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LETTER AND ATTACHED ERRATA PAGES FOR THE FINAL STUDY AREA SCREENING EVALUATION FOR SITE 04 CODDINGTON COVE RUBBLE FILL AREA NS NEWPORT RI
11/13/2014
TETRA TECH

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C-NAVY-11-14-5430W

November 13, 2014

Project Number 112G02300

Mr. William Lovely, Remedial Project Manager
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Boston, Massachusetts 02109-3912

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Reference: CLEAN Contract No. N62470-08-D-1001
Contract Task Order No. WE48

Subject: Errata to Final SASE Report,
Study Area (SA) 04 - Coddington Cove Rubble Fill Area,
Naval Station Newport, Newport RI

Dear Mr. Lovely and Ms. Crump:

On behalf of Mr. James Gravette, U.S. Navy NAVFAC Mid-Atlantic, I am providing to you each for your records, two copies of an errata page set for Section 4.2 of the Final Study Area Screening Evaluation Report for the SA04 as identified above as well as replacement CDs for this document.

This errata page set is provided to note a correction pointed out by RIDEM on the matter of manganese in soil: Manganese was inadvertently identified as not exceeding screening levels for soil. Revised text is high-lit in the attached pages to document the description, the number of exceedances and comparison to background conditions. These changes are minor and do not require revisions to the remainder or the overall conclusions of the SASE report.

If you have any questions regarding this submittal, please do not hesitate to contact me at 978-474-8434.

Very truly yours,

Stephen S. Parker, LSP
Project Manager

Enclosures

c: D. Barclift, NAVFAC (w/encl. – 1)
G. Glenn, Tetra Tech (w/o encl.)
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Benzo(a)pyrene exceeded the RSL of 15 µg/kg in every sample that was collected. Three of those samples (SB01, SB05, and SB08) exceeded the RSL by an order of magnitude or more. Benzo(a)pyrene concentrations in the remaining samples were reported at levels between one and nine times as much as the RSL. Benzo(b)fluoranthene and dibenzo(a,h)anthracene had exceedances in four and five samples respectively. Each analyte had one exceedance of at least an order of magnitude, while the remaining results were well below an order of magnitude greater. Benzo(a)anthracene was the only other analyte with more than one exceedance; all exceedances were less than an order of magnitude greater than the PAL of 150 µg/kg. Indeno(1,2,3-cd)pyrene exceeded its criterion of 150 µg/kg in only one sample at levels less than 5 times greater than the criterion.

Maximum detections for all PAHs that were detected in surface soil samples were detected in SB05. This sample also had the greatest number of criteria exceedances with five. The lowest number of exceedances was one, which occurred in two samples (SB02 and SB04).

Chrysene was detected at levels greater than the DEC in only one sample, SB05. There were other exceedances of DEC's in the PAH group, but in all these instances the RSLs were the more conservative criteria.

Pesticides

A total of seven pesticides were detected in 2010 surface soil samples. There were no exceedances of RSLs or DEC concentrations in the surface soil samples that were collected from the Site.

PCBs

Two PCBs were detected in 2010 surface soil samples. Aroclor-1260 was detected in two samples (SB05 original and duplicate samples) and exceeded its PAL of 0.22 mg/kg in one of those samples. Aroclor-1268 was detected in two samples (SB05 original and duplicate samples); there is no PAL for aroclor-1268.

Metals

A total of 23 metals were detected in surface soil samples collected in 2010. Of those 23, four were detected at levels greater than RSLs in at least one sample. The table below presents a summary of statistics that were calculated for surface soil metals results.

PARAMETER (Metals)	FREQ	MAX (mg/kg)	MIN (mg/kg)	AVG (mg/kg)	LOCATION OF MAX	CRITERIA					
						RSL (mg/kg)	exceedances	DEC (mg/kg)	exceedances	LEACH (mg/kg)	exceedances
Arsenic	8/8	17	5.7	8.77	CRF-SS-SB05-0001-AVG	0.39	8	7	5		
Beryllium	8/8	0.49	0.265	0.356	CRF-SS-SB03-0001	16	0	0.4	2		
Chromium	8/8	18	12	14.1	CRF-SS-SB02-0001	0.29	8				
Lead	8/8	630	19	105	CRF-SS-SB08-0001	400	1	150	1		
Manganese	8/8	480	196	369	CRF-SS-SB06-0001	180	8	390	3		

Arsenic was detected in all samples at levels more than an order of magnitude greater than the RSL of 0.39 mg/kg. Chromium was detected in all samples at levels more than an order of magnitude greater than the RSL of 0.29 mg/kg. Manganese was detected in all samples at levels exceeding the RSL of 180 mg/kg. Lead was detected in only one sample (SB08) at levels greater than the RSL of 400 mg/kg. Beryllium did not exceed RSL but did exceed the DEC in two samples.

Metals concentrations that were detected in onsite soils were compared to concentrations that were detected in background soils. The only native soil located onsite is a small area of Stissing Silt Loam (Se) located in the center of the site; the rest of the soil at the site is urban fill according to the RI Geographical Information System (GIS) soil map (RIGIS, 2009b). For the purposes of this comparison it was assumed that before fill was placed at the site most of the soil was also Stissing Silt Loam. In addition, Pittstown silt loam (Pm) is also documented to be present in the vicinity of the site. Onsite arsenic levels are within the range that was detected in the Basewide Background Study (BBS) and the onsite average of arsenic was below the BBS average. Chromium concentrations in samples collected from the site are within the range of chromium concentrations that was detected in the BBS, and the onsite average concentration only was slightly higher than the BBS average. Onsite manganese concentrations in surface soil are nearly all within the range that was detected in the Basewide Background Study (BBS), with the onsite maximum concentration of 480 mg/kg nearly identical to the background maximum of 477 mg/kg, however, the onsite average concentration of manganese at 369 mg/kg exceeded the background average of 210 mg/kg. The table below presents a summary of background conditions and conditions at the Site.

SURFACE SOIL	SeSSS (Stissing Silt Loam)		PmSS (Pittstown Silt Loam)		Onsite	
PARAMETER	RANGE (mg/kg)	AVERAGE (mg/kg)	RANGE (mg/kg)	AVERAGE (mg/kg)	RANGE (mg/kg)	AVERAGE (mg/kg)
Arsenic	2.63 - 71.70	13	4.70 - 21.30	9.59	5.7 - 17	8.77
Chromium	8.30 - 28.20	12.7	11.20 - 16	13.5	12 - 18	14.1
Manganese	50 - 373	130	101 - 477	289	196 - 480	369

Figure 4-1 presents 2004 and 2010 metals concentrations at each surface soil sample location.

Petroleum Hydrocarbons

An aliquot of surface soil was collected by a RIDEM representative at all surface soil sample locations excluding SB06, where the Navy collected a soil aliquot for GRO/DRO analysis. TPH was detected in six out of seven RIDEM samples and DRO was detected in the one sample collected by the Navy. There were no exceedances of the 500 mg/kg PAL for TPH in surface soil samples.

Surface Soil Data Summary

PAHs and metals were predominantly the contaminants that were detected at concentrations exceeding RSLs. Benzo(a)pyrene was detected in every surface soil sample at concentrations above RSLs.

SB05 is where maximum concentrations of all PAHs were recorded; the intent of this soil boring was to target the location of TP02 that was excavated during the PA and contained VOC contaminated soils. VOCs were not detected at levels greater than RSLs in surface soils, including the sample collected at SB05.

The three metals that exceeded RSLs, arsenic, chromium, and manganese, exceeded at all 8 surface soil sample locations. Although the levels exceeded the RSLs, in comparison to levels observed in similar soils evaluated during the BBS, both arsenic and chromium were within the background concentration ranges and near or below the averages. Manganese values were nearly all within the background range, but had a higher average concentration than background soils.

Surface Soil Data and Ecological Screening Criteria

Included in Figure 4-1 are 2004 and 2010 sample locations and selected contaminants which exceed ecological soil screening criteria, including benzo(a)pyrene, 4,4'-DDE, 4,4'-DDT, and metals.

4.2.2 Subsurface Soil Sample Results

This section presents the results of the subsurface soil sampling. Subsurface soil samples were collected during the advancement of soil borings, and during the excavation of test pits, as described in Section 2. Subsurface soil samples were analyzed for VOCs, PAHs, pesticides, PCBs, and TAL metals. Additionally, at SB06, GRO/DRO was analyzed in subsurface soil samples that were collected. A representative from RIDEM was present during subsurface soil sampling to collect a sample aliquot for TPH analysis at all locations where the Navy did not collect soil for GRO/DRO analysis. Table 4-3

presents the results for analytes that were present at levels greater than detection limits in subsurface soil samples. Table 4-2 presents a summary of TPH results for samples that were collected by RIDEM.

The locations of the soil borings and test pits where subsurface soils were collected are depicted on Figure 1-2. Subsurface soil samples were collected from depths ranging from 1 ft bgs to 38 ft bgs.

Contaminant-specific concentrations were compared to USEPA Residential Soil RSLs (USEPA 2010). In addition, results were compared to RIDEM DEC and leachability criteria for discussion purposes only.

VOCs

A total of 13 VOCs were detected in subsurface soil samples that were collected in 2010. There were no VOCs detected at levels exceeding RSLs, or DEC concentrations. See Table 4-3 for a complete list of VOCs that were detected in subsurface soil samples.

PAHs

A total of 17 PAHs were detected in subsurface soil samples that were collected in 2010. Of those 17 PAHs, five were detected at levels greater than their respective RSLs in at least two samples. The table below presents a summary of statistics that were calculated for subsurface soil PAH results.

PARAMETER (PAH)	FREQ	MAX (µg/kg)	MIN (µg/kg)	AVG (µg/kg)	LOCATION OF MAX	CRITERIA					
						RSL (µg/kg)	exceedances	DEC (µg/kg)	exceedances	LEACH. (µg/kg)	exceedances
Benzo(a)anthracene	25/32	1600	0.99	146	CRF-SO-SB03-0608	150	2	900	1		
Benzo(a)pyrene	26/32	990	0.66	114	CRF-SO-SB03-0608	15	16	400	2	2.4E+5	0
Benzo(b)fluoranthene	25/32	2400	0.99	210	CRF-SO-SB03-0608	150	6	900	2		
Benzo(g,h,i)perylene	24/32	820	1.25	83.1	CRF-SO-SB03-0608	1.7E+6	0	800	1		
Benzo(k)fluoranthene	26/32	920	0.34	74.2	CRF-SO-SB03-0608	1500	0	900	1		
Chrysene	25/32	1800	0.66	140	CRF-SO-SB03-0608	1.5E+4	0	400	2		
Dibenzo(a,h)anthracene	23/32	340	1	34.8	CRF-SO-SB03-0608	15	9	400	0		
Indeno(1,2,3-cd)pyrene	24/32	990	1.45	94.8	CRF-SO-SB03-0608	150	2	900	1		

Only three PAHs were detected at levels greater than their respective PALs with any frequency: benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(a,h)anthracene. Benzo(a)pyrene was the most frequently detected PAH at levels exceeding its RSL: three of the 16 samples whose results were greater than the RSL of 0.015 mg/kg, exceeded the RSL by at least one order of magnitude; the remaining samples whose benzo(a)pyrene levels exceeded the RSL exceeded at 1 to 9 times the RSL. Samples

containing benzo(b)fluoranthene and dibenzo(a,h)anthracene concentrations which exceeded RSLs, did so by only a small margin; the exceptions were samples collected from SB03, 6 to 8 feet and TP14 1 to 2 feet; the results for benzo(b)fluoranthene and dibenzo(a,h)anthracene in these samples exceeded by more than an order of magnitude. In addition SB03 and TP14 contained the greatest number of PAH exceedances in subsurface soil samples. Figures 4-2 and 4-3 present concentrations of benzo(a)pyrene and dibenzo(a,h)anthracene by sample location for subsurface soil samples and test pit samples, respectively.

Indeno(1,2,3-cd)pyrene and benzo(a)anthracene were each only detected in two samples at levels greater than RSLs.

Three PAHs did not exceed RSL values but did exceed DEC concentrations: benzo(g,h,i)perylene, benzo(k)fluoranthene, and chrysene. These analytes only exceeded DEC concentrations in one or two samples each.

Pesticides

A total of nine pesticides were detected in 2010 subsurface soil samples. There were no pesticides detected at levels greater than RSLs in subsurface soil samples. For a complete list of pesticides that were detected in subsurface soils see Table 4-3.

PCBs

A total of three PCBs were detected in 2010 subsurface soils. Aroclor-1254 was detected in one sample below the RSL of 0.22 mg/kg. Aroclor-1260 was detected in three samples, one of which (TP14-0102) exceeded the PAL of 0.22 mg/kg with a result of 0.44 mg/kg. Aroclor-1268 was detected in four samples; there is no criterion for aroclor-1268.

Metals

A total of 23 metals were detected in subsurface soil samples that were collected in 2010. Four of the detected metals exceeded their respective RSLs in all or nearly all of the 32 subsurface soil samples. The table below presents a summary of statistics that were calculated for subsurface soil metals results.

PARAMETER (Metals)	FREQ	MAX (mg/kg)	MIN (mg/kg)	AVG (mg/kg)	LOCATION OF MAX	CRITERIA					
						RSL (mg/kg)	exceedances	DEC (mg/kg)	exceedances	LEACH. (mg/kg)	exceedances
Arsenic	32/32	33	1.4	10.4	CRF-SO-SB06-1214	0.39	32	7	26		
Beryllium	32/32	0.52	0.094	0.337	CRF-SO-TP12-0102	16	0	0.4	8		
Chromium	32/32	24.5	5.75	14.1	CRF-SO-SB06-1416-AVG	0.29	32				
Iron	32/32	64500	8300	28300	CRF-SO-SB06-1416-AVG	5500	32				
Lead	32/32	160	5.1	27.8	CRF-SO-SB08-0406	400	0	150	1		
Manganese	32/32	2000	66.5	397	CRF-SO-SB06-1416-AVG	180	30	390	11		

Arsenic concentrations exceeded the RSL of 0.39 mg/kg in every subsurface soil sample at levels more than an order of magnitude greater than the RSL. Chromium concentrations exceeded the RSL of 0.29 mg/kg in every subsurface soil sample at levels more than an order of magnitude greater than the RSL. Figures 4-2 and 4-3 present the subsurface soil and test pit locations where arsenic and chromium were detected and their relative concentrations compared to their respective PALs.

The RSLs for iron and manganese were exceeded in all (iron) or most (manganese) samples, with only the maximum location exceeding by an order of magnitude. Beryllium and lead did not exceed their RSLs. Arsenic, beryllium, lead, and manganese also exceeded the DECs in at least one subsurface soil sample.

Metals concentrations that were detected in onsite soils were compared to concentrations that were detected in background soils. The only native soil located onsite is a small area of Stissing Silt Loam (Se) located in the center of the site; the rest of the soil at the site is urban fill according to the RI GIS soil map (RIGIS, 2009b). For the purposes of this comparison it was assumed that before fill was placed at the site most of the soil was also Stissing Silt Loam. In addition, Pittstown silt loam (Pm) is also documented to be present in the vicinity of the site. Onsite arsenic and chromium concentrations are nearly all within background ranges, with the onsite maximum concentrations nearly identical to, but slightly exceeding, the background maximum concentrations for these two metals, and averages were below the background averages. Iron and manganese concentrations were detected in somewhat wider ranges than those that were detected for background subsurface soils, however, the onsite average values for these two metals are less than one or both of the averages for the two compared background soil types. The table below presents a comparison of onsite conditions and background conditions as presented in the NAVSTA Newport BBS (TtNUS, 2008).

SUBSURFACE SOIL	SeSB (Stissing Silt Loam)		PmSB (Pittstown Silt Loam)		Onsite	
PARAMETER	RANGE (mg/kg)	AVERAGE (mg/kg)	RANGE (mg/kg)	AVERAGE (mg/kg)	RANGE (mg/kg)	AVERAGE (mg/kg)
Arsenic	4.40 - 32.2	16.8	5.30 – 23.50	14.3	1.4 - 33	10.4
Chromium	12.6 - 17.3	14.8	11.90 – 21.30	14.4	5.75 - 24.5	14.1
Iron	15,000 – 42,650	29,600	14,900 – 38,700	26,900	8,300 – 64,500	28,300
Manganese	191 – 1,330	461	214 – 1,520	549	66.5 - 2,000	397

Petroleum Hydrocarbons

TPH was detected at levels greater than detection limits in 16 out of 28 subsurface soil samples that were collected by RIDEM. Of those 16 results, only one sample contained TPH at levels greater than the PAL of 500 mg/kg; that sample was collected from SB08 at the 8 to 10 foot interval. There were no detections of DRO or GRO in soil samples that were collected from SB06. TPH results for subsurface soil samples can be found on Table 4-2.

Summary of Subsurface Soil Data

In general, for both subsurface soil samples collected from soil borings and subsurface soil samples collected from test pits, concentrations of contaminants that are present decrease with depth. This is not the case for every contaminant and every location, but can be made as a general statement. There do not appear to be any horizontally spatial patterns of contamination within the subsurface soil at the site.

As was the case with surface soils, PAHs and metals were the predominant contaminants that exceeded their respective PALs. Similar to surface soils, the most predominant PAH found above the PAL was benzo(a)pyrene, which was detected in 16 samples at levels greater than its PAL. Concentrations of arsenic, chromium, iron, and manganese, while above RSLs, were also similar to background levels seen in background soil, though iron and manganese maximum values exceed background maximum values.

4.2.3 Groundwater Sample Results

Groundwater samples were collected from the eight newly installed groundwater monitoring wells following procedures outlined in Section 2.3. A total of eight samples were collected and analyzed for VOCs, SVOCs, pesticides, PCBs, and TAL metals (total and dissolved). Groundwater sample results were compared to project specific PALs. PAL consist of USEPA MCLs (May 2009), or if no MCL was available, USEPA Tap Water RSLs (May 2010) (USEPA, 2010). Table 4-4 presents a summary of results for analytes that were present in samples at levels greater than detection limits. Figure 1-2 presents the locations of groundwater monitoring wells.