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REVISED DRAFT SOIL DELINEATION SAMPLING DATA SUMMARY REPORT SOLDI WASTE MANAGEMENT UNIT 16 (SWMU 16) CAST HIGH EXPLOSIVES FILL/BUILDING 146 INCINERATOR NSA CRANE IN (DRAFT ACTING AS FINAL)
12/1/2012
TETRA TECH

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Revised Draft
Soil Delineation Sampling Data Summary Report
SWMU 16 - Cast High Explosive Fill/ Building 146 Incinerator

Naval Support Activity Crane
Crane, Indiana

Naval Facilities Engineering Command Midwest

Contract Number N62470-08-D-1001

Contract Task Order F277

December 2012

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DECEMBER 2012

REVISED DRAFT
SOIL DELINEATION SAMPLING DATA SUMMARY REPORT
FOR
SWMU 16 - CAST HIGH EXPLOSIVE FILL/ BUILDING 146 INCINERATOR

NAVAL SUPPORT ACTIVITY, CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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1.0 BACKGROUND

This report constitutes the Delineation Data Summary Report for Solid Waste Management Unit (SWMU) 16, Cast High Explosives Fill/B146 Incinerator, located at the Naval Surface Warfare Center (NSWC), Crane, Indiana. Tetra Tech, Inc. (Tetra Tech) prepared this report for the Department of the Navy (Navy), Naval Facilities Engineering Field Division Midwest (NAVFAC MW). This report was completed under Contract Task Order (CTO) F277, Comprehensive Long-Term Environmental Action Navy (CLEAN) III, Contract Number N62470-08-D-0001.

Building 146 was an explosives fill and pressure washout facility and included a trichloroethene (TCE) degreaser, which discharged to sumps located outside of Building 146. Prior to 1978, outfalls from the sumps, which are located north, east, and west of Building 146, discharged to swales that ultimately discharged to Boggs Creek via Turkey Creek. In 1998 it was found that discharges of floor drains located near the degreaser were routed through terra cotta pipe to the west sump. The degreaser has been removed and the drain lines from Building 146 have been plugged. Three oil-fired, rotary kiln incinerators, with fuel storage tanks were located on the south end of Building 146. These incinerators were used for the destruction of the explosive constituent of small munitions items and components. Ashes from the incinerator were stored in a pile, which was located near the incinerators. The incinerators were closed in the early 1990s, and the waste ash piles were removed along with some obviously contaminated soil.

The Navy has completed a Resource Conservation Act (RCRA) Facility Investigation (RFI) for SWMU 16. Based on the findings in the RFI, the Navy determined that an interim measures action would be conducted in the TCE Contamination Area to reduce contamination sources for groundwater, and the Metals Contamination Area to reduce ecological risk. Efficient implementation of the interim measure required a more precise delineation of the extent of soils contamination in each area. In addition, after the RFI field activities were completed, an underground storage tank (UST) was discovered in an area northeast of Building 146.

1.1 PRELIMINARY REMEDIATION GOALS

As presented in the Technical Memorandum, Ecological Media Cleanup Goals SWMU 16 Surface Soils (Tetra Tech, 2010), site-specific preliminary remediation goals (PRGs) were developed based on risks to plants and invertebrates for antimony and copper, and based on risks to plants, soil invertebrates, and invertivorous birds for lead and zinc. The PRGs were developed using the results of earthworm and plant toxicity tests, and earthworm bioaccumulation tests that were conducted using site soil. The following briefly presents the development of each PRG.

- Soil Invertebrates: The PRGs for soil invertebrates were based on the results of a 28-day earthworm toxicity test, where survival and growth of the earthworms were the endpoints. None of the site samples had lower survival or growth earthworms compared to the reference samples, so the maximum detected concentrations of the metals in the samples tested were considered the No Observed Effects Concentration (NOEC). The NOECs are used as the PRGs for soil invertebrates for copper (253 mg/kg) and zinc (1,950 mg/kg). Because the USEPA Ecological Soil Screening Levels (Eco SSLs) (USEPA, 2005a and 2005b) for soil invertebrates for antimony (78 mg/kg) and lead (1,700 mg/kg) were greater than the NOECs, the Eco SSLs are the PRGs for those metals (see Table 1-1).

- Plants: The PRGs for plants were based on the results of 28-day toxicity tests with Red clover and ryegrass. The endpoints of the tests were germination, survival, and growth. There were some impacts to plants in the site samples, but it appeared the soil pH was a confounding factor in the tests. Nevertheless, NOECs and Lowest Observed Effects Concentrations (LOECs) were developed for antimony, lead, and zinc. The geometric means between the NOECs and LOECs were used at the PRGs for antimony (6.3 mg/kg), lead (652 mg/kg), and zinc (1,950 mg/kg). A LOEC could not be developed for copper because the maximum concentration was in a non-toxic sample so the PRGs for copper was based on the NOEC.

- Invertivorous Birds: The PRGs for invertivorous birds was developed by first conducting an earthworm bioaccumulation test using site soils, and then using the site-specific bioaccumulation factors (BAFs) to calculate the PRG. Table 1-1 presents the calculated value of the PRGs for invertivorous birds for lead and zinc; PRGs were not calculated for antimony or copper because these metals did not pose potential risks to invertivorous birds in the ecological risk assessment for SWMU 16 (Tetra Tech, 2011a). The PRG for lead in Table 1-1 (163 mg/kg) is lower than the value presented in the Technical Memorandum (349 mg/kg) (Tetra Tech, 2010) because USEPA suggested that the Navy use a lowest observed adverse effects level (LOAEL) for lead on another site that was lower than the LOAEL presented in the Technical Memorandum. This LOAEL then resulted in the lower PRG presented in Table 1-1. Note that because birds roam across the site, USEPA agreed that the PRGs for insectivorous birds can be applied as an average concentration across the site.

The PRGs were then used as the media cleanup standards (MCSs) for SWMU 16 with one exception. For antimony, the plant PRG of 6.3 mg/kg was lower than the base-wide background concentration of 6.9 mg/kg. Therefore, 6.9 mg/kg was used as the MCS for antimony.

As presented in Table 1-1, the MCS for lead at any given sample point is 652 mg/kg to be protective of plants; whereas, 163 mg/kg is the average MCS concentration that has to be met to be protective of birds

across the site. Therefore for initial screening purposes, 652 mg/kg was used as the MCS for lead for the individual sampling locations.

PRGs for chlorinated solvents in soil were based on the protection of groundwater. These PRGs are listed in Table 1-2.

TABLE 1-1

SOIL PRELIMINARY REMEDIATION GOALS - METALS
SWMU 16
NSA CRANE
CRANE, INDIANA

Assessment Endpoint	Concentrations of metals (mg/kg)			
	Antimony	Copper	Lead	Zinc
Soil Invertebrates				
Preliminary Remediation Goal	78[1]	253	1700[1]	1950
Invertivorous Birds				
Preliminary Remediation Goal	-	-	163	5363
Terrestrial Plants				
Preliminary Remediation Goal	6.3	253	652	1716

1 - Based on USEPA Ecological Soil Screening Levels (USEPA 2005a and b).
- - Not applicable

TABLE 1-2

SOIL PRELIMINARY REMEDIATION GOALS - VOLATILE ORGANICS
SWMU 16
NSA CRANE
CRANE, INDIANA

Compound	CAS No.	MCS (µg/kg)
Carbon tetrachloride	56-23-5	38
1,1,2-Trichloroethane	79-00-5	32
cis-1,2-Dichloroethene	156-59-2	420
trans-1,2-Dichloroethene	156-60-5	580
Tetrachloroethene	127-18-4	46
Trichloroethene	79-01-6	36
Vinyl chloride	75-01-4	13.8

Notes:

CAS - Chemical Abstracts Service
µg/kg - micrograms per kilogram

2.0 FIELD INVESTIGATION

Two rounds of soil delineation sampling were conducted for SWMU 16. Round 1 occurred in August 2011, and Round 2 occurred in October/November 2012. Table 2-1 presents the Rounds 1 and 2 soil delineation samples that were collected for each area, and the associated laboratory analyses. Figures 3-1 through 3-5 present the sample locations. Appendix A.1 provides the soil boring and sample logs for the Round 1 sampling event (August 2011), and Appendix A.2 provides the soil boring and sample logs for the Round 2 sampling event (October/November 2012). The soil boring and sample logs for the prior RFI sampling are presented in the SWMU 16 RFI report (Tetra Tech, 2011). Appendix A.3 presents the chain-of-custody forms for the August 2011 event, and Appendix A.4 presents the chain-of-custody forms for the October/November 2012 event.

2.1 ROUND 1 SOIL DELINEATION SAMPLING

The Round 1 soil delineation sampling field activities conducted in August 2011 were implemented in accordance with the EPA-approved SAP (Tetra Tech, 2011b). The field investigation activities were conducted in three discrete areas: TCE Contamination Area, Metals Contamination Area, and UST Area.

2.1.1 TCE Contamination Area

Soil samples were collected from select areas identified based on historic RFI data in the TCE Contamination Area. Forty-four (44) soil borings (16SB118 – 16SB153 and 16SB199 – 16SB206) were advanced with the use of a DPT rig within the area west and north of Building 146 during Round 1. Up to three soil samples were collected from each boring location; one surface soil (0.5 – 2 feet bgs), and up to two subsurface soil samples, depending on soil depth above bedrock. The subsurface soil samples were collected from 2 to 6 feet bgs and the 2-foot soil interval above the bedrock surface. Only one subsurface soil sample was collected if the bedrock was less than 6 feet bgs. The samples were analyzed for VOCs associated with solvent use.

2.1.2 Metals Contamination Area

Thirty-seven (37) surface soil samples (16SS154 – 16SS190) were collected in Round 1 within the Metals Contamination Area. Only surface soil samples were collected, since the only concerns are ecological receptors for metals. Surface soil samples were collected for analyses of select metals associated with the former ash piles (antimony, copper, lead, and zinc).

2.1.3 UST Area

Eight (8) soil borings (16SB191 – 16SB198) were advanced within the area surrounding the UST. Surface and subsurface soil samples were collected to determine the presence/absence of contamination in the area of the UST. All samples were analyzed for VOCs, Total Petroleum Hydrocarbons - Diesel Range Organic (TPH-DRO), TPH - Gasoline Range Organics (GRO) and lead.

2.1.4 Round 1 Sampling Summary

The extent of the TCE soil contamination was not fully delineated in the southern area of the TCE Contamination Area. In addition, the need existed for further horizontal contaminant delineation refinement in the northwestern and northern areas.

In addition, the extent of metals contamination was fully delineated for antimony and copper; however, additional soil sampling was required to fully delineate/bound the extent of zinc and lead concentrations in surface soils above the MCS in the southeastern area of the site.

Based on the results of the Round 1 soil delineation sampling, it was determined by the Navy that additional soil delineation sampling was warranted in both the TCE Contamination Area and the Metals Contamination Area in order to fully delineate the extent of the observed contamination (Tetra Tech, 2012).

2.2 ROUND 2 SOIL DELINEATION SAMPLING

The Round 2 soil delineation sampling field activities were conducted in October and November 2012. The field activities were implemented in accordance with the SWMU 16 Delineation Sampling Data Summary Report (Tetra Tech, 2012). The field investigation activities were conducted in two discrete areas: TCE Contamination Area and Metals Contamination Area.

2.2.1 TCE Contamination Area

Round 2 soil delineation sampling in the TCE Contamination Area consisted of collecting twenty (20) surface and nine (9) subsurface soil samples from select areas (16SB207 – 16SB220 and 16SB236 – 16SB241) based on the Round 1 soil delineation sampling results, in order to fully delineate the TCE contamination, both horizontally and vertically, in these areas. Surface and subsurface soil samples were collected from the ground surface to the top of bedrock, observed at approximately 2 to 6 feet bgs in the sampled areas. All soil samples were analyzed for select VOC analysis associated with solvent use (i.e., 1,1,2-trichloroethane, carbon tetrachloride, cis-1,2-dichloroethene, trans-1,2-dichloroethene, TCE, and vinyl chloride).

2.2.2 Metals Contamination Area

Round 2 soil delineation sampling in the Metals Contamination Area consisted of the collection of 15 surface soil samples (16SS221 – 16SB235). Only soil samples were collected, since the only concerns for metals are ecological receptors. All of the samples collected were analyzed for lead and zinc in order to fully delineate the horizontal extent of exceedances of these two metals identified in the Round 1 delineation sampling.

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
Soil Delineation Sampling – TCE Contamination Area (Round 1)							
16SB118	8/24/11	DPT	7.2	16SS1180002	Asphalt/Gravel		
				16SB1180206	X		
				16SB1180607	X		
16SB119	8/24/11	DPT	7.9	16SS1190002	Asphalt/Gravel		
				16SB1190406	X		
				16SB1190608	X		
16SB120	8/24/11	DPT	7.8	16SS1200002	Asphalt/Gravel		
				16SB1200406	X		
				16SB1200608	X		
16SB121	8/24/11	DPT	7.0	16SS1210002	Asphalt/Gravel		
				16SB1210306	X		
				16SB1210607	X		
16SB122	8/24/11	DPT	10.0	16SS1220002	Asphalt/Gravel		
				16SB1220406	X		
				16SB1220910	X		
16SB123	8/24/11	DPT	8.0	16SS1230002	Asphalt/Gravel		
				16SB1230306	X		
				16SB1230608	X		
16SB124	8/24/11	DPT	11.0	16SS1240002	Asphalt/Gravel		
				16SB1240306	X		
				16SB1240911	X		
16SB125	8/24/11	DPT	7.1	16SS1250002	Asphalt/Gravel		
				16SB1250306	X		
				16SB1250607	X		
16SB126	8/24/11	DPT	5.0	16SS1260002	X		
				16SB1260205	X		
				16SB126XXXX	Refusal		

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB127	8/24/11	DPT	5.7	16SS1270002	X		
				16SB1270206	X		
				16SB127XXXX	Refusal		
16SB128	8/24/11	DPT	6.7	16SS1280002	X		
				16SB1280206	X		
				16SB1280607	X		
16SB129	8/24/11	DPT	6.0	16SS1290002	X		
				16SB1290206	X		
				16SB129XXXX	Refusal		
16SB130	8/24/11	DPT	7.3	16SS1300002	X		
				16SB1300206	X		
				16SB1300607	X		
16SB131	8/24/11	DPT	6.0	16SS1310002	X		
				16SB1310206	X		
				16SB131XXXX	Refusal		
16SB132	8/24/11	DPT	7.9	16SS1320002	X		
				16SB1320206	X		
				16SB1320608	X		
16SB133	8/24/11	DPT	6.0	16SS1330002	X		
				16SB1330206	X		
				16SB133XXXX	Refusal		
16SB134	8/24/11	DPT	6.7	16SS1340002	X		
				16SB1340206	X		
				16SB1340607	X		
16SB135	8/24/11	DPT	6.0	16SS1350002	X		
				16SB1350206	X		
				16SB135XXXX	Refusal		
16SB136	8/24/11	DPT	7.0	16SS1360002	X		
				16SB1360206	X		
				16SB1360607	X		

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB137	8/24/11	DPT	5.0	16SS1370002	X		
				16SB1370205	X		
				16SB137XXXX	Refusal		
16SB138	8/24/11	DPT	7.8	16SS1380002	X		
				16SB1380206	X		
				16SB1380608	X		
16SB139	8/24/11	DPT	5.5	16SS1390002	X		
				16SB1390206	X		
				16SB139XXXX	Refusal		
16SB140	8/24/11	DPT	6.0	16SS1400002	X		
				16SB1400206	X		
				16SB140XXXX	Refusal		
16SB141	8/25/11	DPT	9.1	16SS1410002	X		
				16SB1410206	X		
				16SB1410709	X		
16SB142	8/25/11	DPT	3.7	16SS1420002	X		
				16SB1420204	X		
				16SB142XXXX	Refusal		
16SB143	8/25/11	DPT	4.9	16SS1430002	X		
				16SB1430205	X		
				16SB143XXXX	Refusal		
16SB144	8/25/11	DPT	3.5	16SS1440002	X		
				16SB144-0204	X		
				16SB144XXXX	Refusal		
16SB145	8/25/11	DPT	3.1	16SS1450002	X		
				16SB1450203	X		
				16SB145XXXX	Refusal		
16SB146	8/25/11	DPT	4.7	16SS1460002	X		
				16SB1460205	X		
				16SB146XXXX	Refusal		

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB147	8/25/11	DPT	5.9	16SS1470002	X		
				16SB1470206	X		
				16SB147XXXX	Refusal		
16SB148	8/25/11	DPT	6.0	16SS1480002	X		
				16SB1480206	X		
				16SB148XXXX	Refusal		
16SB149	8/25/11	DPT	5.5	16SS1490002	X		
				16SB1490206	X		
				16SB149XXXX	Refusal		
16SB150	8/25/11	DPT	4.8	16SS1500002	X		
				16SB1500205	X		
				16SB150XXXX	Refusal		
16SB151	8/25/11	DPT	3.9	16SS1510002	X		
				16SB1510204	X		
				16SB151XXXX	Refusal		
16SB152	8/25/11	DPT	2.8	16SS1520002	X		
				16SB1520203	X		
				16SB152XXXX	Refusal		
16SB153	8/25/11	DPT	5.4	16SS1530002	X		
				16SB1530206	X		
				16SB153XXXX	Refusal		
16SB199	8/24/11	DPT	8.7	16SS1990002	Asphalt/Gravel		
				16SB1990406	X		
				16SB1990709	X		
16SB200	8/25/11	DPT	3.9	16SS2000002	Gravel		
				16SB2000204	X		
				16SB200XXXX	Refusal		
16SB201	8/25/11	DPT	3.2	16SS2010002	Gravel		
				16SB2010203	X		
				16SB201XXXX	Refusal		

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB202	8/25/11	DPT	4.0	16SS2020002	Gravel		
				16SB2020204	X		
				16SB202XXXX	Refusal		
16SB203	8/25/11	DPT	3.0	16SS2030002	Gravel		
				16SB2030203	X		
				16SB203XXXX	Refusal		
16SB204	8/25/11	DPT	8.8	16SS2040002	X		
				16SB2040206	X		
				16SB2040709	X		
16SB205	8/25/11	DPT	6.5	16SS2050002	X		
				16SB2050206	X		
				16SB2050607	X		
16SB206	8/25/11	DPT	4.3	16SS2060002	X		
				16SB2060204	X		
				16SB206XXXX	Refusal		
Soil Delineation Sampling – TCE Contamination Area (Round 2)							
16SB207	10/6/12	DPT	2.5	16SS2070002	X		
				16SB2070206	Refusal		
				16SB207XXXX	Refusal		
16SB208	10/6/12	DPT	1.6	16SS2080002	X		
				16SB2080206	Refusal		
				16SB208XXXX	Refusal		
16SB209	10/6/12	DPT	2.7	16SS2090002	X		
				16SB2090203	X		
				16SB209XXXX	Refusal		
16SB210	10/6/12	DPT	1.7	16SS2100002	X		
				16SB2100206	Refusal		
				16SB210XXXX	Refusal		
16SB211	10/6/12	DPT	2.5	16SS2110002	X		
				16SB2110206	Refusal		
				16SB211XXXX	Refusal		

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB212	10/6/12	DPT	1.7	16SS2120002	X		
				16SB2120206	Refusal		
				16SB212XXXX	Refusal		
16SB213	10/6/12	DPT	1.7	16SS2130002	X		
				16SB2130206	Refusal		
				16SB213XXXX	Refusal		
16SB214	10/6/12	DPT	2.5	16SS2140002	X		
				16SB2140206	Refusal		
				16SB214XXXX	Refusal		
16SB215	10/6/12	DPT	2.3	16SS2150002	X		
				16SB2150206	Refusal		
				16SB215XXXX	Refusal		
16SB216	10/6/12	DPT	2.3	16SS2160002	X		
				16SB2160204	Refusal		
				16SB216XXXX	Refusal		
16SB217	10/6/12	DPT	2.3	16SS2170002	X		
				16SB2170204	Refusal		
				16SB217XXXX	Refusal		
16SB218	10/6/12	DPT	2.5	16SS2180002	X		
				16SB2180204	Refusal		
				16SB218XXXX	Refusal		
16SB219	10/6/12	DPT	6.0	16SS2190002	X		
				16SB2190206	X		
				16SB219XXXX	Refusal		
16SB220	10/6/12	DPT	6.0	16SS2200002	X		
				16SB2200206	X		
				16SB220XXXX	Refusal		
16SB236	11/30/12	DPT	5.7	16SS2360002	X		
				16SB2360206	X		
				16SB236XXXX	Refusal		

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB237	11/30/12	DPT	5.2	16SS2370002	X		
				16SB2370206	X		
				16SB237XXXX	Refusal		
16SB238	11/30/12	DPT	5.4	16SS2380002	X		
				16SB2380206	X		
				16SB238XXXX	Refusal		
16SB239	11/30/12	DPT	5.7	16SS2390002	X		
				16SB2390206	X		
16SB239	11/30/12	DPT	5.7	16SB239XXXX	Refusal		
16SB240	11/30/12	DPT	5.9	16SS2400002	X		
				16SB2400206	X		
				16SB240XXXX	Refusal		
16SB241	11/30/12	DPT	6.1	16SS2410002	X		
				16SB2410206	X		
				16SB241XXXX	Refusal		
SOIL – Metals Contamination Area							
16SB154	8/25/11	DPT	2	16SS1540002		X	
16SB155	8/25/11	DPT	2	16SS1550002		X	
16SB156	8/25/11	DPT	2	16SS1560002		X	
16SB157	8/25/11	DPT	2	16SS1570002		X	
16SB158	8/25/11	DPT	2	16SS1580002		X	
16SB159	8/25/11	DPT	2	16SS1590002		X	
16SB160	8/25/11	DPT	2	16SS1600002		X	
16SB161	8/25/11	DPT	2	16SS1610002		X	
16SB162	8/25/11	DPT	2	16SS1620002		X	
16SB163	8/25/11	DPT	2	16SS1630002		X	
16SB164	8/25/11	DPT	2	16SS1640002		X	
16SB165	8/25/11	DPT	2	16SS1650002		X	

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB166	8/25/11	DPT	2	16SS1660002		X	
16SB167	8/25/11	DPT	2	16SS1670002		X	
16SB168	8/25/11	DPT	2	16SS1680002		X	
16SB169	8/25/11	DPT	2	16SS1690002		X	
16SB170	8/25/11	DPT	2	16SS1700002		X	
16SB171	8/25/11	DPT	2	16SS1710002		X	
16SB172	8/25/11	DPT	2	16SS1720002		X	
16SB173	8/25/11	DPT	2	16SS1730002		X	
16SB174	8/25/11	DPT	2	16SS1740002		X	
16SB175	8/25/11	DPT	2	16SS1750002		X	
16SB176	8/26/11	HA	2	16SS1760002		X	
16SB177	8/26/11	HA	2	16SS1770002		X	
16SB178	8/26/11	HA	2	16SS1780002		X	
16SB179	8/26/11	HA	2	16SS1790002		X	
16SB180	8/26/11	HA	2	16SS1800002		X	
16SB181	8/26/11	HA	2	16SS1810002		X	
16SB182	8/26/11	HA	2	16SS1820002		X	
16SB183	8/26/11	HA	2	16SS1830002		X	
16SB184	8/26/11	HA	2	16SS1840002		X	
16SB185	8/26/11	HA	2	16SS1850002		X	
16SB186	8/26/11	HA	2	16SS1860002		X	
16SB187	8/26/11	HA	2	16SS1870002		X	
16SB188	8/26/11	HA	2	16SS1880002		X	
16SB189	8/26/11	HA	2	16SS1890002		X	
16SB190	8/26/11	HA	2	16SS1900002		X	
16SB221	10/5/12	HA	2	16SS2210002		X	

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB222	10/5/12	HA	2	16SS2220002		X	
16SB223	10/5/12	HA	2	16SS2230002		X	
16SB224	10/5/12	HA	2	16SS2240002		X	
16SB225	10/5/12	HA	2	16SS2250002		X	
16SB226	10/5/12	HA	2	16SS2260002		X	
16SB227	10/5/12	HA	2	16SS2270002		X	
16SB228	10/5/12	HA	2	16SS2280002		X	
16SB229	10/5/12	HA	2	16SS2290002		X	
16SB230	10/5/12	HA	2	16SS2300002		X	
16SB231	10/5/12	HA	2	16SS2310002		X	
16SB232	10/5/12	HA	2	16SS2320002		X	
16SB233	10/5/12	HA	2	16SS2330002		X	
16SB234	10/5/12	HA	2	16SS2340002		X	
16SB235	10/5/12	HA	2	16SS2350002		X	
SOIL – UST Area							
16SB191	8/23/11	DPT	7.8	16SS1910002			X
				16SB1910206			X
				16SB1910608			X
16SB192	8/23/11	DPT	8.8	16SS1920002			X
				16SB1920206			X
				16SB1920709			X
16SB193	8/23/11	DPT	8.1	16SS1930002			X
				16SB1930206			X
				16SB1930608			X
16SB194	8/23/11	DPT	9.6	16SS1940002			X
				16SB1940206			X
				16SB1940810			X

TABLE 2-1

ROUNDS 1 & 2 SAMPLE SUMMARY
SWMU 16
NSA CRANE
CRANE, INDIANA

Sample Location	Date Sampled Collected	Sample Collection Method	Total Depth (feet bgs)	Sample ID	Analyses		
					TCE Contamination Area VOCs	Metals Contamination Area	UST Area VOCs, TPH-GRO TPH-DRO, Lead
16SB195	8/23/11	DPT	8.6	16SS1950002			X
				16SB1950206			X
				16SB1950709			X
16SB196	8/23/11	DPT	11.5	16SS1960002			X
				16SB1960206			X
				16SB1961012			X
16SB197	8/23/11	DPT	7.2	16SS1970002			X
				16SB1970206			X
				16SB1970607			X
16SB198	8/23/11	DPT	7.0	16SS1980002			X
				16SB1980206			X
				16SB1980607			X

Notes:
bgs – below ground surface
DPT – Direct Push Technology
HA – Hand Auger
Borings drilled in the TCE Contamination Area and the UST Area were advanced until boring refusal (bedrock). Borings drilled/hand augered in the Metals Contamination Area were advanced to two feet below ground surface. (See text for analyses descriptions).

3.0 ANALYTICAL DATA SUMMARIES

The following presents the results of the SWMU 16 soil delineation sampling data analyses.

3.1 TCE CONTAMINATION AREA SOIL DELINEATION DATA

Table 3-1 presents the TCE Contamination Area surface and subsurface soil data screened against the applicable MCSs for VOCs. Figure 3-1 presents the TCE concentrations above the MCSs for the surface soil data. The table and figure utilizes the entire VOC dataset for all samples collected at SWMU 16 as part of the RFI, as well as the soil delineation sampling events.

TCE was the only constituent to exhibit concentrations above MCSs in both rounds of delineation sampling. Several surface soil samples showed exceedances, mainly in the southern extent of sampling.

Figures 3-2 and 3-3 present the TCE concentrations above MCSs for the subsurface soil data for the 2 – 6 feet bgs and 6 – 10 feet bgs samples, respectively. The figures utilize the entire VOC dataset for all samples collected at SWMU 16. The 2 – 6 foot bgs area encompasses the contamination observed in both the 0 - 2 foot bgs and 6 - 10 foot bgs depth horizons. Therefore, the "clean boundary" dashed line depicted in Figure 3-2 would serve as the extent of the TCE Contamination Area requiring remediation.

Similar to the surface soil data, TCE was the only constituent to exhibit concentrations above MCSs in the subsurface soil samples. Exceedances were observed in the northern, western and southern investigation areas.

Based on the results of the Round 2 soil delineation data, the extent of TCE soil contamination has been fully delineated, both horizontally and vertically (top of bedrock), in the TCE Contamination Area of SWMU 16.

3.2 METALS CONTAMINATION AREA SURFACE SOIL DELINEATION DATA

Table 3-2 presents the Metals Contamination Area soil data screened against the applicable MCSs. Figure 3-4 presents the surface soil data for antimony, copper, lead and zinc, and the proposed soil removal areas. Both the table and figure utilize the entire dataset for all samples collected at SWMU 16 as part of the RFI, as well as the most recent soil delineation sampling event.

Several exceedances of all four metals were observed, with the majority of the highest exceedances co-located in the eastern and southeastern portions of the area. Based on the results of the Round 2 data,

the extent of metals concentrations above MCSs has been fully delineated in the surface soil horizontally in the Metals Contamination Area of SWMU 16.

3.3 UST AREA SOIL DELINEATION DATA

Table 3-3 presents the UST Area surface soil data screened against the applicable Project Screening Levels (PSLs) established in the SAP (Tetra Tech, 2011b). Figure 3-5 presents the soil sampling locations for the UST Area.

The only exceedance of a PSL in the surface soil samples was for acrolein, which was detected in a duplicate sample (16SS1980002-D). There were no exceedances of PSLs for any of the subsurface soil samples.

3.4 DATA SUMMARY

3.4.1 TCE Contamination Area

Based on the evaluation of all data available for SWMU 16, the extent of the TCE soil contamination is fully delineated both horizontally and vertically (top of bedrock) for the TCE Contamination Area

3.4.2 Metals Contamination Area

Based on the evaluation of all data available for SWMU 16, the extent of surface soil metals contamination is fully delineated for the Metals Contamination Area.

3.4.3 UST Area

Based on the evaluation of the soil data for the UST Area, no further action is required.

TABLE 3-1

TCE CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

Location	Sample ID	Sample Date	1,1,2-TRICHLOR OETHANE	CIS-1,2-DICHLORO ETHENE	TRANS-1,2-DICHLOR OETHENE	TRICHLORO ETHENE	VINYL CHLORIDE	CARBON TETRACHLO RIDE	TETRACHLOR OETHENE
		SWMU 16 MCS	32	420	580	36	14	38	46
16SB001	16SS0010002	03/27/2003	1 U	1 U	1 U	1 U	1 U	1 U	1 U
16SB001	16SB0010406	03/27/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB002	16SS0020002	03/27/2003	1.1 U	1.1 U	1 J	1.1 U	1.1 U	1.1 U	1.1 U
16SB002	16SB0020406	03/27/2003	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
16SB003	16SS0030002	03/27/2003	1.1 U	1.1 U	2 J	1.1 U	1.1 U	1.1 U	1.1 U
16SB004	16SS0040002	03/27/2003	1.2 U	1.2 U	1 J	1.2 U	1.2 U	1.2 U	1.2 U
16SB005	16SS0050002	03/27/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB006	16SS0060002	03/27/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB034	16SS0340002	04/09/2003	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
16SB035	16SS0350002	03/28/2003	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
16SB036	16SS0360002	04/09/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB036	16SB0360203	04/09/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB037	16SS0370002	03/28/2003	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
16SB038	16SS0380002	03/28/2003	1.1 U	1.1 U	1.1 U	6	1.1 U	1.1 U	1.1 U
16SB038	16SB0380203	03/28/2003	1.1 U	1.1 U	1.1 U	4	1.1 U	1.1 U	1.1 U
16SB039	16SS0390002	03/28/2003	1.2 U	23	2 J	86	1.2 U	1.2 U	1.2 U
16SB039	16SB0390203	03/28/2003	1.2 U	200	12	280	1.2 U	1.2 U	1.2 U
16SB040	16SB0400506	03/28/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB040	16SB0400608	03/28/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB041	16SB0410305	03/27/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB041	16SB0410507	03/27/2003	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB047	16SB0470405	12/05/2003	1.18 U	22	1.18 U	61	1.18 U	1.18 U	1.18 U
16SB048	16SB0480203	12/05/2003	1.12 U	1.12 U	1.12 U	97 J	1.12 U	1.12 U	1.12 U
16SB049	16SB0490405	12/05/2003	0.81 U	0.814 U	0.814 U	37	0.814 U	0.814 U	0.814 U
16SB050	16SB0500103	12/05/2003	0.98 U	0.978 U	1 J	190 J	0.978 U	0.978 U	0.978 U
16SB051	16SS0510102	08/13/2004	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U
16SB051	16SB0510204	08/13/2004	1.17 U	1.17 U	1.17 U	1.17 U	1.17 U	1.17 U	1.17 U
16SB052	16SS0520102	08/12/2004	0.93 U	0.933 U	0.933 U	8	0.933 U	0.933 U	0.933 U
16SB052	16SB0520205	08/12/2004	1.05 U	1.05 U	1.05 U	14	1.05 U	1.05 U	1.05 U
16SB053	16SS0530102	08/12/2004	0.89 U	0.888 U	0.888 U	61	0.888 U	0.888 U	0.888 U
16SB053	16SB0530205	08/12/2004	1.01 U	1.01 U	1.01 U	1300	1.01 U	1.01 U	1.01 U
16SB054	16SS0540102	08/13/2004	1.05 U	1.05 U	1.05 U	67	1.05 U	1.05 U	1.05 U
16SB054	16SB0540205	08/13/2004	1.3 U	1.3 U	1.3 U	210	1.3 U	1.3 U	1.3 U
16SB055	16SS0550102	08/12/2004	0.93 U	0.93 U	0.93 U	64	0.93 U	0.93 U	0.93 U
16SB055	16SB0550206	08/12/2004	1.07 U	1.07 U	1.07 U	79	1.07 U	1.07 U	1.07 U
16SB055	16SB0550607	08/12/2004	0.95 U	0.946 U	0.946 U	2 J	0.946 U	0.946 U	0.946 U
16SB056	16SS0560102	08/12/2004	1.02 U	1.02 U	1.02 U	34	1.02 U	1.02 U	1.02 U
16SB056	16SB0560206	08/12/2004	8 J	1.05 UR	1.05 UR	930 J	1.05 U	1.05 UR	1.05 UR
16SB056	16SB0560608	08/12/2004	4	1.13 U	1.13 U	200	1.13 U	1.13 U	1.13 U
16SB057	16SS0570102	08/13/2004	0.99 U	0.993 U	0.993 U	0.993 U	0.993 U	0.993 U	0.993 U
16SB057	16SB0570206	08/13/2004	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U
16SB058	16SS0580102	08/13/2004	0.95 U	0.945 U	0.945 U	0.945 U	0.945 U	0.945 U	0.945 U

TABLE 3-1

TCE CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

Location	Sample ID	Sample Date	1,1,2-TRICHLOR OETHANE	CIS-1,2-DICHLORO ETHENE	TRANS-1,2-DICHLOR OETHENE	TRICHLORO ETHENE	VINYL CHLORIDE	CARBON TETRACHLO RIDE	TETRACHLOR OETHENE
		SWMU 16 MCS	32	420	580	36	14	38	46
16SB058	16SB0580206	08/13/2004	1.06 U	1.06 U	1.06 U	18	1.06 U	1.06 U	1.06 U
16SB058	16SB0580607	08/13/2004	1.03 U	1.03 U	1.03 U	28	1.03 U	1.03 U	1.03 U
16SB059	16SS0590102	08/13/2004	1.01 U	1.01 U	1.01 U	13	1.01 U	1.01 U	1.01 U
16SB059	16SB0590206	08/13/2004	1.22 U	1.22 U	1.22 U	190	1.22 U	1.22 U	1.22 U
16SB059	16SB0590608	08/13/2004	0.99 U	0.988 U	0.988 U	9	0.988 U	0.988 U	0.988 U
16SB060	16SS0600102	08/11/2004	1.14 U	17	1.14 U	9	1.14 U	1.14 U	1.14 U
16SB060	16SB0600206	08/11/2004	1.04 UJ	8 J	1.04 UJ	28 J	1.04 UJ	1.04 UJ	1.04 UJ
16SB060	16SB0600609	08/11/2004	1.02 U	4	1.02 U	1.02 U	1.02 U	1.02 U	1.02 U
16SB061	16SS0610102	08/11/2004	1.19 U	1.1 J	1.19 U	3 J	1.19 U	1.19 U	1.19 U
16SB061	16SB0610206	08/11/2004	1.09 U	86	5	160	1.09 U	1.09 U	1.09 U
16SB061	16SB0610607	08/11/2004	1.2 U	11	1.2 U	14	1.2 U	1.2 U	1.2 U
16SB062	16SS0620102	08/13/2004	1 U	1 U	1 U	1 U	1 U	1 U	1 U
16SB062	16SB0620206	08/13/2004	1.01 U	1.01 U	1.01 U	5	1.01 U	1.01 U	1.01 U
16SB062	16SB0620607	08/13/2004	0.97 U	0.968 U	0.968 U	6	0.968 U	0.968 U	0.968 U
16SB063	16SS0630102	08/11/2004	1.01 U	1.01 U	1.01 U	1.01 U	1.01 U	1.01 U	1.01 U
16SB063	16SB0630206	08/11/2004	1.19 U	1.19 U	1.19 U	1.19 U	1.19 U	1.19 U	1.19 U
16SB063	16SB0630608	08/11/2004	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
16SB064	16SS0640102	08/11/2004	1.05 U	1.05 U	1.05 U	1.05 U	1.05 U	1.05 U	1.05 U
16SB064	16SB0640206	08/11/2004	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U	1.09 U
16SB064	16SB0640608	08/11/2004	1.24 U	1.24 U	1.24 U	1.24 U	1.24 U	1.24 U	1.24 U
16SB065	16SS0650102	08/11/2004	1.17 U	1.17 U	1.17 U	1.17 U	1.17 U	1.17 U	1.17 U
16SB065	16SB0650206	08/11/2004	1.27 U	24	3 J	3 J	12	1.27 U	1.27 U
16SB065	16SB0650608	08/11/2004	1.45 U	27	4 J	17	6	1.45 U	1.45 U
16SB066	16SS0660102	08/12/2004	1.26 U	73	1.26 J	34	1.26 U	1.26 U	1.26 U
16SB066	16SB0660206	08/12/2004	1.23 U	23	1.23 U	9	1.23 U	1.23 U	1.23 U
16SB066	16SB0660608	08/12/2004	0.92 U	1 J	0.92 U	0.92 U	0.92 U	0.92 U	0.92 U
16SB067	16SS0670102	08/12/2004	1.19 U	3 J	1.19 U	3 J	1.19 U	1.19 U	1.19 U
16SB067	16SB0670206	08/12/2004	1.09 U	1.09 U	1.09 U	2 J	1.09 U	1.09 U	1.09 U
16SB067	16SB0670609	08/12/2004	1.21 U	1.21 U	1.21 U	2 J	1.21 U	1.21 U	1.21 U
16SB068	16SS0680102	08/12/2004	0.96 U	5	0.963 U	0.963 U	0.963 U	0.963 U	0.963 U
16SB068	16SB0680206	08/12/2004	1.02 U	7 J	1.02 U	1.02 U	1.02 U	1.02 U	1.02 U
16SB068	16SB0680609	08/12/2004	1.12 U	5	1.12 U	1.12 U	1.12 U	1.12 U	1.12 U
16SB069	16SS0690102	08/12/2004	1 U	0.995 U	0.995 U	0.995 U	0.995 U	0.995 U	0.995 U
16SB069	16SB0690206	08/12/2004	1.05 U	1.05 U	1.05 U	1.05 U	1.05 U	1.05 U	1.05 U
16SB069	16SB0690607	08/12/2004	1.35 U	1.35 U	1.35 U	1.35 U	1.35 U	1.35 U	1.35 U
16SB070	16SS0700102	08/12/2004	0.92 U	0.923 U	0.923 U	0.923 U	0.923 U	0.923 U	0.923 U
16SB070	16SB0700206	08/12/2004	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
16SB070	16SB0700607	08/12/2004	0.98 U	2 J	0.978 U	10	0.978 U	0.978 U	0.978 U
16SB071	16SS0710102	08/12/2004	0.94 UJ	0.943 UJ	0.943 UJ	0.943 UJ	0.943 UJ	0.943 UJ	0.943 UJ
16SB071	16SB0710206	08/12/2004	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U	1.16 U
16SB072	16SS0720102	08/12/2004	0.93 U	13	0.933 U	2 J	0.933 U	0.933 U	0.933 U
16SB072	16SB0720206	08/12/2004	0.99 U	32	0.986 U	5	0.986 U	0.986 U	0.986 U

TABLE 3-1

TCE CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

Location	Sample ID	Sample Date	1,1,2-TRICHLOR OETHANE	CIS-1,2-DICHLORO ETHENE	TRANS-1,2-DICHLOR OETHENE	TRICHLORO ETHENE	VINYL CHLORIDE	CARBON TETRACHLO RIDE	TETRACHLOR OETHENE
		SWMU 16 MCS	32	420	580	36	14	38	46
16SB072	16SB0720607	08/12/2004	1.22 U	53	1.22 U	11	1.22 U	1.22 U	1.22 U
16SB073	16SS0730102	08/12/2004	1 U	3 J	1 U	1 U	1 U	1 U	1 U
16SB073	16SB0730204	08/12/2004	1.03 U	5	1.03 U	1.03 U	1.03 U	1.03 U	1.03 U
16SB074	16SS0740102	08/17/2004	0.94 U	0.938 U	0.938 U	0.938 U	0.938 U	0.938 U	0.938 U
16SB074	16SB0740206	08/17/2004	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U	1.04 U
16SB075	16SS0750102	08/12/2004	0.97 U	0.967 U	0.967 U	0.967 U	0.967 U	0.967 U	0.967 U
16SB075	16SB0750203	08/12/2004	0.98 U	0.975 U	0.975 U	0.975 U	0.975 U	0.975 U	0.975 U
16SB076	16SS0760102	08/12/2004	0.95 U	0.953 U	0.953 U	0.953 U	0.953 U	0.953 U	0.953 U
16SB076	16SB0760206	08/12/2004	0.93 U	0.929 U	0.929 U	0.929 U	0.929 U	0.929 U	0.929 U
16SB076	16SB0760607	08/12/2004	1.12 U	1.12 U	1.12 U	1.12 U	1.12 U	1.12 U	1.12 U
16SB077	16SS0770102	08/12/2004	0.89 U	0.893 U	0.893 U	0.893 U	0.893 U	0.893 U	0.893 U
16SB077	16SB0770206	08/12/2004	0.99 U	0.988 U	0.988 U	0.988 U	0.988 U	0.988 U	0.988 U
16SB077	16SB0770610	08/12/2004	0.92 U	0.92 U	0.92 U	1 J	0.92 U	0.92 U	0.92 U
16SB078	16SS0780102	08/12/2004	1.02 U	1.02 U	1.02 U	1.02 U	1.02 U	1.02 U	1.02 U
16SB078	16SB0780206	08/12/2004	1.01 U	1.01 U	1.01 U	1.01 U	1.01 U	1.01 U	1.01 U
16SB078	16SB0780609	08/12/2004	1.04 UJ	1.04 UJ	1.04 UJ	1.04 UJ	1.04 UJ	1.04 UJ	1.04 UJ
16SB090	16SB0900406	08/16/2004	0.96 U	0.955 U	0.955 U	220 J	0.955 U	0.955 U	0.955 U
16SB090	16SB0900608	08/16/2004	1.17 U	1.17 J	1.17 U	220 J	1.17 U	1.17 U	1.17 U
16SB091	16SB0910406	08/16/2004	0.94 U	1 J	0.944 U	390 J	0.944 U	0.944 U	0.944 U
16SB091	16SB0910609	08/16/2004	0.97 U	3 J	0.974 U	980	0.974 U	0.974 U	0.974 U
16SB092	16SB0920406	08/16/2004	0.93 U	0.932 U	0.932 U	32	0.932 U	0.932 U	0.932 U
16SB092	16SB0920608	08/16/2004	0.87 U	0.869 U	0.869 U	28	0.869 U	0.869 U	0.869 U
16SB093	16SB0930406	08/16/2004	0.95 U	0.95 U	0.95 U	250 J	0.95 U	0.95 U	0.95 U
16SB093	16SB0930608	08/16/2004	1.05 U	1.05 U	1.05 U	360	1.05 U	1.05 U	1.05 U
16SB094	16SB0940708	08/16/2004	1.48 U	1.48 U	1.48 U	20	1.48 U	1.48 U	1.48 U
16SB095	16SB0950406	08/16/2004	1.01 U	1.01 U	1.01 U	9000	1.01 U	1.01 U	1.01 U
16SB095	16SB0950607	08/16/2004	1.05 U	1.05 U	1.05 U	2000	1.05 U	1.05 U	1.05 U
16SB096	16SB0960406	08/16/2004	0.97 U	0.966 U	0.966 U	120 J	0.966 U	0.966 U	0.966 U
16SB096	16SB0960608	08/16/2004	1.06 U	1.06 U	1.06 U	11	1.06 U	1.06 U	1.06 U
16SB097	16SB0970406	08/16/2004	0.96 U	0.957 U	0.957 U	1200	0.957 U	0.957 U	0.957 U
16SB097	16SB0970607	08/16/2004	1.09 U	1.09 U	1.09 U	88 J	1.09 U	1.09 U	1.09 U
16SB098	16SS0980102	08/16/2004	1.24 U	1.24 U	1.24 U	170	1.24 U	1.24 U	1.24 U
16SB098	16SB0980206	08/16/2004	0.92 U	0.922 U	0.922 U	140	0.922 U	0.922 U	0.922 U
16SB098	16SB0980607	08/16/2004	0.93 U	0.929 U	0.929 U	200 J	0.929 U	0.929 U	0.929 U
16SB099	16SS0990102	08/16/2004	0.98 U	0.98 U	0.98 U	103 J	0.98 U	0.98 U	0.98 U
16SB099	16SB0990206	08/16/2004	1.11 U	1.11 U	1.11 U	630	1.11 U	1.11 U	1.11 U
16SB099	16SB0990608	08/16/2004	1.06 U	1.06 U	1.06 U	160	1.06 U	1.06 U	1.06 U
16SB118	16SB1180206	08/24/2011	0.54 U	16.4	0.308 J	4.03	0.544 U	–	–
16SB118	16SB1180607	08/24/2011	0.53 U	34.1	0.55 J	16.1	0.31 J	–	–
16SB119	16SB1190406	08/24/2011	0.53 U	35.9	1.1	4.02	0.823 J	–	–
16SB119	16SB1190608	08/24/2011	0.3 U	0.525	0.303 U	0.333 U	0.303 U	–	–
16SB120	16SB1200406	08/24/2011	0.33 U	7.31 J	0.344 J	5.6	0.333 U	–	–

TABLE 3-1

TCE CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

Location	Sample ID	Sample Date	1,1,2-TRICHLOR OETHANE	CIS-1,2-DICHLORO ETHENE	TRANS-1,2-DICHLOR OETHENE	TRICHLORO ETHENE	VINYL CHLORIDE	CARBON TETRACHLO RIDE	TETRACHLOR OETHENE
		SWMU 16 MCS	32	420	580	36	14	38	46
16SB120	16SB1200608	08/24/2011	0.31 U	17.6 J	0.368 J	2.13 J	0.311 U	–	–
16SB121	16SB1210306	08/24/2011	0.3 U	2.77	0.3 U	0.904	0.3 U	–	–
16SB121	16SB1210607	08/24/2011	0.53 U	1.91	0.532 U	1.06	0.532 U	–	–
16SB122	16SB1220406	08/24/2011	0.31 U	2.78	0.312 U	1.9	0.312 U	–	–
16SB122	16SB1220910	08/24/2011	0.55 U	11.2	0.548 U	4.39	0.548 U	–	–
16SB123	16SB1230306	08/24/2011	–	120	13	190	2	–	–
16SB123	16SB1230608	08/24/2011	–	63	7	150	1	–	–
16SB124	16SB1240306	08/24/2011	–	20	0.57 J	110	0.63 U	–	–
16SB124	16SB1240911	08/24/2011	–	12	0.56 U	63	0.56 U	–	–
16SB125	16SB1250306	08/24/2011	–	41	1	95	0.59 U	–	–
16SB125	16SB1250607	08/24/2011	–	23	0.67 J	57	0.56 U	–	–
16SB126	16SS1260002	08/24/2011	–	0.51 U	0.51 U	0.51 U	0.51 U	–	–
16SB126	16SB1260205	08/24/2011	–	0.6 U	0.6 U	0.6 U	0.6 U	–	–
16SB127	16SS1270002	08/24/2011	–	0.51 U	0.51 U	0.51 U	0.51 U	–	–
16SB127	16SB1270206	08/24/2011	–	0.54 U	0.54 U	44	0.54 U	–	–
16SB128	16SS1280002	08/24/2011	–	0.52 U	0.52 U	0.52 U	0.52 U	–	–
16SB128	16SB1280206	08/24/2011	–	0.52 U	0.52 U	18	0.52 U	–	–
16SB128	16SB1280607	08/24/2011	–	0.57 U	0.57 U	41	0.57 U	–	–
16SB129	16SS1290002	08/24/2011	–	0.52 U	0.52 U	0.52 U	0.52 U	–	–
16SB129	16SB1290206	08/24/2011	–	0.52 U	0.52 U	65	0.52 U	–	–
16SB130	16SS1300002	08/24/2011	–	0.67 U	0.67 U	0.67 U	0.67 U	–	–
16SB130	16SB1300206	08/24/2011	–	0.52 U	0.52 U	27	0.52 U	–	–
16SB130	16SB1300607	08/24/2011	–	0.48 J	0.73 U	160	0.73 U	–	–
16SB131	16SS1310002	08/24/2011	–	0.72 U	0.72 U	0.72 U	0.72 U	–	–
16SB131	16SB1310206	08/24/2011	–	0.69 U	0.69 U	37	0.69 U	–	–
16SB132	16SS1320002	08/24/2011	0.45 U	0.45 U	0.45 U	0.495 U	0.45 U	–	–
16SB132	16SB1320206	08/24/2011	0.49 U	0.487 U	0.487 U	1.2	0.487 U	–	–
16SB132	16SB1320608	08/24/2011	0.49 U	0.493 U	0.493 U	2.99	0.493 U	–	–
16SB133	16SS1330002	08/24/2011	0.51 U	0.507 U	0.507 U	0.557 U	0.507 U	–	–
16SB133	16SB1330206	08/24/2011	0.5 U	0.502 U	0.502 U	0.561 J	0.502 U	–	–
16SB134	16SS1340002	08/24/2011	0.45 U	0.449 U	0.449 U	0.494 U	0.449 U	–	–
16SB134	16SB1340206	08/24/2011	0.48 U	0.484 U	0.484 U	62.7	0.484 U	–	–
16SB134	16SB1340607	08/24/2011	0.54 U	0.647 J	0.539 U	780	0.539 U	–	–
16SB135	16SB1350002	08/24/2011	0.49 U	0.491 U	0.491 U	3.21	0.491 U	–	–
16SB135	16SB1350206	08/24/2011	0.48 U	4.86	4.28	96.6 J	0.48 U	–	–
16SB136	16SS1360002	08/24/2011	0.51 U	0.511 U	0.511 U	0.681 J	0.511 U	–	–
16SB136	16SB1360206	08/24/2011	0.57 U	0.573 U	0.573 U	3.28	0.573 U	–	–
16SB136	16SB1360607	08/24/2011	0.52 U	0.523 U	0.523 U	3.28	0.523 U	–	–
16SB137	16SS1370002	08/24/2011	0.52 U	0.516 U	0.499 J	14.6	0.516 U	–	–
16SB137	16SB1370205	08/24/2011	0.52 U	0.523 U	0.523 U	0.576 UJ	0.523 U	–	–
16SB138	16SS1380002	08/24/2011	0.52 U	0.519 U	0.519 U	2.76	0.519 U	–	–
16SB138	16SB1380206	08/24/2011	0.51 J	17.7	18.9	1280	0.497 U	–	–

TABLE 3-1

TCE CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

Location	Sample ID	Sample Date	1,1,2-TRICHLOR OETHANE	CIS-1,2-DICHLORO ETHENE	TRANS-1,2-DICHLOR OETHENE	TRICHLORO ETHENE	VINYL CHLORIDE	CARBON TETRACHLO RIDE	TETRACHLOR OETHENE
		SWMU 16 MCS	32	420	580	36	14	38	46
16SB138	16SB1380608	08/24/2011	0.37 J	2.44	1.52	462	0.478 U	–	–
16SB139	16SS1390002	08/24/2011	0.29 U	0.287 U	0.287 U	0.315 U	0.287 U	–	–
16SB139	16SB1390206	08/24/2011	0.31 U	0.21 J	0.308 U	1.37	0.308 U	–	–
16SB140	16SS1400002	08/24/2011	0.49 U	0.492 U	0.492 U	0.541 U	0.492 U	–	–
16SB140	16SB1400206	08/24/2011	0.52 U	9.46	0.517 U	14.4	1.76	–	–
16SB141	16SS1410002	08/25/2011	0.5 U	0.5 U	0.5 U	0.55 U	0.5 U	–	–
16SB141	16SB1410206	08/25/2011	0.54 U	0.536 U	0.536 U	4.69	0.536 U	–	–
16SB141	16SB1410709	08/25/2011	0.33 U	0.33 U	0.33 U	3.3	0.33 U	–	–
16SB142	16SS1420002	08/25/2011	0.52 U	0.519 U	0.519 U	0.571 U	0.519 U	–	–
16SB142	16SB1420204	08/25/2011	0.58 U	0.578 U	0.578 U	1.39	0.578 U	–	–
16SB143	16SS1430002	08/25/2011	0.5 U	0.501 U	0.501 U	0.551 U	0.501 U	–	–
16SB143	16SB1430205	08/25/2011	0.58 U	0.582 U	0.582 U	0.641 U	0.582 U	–	–
16SB144	16SS1440002	08/25/2011	0.53 U	0.533 U	0.533 U	0.586 U	0.533 U	–	–
16SB144	16SB1440204	08/25/2011	0.51 U	0.514 U	0.514 U	0.566 U	0.514 U	–	–
16SB145	16SS1450002	08/25/2011	0.53 U	0.529 U	0.529 U	0.582 U	0.529 U	–	–
16SB145	16SB1450203	08/25/2011	0.53 U	0.533 U	0.533 U	0.587 U	0.533 U	–	–
16SB146	16SB1460205	08/25/2011	0.49 U	0.488 U	0.488 U	51.4	0.488 U	–	–
16SB147	16SS1470002	08/25/2011	0.51 U	0.775 J	0.511 U	19.3	0.511 U	–	–
16SB147	16SB1470206	08/25/2011	0.58 U	0.494 J	0.581 U	12.3 J	0.581 U	–	–
16SB148	16SS1480002	08/25/2011	0.53 U	0.533 U	0.533 U	5.57	0.533 U	–	–
16SB148	16SB1480206	08/25/2011	0.59 U	0.592 U	0.592 U	2.66	0.592 U	–	–
16SB150	16SB1500205	08/25/2011	0.52 U	0.518 U	0.518 U	329	0.518 U	–	–
16SB151	16SS1510002	08/25/2011	0.5 U	1.34	0.501 U	123	0.501 U	–	–
16SB151	16SB1510204	08/25/2011	0.54 U	0.295 J	0.537 U	220	0.537 U	–	–
16SB152	16SS1520002	08/25/2011	0.54 U	0.539 U	0.539 U	185	0.539 U	–	–
16SB152	16SB1520203	08/25/2011	0.57 U	0.569 U	0.569 U	173	0.569 U	–	–
16SB153	16SS1530002	08/25/2011	0.52 U	0.519 U	0.519 U	157	0.519 U	–	–
16SB153	16SB1530206	08/25/2011	0.52 U	0.518 U	0.518 U	236	0.518 U	–	–
16SB207	16SS207-0002	10/06/2012	2.48 U	2.48 UJ	2.48 U	10.4 J	2.48 U	2.48 U	2.48 U
16SB208	16SS208-0002	10/06/2012	2.28 U	2.28 UJ	2.28 U	15.3	2.28 U	2.28 U	2.28 U
16SB209	16SS209-0002	10/06/2012	2.23 U	2.23 UJ	2.23 U	44.2	2.23 U	2.23 U	2.23 U
16SB209	16SB209-0203	10/06/2012	3 U	3 UJ	3 U	45.5 J	3 U	3 U	3 U
16SB210	16SS210-0002	10/06/2012	2.54 U	2.54 UJ	2.54 U	2.54 U	2.54 U	2.54 U	2.54 U
16SB211	16SS211-0002	10/06/2012	2.99 UJ	2.99 UJ	2.99 UJ	13.4 J	2.99 UJ	2.99 UJ	2.99 UJ
16SB212	16SS212-0002	10/06/2012	2.38 U	2.38 UJ	2.38 U	23.8	2.38 U	2.38 U	2.38 U
16SB213	16SS213-0002	10/06/2012	2.59 U	2.59 UJ	2.59 U	3.49 J	2.59 U	2.59 U	2.59 U
16SB214	16SS214-0002	10/06/2012	2.86 U	2.86 UJ	2.86 U	2.86 U	2.86 U	2.86 U	2.86 U
16SB215	16SS215-0002	10/06/2012	2.54 U	2.54 UJ	2.54 U	30.1	2.54 U	2.54 U	2.54 U
16SB216	16SS216-0002	10/06/2012	2.52 U	2.52 UJ	2.52 U	3.36 J	2.52 U	2.52 U	2.52 U
16SB217	16SS217-0002	10/06/2012	2.21 U	2.21 UJ	2.21 U	1.62 J	2.21 U	2.21 U	2.21 U
16SB218	16SS218-0002	10/06/2012	2.51 UJ	2.51 UJ	2.51 UJ	21.1 J	2.51 UJ	2.51 UJ	2.51 UJ
16SB219	16SS219-0002	10/06/2012	2.39 U	2.39 UJ	2.39 U	2.39 U	2.39 U	2.39 U	2.39 U

TABLE 3-1

TCE CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

Location	Sample ID	Sample Date	1,1,2-TRICHLOR OETHANE	CIS-1,2-DICHLORO ETHENE	TRANS-1,2-DICHLOR OETHENE	TRICHLORO ETHENE	VINYL CHLORIDE	CARBON TETRACHLO RIDE	TETRACHLOR OETHENE
		SWMU 16 MCS	32	420	580	36	14	38	46
16SB219	16SB219-0206	10/06/2012	2.55 U	2.55 UJ	2.55 U	56	2.55 U	2.55 U	2.55 U
16SB220	16SS220-0002	10/06/2012	2.51 U	2.51 UJ	2.51 U	2.51 U	3.17 J	2.51 U	2.51 U
16SB220	16SB220-0206	10/06/2012	2.42 U	2.42 U	2.42 U	2.42 U	2.42 UJ	2.42 U	2.42 U
16SB236	16SS236-0002	11/30/2012	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U
16SB236	16SB236-0206	11/30/2012	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U	2.34 U
16SB237	16SS237-0002	11/30/2012	2.64 U	2.64 U	2.64 U	2.64 U	2.64 U	2.64 U	2.64 U
16SB237	16SB237-0206	11/30/2012	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U
16SB238	16SS238-0002	11/30/2012	2.35 U	2.35 U	2.35 U	2.35 U	2.35 U	2.35 U	2.35 U
16SB238	16SB238-0206	11/30/2012	2.23 U	2.23 U	2.23 U	2.23 U	2.23 U	2.23 U	2.23 U
16SB239	16SS239-0002	11/30/2012	2.29 U	2.29 U	2.29 U	2.29 U	2.29 U	2.29 U	2.29 U
16SB239	16SB239-0206	11/30/2012	1.79 U	1.79 U	1.79 U	1.79 U	1.79 U	1.79 U	1.79 U
16SB240	16SS240-0002	11/30/2012	2.23 U	2.23 U	2.23 U	2.23 U	2.23 U	2.23 U	2.23 U
16SB240	16SB240-0206	11/30/2012	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U	2.31 U
16SB241	16SS241-0002	11/30/2012	2.04 U	2.04 U	2.04 U	2.04 U	2.04 U	2.04 U	2.04 U
16SB241	16SB241-0206	11/30/2012	2.57 U	2.57 U	2.57 U	2.57 U	2.57 U	2.57 U	2.57 U

Shaded cells indicate the chemical concentration exceeds the MCS.
J - chemical detected, but the conentration reported is an estimated value
U - concentration not detected at the laboratory detection limit
-- - not analyzed
All units are in µg/kg
MCS - Media Cleanup Standard

TABLE 3-2

METALS CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

LOCATION	SAMPLE ID	SAMPLE DATE	ANTIMONY	COPPER	LEAD	ZINC
		SWMU 16 MCS	6.9(1) / 6.3(2)	253	652(2) / 163(3)	1716
16SB007	16SS0070002	3/27/2003	0.29 U	13.8 J	16.0 J	48.1 J
16SB008	16SS0080002	3/27/2003	2.9 U	T	195 J	271 J
16SB009	16SS0090002	3/27/2003	8.9 J	84.0 J	311 J	552 J
16SB009	16SS0090002-D	3/27/2003	13.6 J	190 J	480 J	1320 J
16SB010	16SS0100002	3/27/2003	7.3 J	127 J	345 J	972 J
16SB011	16SB0110204	3/27/2003	0.39 U	8.7 J	8.1 J	20.6 J
16SB011	16SS0110002	3/27/2003	3.4 U	16.9 J	15.2 J	55.9 J
16SB012	16SB0120204	3/28/2003	0.71 U	13.2 J	10.3 J	35.9 J
16SB012	16SS0120002	3/28/2003	3.6 J	62.6 J	258 J	603 J
16SB013	16SB0130204	3/28/2003	0.41 U	19.3 J	9.5 J	15.2 U
16SB013	16SS0130002	3/28/2003	13.0 J	122 J	405 J	1560 J
16SB014	16SS0140002	3/27/2003	27.2 J	231 J	1240 J	575 J
16SB015	16SS0150002	3/27/2003	4.4 J	413 J	211 J	1150 J
16SB016	16SS0160002	3/27/2003	6.6 J	66.9 J	154 J	563 J
16SB017	16SB0170204	3/27/2003	0.31 U	15.5 J	6.1 J	59.0 J
16SB017	16SS0170002	3/27/2003	1.4 U	39.5 J	140 J	438 J
16SB018	16SB0180203	3/28/2003	0.51 U	34.8 J	14.2 J	17.8 J
16SB018	16SS0180002	3/28/2003	0.59 U	12.8 J	9.8 J	47.8 J
16SB019	16SB0190203	3/28/2003	0.24 U	6.8 J	6.3 J	14.0 J
16SB019	16SS0190002	3/28/2003	0.29 U	6.9 J	8.1 J	17.6 U
16SB020	16SS0200002	3/28/2003	7.7 J	65.4 J	765 J	132 U
16SB021	16SS0210002	3/28/2003	14.8 J	391 J	211 J	2510 U
16SB022	16SB0220203	3/28/2003	0.14 U	3.6 J	3.4 J	15.6 J
16SB022	16SS0220002	3/28/2003	2.0 U	28.3 J	69.9 J	197 U
16SB023	16SB0230203	3/28/2003	0.24 U	8.6 J	7.3 J	20.2 J
16SB023	16SS0230002	3/28/2003	1.3 U	23.0 J	43.0 J	102 J
16SB024	16SB0240203	3/28/2003	0.28 U	7.8 J	5.8 J	17.5 J
16SB024	16SS0240002	3/28/2003	2.0 J	15.3 J	18.0 J	174 J
16SB025	16SB0250203	3/28/2003	0.57 U	10.0 J	7.4 J	11.5 J
16SB025	16SS0250002	3/28/2003	1.5 U	19.0 J	24.9 J	97.2 J
16SB026	16SB0260204	4/9/2003	0.14 U	10.8 J	7.9 U	48.9 J
16SB026	16SS0260002	4/9/2003	0.19 U	13.0 J	14.8 U	49.0 J
16SB027	16SB0270203	3/28/2003	0.97 U	3.9 J	4.4 J	4.5 U
16SB027	16SS0270002	3/28/2003	0.27 U	5.1 J	8.3 J	24.3 U
16SB028	16SB0280203	3/28/2003	0.19 U	6.8 J	6.4 J	59.6 J
16SB028	16SS0280002	3/28/2003	0.66 U	19.8 J	31.8 J	144 U
16SB029	16SB0290203	3/28/2003	0.41 U	11.5 J	6.5 J	29.1 J
16SB029	16SS0290002	3/28/2003	2.8 U	35.0 J	85.7 J	401 U
16SB030	16SB0300203	3/28/2003	0.48 U	11.2 J	8.3 J	27.9 J
16SB030	16SS0300002	3/28/2003	1.2 U	18.8 J	16.9 J	68.2 J
16SB031	16SS0310002	3/28/2003	1.6 U	42.5 J	150 J	633 J
16SB032	16SB0320204	4/9/2003	0.51 J	17.1 J	20.1 J	31.2 J
16SB032	16SS0320002	4/9/2003	0.79 J	15.9 J	17.2 J	40.6 J
16SB033	16SB0330204	4/9/2003	0.25 U	5.4 J	12.9 J	8.6 U
16SB033	16SS0330002	4/9/2003	1.1 J	33.5 J	123 J	193 U
16SB043	16SS0430002	12/5/2003	1.2 J	19.2 J	31.5 J	144 J
16SB044	16SS0440002	12/5/2003	3.3 J	72.9 J	240 J	967 J
16SB045	16SS0450002	12/5/2003	3.1 J	32.2 J	127 J	455 J
16SB085	16SB0850204	8/14/2004	0.65 U	12.5 J	15.6 J	40.6

TABLE 3-2

METALS CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA

LOCATION	SAMPLE ID	SAMPLE DATE	ANTIMONY	COPPER	LEAD	ZINC
		SWMU 16 MCS	6.9(1) / 6.3(2)	253	652(2) / 163(3)	1716
16SB085	16SS0850002	8/14/2004	0.96 U	19.2 J	26 J	135
16SB086	16SB0860204	8/14/2004	0.56 U	14.2 J	13.2 J	35.7
16SB086	16SS0860002	10/16/2004	3.0 J	38.5 J	110 J	368 J
16SB087	16SB0870204	8/14/2004	1.4 J	25.5 J	71.1 J	130
16SB087	16SS0870002	8/14/2004	0.94 U	14.6 J	21.4 J	88.6
16SB088	16SB0880204	8/14/2004	0.34 U	6.6 J	9.4 J	18.2
16SB088	16SS0880002	8/14/2004	1.9 J	36.8 J	82.6 J	280
16SB089	16SB0890204	8/14/2004	0.62 U	16.7 J	21.2 J	35.4
16SB089	16SS0890002	8/14/2004	5.2 J	43.5 J	112 J	683
16SB154	16SS1540002	8/25/2011	1.7	24	69	200
16SB155	16SS1550002	8/25/2011	1.2	36	120	470
16SB156	16SS1560002	8/25/2011	0.57	16	24	76
16SB157	16SS1570002	8/25/2011	4.5	110	390	850
16SB158	16SS1580002	8/25/2011	0.33	11	23	42
16SB159	16SS1590002	8/25/2011	1.8	52	120	380
16SB160	16SS1600002	8/25/2011	0.081 U	21	19	130
16SB161	16SS1610002	8/25/2011	0.7	100	38	1400
16SB162	16SS1620002	8/25/2011	1.7	38	120	170
16SB163	16SS1630002	8/25/2011	0.51	34	94	210
16SB164	16SS1640002	8/25/2011	0.63	24	39	160
16SB165	16SS1650002	8/25/2011	0.27	35	94	190
16SB166	16SS1660002	8/25/2011	0.49	33	42	280
16SB167	16SS1670002	8/25/2011	0.61	28	55 J	140
16SB168	16SS1680002	8/25/2011	0.53	17	36 J	97
16SB169	16SS1690002	8/25/2011	0.58	17	31 J	91
16SB170	16SS1700002	8/25/2011	0.69	17	29 J	130
16SB171	16SS1710002	8/25/2011	1.6	41	79 J	340
16SB172	16SS1720002	8/25/2011	2.9	38	110 J	330
16SB173	16SS1730002	8/25/2011	0.34	13	17 J	59
16SB174	16SS1740002	8/25/2011	1.1	25	28 J	85
16SB175	16SS1750002	8/25/2011	0.42	24	32 J	84
16SB176	16SS17600002	8/26/2011	5	52	170	550
16SB177	16SS17700002	8/26/2011	7.3	150 J	760 J	2000 J
16SB178	16SS17800002	8/26/2011	6	88	290	1500
16SB179	16SS17900002	8/26/2011	4.9	190	590	2200
16SB180	16SS18000002	8/26/2011	4.7	96	370	1100
16SB181	16SS18100002	8/26/2011	8.3	450	1800	4000
16SB182	16SS18200002	8/26/2011	3.2	63	210	630
16SB183	16SS18300002	8/26/2011	4.9	95	360	1200
16SB184	16SS18400002	8/26/2011	7.8	170	640	1400
16SB185	16SS18500002	8/26/2011	1.5	27	78	390
16SB186	16SS18600002	8/26/2011	18	250	830	2600
16SB187	16SS18700002	8/26/2011	2.6	41	120	390
16SB188	16SS18800002	8/26/2011	21	290	1100	3200
16SB189	16SS18900002	8/26/2011	1.6	27	85	320
16SB190	16SS19000002	8/26/2011	15	190	600	2000
16SB221	16SS2210002	10/5/2012	--	--	101 J	902
16SB222	16SS2220002	10/5/2012	--	--	76.9 J	991
16SB223	16SS2230002	10/5/2012	--	--	175 J	883
16SB224	16SS2240002	10/5/2012	--	--	50.9 J	504

TABLE 3-2

METALS CONTAMINATION AREA SOIL SAMPLE SCREENING
SWMU 16
NSA CRANE
CRANE, INDIANA
PAGE 3 OF 3

LOCATION	SAMPLE ID	SAMPLE DATE	ANTIMONY	COPPER	LEAD	ZINC
		SWMU 16 MCS	6.9(1) / 6.3(2)	253	652(2) /163(3)	1716
16SB225	16SS2250002	10/5/2012	--	--	125 J	525
16SB226	16SS2260002	10/5/2012	--	--	101 J	288
16SB227	16SS2270002	10/5/2012	--	--	92.4 J	750
16SB228	16SS2280002	10/5/2012	--	--	244 J	671
16SB229	16SS2290002	10/5/2012	--	--	155 J	527
16SB230	16SS2300002	10/5/2012	--	--	358 J	1060
16SB231	16SS2310002	10/5/2012	--	--	28 J	155
16SB232	16SS2320002	10/5/2012	--	--	168 J	735
16SB233	16SS2330002	10/5/2012	--	--	114 J	741
16SB234	16SS2340002	10/5/2012	--	--	59.8 J	214
16SB235	16SS2350002	10/5/2012	--	--	339 J	930

Shaded cells indicate the chemical concentration exceeds the Medium Cleanup Standard (MCS).

J - estimated value

U - concentration is below the laboratory detection limit

1 - Basewide background concentration for soil

2 - Plant preliminary remediation goal, not to be exceeded at any given sample point

3 - Preliminary remediation goal for invertivorous birds - applied as an average lead concentration across the site.

All units are mg/kg

MCS - Media Cleanup Standard

-- - Not analyzed

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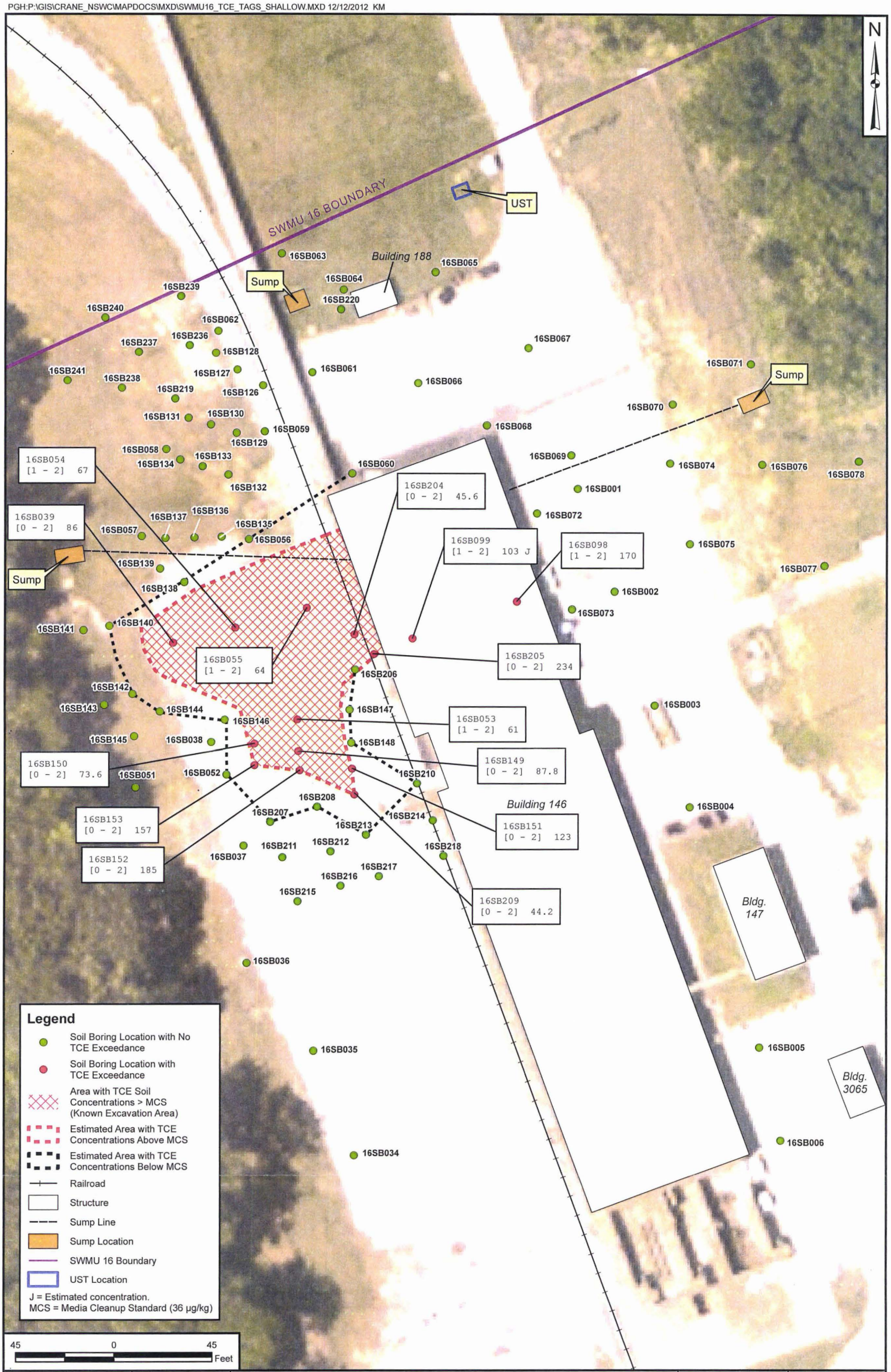

DRAWN BY	DATE		TCE CONTAMINATION AREA SOIL SAMPLING RESULTS AND CLEAN BOUNDARY SURFACE SOIL (0 - 2 FT) SWMU 16 - CAST HIGH EXPLOSIVES FILL/BLDG. 145 INCINERATOR NSA CRANE CRANE, INDIANA	CONTRACT NUMBER	CTO NUMBER
C. TULLEY	01/20/12			02127	F277
CHECKED BY	DATE			APPROVED BY	DATE
J. DUCAR	12/12/12			—	—
REVISED BY	DATE			APPROVED BY	DATE
K. MOORE	12/7/12			—	—
SCALE		NAVFAC		FIGURE NO.	REV
AS NOTED				FIGURE 3-1	0

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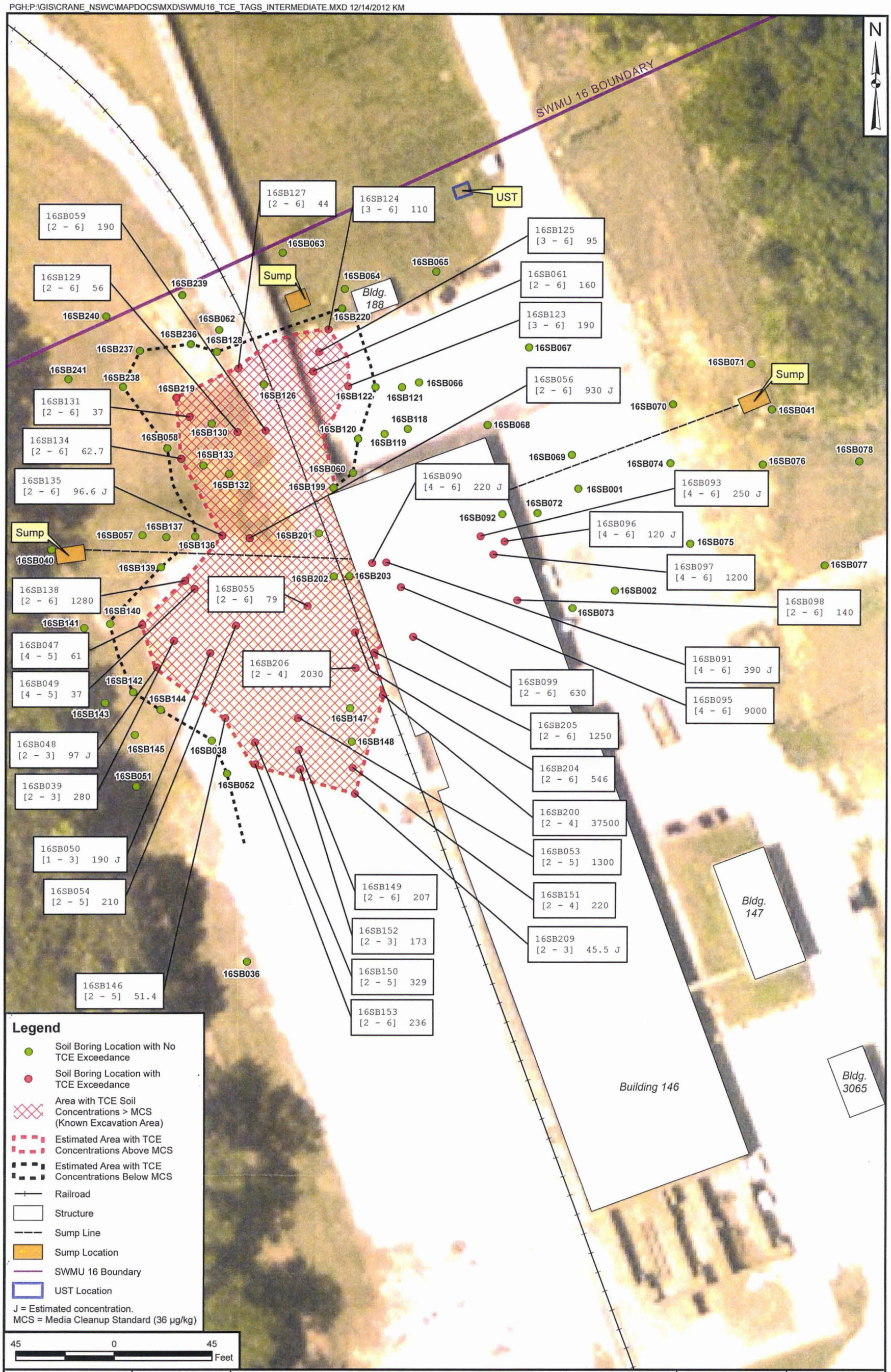

DRAWN BY C. TULLEY	DATE 01/20/12	NAVFAC	TCE CONTAMINATION AREA SOIL SAMPLING RESULTS AND CLEAN BOUNDARY INTERMEDIATE SOIL (2 - 6 FT) SWMU 16 - CAST HIGH EXPLOSIVES FILL/BLDG. 145 INCINERATOR NSA CRANE CRANE, INDIANA	CONTRACT NUMBER 02127 / CTO NUMBER F277
CHECKED BY J. DUCAR	DATE 12/12/12			APPROVED BY — / DATE —
REVISED BY K. MOORE	DATE 12/10/12			APPROVED BY — / DATE —
SCALE AS NOTED				FIGURE NO. FIGURE 3-2 / REV 0

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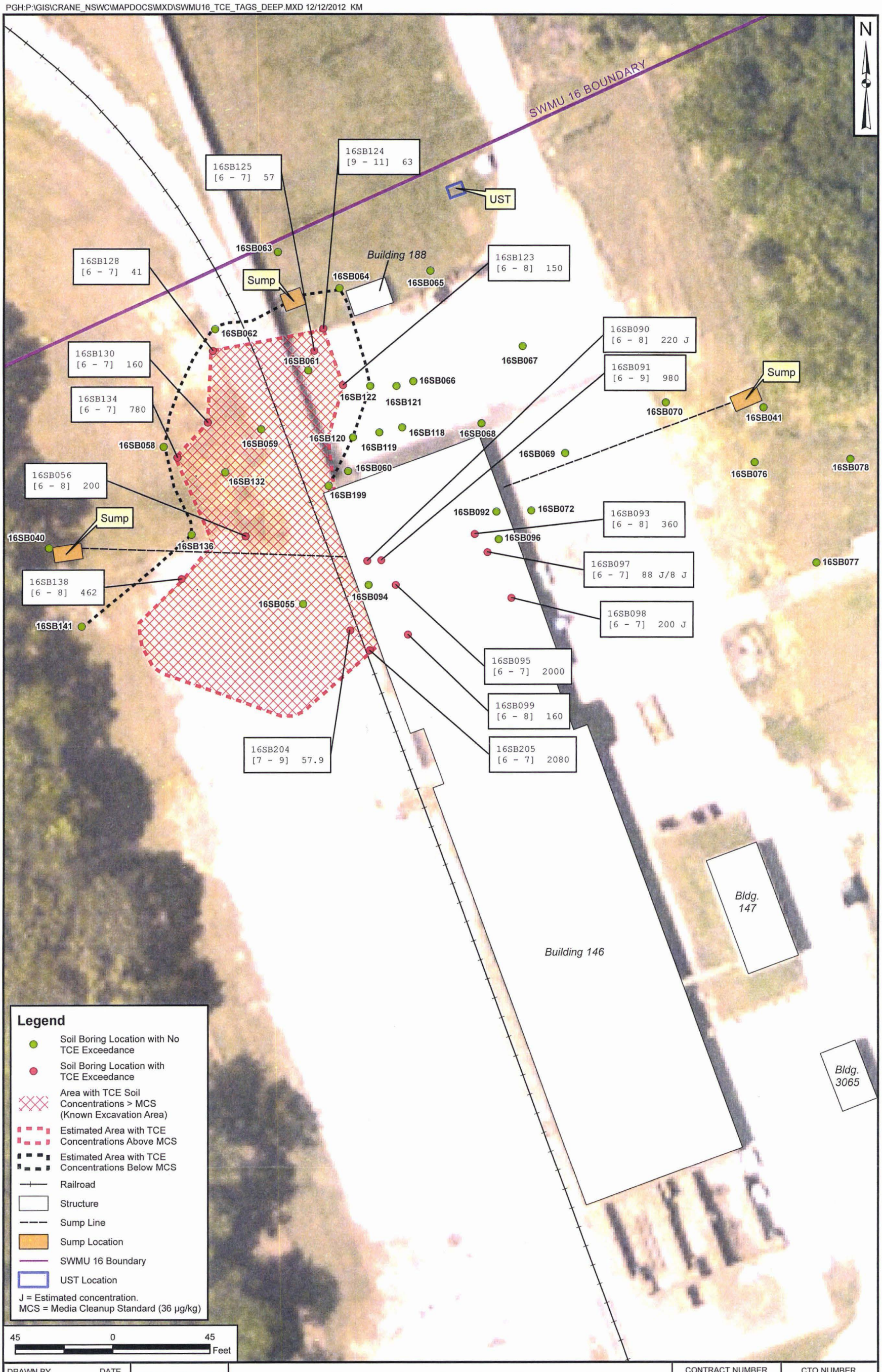

DRAWN BY	DATE
C. TULLEY	01/20/12
CHECKED BY	DATE
J. DUCAR	12/12/12
REVISED BY	DATE
—	—
SCALE	
AS NOTED	

NAVFAC

TCE CONTAMINATION AREA SOIL SAMPLING RESULTS
AND CLEAN BOUNDARY
DEEP SOIL (6 - 10 FT)
SWMU 16 - CAST HIGH EXPLOSIVES FILL/BLDG. 145 INCINERATOR
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
02127	F277
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 3-3	0

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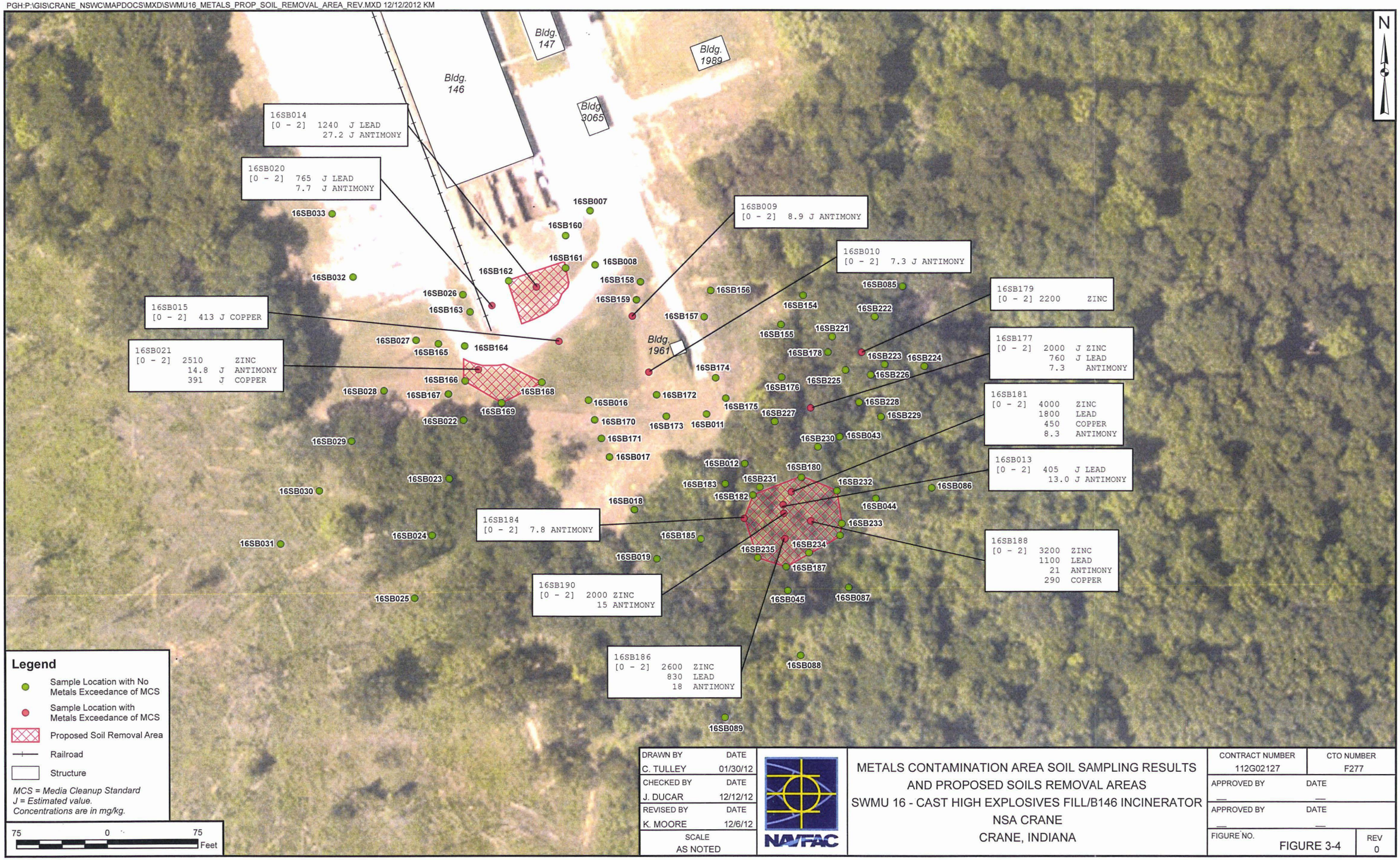

DRAWN BY	DATE
C. TULLEY	01/30/12
CHECKED BY	DATE
J. DUCAR	12/12/12
REVISED BY	DATE
K. MOORE	12/6/12
SCALE	
AS NOTED	

NAVFAC

METALS CONTAMINATION AREA SOIL SAMPLING RESULTS
AND PROPOSED SOILS REMOVAL AREAS
SWMU 16 - CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
112G02127	F277
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO. FIGURE 3-4	REV 0

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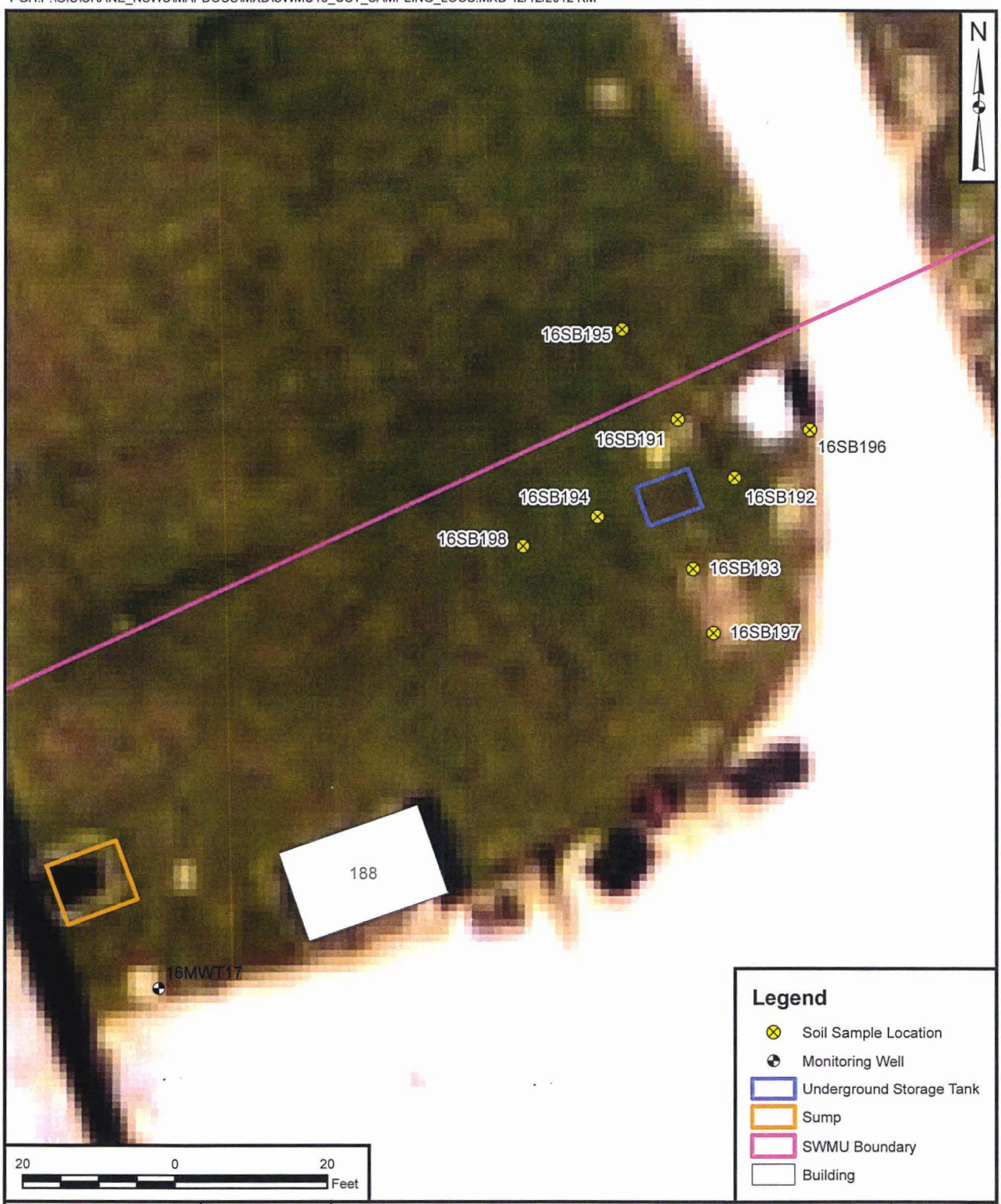

DRAWN BY S. PAXTON	DATE 01/19/12	NAVFAC	UST AREA SAMPLING LOCATIONS SWMU 16 - CAST HIGH EXPLOSIVES FILL / BUILDING 146 INCINERATOR NSA CRANE CRANE, INDIANA	CONTRACT NUMBER ___ / CTO NUMBER F277
CHECKED BY J. DUCAR	DATE 12/12/12			APPROVED BY ___ / DATE ___
REVISED BY S. PAXTON	DATE 02/28/12			APPROVED BY ___ / DATE ___
SCALE AS NOTED				FIGURE NO. FIGURE 3-5 / REV 0

4.0 RECOMMENDATIONS

4.1 TCE CONTAMINATION AREA

The TCE Contamination Area extent of contamination is fully delineated. The recommendation is to proceed to an Intern Measures Work Plan (IMWP).

4.2 METALS CONTAMINATION

The Metals Contamination Area extent of contamination is fully delineated. The recommendation is to proceed to an IMWP.

4.2.1 Metals Contamination Area Soil Removal Determination

A systematic approach was used to determine which sample locations should be proposed for removal. The approach focused on first removing sample locations where concentrations of multiple metals were elevated, and in areas where ecological receptors were more likely to be exposed to the metals. Based on this, the soil near sample locations 16SB013, 16SB181, 16SB186, 16SB188, and 16SB190 are proposed for removal (see Table 4-1 and Figure 3-4). In addition, the soil around sample locations 16SB014 and 16SB021 is proposed for removal because of elevated concentrations of several metals, even though the habitat in these areas is limited. By removing the sample results from the areas proposed for excavation, and replacing the results with background concentrations [assuming the 95% UTL for Soil Category 3 from the Crane Basewide Soil Investigation Report (Tetra Tech, 2001)] for the four metals, the resulting average concentration for lead decreased from 212 mg/kg to 139 mg/kg, which is well below the invertivorous bird PRG of 163 mg/kg.

As noted on Table 4-1, there are seven additional locations that are not proposed for removal, even though the MCSs are exceeded for some of the metals. The last column in the table presents the rationale for why the locations are not proposed for removal. The rationales are presented in more detail below:

- 16SB020: The sample from this location was collected within the railroad bed so there is no ecological habitat in this area so it is not necessary to remove soil from this location.

- 16SB177 and 16SB179: These sample locations are within the wooded area in the south eastern portion of SWMU 16 (see Figure 3-4). The only MCSs that are being exceeded are based on plants; however, removing the soil would result in removing the trees and other vegetation. Also, because concentrations of metals just slightly exceed the plant MCSs and the area is wooded, it is not likely

that significant impacts to plants are occurring. Therefore, the damage that would be caused to the vegetation in the area during excavation activities does not warrant a removal of soil around these sample locations.

- 16SB009 and 16SB010: Soil from these sample locations only slightly exceeded the background concentration for antimony. No other metals exceeded a MCS at these locations. Also, as discussed in the Technical Memorandum (Tetra Tech, 2010), there is uncertainty in whether the impacts observed in the plant toxicity test was due to antimony. For these reasons, the soil around these sample locations is not proposed for removal.

- 16SB015: Soil from this sample location only slightly exceeded the plant MCS for copper. As stated above, the plant MCS for copper is based on a NOEC so impacts to plants at this level cannot be determined, but it would be greater than 253 mg/kg. For that reason, it is not likely the copper from this location is significantly impacting plants so the soil around this sample location is not proposed for removal.

Figure 3-4 presents the three discrete soil areas proposed to be remediated.

TABLE 4-1

SOIL SAMPLES PROPOSED FOR REMOVAL
SWMU 16
NSA CRANE
CRANE, INDIANA

SAMPLE LOCATION	SAMPLE DATE	PRE-REMEDIATION CONCENTRATIONS				POST-REMEDIATION CONCENTRATIONS				Sample Removed or Rationale for Not Removing a Sample
		ANTIMONY	COPPER	LEAD	ZINC	ANTIMONY	COPPER	LEAD	ZINC	
	SWMU 16 MCS	*6.9(1)/6.3(2)*	*253*	*652(2)/163(3)*	*1716*	*6.9(1)/6.3(2)*	*253*	*652(2)/163(3)*	*1716*	
16SB181	8/26/2011	6.9	450	1800	4000	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB014	3/27/2003	27.2	231	1240	575	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB188	8/26/2011	21	290	1100	3200	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB186	8/26/2011	18	250	830	2600	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB020	3/28/2003	7.7	65.4	765	132	7.7	65.4	765	132	Sample is located in railroad line. No ecological habitat.
16SB177	8/26/2011	7.3	150	760	2000	7.3	150	760	2000	Slightly greater than plant PRG in wooded area. Removal would impact plants by trying to protect plants.
16SB184	8/26/2011	7.8	170	640	1400	7.8	170	640	1400	Isolated detection above plant PRG and background.
16SB190	8/26/2011	15	190	600	2000	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB179	8/26/2011	4.9	190	590	2200	4.9	190	590	2200	Slightly greater than plant PRG in wooded area. Removal would impact plants by trying to protect plants.
16SB013	3/28/2003	13	122	405	1560	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB157	8/25/2011	4.5	110	390	850	4.5	110	390	850	No Issue
16SB180	8/26/2011	4.7	96	370	1100	4.7	96	370	1100	No Issue
16SB183	8/26/2011	4.9	95	360	1200	4.9	95	360	1200	No Issue
16SB010	3/27/2003	7.3	127	345	972	7.3	127	345	972	Isolated detection above plant PRG and background.
16SB009	3/27/2003	8.9	84	311	552	8.9	84	311	552	Isolated detection above plant PRG and background.
16SB178	8/26/2011	6	88	290	1500	6	88	290	1500	No Issue
16SB012	3/28/2003	3.6	62.6	258	603	3.6	62.6	258	603	No Issue
16SB044	12/5/2003	3.3	72.9	240	967	3.3	72.9	240	967	No Issue
16SB021	3/28/2003	14.8	391	211	2510	6.9(4)	17.6(4)	27(4)	65.6(4)	To Be Removed
16SB015	3/27/2003	4.4	413	211	1150	4.4	413	211	1150	PRG for copper very conservative because no impacts to plants or invertebrates were observed at 253 mg/kg.
16SB182	8/26/2011	3.2	63	210	630	3.2	63	210	630	No Issue
16SB008	3/27/2003	2.9	52.5	195	271	2.9	52.5	195	271	No Issue
16SB176	8/26/2011	5	52	170	550	5	52	170	550	No Issue
16SB016	3/27/2003	6.6	66.9	154	563	6.6	66.9	154	563	No Issue
16SB031	3/28/2003	1.6	42.5	150	633	1.6	42.5	150	633	No Issue
16SB017	3/27/2003	1.4	39.5	140	438	1.4	39.5	140	438	No Issue
16SB045	12/5/2003	3.1	32.2	127	455	3.1	32.2	127	455	No Issue
16SB033	4/9/2003	1.1	33.5	123	193	1.1	33.5	123	193	No Issue

TABLE 4-1

SOIL SAMPLES PROPOSED FOR REMOVAL
SWMU 16
NSA CRANE
CRANE, INDIANA

SAMPLE LOCATION	SAMPLE DATE	PRE-REMEDIATION CONCENTRATIONS				POST-REMEDIATION CONCENTRATIONS				Sample Removed or Rationale for Not Removing a Sample
		ANTIMONY	COPPER	LEAD	ZINC	ANTIMONY	COPPER	LEAD	ZINC	
	SWMU 16 MCS	*6.9(1)/6.3(2)*	*253*	*652(2)/163(3)*	*1716*	*6.9(1)/6.3(2)*	*253*	*652(2)/163(3)*	*1716*	
16SB187	8/26/2011	2.6	41	120	390	2.6	41	120	390	No Issue
16SB159	8/25/2011	1.8	52	120	380	1.8	52	120	380	No Issue
16SB162	8/25/2011	1.7	38	120	170	1.7	38	120	170	No Issue
16SB155	8/25/2011	1.2	36	120	470	1.2	36	120	470	No Issue
16SB089	8/14/2004	5.2	43.5	112	683	5.2	43.5	112	683	No Issue
16SB086	10/16/2004	3	38.5	110	368	3	38.5	110	368	No Issue
16SB172	8/25/2011	2.9	38	110	330	2.9	38	110	330	No Issue
16SB163	8/25/2011	0.51	34	94	210	0.51	34	94	210	No Issue
16SB165	8/25/2011	0.27	35	94	190	0.27	35	94	190	No Issue
16SB029	3/28/2003	2.8	35	85.7	401	2.8	35	85.7	401	No Issue
16SB189	8/26/2011	1.6	27	85	320	1.6	27	85	320	No Issue
16SB088	8/14/2004	1.9	36.8	82.6	280	1.9	36.8	82.6	280	No Issue
16SB171	8/25/2011	1.6	41	79	340	1.6	41	79	340	No Issue
16SB185	8/26/2011	1.5	27	78	390	1.5	27	78	390	No Issue
16SB022	3/28/2003	2	28.3	69.9	197	2	28.3	69.9	197	No Issue
16SB154	8/25/2011	1.7	24	69	200	1.7	24	69	200	No Issue
16SB167	8/25/2011	0.61	28	55	140	0.61	28	55	140	No Issue
16SB023	3/28/2003	1.3	23	43	102	1.3	23	43	102	No Issue
16SB166	8/25/2011	0.49	33	42	280	0.49	33	42	280	No Issue
16SB164	8/25/2011	0.63	24	39	160	0.63	24	39	160	No Issue
16SB161	8/25/2011	0.7	100	38	1400	0.7	100	38	1400	No Issue
16SB168	8/25/2011	0.53	17	36	97	0.53	17	36	97	No Issue
16SB175	8/25/2011	0.42	24	32	84	0.42	24	32	84	No Issue
16SB028	3/28/2003	0.66	19.8	31.8	144	0.66	19.8	31.8	144	No Issue
16SB043	12/5/2003	1.2	19.2	31.5	144	1.2	19.2	31.5	144	No Issue
16SB169	8/25/2011	0.58	17	31	91	0.58	17	31	91	No Issue
16SB170	8/25/2011	0.69	17	29	130	0.69	17	29	130	No Issue
16SB174	8/25/2011	1.1	25	28	85	1.1	25	28	85	No Issue
16SB085	8/14/2004	0.96	19.2	26	135	0.96	19.2	26	135	No Issue
16SB025	3/28/2003	1.5	19	24.9	97.2	1.5	19	24.9	97.2	No Issue
16SB156	8/25/2011	0.57	16	24	76	0.57	16	24	76	No Issue
16SB158	8/25/2011	0.33	11	23	42	0.33	11	23	42	No Issue
16SB087	8/14/2004	0.94	14.6	21.4	88.6	0.94	14.6	21.4	88.6	No Issue
16SB160	8/25/2011	0.081	21	19	130	0.081	21	19	130	No Issue
16SB024	3/28/2003	2	15.3	18	174	2	15.3	18	174	No Issue
16SB032	4/9/2003	0.79	15.9	17.2	40.6	0.79	15.9	17.2	40.6	No Issue
16SB173	8/25/2011	0.34	13	17	59	0.34	13	17	59	No Issue

TABLE 4-1

SOIL SAMPLES PROPOSED FOR REMOVAL
SWMU 16
NSA CRANE
CRANE, INDIANA

SAMPLE LOCATION	SAMPLE DATE	PRE-REMEDIATION CONCENTRATIONS				POST-REMEDIATION CONCENTRATIONS				Sample Removed or Rationale for Not Removing a Sample
		ANTIMONY	COPPER	LEAD	ZINC	ANTIMONY	COPPER	LEAD	ZINC	
SWMU 16 MCS		*6.9(1)/6.3(2)*	*253*	*652(2)/163(3)*	*1716*	*6.9(1)/6.3(2)*	*253*	*652(2)/163(3)*	*1716*	
16SB030	3/28/2003	1.2	18.8	16.9	68.2	1.2	18.8	16.9	68.2	No Issue
16SB007	3/27/2003	0.29	13.8	16	48.1	0.29	13.8	16	48.1	No Issue
16SB011	3/27/2003	3.4	16.9	15.2	55.9	3.4	16.9	15.2	55.9	No Issue
16SB026	4/9/2003	0.19	13	14.8	49	0.19	13	14.8	49	No Issue
16SB018	3/28/2003	0.59	12.8	9.8	47.8	0.59	12.8	9.8	47.8	No Issue
16SB027	3/28/2003	0.27	5.1	8.3	24.3	0.27	5.1	8.3	24.3	No Issue
16SB019	3/28/2003	0.29	6.9	8.1	17.6	0.29	6.9	8.1	17.6	No Issue
16SB221	10/5/2012	--	--	--	--	--	--	101	902	No Issue
16SB222	10/5/2012	--	--	--	--	--	--	76.9	991	No Issue
16SB223	10/5/2012	--	--	--	--	--	--	175	883	No Issue
16SB224	10/5/2012	--	--	--	--	--	--	50.9	504	No Issue
16SB225	10/5/2012	--	--	--	--	--	--	125	525	No Issue
16SB226	10/5/2012	--	--	--	--	--	--	101	288	No Issue
16SB227	10/5/2012	--	--	--	--	--	--	92.4	750	No Issue
16SB228	10/5/2012	--	--	--	--	--	--	244	671	No Issue
16SB229	10/5/2012	--	--	--	--	--	--	155	527	No Issue
16SB230	10/5/2012	--	--	--	--	--	--	358	1060	No Issue
16SB231	10/5/2012	--	--	--	--	--	--	28	155	No Issue
16SB232	10/5/2012	--	--	--	--	--	--	168	735	No Issue
16SB233	10/5/2012	--	--	--	--	--	--	114	741	No Issue
16SB234	10/5/2012	--	--	--	--	--	--	59.8	214	No Issue
16SB235	10/5/2012	--	--	--	--	--	--	339	930	No Issue
Average Concentration		**4**	**74**	**212**	**632**	**2**	**53**	**141**	**495**	No Issue

Notes:

Cells are shaded if the chemical concentration exceeds the greater of the basewide background concentration or the preliminary remediation goal. Because the lead PRG for invertovorous birds is an average across the site, the lead concentrations are shaded if they exceed the PRG for plants.

1 - Basewide background concentration for soil
2 - Plant preliminary remediation goal, not to be exceeded at any given sample point
3 - Preliminary remediation goal for invertivorous birds - applied as an average lead concentration across the site.
4 - Concentration is based on backfill material assuming the 95% UTL for Soil Category 3 from the Crane Basewide Soil Investigation Report (Tetra Tech, 2001).

PRG - Preliminary Remediation Goal
MCS - Media Cleanup Standard
Highlighted samples are proposed for removal
-- - Not analyzed

REFERENCES

Tetra Tech, 2001; Basewide Soil Investigation Report, Naval Surface Warfare Center Crane, Crane, Indiana, Tetra Tech NUS, Inc., January 2001.

Tetra Tech, 2010; Technical Memorandum, Ecological Media Cleanup Goals SWMU 16 Surface Soils, December 2010.

Tetra Tech, 2011a; Resource Conservation and Recovery Act Facility Investigation for Solid Waste Management Unit (SWMU) 16, Cast High Explosives Fill/B146 Incinerator, Naval Support Activity Crane, Crane, Indiana, Tetra Tech NUS, Inc., March 2011.

Tetra Tech, 2011b; Sampling and Analysis Plan, Soil Delineation and Characterization Investigation for SWMU 16 – Cast High Explosive Fill/Building 146 Incinerator, Naval Support Activity Crane, Crane, Indiana, Tetra Tech NUS, Inc., August 2011.

Tetra Tech, 2012; NSA Crane – SWMU 16 Delineation Sampling Data Summary Report, Naval Support Activity Crane, Crane, Indiana, Tetra Tech, Inc., March 2012.

USEPA, 2005a; U.S. Environmental Protection Agency, Ecological Soil Screening Level for Antimony, Interim Final. Office of Emergency and Remedial Response. OSWER Directive 9285.7-61, February.

USEPA, 2005b; U.S. Environmental Protection Agency, Ecological Soil Screening Level for Lead, Interim Final. Office of Emergency and Remedial Response. OSWER Directive 9285.7-70, March.

APPENDIX A

SOIL BORING, SAMPLE LOGS, AND CHAIN OF CUSTODY FORMS

(Electronic Version Included on CD)

APPENDIX A.1

SOIL BORING AND SAMPLE LOGS
ROUND 1 SAMPLING EVENT (AUGUST 2011)

APPENDIX A.2

SOIL BORING AND SAMPLE LOGS
ROUND 2 SAMPLING EVENT (OCTOBER/NOVEMBER 2012)

APPENDIX A.3

CHAIN-OF-CUSTODY FORMS
ROUND 1 SAMPLING EVENT (AUGUST 2011)

APPENDIX A.4

CHAIN-OF-CUSTODY FORMS
ROUND 2 SAMPLING EVENT (OCTOBER/NOVEMBER 2012)