, if available.

   Dominant plant, if known: UNKNOWN do to time constraints However, Black Locust has been stick in the past.

4. What is the predominant size of the trees at the site? Use diameter at breast height.

   ☐ 0-6 in. ☐ 6-12 in. ☐ > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.

IIB. SHRUB/SCRUB

1. Is shrub/scrub vegetation present at the site? ☐ yes ☒ no If no, go to Section IIC: Open Field.

2. What percentage of the site is covered by scrub/shrub vegetation? (_____% _____ acres). Indicate the areas of shrub/scrub on the site map. Please identify what information was used to determine this area.

3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph, if available.

4. What is the approximate average height of the scrub/shrub vegetation?

   ☐ 0-2 ft. ☐ 2-5 ft. ☐ > 5 ft.

5. Based on site observations, how dense is the scrub/shrub vegetation?

☐ Dense ☐ Patchy ☐ Sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? ☐ yes ☐ no If yes, please indicate the type below:

☐ Prairie/plains ~~☐ Savannah~~ ~~☐ Old field~~ ☒ Other (specify) MAINTAINED GRASSES

2. What percentage of the site is open field? (55 % 6.5 acres). Indicate the open fields on the site map.

3. What is/are the dominant plant(s)? Provide a photograph, if available.

GRASSES

4. What is the approximate average height of the dominant plant? 4-6"

5. Describe the vegetation cover: ☒ Dense ☐ Sparse ☐ Patchy

IID. MISCELLANEOUS

~~1. Are other types of terrestrial habitats present at the~~ site, other than woods, scrub/shrub, and open field? ☐ yes ☐ no If yes, identify and describe them below.

2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.?

NONE - DUE to time CONSTRAINTS

4. Review the questions in Section 1 to determine if any additional habitat checklists should be completed for this site.

III. AQUATIC HABITAT CHECKLIST – NON-FLOWING SYSTEMS (NA)

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type of open-water, non-flowing system is present at the site?

   ☐ Natural (pond, lake)
   ☐ Artificially created (lagoon, reservoir, canal, impoundment)

2. If known, what is the name(s) of the waterbody(ies) on or adjacent to the site?

   _____

3. If a waterbody is present, what are its known uses (e.g.: recreation, navigation, etc.)?

4. What is the approximate size of the waterbody(ies)? _____ acre(s).

5. Is any aquatic vegetation present? ☐ yes ☐ no If yes, please identify the type of vegetation present if known.

   ☐ Emergent ☐ Submergent ☐ Floating

6. If known, what is the depth of the water? _____

7. What is the general composition of the substrate? Check all that apply.

   ☐ Bedrock ☐ Sand (coarse) ☐ Muck (fine/black)
   ☐ Boulder (>10 in.) ☐ Silt (fine) ☐ Debris
   ☐ Cobble (2.5-10 in.) ☐ Marl (shells) ☐ Detritus
   ☐ Gravel (0.1-2.5 in.) ☐ Clay (slick) ☐ Concrete
   ☐ Other (specify)_____

8. What is the source of water in the waterbody?

   ☐ River/Stream/Creek ☐ Groundwater ☐ Other (specify)_____
   ☐ Industrial discharge ☐ Surface runoff

9. Is there a discharge from the site to the waterbody? ☐ yes ☐ no If yes, please describe this discharge and its path.

10. Is there a discharge from the waterbody? ☐ yes ☐ no If yes, and the information is available, identify from the list below the environment into which the waterbody discharges.

☐ River/Stream/Creek	☐ onsite	☐ offsite	Distance_____
☐ Groundwater	☐ onsite	☐ offsite	
☐ Wetland	☐ onsite	☐ offsite	Distance_____
☐ Impoundment	☐ onsite	☐ offsite	

11. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected provide the measurement and the units of measure below:

_____ Area

_____ Depth (average)

_____ ~~Temperature (depth of the water at which the reading was taken)~~ _____

_____ pH

_____ Dissolved oxygen

_____ Salinity

_____ Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth _____)

_____ Other (specify)

12. Describe observed color and area of coloration.

13. Mark the open-water, non-flowing system on the site map attached to this checklist.

14. What observations, if any, were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

IV. AQUATIC HABITAT CHECKLIST – FLOWING SYSTEMS

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section V, Wetland Habitat Checklist.

1. What type(s) of flowing water system(s) is (are) present at the site?

☐ River	☐ Stream	☐ Creek
☐ Dry wash	☐ Arroyo	☐ Brook
☑ Artificially created (ditch, etc.)	☑ Intermittent Stream	☐ Channeling
	☐ Other (specify)_____	

2. If known, what is the name of the waterbody? Tributary to Boggs Creek

3. For natural systems, are there any indicators of physical alteration (e.g., channeling, debris, etc.)?
☐ yes ☑ no If yes, please describe indicators that were observed.

4. What is the general composition of the substrate? Check all that apply.

☐ Bedrock	☐ Sand (coarse)	☐ Muck (fine/black)
☐ Boulder (>10 in.)	☑ Silt (fine)	☐ Debris
☐ Cobble (2.5-10 in.)	☐ Marl (shells)	☐ Detritus
☐ Gravel (0.1-2.5 in.)	☑ Clay (slick)	☐ Concrete
☐ Other (specify)_____		

5. What is the condition of the bank (e.g., height, slope, extent of vegetative cover)?
Ht - shallow
Slope - Moderate
Veg - None

6. Is the system influenced by tides? ☐ yes ☒ no What information was used to make this determination?

7. Is the flow intermittent? ☑ yes ☐ no If yes, please note the information that was used in making this determination.

HEADWATERS OF Boggs CREEK Tributary - SURFACE WATER VERY SHALLOW (0.03' deep) 12/13/00.

8. Is there a discharge from the site to the waterbody? ☒ yes ☐ no If yes, please describe the discharge and its path.

Boggs Creek

9. Is there a discharge from the waterbody? ☑ yes ☐ no If yes, and the information is available, please identify what the waterbody discharges to and whether the discharge is on site or off site.

Boggs Creek to Lake Gallimore out Lake Gallimore VIA Boggs Creek → EAST Fork WHITE RIVER.

10. Identify any field measurements and observations of water quality that were made. For those parameters for which data were collected, provide the measurement and the units of measure in the appropriate space below:

0.3'	Width (ft.)
0.03'	Depth (ft.)
1.5	Velocity (specify units): gpm
0.28 °C	Temperature (depth of the water at which the reading was taken SURFACE)
8.06	pH
13.8 mg/L	Dissolved oxygen
—	Salinity
14 NTUS	Turbidity (clear, slightly turbid, turbid, opaque) (Secchi disk depth NA)
+161.6 mV	Other (specify) ORP
0.38 mS/cm	Sp. Cond.

ABOVE DATA collected 12/13/00 during sampling trip.

11. Describe observed color and area of coloration.

CLEAR

12. Is any aquatic vegetation present? ☐ yes ☒ no If yes, please identify the type of vegetation present, if known.

☐ Emergent ☐ Submergent ☐ Floating

13. Mark the flowing water system on the attached site map.

14. What observations were made at the waterbody regarding the presence and/or absence of benthic macroinvertebrates, fish, birds, mammals, etc.?

NONE due to time constraints

V. WETLAND HABITAT CHECKLIST

1. Based on observations and/or available information, are designated or known wetlands definitely present at the site?
   ☐ yes ☒ no

   Please note the sources of observations and information used (e.g., USGS Topographic Maps, National Wetland Inventory, Federal or State Agency, etc.) to make this determination.

2. Based on the location of the site (e.g., along a waterbody, in a floodplain) and site conditions (e.g., standing water; dark, wet soils; mud cracks; debris line; water marks), are wetland habitats suspected?
   ☐ yes ☐ no If yes, proceed with the remainder of the wetland habitat identification checklist.

3. What type(s) of vegetation are present in the wetland?

   ☐ Submergent ☐ Emergent
   ☐ Scrub/Shrub ☐ Wooded

   ☐ Other (specify)_____

4. Provide a general description of the vegetation present in and around the wetland (height, color, etc.). Provide a photograph of the known or suspected wetlands, if available.

5. Is standing water present? ☐ yes ☐ no If yes, is this water: ☐ Fresh ☐ Brackish
   What is the approximate area of the water (sq. ft.)?_____
   Please complete questions 4, 11, 12 in Checklist III - Aquatic Habitat -- Non-Flowing Systems.

6. Is there evidence of flooding at the site? What observations were noted?

   ☐ Buttressing ☐ Water marks ☐ Mud cracks

   ☐ Debris line ☐ Other (describe below)

7. If known, what is the source of the water in the wetland?

☐ Stream/River/Creek/Lake/Pond ☐ Groundwater

☐ Flooding ☐ Surface Runoff

8. Is there a discharge from the site to a known or suspected wetland? ☐ yes ☐ no If yes, please describe.

9. Is there a discharge from the wetland? ☐ yes ☐ no. If yes, to what waterbody is discharge released?

☐ Surface Stream/River ☐ Groundwater ☐ Lake/Pond ☐ Marine

10. If a soil sample was collected, describe the appearance of the soil in the wetland area. Circle or write in the best response.

Color (blue/gray, brown, black, mottled) _____

Water content (dry, wet, saturated/unsaturated) _____

11. Mark the observed wetland area(s) on the attached site map.