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NSA CRANE
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FIELD TASK MODIFICATION REQUEST FORM REGARDING THE SAMPLING AND ANALYSIS PLAN AND RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT AT SOLID WASTE MANAGEMENT UNIT 23 (SWMU 23) BATTERY SHOP BUILDING 36 NSA CRANE IN

09/23/2013

TETRA TECH

Tetra Tech, Inc.
FIELD TASK MODIFICATION REQUEST FORM

Project/Installation Name: SWMU 23 – Battery Shop Building 36	**CTO & Project Number:** CTO F27Q; 112G03539	**Task Modification Number:** 002
Modification to: Sampling and Analysis Plan (SAP) – Resource Conservation and Recovery Act Facility Investigation – SWMU 23 – Battery Shop Building 36, August 2012	**Site Location:** NSA Crane	**Date of Request:** September 23, 2013

Background:

Tetra Tech performed Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) sampling during October/November 2012 at Solid Waste Management Unit (SWMU) 23 – Battery Shop Building 36. Additional soil characterization samples were collected in May 2013 under Field Task Modification Request (FTMR) Number 001, dated April 29, 2013.

The current data for SWMU 23 – Battery Shop Building 36 identify discrete soil areas that present unacceptable risks to both ecological and human health receptors (**Figure 1**). The human health risks are being driven by polycyclic aromatic hydrocarbons (PAHs), which are evaluated as Benzo(a)Pyrene (BaP) equivalents, and also lead (Pb). The excess human health risks are being driven by the PAH concentrations in surface soil samples at locations 23SB002, 003, and 004. These soil samples are from within the former suspect liquid disposal area at the edge of the gravel parking area near the top of the slope to the west of Building 36. Lead risk to human health is driven by high lead concentrations at surface soil locations 23SB014 and 23SB017, both of which are located in the former surface debris removal area. The ecological risk is also driven by lead from these same two locations. Location 23SB010 exhibited a surface soil lead concentration greater than its screening criteria; however, since the lead concentration was only slightly greater than its screening criteria, and other samples in the area were below screening criteria, it was not retained as a human health or ecological risk driver at the site. Subsurface soil [greater than 2 feet below ground surface (bgs)] in the area of these

sample locations either is not present due to thin soil horizons and near-surface bedrock or when present the measured subsurface soil lead concentrations are within established soil screening criteria.

A "hot spot" removal action would result in no further action (NFA) for SWMU 23 by addressing the limited soil areas with unacceptable exposure risks. This removal action could be conducted either as an interim measure, before the RFI process is completed or as a corrective measure after the RFI is completed. A "hot spot" removal action generally requires excavation to a pre-determined boundary along with the collection of confirmation samples. Prescriptive remediation would require excavation to a pre-determined boundary, which has been previously defined by samples with known "clean" concentrations.

The contamination located at each of these two soil areas has been bounded vertically and horizontally; however, the lateral distance between a "clean" sample point and a "dirty" sample point ranges from 50 to 100-feet. Implementation of a prescriptive remediation utilizing the data from the current sample points would require excavation of approximately 1,000 cubic yards of material. The excavation would take place primarily in steep terrain.

Sampling Program:

The purpose of the proposed additional sampling under this FTMR would be to improve the delineation between the "clean" and "dirty" sample points in these soil areas, with the goal of providing more accurate excavation perimeters and verifying the amount of soil that requires excavation at the site to reduce receptor risks to more acceptable levels. Each of the two areas is briefly discussed below:

Former Surface Debris Removal Area (Lead Risk)

Lead was detected in the surface soil (less than 2-feet bgs) at two locations within the former surface debris removal area at concentrations much greater than the screening value of 400 milligrams per kilogram (mg/kg). Those two locations include 23SB014 (4,640 mg/kg) and 23SB017 (1,920 mg/kg). Ten additional samples (23SB038 – 047) are proposed for collection and lead analysis at the former surface debris removal area to decrease the amount of

potentially excavated soil. The previous subsurface soil sample collection attempts resulted in refusal due to bedrock at depths less than 2-feet bgs; therefore, all proposed sample depths for this area are for 0 to 2-feet bgs. **Table 1** presents the ten sample locations and their associated sampling method and rationale for collection. **Figure 2** shows the locations of the proposed samples.

Former Suspect Liquid Disposal Area (PAH Risk)

PAHs were detected within the surface soil (0 to 2-feet bgs) at three locations at concentrations greater than the BaP screening value of 0.015 mg/kg. These three locations include 23SB002 (3.82 mg/kg), 23SB003 (4.6 mg/kg), and 23SB004 (2.19 mg/kg). PAH concentrations in soil at SWMU 23 present a human health risk in excess of 1×10^{-4}. Total risk is presented as BaP equivalent concentrations and acceptable risk is within the risk range of 1×10^{-6} to 1×10^{-4}, or 0.015 mg/kg to 1.5 mg/kg BaP equivalent concentrations. The media cleanup goals (MCGs) for PAHs are reduction of contaminant concentrations so that the risk from residual contamination in surface and subsurface soil is within the acceptable risk range for residential receptors.

The risk-based screening level (RBSL) of 1×10^{-4} for residential human health exposure is used as the point of departure for evaluating total cancer risks in this assessment. A RBSL corresponding to a risk level of 1×10^{-4}, or 1.5 mg/kg BaP equivalent concentration, was used to evaluate the total BaP equivalent concentrations for this project. Based on the collected soil samples from SWMU 23 and the BaP equivalent concentrations calculated for those soil samples, there is PAH contamination present in the soil at SWMU 23 above the human health screening level of 0.015 mg/kg BaP equivalents. Because the primary screening level of 0.015 mg/kg BaP equivalents for the human health screening level of 1×10^{-6} is particularly low (15 parts per billion), many of the soil samples collected from SWMU 23 that contained detectable levels of PAHs also exceeded the screening level established for the human health risk level of 1×10^{-6}. However, if all or most of the soil areas with BaP equivalent concentrations greater than the screening level established for the human health risk level of 1×10^{-5} (0.15 mg/kg) were removed from the SWMU 23 area, then the majority of the remaining soil at the site should fall somewhere between the projected residential cancer risk levels 1×10^{-6} (0.015 mg/kg) and 1×10^{-5} (0.15 mg/kg) of BaP equivalents for soil at SWMU 23.

Subsurface soil samples collected from the 2-foot interval above the bedrock at locations 23SB002, 003, and 004 did not present any human health or ecological risks. These subsurface soil samples ranged in depth from 8- to 12-feet bgs. Since it is unknown if risks exist at depths between 2- and 8-feet bgs, additional samples are proposed at these three locations from 2 to 4- and 4 to 6-feet bgs. Samples will be collected at both depths by direct-push technology (DPT) and shipped to the laboratory for extraction; however, to potentially reduce overall analytical costs, only the upper depth soil sample (2 to 4-feet) will be initially analyzed for PAHs. Soil samples will be processed and prioritized in a phased approach. The 4- to 6-foot depth soil sample will only be analyzed if the 2- to 4-foot depth presents an unacceptable exposure risk due to PAH (as BaP equivalents).

Additionally, 42 samples are proposed for collection from 28 new locations (23SB048 – 075) located to the west and to the east of the current three "hot spots" at the former suspected liquid disposal area to significantly decrease the amount of potentially excavated soil. Due to the current distance between a known "dirty" sample location and a known "clean" location, step-out samples are proposed to the east and the west of each of the three "hot spot" locations. All samples proposed for collection to the west of the known "hot spots" would be collected by hand auger due to the steep topography of the site. Bedrock along the hillside has been encountered at depths less than 2-feet bgs; therefore, only surface soil samples (ground surface to 2-feet bgs) are proposed for collection in this area. These samples will all undergo extraction at the laboratory; however, only the first or second step-out sample from the "hot spot" will initially be analyzed for PAHs. The third and fourth step-out samples will only be analyzed for PAHs if the initial step-outs indicate that excess risks are present in the soil. The step-out samples proposed for collection to the east of the known "hot spots" will be collected by DPT due to the difficulty of boring through the gravel parking lot. Only the initial 0 to 2- and 2 to 4-foot step-out samples associated with each of the three "hot spots" will be extracted and analyzed for PAHs. The initial 4 to 6-foot step-out samples and the entire secondary step-out samples will only be analyzed for PAHs if the initial samples indicate that unacceptable risks are present in the soil.

Table 1 presents the proposed surface and subsurface soil sample locations, the proposed sample collection method, and the rationale for collecting each sample. **Figure 1** shows the

locations of the soil samples that have been collected to date for SWMU 23 and summarizes the previous analytical data in terms of upper tolerance limits and soil screening values. Figure 2 and Figure 3 present the locations of the proposed soil samples needed to improve the delineation of soil contamination with excess risk at the former surface debris removal area and the former suspect liquid disposal area, respectively, at SWMU 23.

Approval:

9/23/13

Jim Goerdt, Tetra Tech Project Manager / Date

TABLE 1

FIELD TASK MODIFICATION REQUEST FORM
PROPOSED SAMPLES, METHODOLOGY, ANALYSIS, AND RATIONALE
SWMU 23 – BATTERY SHOP BUILDING 36
NSA CRANE
CRANE, INDIANA

Sample Location[(1)]	Sample ID[(2)]	SAMPLE METHOD	PAHs	Pb	Sample Rationale
23SB002	23SB002-0204	DPT	X	---	Refine vertical PAH contamination
	23SB002-0406	DPT	X[(3)]	---	
23SB003	23SB003-0204	DPT	X	---	Refine vertical PAH contamination
	23SB003-0406	DPT	X[(3)]	---	
23SB004	23SB004-0204	DPT	X	---	Refine vertical PAH contamination
	23SB004-0406	DPT	X[(3)]	---	
23SB038	23SS038-0002	HA	---	X	Refine clean boundary north of 23SB017
23SB039	23SS039-0002	HA	---	X	
23SB040	23SS040-0002	HA	---	X	Refine clean boundary south of 23SB017
23SB041	23SS041-0002	HA	---	X	Refine clean boundary east of 23SB014
23SB042	23SS042-0002	HA	---	X	Refine clean boundary southwest of 23SB014
23SB043	23SS043-0002	HA	---	X	Refine clean boundary northwest of 23SB014
23SB044	23SS044-0002	HA	---	X	
23SB045	23SS045-0002	HA	---	X	Define clean boundary southwest of 23SB017
23SB046	23SS046-0002	HA	---	X	Define clean boundary northwest of 23SB017
23SB047	23SS047-0002	HA	---	X	Define clean boundary northeast of 23SB014
23SB048	23SS048-0002	DPT	X	---	Refine clean boundary northeast of 23SB004
	23SS048-0204	DPT	X	---	
	23SS048-0406	DPT	X[(3)]	---	
23SB049	23SS049-0002	HA	X	---	Refine clean boundary northwest of 23SB004
23SB050	23SS050-0002	HA	X[(3)]	---	
23SB051	23SS051-0002	HA	X[(3)]	---	
23SB052	23SS052-0002	HA	X[(3)]	---	
23SB053	23SS053-0002	HA	X	---	Define a clean boundary

TABLE 1

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PROPOSED SAMPLES, METHODOLOGY, ANALYSIS, AND RATIONALE
SWMU 23 – BATTERY SHOP BUILDING 36
NSA CRANE
CRANE, INDIANA

Sample Location[(1)]	Sample ID[(2)]	SAMPLE METHOD	PAHs	Pb	Sample Rationale
23SB054	23SS054-0002	HA	X[(3)]	---	between 23SB004 and 23SB009
23SB055	23SS055-0002	HA	X	---	
23SB056	23SS056-0002	HA	X	---	Define a clean line between 23SB003 and 23SB004
23SB057	23SS057-0002	HA	X[(3)]	---	
23SB058	23SS058-0002	HA	X[(3)]	---	
23SB059	23SS059-0002	HA	X	---	Refine clean boundary west of 23SB003
23SB060	23SS060-0002	HA	X[(3)]	---	
23SB061	23SS061-0002	HA	X[(3)]	---	
23SB062	23SS062-0002	HA	X	---	Define a clean point between 23SB002 and 23SB003
23SB063	23SS063-0002	HA	X[(3)]	---	Define a clean point between 23SB002 and 23SB003
23SB064	23SS064-0002	HA	X	---	Define a clean point between 23SB002 and 23SB003
23SB065	23SS065-0002	HA	X	---	Refine clean boundary south of 23SB002
23SB066	23SS066-0002	HA	X[(3)]	---	
23SB067	23SS067-0002	HA	X[(3)]	---	
23SB068	23SS068-0002	HA	X	---	Refine a clean point south of 23SB002
23SB069	23SS069-0002	DPT	X	---	Refine a clean point east of 23SB002
	23SB069-0204	DPT	X	---	
	23SB069-0406	DPT	X[(3)]	---	
23SB070	23SS070-0002	DPT	X[(3)]	---	
	23SB070-0204	DPT	X[(3)]	---	
	23SB070-0406	DPT	X[(3)]	---	
23SB071	23SS071-0002	DPT	X	---	Refine a clean point east

TABLE 1

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PROPOSED SAMPLES, METHODOLOGY, ANALYSIS, AND RATIONALE
SWMU 23 – BATTERY SHOP BUILDING 36
NSA CRANE
CRANE, INDIANA

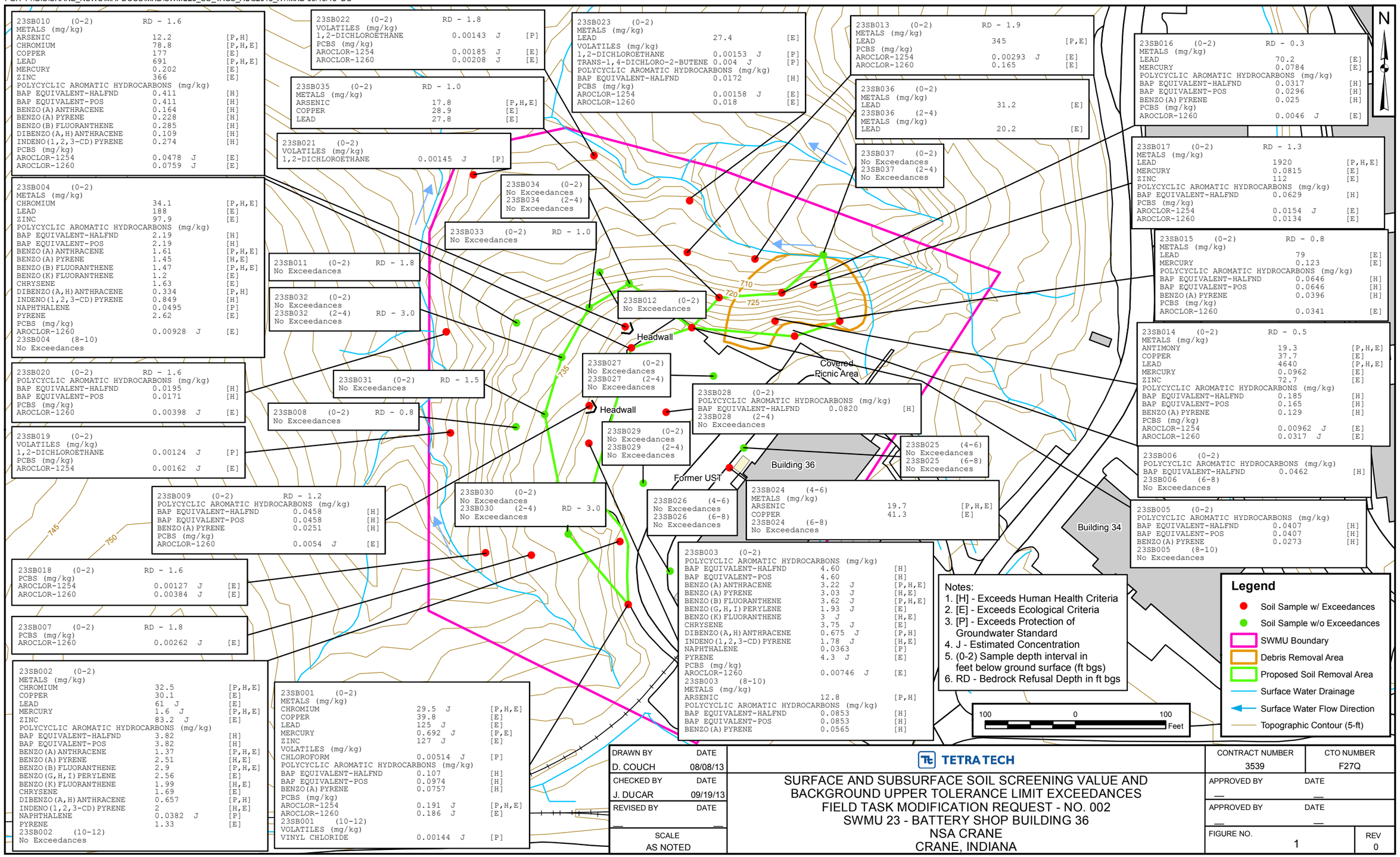
Sample Location[1]	Sample ID[2]	SAMPLE METHOD	PAHs	Pb	Sample Rationale
	23SB071-0204	DPT	X	---	of 23SB003
	23SB071-0406	DPT	X[3]	---	
23SB072	23SS072-0002	DPT	X[3]	---	
	23SB072-0204	DPT	X[3]	---	
	23SB072-0406	DPT	X[3]	---	
23SB073	23SS073-0002	HA	X	---	Refine a clean point between 23SB003 and 23SB004
23SB074	23SS074-0002	DPT	X	---	Refine a clean point southeast of 23SB004
	23SB074-0204	DPT	X	---	
	23SB074-0406	DPT	X[3]	---	
23SB075	23SS075-0002	DPT	X[3]	---	Refine a clean point southeast of 23SB004
	23SB075-0204	DPT	X[3]	---	
	23SB075-0406	DPT	X[3]	---	
Total Soil Samples			**21/ 27[3]**	**10**	

HA = Hand auger
DPT = Direct-push technology
PAH = Polynuclear aromatic hydrocarbons
Pb = Lead

1 23 = SWMU 23
2 SS = Surface soil SB = Subsurface Soil
3 Sample will be designated as “Extract and Hold”. Sample will be collected and shipped to the laboratory for extraction; however, the sample will only be analyzed if instructed to do so by Tetra Tech.

Note: Soil samples to be collected and logged in accordance with **SOPs-08, -09,** and **-10** of the approved UFP-SAP (Tetra Tech, 2012). Field duplicate (FD) and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples will be collected at a minimum frequency of 1 per 20 samples per analyte for laboratory samples.

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU23_SO_TAGS_AUG2013_X1.MXD 09/19/13 DC



23SB010 (0-2) RD - 1.6
METALS (mg/kg)

ARSENIC	12.2	[P,H]
CHROMIUM	78.8	[P,H,E]
COPPER	177	[E]
LEAD	691	[P,H,E]
MERCURY	0.202	[E]
ZINC	366	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.411	[H]
BAP EQUIVALENT-POS	0.411	[H]
BENZO(A)ANTHRACENE	0.164	[H]
BENZO(A)PYRENE	0.228	[H]
BENZO(B)FLUORANTHENE	0.285	[H]
DIBENZO(A,H)ANTHRACENE	0.109	[H]
INDENO(1,2,3-CD)PYRENE	0.274	[H]

PCBS (mg/kg)

AROCLOR-1254	0.0478 J	[E]
AROCLOR-1260	0.0759 J	[E]

23SB004 (0-2)
METALS (mg/kg)

CHROMIUM	34.1	[P,H,E]
LEAD	188	[E]
ZINC	97.9	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	2.19	[H]
BAP EQUIVALENT-POS	2.19	[H]
BENZO(A)ANTHRACENE	1.61	[P,H,E]
BENZO(A)PYRENE	1.45	[H,E]
BENZO(B)FLUORANTHENE	1.47	[P,H,E]
BENZO(K)FLUORANTHENE	1.2	[E]
CHRYSENE	1.63	[E]
DIBENZO(A,H)ANTHRACENE	0.334	[P,H]
INDENO(1,2,3-CD)PYRENE	0.849	[H]
NAPHTHALENE	0.0495	[P]
PYRENE	2.62	[E]

PCBS (mg/kg)

AROCLOR-1260	0.00928 J	[E]

23SB004 (8-10)
No Exceedances

23SB020 (0-2) RD - 1.6
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0195	[H]
BAP EQUIVALENT-POS	0.0171	[H]

PCBS (mg/kg)

AROCLOR-1260	0.00398 J	[E]

23SB019 (0-2)
VOLATILES (mg/kg)

1,2-DICHLOROETHANE	0.00124 J	[P]

PCBS (mg/kg)

AROCLOR-1254	0.00162 J	[E]

23SB018 (0-2) RD - 1.6
PCBS (mg/kg)

AROCLOR-1254	0.00127 J	[E]
AROCLOR-1260	0.00384 J	[E]

23SB007 (0-2) RD - 1.8
PCBS (mg/kg)

AROCLOR-1260	0.00262 J	[E]

23SB002 (0-2)
METALS (mg/kg)

CHROMIUM	32.5	[P,H,E]
COPPER	30.1	[E]
LEAD	61 J	[E]
MERCURY	1.6 J	[P,H,E]
ZINC	83.2 J	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	3.82	[H]
BAP EQUIVALENT-POS	3.82	[H]
BENZO(A)ANTHRACENE	1.37	[P,H,E]
BENZO(A)PYRENE	2.51	[H,E]
BENZO(B)FLUORANTHENE	2.9	[P,H,E]
BENZO(G,H,I)PERYLENE	2.56	[E]
BENZO(K)FLUORANTHENE	1.99	[H,E]
CHRYSENE	1.69	[E]
DIBENZO(A,H)ANTHRACENE	0.657	[P,H]
INDENO(1,2,3-CD)PYRENE	2	[H,E]
NAPHTHALENE	0.0382 J	[P]
PYRENE	1.33	[E]

23SB002 (10-12)
No Exceedances

23SB022 (0-2) RD - 1.8
VOLATILES (mg/kg)

1,2-DICHLOROETHANE	0.00143 J	[P]

PCBS (mg/kg)

AROCLOR-1254	0.00185 J	[E]
AROCLOR-1260	0.00208 J	[E]

23SB035 (0-2) RD - 1.0
METALS (mg/kg)

ARSENIC	17.8	[P,H,E]
COPPER	28.9	[E]
LEAD	27.8	[E]

23SB021 (0-2)
VOLATILES (mg/kg)

1,2-DICHLOROETHANE	0.00145 J	[P]

23SB034 (0-2)
No Exceedances
23SB034 (2-4)
No Exceedances

23SB033 (0-2) RD - 1.0
No Exceedances

23SB011 (0-2) RD - 1.8
No Exceedances

23SB032 (0-2)
No Exceedances
23SB032 (2-4) RD - 3.0
No Exceedances

23SB031 (0-2) RD - 1.5
No Exceedances

23SB008 (0-2) RD - 0.8
No Exceedances

23SB009 (0-2) RD - 1.2
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0458	[H]
BAP EQUIVALENT-POS	0.0458	[H]
BENZO(A)PYRENE	0.0251	[H]

PCBS (mg/kg)

AROCLOR-1260	0.0054 J	[E]

23SB001 (0-2)
METALS (mg/kg)

CHROMIUM	29.5 J	[P,H,E]
COPPER	39.8	[E]
LEAD	125 J	[E]
MERCURY	0.692 J	[P,E]
ZINC	127 J	[E]

VOLATILES (mg/kg)

CHLOROFORM	0.00514 J	[P]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.107	[H]
BAP EQUIVALENT-POS	0.0974	[H]
BENZO(A)PYRENE	0.0757	[H]

PCBS (mg/kg)

AROCLOR-1254	0.191 J	[P,H,E]
AROCLOR-1260	0.186 J	[E]

23SB001 (10-12)
VOLATILES (mg/kg)

VINYL CHLORIDE	0.00144 J	[P]

23SB023 (0-2)
METALS (mg/kg)

LEAD	27.4	[E]

VOLATILES (mg/kg)

1,2-DICHLOROETHANE	0.00153 J	[P]
TRANS-1,4-DICHLORO-2-BUTENE	0.004 J	[P]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0172	[H]

PCBS (mg/kg)

AROCLOR-1254	0.00158 J	[E]
AROCLOR-1260	0.018	[E]

23SB012 (0-2)
No Exceedances

23SB027 (0-2)
No Exceedances
23SB027 (2-4)
No Exceedances

23SB029 (0-2)
No Exceedances
23SB029 (2-4)
No Exceedances

23SB030 (0-2)
No Exceedances
23SB030 (2-4) RD - 3.0
No Exceedances

23SB026 (4-6)
No Exceedances
23SB026 (6-8)
No Exceedances

23SB028 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0820	[H]

23SB028 (2-4)
No Exceedances

23SB013 (0-2) RD - 1.9
METALS (mg/kg)

LEAD	345	[P,E]

PCBS (mg/kg)

AROCLOR-1254	0.00293 J	[E]
AROCLOR-1260	0.165	[E]

23SB036 (0-2)
METALS (mg/kg)

LEAD	31.2	[E]

23SB036 (2-4)
METALS (mg/kg)

LEAD	20.2	[E]

23SB037 (0-2)
No Exceedances
23SB037 (2-4)
No Exceedances

23SB025 (4-6)
No Exceedances
23SB025 (6-8)
No Exceedances

23SB024 (4-6)
METALS (mg/kg)

ARSENIC	19.7	[P,H,E]
COPPER	41.3	[E]

23SB024 (6-8)
No Exceedances

23SB003 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	4.60	[H]
BAP EQUIVALENT-POS	4.60	[H]
BENZO(A)ANTHRACENE	3.22 J	[P,H,E]
BENZO(A)PYRENE	3.03 J	[H,E]
BENZO(B)FLUORANTHENE	3.62 J	[P,H,E]
BENZO(G,H,I)PERYLENE	1.93 J	[E]
BENZO(K)FLUORANTHENE	3 J	[H,E]
CHRYSENE	3.75 J	[E]
DIBENZO(A,H)ANTHRACENE	0.675 J	[P,H]
INDENO(1,2,3-CD)PYRENE	1.78 J	[H,E]
NAPHTHALENE	0.0363	[P]
PYRENE	4.3 J	[E]

PCBS (mg/kg)

AROCLOR-1260	0.00746 J	[E]

23SB003 (8-10)
METALS (mg/kg)

ARSENIC	12.8	[P,H]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0853	[H]
BAP EQUIVALENT-POS	0.0853	[H]
BENZO(A)PYRENE	0.0565	[H]

23SB016 (0-2) RD - 0.3
METALS (mg/kg)

LEAD	70.2	[E]
MERCURY	0.0784	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0317	[H]
BAP EQUIVALENT-POS	0.0296	[H]
BENZO(A)PYRENE	0.025	[H]

PCBS (mg/kg)

AROCLOR-1260	0.0046 J	[E]

23SB017 (0-2) RD - 1.3
METALS (mg/kg)

LEAD	1920	[P,H,E]
MERCURY	0.0815	[E]
ZINC	112	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0629	[H]

PCBS (mg/kg)

AROCLOR-1254	0.0154 J	[E]
AROCLOR-1260	0.0134	[E]

23SB015 (0-2) RD - 0.8
METALS (mg/kg)

LEAD	79	[E]
MERCURY	0.123	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0646	[H]
BAP EQUIVALENT-POS	0.0646	[H]
BENZO(A)PYRENE	0.0396	[H]

PCBS (mg/kg)

AROCLOR-1260	0.0341	[E]

23SB014 (0-2) RD - 0.5
METALS (mg/kg)

ANTIMONY	19.3	[P,H,E]
COPPER	37.7	[E]
LEAD	4640	[P,H,E]
MERCURY	0.0962	[E]
ZINC	72.7	[E]

POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.185	[H]
BAP EQUIVALENT-POS	0.165	[H]
BENZO(A)PYRENE	0.129	[H]

PCBS (mg/kg)

AROCLOR-1254	0.00962 J	[E]
AROCLOR-1260	0.0317 J	[E]

23SB006 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0462	[H]

23SB006 (6-8)
No Exceedances

23SB005 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)

BAP EQUIVALENT-HALFND	0.0407	[H]
BAP EQUIVALENT-POS	0.0407	[H]
BENZO(A)PYRENE	0.0273	[H]

23SB005 (8-10)
No Exceedances

Notes:
1. [H] - Exceeds Human Health Criteria
2. [E] - Exceeds Ecological Criteria
3. [P] - Exceeds Protection of Groundwater Standard
4. J - Estimated Concentration
5. (0-2) Sample depth interval in feet below ground surface (ft bgs)
6. RD - Bedrock Refusal Depth in ft bgs

Legend
- Soil Sample w/ Exceedances
- Soil Sample w/o Exceedances
- SWMU Boundary
- Debris Removal Area
- Proposed Soil Removal Area
- Surface Water Drainage
- Surface Water Flow Direction
- Topographic Contour (5-ft)

DRAWN BY D. COUCH	DATE 08/08/13
CHECKED BY J. DUCAR	DATE 09/19/13
REVISED BY —	DATE —
SCALE AS NOTED	

TETRA TECH

SURFACE AND SUBSURFACE SOIL SCREENING VALUE AND BACKGROUND UPPER TOLERANCE LIMIT EXCEEDANCES
FIELD TASK MODIFICATION REQUEST - NO. 002
SWMU 23 - BATTERY SHOP BUILDING 36
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 3539	CTO NUMBER F27Q
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. 1	REV 0

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU23_SO_TAGS_AUG2013_X2.MXD 09/19/13 DC

N

23SB022 (0-2) RD - 1.8
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00143 J [P]
PCBS (mg/kg)
AROCLOR-1254 0.00185 J [E]
AROCLOR-1260 0.00208 J [E]

23SB021 (0-2)
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00145 J [P]

23SB004 (0-2)
METALS (mg/kg)
CHROMIUM 34.1 [P,H,E]
LEAD 188 [E]
ZINC 97.9 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 2.19 [H]
BAP EQUIVALENT-POS 2.19 [H]
BENZO(A)ANTHRACENE 1.61 [P,H,E]
BENZO(A)PYRENE 1.45 [H,E]
BENZO(B)FLUORANTHENE 1.47 [P,H,E]
BENZO(K)FLUORANTHENE 1.2 [E]
CHRYSENE 1.63 [E]
DIBENZO(A,H)ANTHRACENE 0.334 [P,H]
INDENO(1,2,3-CD)PYRENE 0.849 [H]
NAPHTHALENE 0.0495 [P]
PYRENE 2.62 [E]
PCBS (mg/kg)
AROCLOR-1260 0.00928 J [E]
23SB004 (8-10)
No Exceedances

23SB020 (0-2) RD - 1.6
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0195 [H]
BAP EQUIVALENT-POS 0.0171 [H]
PCBS (mg/kg)
AROCLOR-1260 0.00398 J [E]

23SB023 (0-2)
METALS (mg/kg)
LEAD 27.4 [E]
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00153 J [P]
TRANS-1,4-DICHLORO-2-BUTENE 0.004 J [P]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0172 [H]
PCBS (mg/kg)
AROCLOR-1254 0.00158 J [E]
AROCLOR-1260 0.018 [E]

23SB013 (0-2) RD - 1.9
METALS (mg/kg)
LEAD 345 [P,E]
PCBS (mg/kg)
AROCLOR-1254 0.00293 J [E]
AROCLOR-1260 0.165 [E]

23SB035 (0-2) RD - 1.0
METALS (mg/kg)
ARSENIC 17.8 [P,H,E]
COPPER 28.9 [E]
LEAD 27.8 [E]

23SB036 (0-2)
METALS (mg/kg)
LEAD 31.2 [E]
23SB036 (2-4)
METALS (mg/kg)
LEAD 20.2 [E]

23SB016 (0-2) RD - 0.3
METALS (mg/kg)
LEAD 70.2 [E]
MERCURY 0.0784 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0317 [H]
BAP EQUIVALENT-POS 0.0296 [H]
BENZO(A)PYRENE 0.025 [H]
PCBS (mg/kg)
AROCLOR-1260 0.0046 J [E]

23SB017 (0-2) RD - 1.3
METALS (mg/kg)
LEAD 1920 [P,H,E]
MERCURY 0.0815 [E]
ZINC 112 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0629 [H]
PCBS (mg/kg)
AROCLOR-1254 0.0154 J [E]
AROCLOR-1260 0.0134 [E]

23SB014 (0-2) RD - 0.5
METALS (mg/kg)
ANTIMONY 19.3 [P,H,E]
COPPER 37.7 [E]
LEAD 4640 [P,H,E]
MERCURY 0.0962 [E]
ZINC 72.7 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.185 [H]
BAP EQUIVALENT-POS 0.165 [H]
BENZO(A)PYRENE 0.129 [H]
PCBS (mg/kg)
AROCLOR-1254 0.00962 J [E]
AROCLOR-1260 0.0317 J [E]

23SB015 (0-2) RD - 0.8
METALS (mg/kg)
LEAD 79 [E]
MERCURY 0.123 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0646 [H]
BAP EQUIVALENT-POS 0.0646 [H]
BENZO(A)PYRENE 0.0396 [H]
PCBS (mg/kg)
AROCLOR-1260 0.0341 [E]

23SB006 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0462 [H]
23SB006 (6-8)
No Exceedances

23SB005 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0407 [H]
BAP EQUIVALENT-POS 0.0407 [H]
BENZO(A)PYRENE 0.0273 [H]
23SB005 (8-10)
No Exceedances

23SB010 (0-2) RD - 1.6
METALS (mg/kg)
ARSENIC 12.2 [P,H]
CHROMIUM 78.8 [P,H,E]
COPPER 177 [E]
LEAD 691 [P,H,E]
MERCURY 0.202 [E]
ZINC 366 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.411 [H]
BAP EQUIVALENT-POS 0.411 [H]
BENZO(A)ANTHRACENE 0.164 [H]
BENZO(A)PYRENE 0.228 [H]
BENZO(B)FLUORANTHENE 0.285 [H]
DIBENZO(A,H)ANTHRACENE 0.109 [H]
INDENO(1,2,3-CD)PYRENE 0.274 [H]
PCBS (mg/kg)
AROCLOR-1254 0.0478 J [E]
AROCLOR-1260 0.0759 J [E]

23SB019 (0-2)
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00124 J [P]
PCBS (mg/kg)
AROCLOR-1254 0.00162 J [E]

23SB028 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0820 [H]
23SB028 (2-4)
No Exceedances

23SB009 (0-2) RD - 1.2
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0458 [H]
BAP EQUIVALENT-POS 0.0458 [H]
BENZO(A)PYRENE 0.0251 [H]
PCBS (mg/kg)
AROCLOR-1260 0.0054 J [E]

23SB024 (4-6)
METALS (mg/kg)
ARSENIC 19.7 [P,H,E]
COPPER 41.3 [E]
23SB024 (6-8)
No Exceedances

23SB003 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 4.60 [H]
BAP EQUIVALENT-POS 4.60 [H]
BENZO(A)ANTHRACENE 3.22 J [P,H,E]
BENZO(A)PYRENE 3.03 J [H,E]
BENZO(B)FLUORANTHENE 3.62 J [P,H,E]
BENZO(G,H,I)PERYLENE 1.93 J [E]
BENZO(K)FLUORANTHENE 3 J [H,E]
CHRYSENE 3.75 J [E]
DIBENZO(A,H)ANTHRACENE 0.675 J [P,H]
INDENO(1,2,3-CD)PYRENE 1.78 J [H,E]
NAPHTHALENE 0.0363 [P]
PYRENE 4.3 J [E]
PCBS (mg/kg)
AROCLOR-1260 0.00746 J [E]
23SB003 (8-10)
METALS (mg/kg)
ARSENIC 12.8 [P,H]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0853 [H]
BAP EQUIVALENT-POS 0.0853 [H]
BENZO(A)PYRENE 0.0565 [H]

23SB012
23SB034
23SB033
23SB011
23SB032
23SB031
23SB008
23SB027
23SB025
23SB029
SB038
SB039
SB047
SB046
SB040
SB044
SB042
SB045
SB041
SB043
23SB037
Headwall
Headwall
Covered Picnic Area

665 670 680 685 700 705 710 715 720 725 730 735 740 745 750

Notes:
1. [H] - Exceeds Human Health Criteria
2. [E] - Exceeds Ecological Criteria
3. [P] - Exceeds Protection of Groundwater Standard
4. J - Estimated Concentration
5. (0-2) Sample depth interval in feet below ground surface (ft bgs)
6. RD - Bedrock Refusal Depth in ft bgs

Legend
- Proposed Soil Sample Location
- Hot Spot
- Soil Sample w/ Exceedances
- Soil Sample w/o Exceedances
- SWMU Boundary
- Former Surface Debris Removal Area
- Proposed Soil Removal Area
- Surface Water Drainage
- Surface Water Flow Direction
- Topographic Contour (5-ft)

50 0 50 Feet

DRAWN BY / DATE	D. COUCH 09/19/13
CHECKED BY / DATE	J. GOERDT 09/19/13
REVISED BY / DATE	— —
SCALE	AS NOTED

TETRA TECH

PROPOSED SOIL SAMPLE LOCATIONS (Pb)
FIELD TASK MODIFICATION REQUEST - NO. 002
FORMER SURFACE DEBRIS REMOVAL AREA
SWMU 23 - BATTERY SHOP BUILDING 36
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	3539
CTO NUMBER	F27Q
APPROVED BY / DATE	— —
APPROVED BY / DATE	— —
FIGURE NO.	2
REV	0

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU23_SO_TAGS_AUG2013_X3.MXD 09/23/13 DC

23SB016 (0-2) RD - 0.3
METALS (mg/kg)
LEAD 70.2 [E]
MERCURY 0.0784 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0317 [H]
BAP EQUIVALENT-POS 0.0296 [H]
BENZO(A)PYRENE 0.025 [H]
PCBS (mg/kg)
AROCLOR-1260 0.0046 J [E]

23SB036 (0-2)
METALS (mg/kg)
LEAD 31.2 [E]
23SB036 (2-4)
METALS (mg/kg)
LEAD 20.2 [E]

23SB023 (0-2)
METALS (mg/kg)
LEAD 27.4 [E]
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00153 J [P]
TRANS-1,4-DICHLORO-2-BUTENE 0.004 J [P]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0172 [H]
PCBS (mg/kg)
AROCLOR-1254 0.00158 J [E]
AROCLOR-1260 0.018 [E]

23SB013 (0-2) RD - 1.9
METALS (mg/kg)
LEAD 345 [P,E]
PCBS (mg/kg)
AROCLOR-1254 0.00293 J [E]
AROCLOR-1260 0.165 [E]

23SB014 (0-2) RD - 0.5
METALS (mg/kg)
ANTIMONY 19.3 [P,H,E]
COPPER 37.7 [E]
LEAD 4640 [P,H,E]
MERCURY 0.0962 [E]
ZINC 72.7 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.185 [H]
BAP EQUIVALENT-POS 0.165 [H]
BENZO(A)PYRENE 0.129 [H]
PCBS (mg/kg)
AROCLOR-1254 0.00962 J [E]
AROCLOR-1260 0.0317 J [E]

23SB024 (4-6)
METALS (mg/kg)
ARSENIC 19.7 [P,H,E]
COPPER 41.3 [E]
23SB024 (6-8)
No Exceedances

23SB035 (0-2) RD - 1.0
METALS (mg/kg)
ARSENIC 17.8 [P,H,E]
COPPER 28.9 [E]
LEAD 27.8 [E]

23SB009 (0-2) RD - 1.2
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0458 [H]
BAP EQUIVALENT-POS 0.0458 [H]
BENZO(A)PYRENE 0.0251 [H]
PCBS (mg/kg)
AROCLOR-1260 0.0054 J [E]

23SB027

23SB005 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0407 [H]
BAP EQUIVALENT-POS 0.0407 [H]
BENZO(A)PYRENE 0.0273 [H]
23SB005 (8-10)
No Exceedances

23SB028 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0820 [H]
23SB028 (2-4)
No Exceedances

23SB026

23SB003 (0-2)
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 4.60 [H]
BAP EQUIVALENT-POS 4.60 [H]
BENZO(A)ANTHRACENE 3.22 J [P,H,E]
BENZO(A)PYRENE 3.03 J [H,E]
BENZO(B)FLUORANTHENE 3.62 J [P,H,E]
BENZO(G,H,I)PERYLENE 1.93 J [E]
BENZO(K)FLUORANTHENE 3 J [H,E]
CHRYSENE 3.75 J [E]
DIBENZO(A,H)ANTHRACENE 0.675 J [P,H]
INDENO(1,2,3-CD)PYRENE 1.78 J [H,E]
NAPHTHALENE 0.0363 [P]
PYRENE 4.3 J [E]
PCBS (mg/kg)
AROCLOR-1260 0.00746 J [E]
23SB003 (8-10)
METALS (mg/kg)
ARSENIC 12.8 [P,H]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0853 [H]
BAP EQUIVALENT-POS 0.0853 [H]
BENZO(A)PYRENE 0.0565 [H]

23SB022 (0-2) RD - 1.8
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00143 J [P]
PCBS (mg/kg)
AROCLOR-1254 0.00185 J [E]
AROCLOR-1260 0.00208 J [E]

23SB029

23SB001 (0-2)
METALS (mg/kg)
CHROMIUM 29.5 J [P,H,E]
COPPER 39.8 [E]
LEAD 125 J [E]
MERCURY 0.692 J [P,E]
ZINC 127 J [E]
VOLATILES (mg/kg)
CHLOROFORM 0.00514 J [P]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.107 [H]
BAP EQUIVALENT-POS 0.0974 [H]
BENZO(A)PYRENE 0.0757 [H]
PCBS (mg/kg)
AROCLOR-1254 0.191 J [P,H,E]
AROCLOR-1260 0.186 J [E]
23SB001 (10-12)
VOLATILES (mg/kg)
VINYL CHLORIDE 0.00144 J [P]

23SB034

23SB010 (0-2) RD - 1.6
METALS (mg/kg)
ARSENIC 12.2 [P,H]
CHROMIUM 78.8 [P,H,E]
COPPER 177 [E]
LEAD 691 [P,H,E]
MERCURY 0.202 [E]
ZINC 366 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.411 [H]
BAP EQUIVALENT-POS 0.411 [H]
BENZO(A)ANTHRACENE 0.164 [H]
BENZO(A)PYRENE 0.228 [H]
BENZO(B)FLUORANTHENE 0.285 [H]
DIBENZO(A,H)ANTHRACENE 0.109 [H]
INDENO(1,2,3-CD)PYRENE 0.274 [H]
PCBS (mg/kg)
AROCLOR-1254 0.0478 J [E]
AROCLOR-1260 0.0759 J [E]

23SB012

23SB033

23SB032

23SB031

23SB030

23SB007 (0-2) RD - 1.8
PCBS (mg/kg)
AROCLOR-1260 0.00262 J [E]

23SB008

23SB011

23SB021 (0-2)
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00145 J [P]

23SB018 (0-2) RD - 1.6
PCBS (mg/kg)
AROCLOR-1254 0.00127 J [E]
AROCLOR-1260 0.00384 J [E]

23SB020 (0-2) RD - 1.6
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 0.0195 [H]
BAP EQUIVALENT-POS 0.0171 [H]
PCBS (mg/kg)
AROCLOR-1260 0.00398 J [E]

23SB004 (0-2)
METALS (mg/kg)
CHROMIUM 34.1 [P,H,E]
LEAD 188 [E]
ZINC 97.9 [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 2.19 [H]
BAP EQUIVALENT-POS 2.19 [H]
BENZO(A)ANTHRACENE 1.61 [P,H,E]
BENZO(A)PYRENE 1.45 [H,E]
BENZO(B)FLUORANTHENE 1.47 [P,H,E]
BENZO(K)FLUORANTHENE 1.2 [E]
CHRYSENE 1.63 [E]
DIBENZO(A,H)ANTHRACENE 0.334 [P,H]
INDENO(1,2,3-CD)PYRENE 0.849 [H]
NAPHTHALENE 0.0495 [P]
PYRENE 2.62 [E]
PCBS (mg/kg)
AROCLOR-1260 0.00928 J [E]
23SB004 (8-10)
No Exceedances

23SB019 (0-2)
VOLATILES (mg/kg)
1,2-DICHLOROETHANE 0.00124 J [P]
PCBS (mg/kg)
AROCLOR-1254 0.00162 J [E]

23SB002 (0-2)
METALS (mg/kg)
CHROMIUM 32.5 [P,H,E]
COPPER 30.1 [E]
LEAD 61 J [E]
MERCURY 1.6 J [P,H,E]
ZINC 83.2 J [E]
POLYCYCLIC AROMATIC HYDROCARBONS (mg/kg)
BAP EQUIVALENT-HALFND 3.82 [H]
BAP EQUIVALENT-POS 3.82 [H]
BENZO(A)ANTHRACENE 1.37 [P,H,E]
BENZO(A)PYRENE 2.51 [H,E]
BENZO(B)FLUORANTHENE 2.9 [P,H,E]
BENZO(G,H,I)PERYLENE 2.56 [E]
BENZO(K)FLUORANTHENE 1.99 [H,E]
CHRYSENE 1.69 [E]
DIBENZO(A,H)ANTHRACENE 0.657 [P,H]
INDENO(1,2,3-CD)PYRENE 2 [H,E]
NAPHTHALENE 0.0382 J [P]
PYRENE 1.33 [E]
23SB002 (10-12)
No Exceedances

Notes:
1. [H] - Exceeds Human Health Criteria
2. [E] - Exceeds Ecological Criteria
3. [P] - Exceeds Protection of Groundwater Standard
4. J - Estimated Concentration
5. (0-2) Sample depth interval in feet below ground surface (ft bgs)
6. RD - Bedrock Refusal Depth in ft bgs

Legend
- Proposed Soil Sample Location
- Hot Spot
- Soil Sample w/ Exceedances
- Soil Sample w/o Exceedances
- SWMU Boundary
- Proposed Soil Removal Area
- Surface Water Drainage
- Surface Water Flow Direction
- Topographic Contour (5-ft)

50 0 50 Feet

DRAWN BY D. COUCH	DATE 09/20/13
CHECKED BY J. GOERDT	DATE 09/23/13
REVISED BY D. COUCH	DATE 09/23/13
SCALE AS NOTED	

TETRA TECH

PROPOSED SOIL SAMPLE LOCATIONS (PAHS)
FIELD TASK MODIFICATION REQUEST - NO. 002
FORMER SUSPECT LIQUID DISPOSAL AREA
SWMU 23 - BATTERY SHOP BUILDING 36
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER 3539	CTO NUMBER F27Q
APPROVED BY —	DATE —
APPROVED BY —	DATE —
FIGURE NO. 3	REV 0