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NAB LITTLE CREEK
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TECHNICAL MEMORANDUM CANAL SEDIMENT DELINEATION RESULTS FOR SITE 7 NAB
LITTLE CREEK VA
2/18/2004
CH2MHILL

Canal Sediment Delineation Results for Site 7- The Amphibious Base Landfill, NAB Little Creek, Virginia Beach, Virginia

PREPARED FOR: NAB Little Creek Tier I Partnering Team

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DATE: February 18, 2004

Background

Surface water and sediment samples are collected approximately every six months from 13 locations at Site 7 as part of a long-term monitoring program. The LTM program, initiated in 1998, started with only seven locations (SD201 through SD207). Six additional locations were added to the LTM program beginning in Round 5 (SD208 through SD213). Semi-annual LTM sampling at SD201 through SD213 has continued through the present Round 10 LTM sampling event completed in September 2003.

During the development of the draft ERA for Site 7, it was determined that sediment sampling location SD202 presented the area of highest potential ecological risks at the site. This sample location is situated in the canal on the western portion of the landfill just south of the culvert under the gravel road used for landfill access. Therefore, five additional sediment samples (SD214 through SD218) were collected during Round 8 LTM activities (November 2002) to define the spatial extent of the elevated concentrations of the COCs identified in the Draft ERA. Round 8 LTM sampling locations are shown on Figure 1. Results from the additional sediment samples indicate the exceedances are largely limited to the area just south of the culvert. Lower exceedances were also observed at SD217 just north of the culvert. Potential transport of contaminants north towards Little Creek Cove was determined to be low due to the collapsed culvert beneath the access road.

Sampling Activities

Additional sediment samples were collected in January 2004 to evaluate the known ecological risks and determine limits for a potential interim removal action to excavate the sediment for mitigation of ecological risk. Seven sediment locations were sampled south of the culvert at 25 foot increments extending to SD216 (the southernmost extent of ecological exceedances). One sample was also collected north of the culvert and previous sampling location SD217. All sediment samples were analyzed for COCs based on the Site 7 ERA (select SVOCs, select pest/PCBs, and select TAL metals). Figure 1 illustrates the sampling locations analytical results, and the proposed limits of excavation.

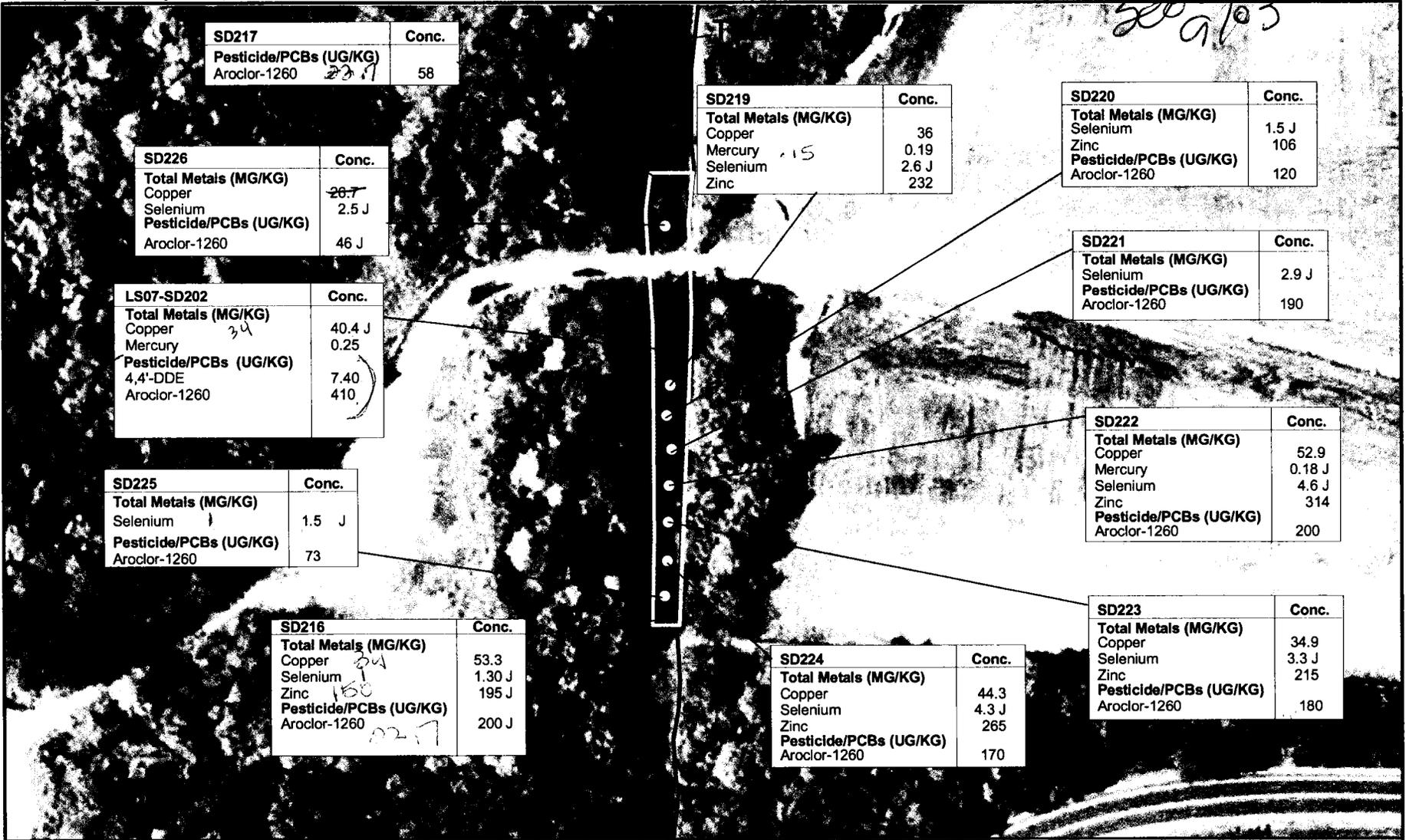
Findings/Recommendations

Analytical results from sediment samples collected at Site 7 in January 2004 are generally consistent with previous LTM sampling rounds. SD216, the southernmost sample in the

canal within the proposed area of excavation, contained individual ecological screening value (ESV) exceedances, but was not recommended for remedial action in the ERA. SD217 also contained slightly elevated Aroclor 1260 but was not recommended for remedial action in the ERA.

The samples collected in January 2004 provided additional data to better delineate the area around sample SD202, which was recommended for remedial action in the ERA to mitigate potential ecological risk. An interim removal action within the canal at Site 7 is proposed between samples SD217 (just north of the drainage culvert) to SD216 (approximately 325 feet south) to address concerns in this area (Figure 1). Excavation of one foot of sediment across the width of the canal is proposed, along with backfill of "clean" soil to original canal elevations. Re-construction of the culvert/landfill access road (which is currently not functioning) will be evaluated and may not be completed, depending upon the needs of NAB Little Creek.

*Apperine
At Threshold - Final
Develop
Site Spec
5/20/03*



SD217		Conc.
Pesticide/PCBs (UG/KG)		
Aroclor-1260	23.7	58

SD226		Conc.
Total Metals (MG/KG)		
Copper	26.7	
Selenium	2.5 J	
Pesticide/PCBs (UG/KG)		
Aroclor-1260		46 J

LS07-SD202		Conc.
Total Metals (MG/KG)		
Copper	34	40.4 J
Mercury		0.25
Pesticide/PCBs (UG/KG)		
4,4'-DDE	7.40	
Aroclor-1260	410	

SD225		Conc.
Total Metals (MG/KG)		
Selenium		1.5 J
Pesticide/PCBs (UG/KG)		
Aroclor-1260		73

SD216		Conc.
Total Metals (MG/KG)		
Copper	24	53.3
Selenium	1	1.30 J
Zinc	150	195 J
Pesticide/PCBs (UG/KG)		
Aroclor-1260	22.7	200 J

SD219		Conc.
Total Metals (MG/KG)		
Copper		36
Mercury	15	0.19
Selenium		2.6 J
Zinc		232

SD220		Conc.
Total Metals (MG/KG)		
Selenium		1.5 J
Zinc		106
Pesticide/PCBs (UG/KG)		
Aroclor-1260		120

SD221		Conc.
Total Metals (MG/KG)		
Selenium		2.9 J
Pesticide/PCBs (UG/KG)		
Aroclor-1260		190

SD222		Conc.
Total Metals (MG/KG)		
Copper		52.9
Mercury		0.18 J
Selenium		4.6 J
Zinc		314
Pesticide/PCBs (UG/KG)		
Aroclor-1260		200

SD223		Conc.
Total Metals (MG/KG)		
Copper		34.9
Selenium		3.3 J
Zinc		215
Pesticide/PCBs (UG/KG)		
Aroclor-1260		180

SD224		Conc.
Total Metals (MG/KG)		
Copper		44.3
Selenium		4.3 J
Zinc		265
Pesticide/PCBs (UG/KG)		
Aroclor-1260		170

LEGEND

- Sediment Samples Collected in January 2004
- ▲ ERA samples that contained individual ESV exceedances but were not risk-drivers
- ERA risk driving location
- ▬ Proposed limit of excavation

J - Reported value is estimated
* Lab duplicate analysis was not within control limits.



0 50 100 Feet

Figure 1
Sediment Detections
Site 7 Sediment Delineation
NAB Little Creek
Virginia Beach, Virginia

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pcbs 1 mg/kg

Site 7
Sediment Sample Summary
NAB Little Creek
Virginia Beach, VA

Sample ID	LS07-SD218-02D	LS07-SD217-02D	LS07-SD226-04A	LS07-SD202-02D	LS07-SD202P-02D			LS07-SD202-03C	LS07-SD202P-03C	LS07-SD219-04A
Sample Date	11/06/02	11/06/02	1/27/04	11/07/02	11/07/02	03/18/03	03/18/03	09/02/03	09/02/03	1/27/04
Total Metals (MG/K)										
Arsenic	0.71 U	1.40 J	4.1	8.10	7.10	3.20	5.80	9.50	9.40	8.1
Copper	3.10 J	24.9	26.7	141	54.6	11.6	18.7	38.8 J	40.4 J	36
Cyanide	0.031 U	0.032 U	1.4 UN	0.078 J	0.047 U	NA	NA	1.09 U	1.13 U	1.8 UN
Lead	1.80	11.5	21.1 *	52.5	39.6	7.10 J	12.4 J	28.6	35.4	26.7 *
Mercury	0.050 U	0.050 U	0.062 J	0.18	0.073 U	0.10 U	0.15	0.20 U	0.25	0.19
Selenium	0.71 U	0.73 U	2.5 J	1.50 J	1.10 U	0.62 U	0.82 U	1.30 UL	1.30 UL	2.8 J
Zinc	11.8 J	49.3 J	112	470 J	184 J	80.5	98.6	203 J	184 J	232
Pesticide/Polychlorinated Biphenyls (UG/l)										
4,4'-DDE	4.20 U	4.20 U	5.2 U	7.40	5.10 J	3.50 U	4.50 U	7.10 U	7.50 U	5.9 U
Aroclor-1260	42.0 U	58.0	46 J	260 J	410	35.0 U	45.0 U	71.0 U	75.0 U	59 U
Dieldrin	4.20 U	4.20 U	5.2 U	2.80 J	3.30 J	3.50 U	4.50 U	7.10 U	7.50 U	5.9 U
Semivolatile Organic Compounds (UG/K)										
Acenaphthene	420 U	420 U	520 U	29.0 J	650 U	350 U	450 U	720 U	740 U	590 U
Fluorene	420 U	420 U	520 U	44.0 J	650 U	350 U	450 U	720 U	740 U	590 U

Shading denotes and exceedance as compared to ecological screening values in Site 7 ERA

Site 7
Sediment Sample Summary
NAB Little Creek
Virginia Beach, VA

Sample ID	LS07-SD220-04A	LS07-SD220P-04A	LS07-SD221-04A	LS07-SD222-04A	LS07-SD223-04A	LS07-SD224-04A	LS07-SD225-04A	LS07-SD216-02D	LS07-SD215-02D
Sample Date	1/27/04	1/27/04	1/27/04	1/27/04	1/27/04	1/27/04	1/27/04	11/06/02	11/06/02
Total Metals (MG/KG)									
Arsenic	3.3	2.1 J	6	9.9	8.3	10	5.4	11.4	1.10 J
Copper	17.7	6.3	26.6	52.9	34.9	44.3	13.4	53.3	8.00
Cyanide	1.3 UN	1.3 UN	1.6 UN	2 UN	1.8 UN	1.9 UN	1.6 UN	0.35 J	0.029 U
Lead	13.7 *	6.5 *	24.9 *	38.4 *	24.5 *	29.9 *	14.1 *	40.5	3.50
Mercury	0.055 J	0.043 J	0.082 J	0.18 J	0.086 J	0.12 J	0.045 J	0.086 J	0.060 U
Selenium	1.2 J	1.5 J	2.9 J	4.6 J	3.3 J	4.3 J	1.5 J	1.30 J	0.67 U
Zinc	106	42.3	117	314	215	265	64.2	195 J	22.0 J
Pesticide/Polychlorinated Biphenyls (UG/l)									
4,4'-DDE	4.8 U	4.7 U	4.4 U	6.1 U	6.4 U	6.4 U	5 U	5.90 U	4.00 U
Aroclor-1260	120	100	190	200	180	170	73	200 J	27.0 J
Dieldrin	4.8 U	4.7 U	4.4 U	6.1 U	6.4 U	6.4 U	5 U	5.90 U	4.00 U
Semivolatile Organic Compounds (UG/K)									
Acenaphthene	480 U	470 U	440 U	610 U	640 U	650 U	500 U	20.0 J	400 U
Fluorene	480 U	470 U	440 U	610 U	640 U	650 U	500 U	590 U	400 U