



## DEPARTMENT OF THE NAVY

CRANE DIVISION  
NAVAL SURFACE WARFARE CENTER  
300 HIGHWAY 381  
CRANE, INDIANA 47522-5000

N00164.AR.000497  
NSWC CRANE  
5090.3a

5090 IN REPLY REFER TO:  
Ser 095/9226  
08 DEC 1999

Indiana Department of Environmental Management  
Solid and Hazardous Waste Management Office  
Attn: Mr. Bruce Palin  
100 North Senate Street  
P.O. Box 6015  
Indianapolis, IN 46206-6015

Dear Mr. Palin:

This letter is in response to the denial by the Indiana Department of Environmental Management (IDEM) of an insignificant facility modification FP51-2 dated April 9, 1998. Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) now believes enough data has been collected in order to support and resubmit the request for an insignificant facility modification for the use of composted soils as daily cover for the NAVSURFWARCENDIV Crane Sanitary Landfill.

NAVSURFWARCENDIV Crane began the compost project as an Interim Measure to remove the source of contamination at four Solid Waste Management Units (SWMUs). The information you previously reviewed, Internal Draft Pilot Scale Treatability Test Report (the final version was approved by U.S.EPA September 10, 1999), concerned Pilot Scale Operations that evaluated seven different combinations of amendments and soil to determine the mix that reduced the explosives contamination the greatest, the quickest, and the most economical. A final mix was chosen from the above-mentioned report to begin Full Scale Operations.

NAVSURFWARCENDIV Crane has been under Full Scale Operations for the past twenty months with U.S. Environmental Protection Agency (U.S.EPA) approval. A summary of analytical results from Mine Fill A initial soil characterization samples is included as enclosure (1). The Industrial and Residential Cleanup Standards for composted soil are included as enclosures (2) and (3), respectively. Finally, enclosure (4) is a table that contains the average explosives concentrations at Day Last for the windrows processed. Once the cleanup goals are met, the composted soil is returned to the excavation site as backfill. Due to added amendments, there is an excess amount of composted material that cannot be returned to the excavation site. Currently, the excess compost soil meeting Residential Cleanup Standards is permanently placed within the SWMU in U.S.EPA approved areas allowing for natural drainage patterns. Due to limited space within the Solid Waste Management Units, NAVSURFWARCENDIV Crane would like to use the compost as daily cover in the on-site sanitary landfill. The Bioremediation facility was constructed in close proximity to reduce the hauling

distance of the compost. Using compost as daily cover would also reduce costs of purchasing daily cover material from off site sources.

The denial letter listed above, states that the cleanup goals are greater than those IDEM has approved for alternative daily cover and are not even appropriate for disposal in the NAVSURFWARCENDIV Crane Sanitary Landfill without further testing and IDEM approval. However, the IDEM values were never provided and the U.S.EPA has approved the values for residential use with the stipulations listed in enclosure (2). Industrial soil restrictions are found in enclosure (3).

Your timely attention in this matter would be greatly appreciated. NAVSURFWARCENDIV Crane point of contact is Ms. Christine D. Freeman, Code 09511, telephone 812-854-4423.

Sincerely,



JAMES M. HUNSICKER, DIRECTOR  
ENVIRONMENTAL PROTECTION DEPARTMENT  
BY DIRECTION OF THE COMMANDER

Encls:

- (1) Pre-excavation Sampling Analytical Results
- (2) Table 1-1 Residential Remedial Goals
- (3) Table 1-2 Industrial Remedial Goals
- (4) Day Last Sampling Analytical Results

Copy to: ~~(w/o encls)~~

ADMINISTRATIVE RECORD

IDEM Southwest Regional Office (J. Thomann)

SOUTHNAVFACENGCOM (Code 1864)

USEPA (DW-8J)

# MFA Initial Soil Characterization Summary Report

<i>Compound</i>	<i>Sample Matrix</i>	<i>Total Samples</i>	<i>Number of Hits</i>	<i>Minimum of Hits</i>	<i>Maximum of Hits</i>	<i>Average of Hits</i>	<i>Overall Minimum</i>	<i>Overall Maximum</i>	<i>Overall Average</i>	<i>Units of Measure</i>
1,1-DICHLOROETHANE	SO	214	None	N/A	N/A	N/A	5	8200	56	UGKG
1,2-DICHLOROETHANE	SO	214	2	2	2	2	2	8200	56	UGKG
O-XYLENE	SO	2	None	N/A	N/A	N/A	1600	8200	4900	UGKG
TNB	SO	397	43	97	25400	3262	97	1250000	6163	UGKG
DNB	SO	397	None	N/A	N/A	N/A	229	1250000	5883	UGKG
TNT	SO	397	197	60	8530000	123047	60	8530000	62751	UGKG
2,4-DINITROTOLUENE	SO	399	6	253	373	317	229	1250000	6591	UGKG
2,6-DINITROTOLUENE	SO	399	1	506	506	506	238	1300000	6121	UGKG
2-Am DNT	SO	397	76	192	14700	1395	192	1250000	6795	UGKG
2-NT	SO	397	2	646	1290	968	229	1250000	5884	UGKG
3-NT	SO	397	1	352	352	352	229	1250000	5884	UGKG
4-Am DNT	SO	397	112	66.4	17500	1157	66.4	1250000	7080	UGKG
4-NT	SO	397	None	N/A	N/A	N/A	229	1250000	5883	UGKG
ACETONE	SO	212	105	2	990	30	2	1100	31	UGKG
SILVER	SO	47	2	140	230	185	130	230	156	UGKG
ALUMINUM	SO	50	50	8500000	27200000	15548000	8500000	27200000	15548000	UGKG
ARSENIC	SO	47	47	2300	57300	9136	2300	57300	9136	UGKG
BARIUM	SO	395	395	53.9	426000	72511	53.9	426000	72511	UGKG
CADMIUM	SO	395	131	40	18400	1041	0.09	18400	389	UGKG
METHYLENE CHLORIDE	SO	214	145	1	6100	71	1	6100	55	UGKG

<i>Compound</i>	<i>Sample Matrix</i>	<i>Total Samples</i>	<i>Number of Hits</i>	<i>Minimum of Hits</i>	<i>Maximum of Hits</i>	<i>Average of Hits</i>	<i>Overall Minimum</i>	<i>Overall Maximum</i>	<i>Overall Average</i>	<i>Units of Measure</i>
CHLOROFORM	SO	214	17	1	1800	107	1	1800	26	UGKG
CHROMIUM	SO	395	395	11.9	60000	17108	11.9	60000	17108	UGKG
DIESEL FUEL	SO	1	1	454000	454000	454000	454000	454000	454000	UGKG
TPH-GASOLINE RANGE ORGANICS	SO	1	None	N/A	N/A	N/A	2640	2640	2640	UGKG
MERCURY	SO	47	6	40	90	58	40	90	42	UGKG
HMX	SO	400	318	171	1450000	61202	171	1450000	49661	UGKG
TOLUENE	SO	214	12	1	2300	334	1	2300	29	UGKG
2-BUTANONE	SO	212	17	1	23	8	1	540	11	UGKG
4-METHYL-2-PENTANONE	SO	212	2	5	7	6	5	1100	22	UGKG
TOTAL PETROLEUM HYDROCARBO	SO	1	None	N/A	N/A	N/A	3000	3000	3000	UGKG
NITROBENZENE	SO	399	None	N/A	N/A	N/A	238	1300000	6414	UGKG
LEAD	SO	395	395	11.1	193000	16772	11.1	193000	16772	UGKG
PETN	SO	49	None	N/A	N/A	N/A	250	250	250	UGKG
RDX	SO	399	311	84.9	9580000	362471	84.9	9580000	284003	UGKG
SELENIUM	SO	47	24	500	1400	967	450	1400	730	UGKG
TETRYL	SO	397	None	N/A	N/A	N/A	596	3250000	15297	UGKG
TCLP SILVER	TL	348	37	1	10	3	1	10	1	UGL
TCLP ARSENIC	TL	348	71	2.1	32.7	4	2.1	32.7	4	UGL
TCLP BARIUM	TL	348	348	0.38	3300	1356	0.38	3300	1356	UGL
TCLP CADMIUM	TL	348	215	0.31	17.6	1	0.3	17.6	0	UGL
TCLP CHROMIUM	TL	348	182	0.92	84.3	2	0.8	84.3	1	UGL
TCLP MERCURY	TL	347	31	0.38	4.9	1	0.1	4.9	1	UGL

<i>Compound</i>	<i>Sample Matrix</i>	<i>Total Samples</i>	<i>Number of Hits</i>	<i>Minimum of Hits</i>	<i>Maximum of Hits</i>	<i>Average of Hits</i>	<i>Overall Minimum</i>	<i>Overall Maximum</i>	<i>Overall Average</i>	<i>Units of Measure</i>
TCLP LEAD	TL	348	300	0.91	1850	30	0.9	1850	26	UGL
TCLP SELENIUM	TL	348	112	3.5	50.5	5	1	50.5	5	UGL
TOTAL PETROLEUM HYDROCARBO	SO	1	None	N/A	N/A	N/A	3000	3000	3000	UGKG
TOTAL PETROLEUM HYDROCARBO	SO	1	None	N/A	N/A	N/A	3000	3000	3000	UGKG
TOTAL PETROLEUM HYDROCARBO	SO	1	None	N/A	N/A	N/A	3000	3000	3000	UGKG
XYLENES, TOTAL COMBINED	SO	1	None	N/A	N/A	N/A	5	5	5	UGKG
XYLENES	SO	213	9	1	3	2	1	8200	56	UGKG

*Minimum, Maximum and Average values were calculated using the found concentration. For compounds found to be present below the reporting limit, the actual value found was utilized. In cases where no target compound was found in the sample, the reporting limit was utilized.*

*The average calculated is the arithmetic mean (the sum of the values divided by the number of values).*

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>EXPLOSIVES</b>							
Pentaerythritol tetranitrate (PETN)	X	X	X	X	To be determined by U.S. EPA 1998	8330	0.25
2,4,6-trinitrotoluene (TNT)	X	X	X	X	15	8330	0.50
Cyclotrimethylene trinitramine (RDX) (Hexahydro 1,3,5 trinitro 1,3,5 triaziine)	X	X	X	X	4.0	8330	0.625
Cyclotetremethylene tetranitramine (HMX) (Octahydro 1,3,5,7 tetranitro 1,3,5,7 tetrazocine)	X	X	X	X	3,300	8330	1.60
Tetryl (Methyl 2,4,6 trinitro phenyl nitramine)	X	X	X	X	650	8330	0.38
Trinitrobenzene (TNB)	X	X	X	X	3.3	8330	0.575
1,3-Dinitrobenzene (DNB)	X	X	X	X	6.5	8330	0.49
1,2-DNB	X	X	X	X	— 26 *	8330	
1,4-DNB	X	X	X	X	— 26 *	8330	
Nitrobenzene (NB)	X	X	X	X	18	8330	0.26
Dinitrotoluene (DNT) (total)	X	X	X	X	— 0.65	8330	
4-Amino 2,6 Dinitrotoluene (4-Am DNT)	X	X	X	X	65 **	8330	0.45

**TABLE 1 - 1**  
**RESIDENTIAL USE SOIL REMEDIAL GOALS,**  
**SWMU-SPECIFIC CHEMICALS OF CONCERN,**  
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**NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
2-Amino 4,6 Dinitrotoluene (2-Am DNT)	X	X	X	X	130 ***	8330	0.40
2,4 DNT	X	X	X	X	130	8330	0.24
2,6-DNT	X	X	X	X	65	8330	0.39
2-nitrotoluene (2 NT)	X	X	X	X	650	8330	0.72
3 NT	X	X	X	X	650	8330	0.50
4 NT	X	X	X	X	650	8330	0.48

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 \* = Region 9 Preliminary Remedial Goal (PRG) value.  
 \*\* = Using 2,6 DNT as the surrogate for toxicity potential.  
 \*\*\* = Using 2,4 DNT as the surrogate for toxicity potential.

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>METALS</b>							
Aluminum	X	X	X	X	77,000	6010	15.0
Antimony			X	X	31	6010	6.0
Arsenic	T	T	X T	X T	0.32	7060	0.80
Barium	X T	X T	X T	X T	5,300	6010	1.0
Beryllium			X	X	0.14	6010	0.5
Cadmium	X T	X T	X T	X T	38	6010	0.5
Chromium (total)	X T	X T	X T	X T	210	6010	1.0
Cobalt			X	X	4,600	6010	2.5
Copper			X	X	2,800	6010	2.5
Iron				X	EN-BG	6010	10.0
Lead	X T	X T	X T	X T	400	6010	10.0
Magnesium				X	EN-BG	6010	50.0
Nickel			X	X	1,500	6010	4.0
Zinc			X	X	23,000	6010	2.0
Mercury	X T	X T	X T	X T	23	7471	0.033

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
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NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
Selenium	T	T	T	T	380	6010	25.0
Silver	T	T	T	T	380	6010	1.0
Manganese			X		3,200 +	6010	1.0
Thallium			X		6.3 ++	6010	25.0
Vanadium			X		540 +++	6010	2.0
Cyanide			X		1,300 ++++	9010	0.50

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 EN-BG = Essential nutrient; individual sample levels must be compared to unimpacted background levels at the site.  
 + = Region 9 PRG value.  
 ++ = Average of Region 9 PRGs for Thallium compounds.  
 +++ = Region 9 PRG for Elemental Vanadium.  
 ++++ = Region 9 PRG value for "Free Cyanide"; this is the remedial goal that should be compared to the "Total Cyanide" measurement.

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>VOLATILE ORGANICS</b>							
Dichloromethane (methylene chloride)	X	X	X		7.8	8260	0.005
Acetone	X	X	X		2,000	8260	0.005
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		7,100	8260	0.005
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			770	8260	0.005
Toluene	X	X			790	8260	0.005
Xylene (total)	X	X		X	320	8260	0.005
Trans 1,3 dichloropropene				X	0.25	8260	0.005
1,1,1 Trichloroethane			X	X	1,200	8260	0.005
1,1,2 Trichloroethane			X	X	0.65	8260	0.005

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
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NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
1,1 Dichloroethylene			X		0.07 #	8260	0.005
1,2 Dichloroethylene			X		35 *	8260	0.010
Trichloroethylene (TCE)			X		5 #	8260	0.005
1,1,2,2 Tetrachloroethane			X T		0.6 #	8260	0.005
Vinyl Chloride			X T		0.03 #	8260	0.005
Chloroethane			X		1,100 **	8260	0.005
Chloroform	T		X T		0.03 #	8260	0.005
Tetrachloroethylene			X		11 #	8260	0.005
1,2 Dichloroethane	T				0.4 #	8260	0.005
1,1 Dichloroethane	T				500 **	8260	0.005

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 \* = For mixture of cis- and trans- isomers; Region 9 PRG.  
 \*\* = Region 9 PRG.  
 # = Soil screening level for inhalation of volatile chemical.

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>SEMI-VOLATILE ORGANICS</b>							
Phenanthrene				X	100 *	8270	0.33
Fluoranthene				X	2,600	8270	0.33
Pyrene				X	100	8270	0.33
Bis (2-ethylhexyl) phthalate			X		46 +	8270	0.33
di-n-butyl phthalate			X		6,500 *	8270	0.33
N-Nitrosodiphenylamine			X		130 +	8270	0.33
Benzo (b) fluoranthene			X		0.9 +	8270	0.33
4 - Nitrophenol			X		NA	8270	1.60
Benzo (a) anthracene			X		0.9 +	8270	0.33
Chrysene			X		7 *	8270	0.33

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 \* = Region 9 PRG.  
 + = Soil screening level.  
 \* = Using Pyrene as the surrogate for volatile PAHs which are not suspected to be human carcinogens.

**TABLE 1 - 1**  
**RESIDENTIAL USE SOIL REMEDIAL GOALS,**  
**SWMU-SPECIFIC CHEMICALS OF CONCERN,**  
**AND ACCEPTABLE REPORTING LIMITS**  
**NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>POLYCHLORINATED BIPHENYLS (PCBs)</b>							
Arochlor 1242		X			0.066 #	8081	0.033
Arochlor 1254		X			0.066 #	8081	0.067
Arochlor 1260		X			0.066 #	8081	0.067

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 # = This is probably a single assay for PCBs; you cannot analyze PCBs in an old release to soil by assuming that the PCB congener/chlorine content will be similar to the original commercial product.

**TABLE 1 - 1  
RESIDENTIAL USE SOIL REMEDIAL GOALS,  
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NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Residential Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>DIOXINS</b>							
2,3,7,8 TCDD equivalents			X *		0.001 +	8290	0.00001

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 \* - Dioxin Soil Sampling is limited to a proximity around solvent burning areas.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 + = This is U.S. EPA remedial policy for residential areas (1 part per billion); However, U.S. EPA may elect to adopt a more stringent state standard if one is available.

**TABLE 1 - 1**  
**RESIDENTIAL USE SOIL REMEDIAL GOALS,**  
**SWMU-SPECIFIC CHEMICALS OF CONCERN,**  
**AND ACCEPTABLE REPORTING LIMITS**  
**NAVAL SURFACE WARFARE CENTER - CRANE**

**Preliminary Exposure Scenarios and Land Use Options:**

These values only address direct inhalation and ingestion.

No cumulative risk is calculated.

No agricultural crop use is allowed.

No gardening or food chain use is allowed.

No animal grazing is allowed.

No site-specific risk assessment values are calculated.

Leaching and ground water impacts at the disposal site are not addressed.

Uncontrolled use of soil is not allowed without restrictions.

**TABLE 1 - 2**  
**INDUSTRIAL USE SOIL REMEDIAL GOALS,**  
**SWMU-SPECIFIC CHEMICALS OF CONCERN,**  
**AND ACCEPTABLE REPORTING LIMITS**  
**NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>EXPLOSIVES</b>							
Pentaerythritol tetranitrate (PETN)	X	X	X	X	To be determined by U.S. EPA 1998	8330	0.25
2,4,6-trinitrotoluene (TNT)	X	X	X	X	64	8330	0.50
Cyclotrimethylene trinitramine (RDX) (Hexahydro 1,3,5 trinitro 1,3,5 triazine)	X	X	X	X	17	8330	0.625
Cyclotetremethylene tetranitramine (HMX) (Octahydro 1,3,5,7 tetranitro 1,3,5,7 tetrazocine)	X	X	X	X	34,000	8330	1.60
Tetryl (Methyl 2,4,6 trinitro phenylnitroamine)	X	X	X	X	6,800	8330	0.38
Trinitrobenzene (TNB)	X	X	X	X	34	8330	0.575
1,3-Dinitrobenzene (DNB)	X	X	X	X	68	8330	0.49
1,2-DNB	X	X	X	X	270	8330	
1,4-DNB	X	X	X	X	270	8330	
Nitrobenzene (NB)*	X	X	X	X	94	8330	0.26
Dinitrotoluene (DNT) (total)	X	X	X	X	2.8	8330	
4-Amino 2,6 Dinitrotoluene (4-Am DNT)	X	X	X	X	680 **	8330	0.45

**TABLE 1 - 2**  
**INDUSTRIAL USE SOIL REMEDIAL GOALS,**  
**SWMU-SPECIFIC CHEMICALS OF CONCERN,**  
**AND ACCEPTABLE REPORTING LIMITS**  
**NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
2-Amino 4,6 Dinitrotoluene (2-Am DNT)	X	X	X	X	1,400 ***	8330	0.40
2,4 DNT	X	X	X	X	1,400	8330	0.24
2,6-DNT	X	X	X	X	680	8330	0.39
2-nitrotoluene (2 NT)	X	X	X	X	6,800	8330	0.72
3 NT	X	X	X	X	6,800	8330	0.50
4 NT	X	X	X	X	6,800	8330	0.48

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
X = Parameter is a Chemical of Concern at the SWMU.  
1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
\* = Region 9 Preliminary Remedial Goal (PRG) value.  
\*\* = Using 2,6 DNT as the surrogate for toxicity potential.  
\*\*\* = Using 2,4 DNT as the surrogate for toxicity potential.

**TABLE 1 - 2  
INDUSTRIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>METALS</b>							
Aluminum	X	X	X	X	100,000	6010	15.0
Antimony			X	X	680	6010	6.0
Arsenic	T	T	X T	X T	2.4	7060	0.80
Barium	X T	X T	X T	X T	100,000	6010	1.0
Beryllium			X	X	1.1	6010	0.5
Cadmium	X T	X T	X T	X T	850	6010	0.5
Chromium (total)	X T	X T	X T	X T	450	6010	1.0
Cobalt			X	X	97,000	6010	2.5
Copper			X	X	63,000	6010	2.5
Iron				X	EN-BG	6010	10.0
Lead	X T	X T	X T	X T	1,000	6010	10.0
Magnesium				X	EN-BG	6010	50.0
Nickel			X	X	34,000	6010	4.0
Zinc			X	X	100,000	6010	2.0
Mercury	X T	X T	X T	X T	510 **	7471	0.033

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NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
Selenium	T	T	T	T	8,500	6010	25.0
Silver	T	T	T	T	8,500	6010	1.0
Manganese			X		43,000 *	6010	1.0
Thallium			X		140 *	6010	25.0
Vanadium			X		12,000 *	6010	2.0
Cyanide			X		14,000 *	9010	0.50

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
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 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 \* = Region 9 PRG.

**TABLE 1 - 2  
INDUSTRIAL USE SOIL REMEDIAL GOALS,  
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AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>VOLATILE ORGANICS</b>							
Dichloromethane (methylene chloride)	X	X	X		18	8260	0.005
Acetone	X	X	X		8,800	8260	0.005
Methyl ethyl ketone (2 - butanone)	X T	X T	X T		27,000	8260	0.005
Methyl isobutyl ketone (4 - methyl -2- pentanone)	X	X			2,800	8260	0.005
Toluene	X	X			880	8260	0.005
Xylene (total)	X	X		X	320	8260	0.005
Trans 1,3 dichloropropene				X	0.55 *	8260	0.005
1,1,1 Trichloroethane			X	X	3,000	8260	0.005
1,1,2 Trichloroethane			X	X	1.5	8260	0.005

**TABLE 1 - 2  
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Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
1,1 Dichloroethylene			X		0.08 *	8260	0.005
1,2 Dichloroethylene			X		0.55 *	8260	0.010
Trichloroethylene (TCE)			X		7 *	8260	0.005
1,1,2,2 Tetrachloroethane			X T		1.1 *	8260	0.005
Vinyl Chloride			X T		0.035 *	8260	0.005
Chloroethane			X		1,600 *	8260	0.005
Chloroform	T		X T		0.53 *	8260	0.005
Tetrachloroethylene			X		17 *	8260	0.005
1,2 Dichloroethane	T				0.55 *	8260	0.005
1,1 Dichloroethane	T				1,700 *	8260	0.005

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
X = Parameter is a Chemical of Concern at the SWMU.  
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1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
\* = Region 9 PRG.

**TABLE 1 - 2  
INDUSTRIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>SEMI-VOLATILE ORGANICS</b>							
Phenanthrene				X		8270	0.33
Fluoranthene				X	27,000	8270	0.33
Pyrene				X	100	8270	0.33
Bis (2-ethylhexyl) phthalate			X		140 *	8270	0.33
di-n-butyl phthalate			X		68,000 *	8270	0.33
N-Nitrosodiphenylamine			X		390 *	8270	0.33
Benzo (b) fluoranthene			X		2.6 *	8270	0.33
4 - Nitrophenol			X		NA	8270	1.60
Benzo (a) anthracene			X		2.6 *	8270	0.33
Chrysene			X		7 *	8270	0.33

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 \* = Region 9 PRG.

**TABLE 1 - 2  
INDUSTRIAL USE SOIL REMEDIAL GOALS,  
SWMU-SPECIFIC CHEMICALS OF CONCERN,  
AND ACCEPTABLE REPORTING LIMITS  
NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>POLYCHLORINATED BIPHENYLS (PCBs)</b>							
Arochlor 1242		X			0.34 #	8081	0.033
Arochlor 1254		X			19 #	8081	0.067
Arochlor 1260		X			0.34 #	8081	0.067

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 # = This is probably a single assay for PCBs; you cannot analyze PCBs in an old release to soil by assuming that the PCB congener/chlorine content will be similar to the original commercial product.

**TABLE 1 - 2  
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SWMU-SPECIFIC CHEMICALS OF CONCERN,  
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NAVAL SURFACE WARFARE CENTER - CRANE**

Parameter	SWMU Parameter Applicable To				IM Industrial Cleanup Goal (Human Health Only) (mg/kg)	Method of Analysis <sup>1</sup>	Analytical Reporting Limit (mg/kg)
	M A	M B	A B G	R E			
<b>DIOXINS</b>							
2,3,7,8 TCDD equivalents			X *		0.005 - 0.020 +	8290	0.000001

NOTES: MA = Mine Fill A, MB = Mine Fill B, ABG = Ammunition Burning Ground, and RE = Rockeye.  
 X = Parameter is a Chemical of Concern at the SWMU.  
 T = Parameter is a TCLP parameter for waste characterization.  
 \* - Dioxin Soil Sampling is limited to a proximity around solvent burning areas.  
 1. Analytical methods listed above are SW-846 methods, unless otherwise indicated.  
 + = This is U.S. EPA remedial policy for industrial areas (5-10 parts per billion); However, U.S. EPA may elect to adopt a more stringent State standard if one is available.

**TABLE 1 - 2**  
**INDUSTRIAL USE SOIL REMEDIAL GOALS,**  
**SWMU-SPECIFIC CHEMICALS OF CONCERN,**  
**AND ACCEPTABLE REPORTING LIMITS**  
**NAVAL SURFACE WARFARE CENTER - CRANE**

**Preliminary Exposure Scenarios and Land Use Options:**

These values only address direct inhalation and ingestion.

Worker safety is not addressed.

No cumulative risk is calculated.

No agricultural crop use is allowed.

No residential use is allowed.

No gardening or food chain use is allowed.

No animal grazing is allowed.

No site-specific risk assessment values are calculated.

Leaching and ground water impacts at the disposal site are not addressed.

Uncontrolled use of soil is not allowed without restrictions.

Industrial construction exposure is not addressed.

## Day Last Sampling Analytical Results

Finished Compost					Finished Compost (continued)				
Windrow Number	Days Processed	HMX	RDX	TNT	Windrow Number	Days Processed	HMX	RDX	TNT
001	26	2.100	1.000	0.400	047	13	2.200	1.500	0.300
002	21	2.300	1.400	0.300	048	17	2.200	2.000	0.300
003	15	2.200	1.100	0.300	049	10	2.100	1.400	0.320
004	14	2.300	2.100	0.700	050	9	2.600	2.800	0.250
005	15	2.200	1.100	0.300	051	14	2.200	1.200	0.250
006	14	2.200	1.000	0.250	052	11	3.000	2.000	0.300
007	13	2.200	1.000	0.250	053	11	3.000	7.700	5.800
008	8	2.200	1.100	0.290	054	12	2.100	1.100	0.200
009	8	2.200	1.800	0.450	055	9	2.100	1.400	0.300
010	10	2.200	1.000	0.250	056	7	2.000	2.600	6.900
011	9	2.100	1.000	0.250	057	9	2.200	1.900	4.300
012	7	5.400	1.600	0.380	058	9	2.109	1.039	0.306
013	7	3.800	2.500	1.200	059	8	2.042	2.763	0.352
014	8	2.200	1.000	0.250	060	8	2.098	4.847	0.403
015	7	1.900	1.100	0.250	061	8	21.340	3.461	4.236
016	6	2.000	1.100	0.260	062	6	2.185	6.474	0.777
017	7	1.900	1.100	0.250	063	8	2.189	3.418	1.581
018	6	2.300	1.100	0.250	064	8	2.571	12.142	1.694
019	7	2.200	1.700	0.240	065	8	2.114	4.858	1.168
020	7	3.200	1.600	0.250	066	11	2.041	1.922	0.326
021	7	2.550	2.470	0.510	067	7	2.105	4.001	1.377
022	21	2.060	2.320	0.260	068	10	2.205	2.924	3.843
023	23	4.480	3.260	0.250	069	7	2.173	6.853	1.961
024	10	2.570	1.950	0.450	070	7	2.161	3.203	0.368
025	7	2.540	3.020	0.240	071	9	2.157	0.936	22.476
026	6	2.360	2.340	0.990	072	7	2.171	1.756	0.246
027	7	1.860	1.680	0.380	073	6	2.267	2.890	5.876
028	21	2.810	5.880	1.480	074	8	2.066	1.427	0.358
029	7	2.670	2.290	1.490	075	8	1.899	2.699	0.226
030	20	2.090	4.930	0.250	076	7	1.978	3.968	0.312
031	10	2.170	3.670	0.250	077	8	3.654	7.921	0.457
032	7	1.660	2.960	0.250	078	6	3.618	7.439	0.765
033	6	2.020	2.780	0.690	079	10	2.416	3.884	0.236
034	7	3.100	3.150	1.460	080	7	2.167	3.169	0.464
035	9	3.710	6.240	0.530	081	6	2.087	1.733	0.237
036	13	2.750	4.210	0.250	082	6	2.545	1.737	0.244
037	12	2.830	6.780	0.460	083	6	1.979	2.172	0.694
038	7	3.880	7.230	11.000	084	6	2.684	1.814	0.231
039	6	5.220	13.100	1.180	085	7	2.407	2.804	0.375
040	7	5.830	5.240	1.120	086	6	2.045	1.595	0.232
041	7	5.520	8.910	0.310	087	6	2.379	2.220	0.378
042	7	7.100	14.700	0.380	088	6	2.589	1.931	0.245
043	6	2.870	8.290	0.340	089	6	2.169	1.440	0.671
044	7	4.670	7.170	0.295	090	6	2.387	3.210	0.245
045	18	3.410	4.440	0.270	091	6	2.235	1.111	0.287
046	16	2.820	2.860	0.250	092	6	2.361	4.268	0.326

## Day Last Sampling Analytical Results

Finished Compost (continued)				
W#	Days Processed	HMX	RDX	TNT
093	6	3.331	5.185	0.500
094	6	2.831	2.092	0.243
095	8	2.133	1.218	0.242
096	6	2.496	1.366	0.246
097	7	0.833	2.405	1.692
098	7	2.180	4.942	0.304
099	9	1.380	0.704	1.000
100	7	1.557	1.941	0.228
101	9	2.610	6.350	0.815
102	14	2.746	15.487	0.873
105	6	3.667	4.858	1.883
103	15	3.061	3.937	0.983
106	9	1.606	5.658	1.000
107	7	1.600	6.360	0.919
104	19	2.223	4.892	1.012
108	7	1.856	0.935	0.233
109	11	2.163	0.982	0.246
110	10	2.147	1.084	0.244
111	9	2.062	0.996	0.234

Notes: All results are ppm