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TECHNICAL MEMORANDUM SUMMARY OF DIRECT PUSH SOIL SURVEY OCEANA
SALVAGE ACCESS ROAD NAS OCEANA VA
02/01/2005
CH2M HILL

Summary of Direct-Push Soil Survey, Oceana Salvage Access Road, Virginia Beach, VA

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DATE: February 1, 2005

This technical memorandum summarizes the sampling methodology and results of samples collected during the direct push soil survey conducted at the Oceana Salvage access road on January 18, 2005. Soil sampling at the access road was conducted in order to confirm the presence or absence of battery casings reportedly buried beneath the road.

Sampling was initiated at approximately 9:00 AM. Direct push samples were collected using an IRA300 direct-push rig and 4-foot macrosamplers with disposable acetate sleeves. Direct-push samples were collected at twenty-five (25) locations. Sample locations were not surveyed and are approximated on Figure 1. Presence or absence and approximate depth of crushed battery casings were recorded in a field notebook. Approximate depths to waste and depths to visually clean soil are shown on Table 1. Waste containing battery casings was encountered at all but one (SS16) sample location. Battery fragments were encountered between approximately 0.1 and 2.5 feet below ground surface (bgs). The thickness of the layer of battery fragments was approximately 0.5' to 1.0'. Visual examination of the soil at SS16, where no battery fragments were observed, indicated other debris including plastic and brick from 1.25' - 1.75' bgs. Images 1 and 2 show battery fragments from SS01 and SS09 respectively and are typical of the battery fragment waste encountered beneath the road surface.

Soil samples were collected at all twenty-five locations from the the visible layer of waste. Additionally, soil samples were collected below the waste at two locations (SS06 and SS07). Due to short notice of field investigation, soil samples were collected into disposable plastic bags and transported to the Virginia Beach office of CH2M HILL for lead screening prior to packing and shipment to a contract laboratory for lead analysis.

Sixteen of the twenty-five samples were screened for lead prior to selecting four to be sent to the laboratory for lead analysis. Field lead measurements were conducted using the Sensafe™ Soil Check lead soil test kits. The kits detect concentrations of lead at intervals of <100, 100-200 ppm, 200-300 ppm or >400 ppm. Lead screening results are shown on Table 1. Four soil samples were selected for submission to the laboratory for lead analysis. Two soil samples, OSAL-SS02-02 and OSAL-SS19-02, were selected for laboratory lead analysis based on a field screening result of >400 ppm for lead and visual presence of numerous battery fragments within the sample interval. Soil samples collected below the waste layer, OSAL-SS06-02 and OSAL-SS07-02, were submitted for laboratory lead analysis to determine if lead has leached into the soils below the battery fragments. Prior to transfer of soils into

laboratory prepared sample containers, all visible battery fragments were removed from samples OSAL-SS02-02 and OSAL-SS19-02. Samples were transferred into laboratory prepared sample containers and packed on ice for overnight shipment to CompuChem, a division of Liberty Analytical Corporation, in Cary, North Carolina.

Samples were analyzed for lead via the ICP method. Analytical results are shown on Table 2. Form Is are attached as Appendix A.

*Table 2
Analytical Results for Lead
Oceana Salvage Access Road
Virginia Beach, Virginia*

Sample ID	Depth Interval	Lead Concentration (mg/kg)
OSAL-SS02-02	2'-3' bgs	31400
OSAL-SS06-02	2'-3' bgs	127
OSAL-SS07-02	1.5'-2.5' bgs	18.1
OSAL-SS19-02	2'-3' bgs	149000

Analytical results for the soil samples collected within the waste layer indicate lead at concentrations of 31,400 mg/kg and 149,000 mg/kg. Lead is regulated by the EPA based on blood-lead uptake using physiologically based pharmacokinetic model referred to as the Integrated Exposure Uptake Biokinetic (IEUBK) model. As a screening tool, lead is screened at 400 mg/kg in residential soil and 1000 mg/kg in industrial soil. Results from soil samples collected within the waste layer are in exceedance of these screening values. Analytical results for samples beneath the layer of waste were 127 mg/kg and 18.1 mg/kg, within the EPA lead screening toxicity values.

Conclusions

The field investigation summarized in this technical memorandum confirmed the presence of crushed battery casings beneath the Oceana Salvage access road. The extent of the contamination was not delineated. Subsurface soil analytical results from the Oceana Salvage access road indicated contamination above the EPA lead screening toxicity values for residential and industrial soil. The presence or absence of surface soil contamination has not been determined. The extent to which contamination has impacted wetland area adjacent to the site has not been determined. Additional investigation is recommended to further evaluate the nature and extent of contamination at this site.

Table 1
Waste Intervals and Descriptions
Oceana Salvage Access Road
Virginia Beach, Virginia

Sample Location	Approximate Depth to Waste	Approximate Depth to Clean Soil	Description of Waste	Sample Depth Interval 1	Sample Depth Interval 1 Field Lead Result	Sample Depth Interval 2	Sample Depth Interval 2 Field Lead Result	Other Notes
SS01	0.1'	1'	crushed battery casings	0.1'-1' bgs	>400 mg/kg	NA	NA	
SS02	2'	3'	crushed battery casings	2'-3' bgs	>400 mg/kg	NA	NA	
SS03	2'	3'	crushed battery casings	2'-3' bgs	NM	NA	NA	
SS04	2'	3'	crushed battery casings	2'-3' bgs	NM	NA	NA	
SS05	2.5'	3'	battery casings, tires, glass	2.5'-3' bgs	>400 mg/kg	NA	NA	Tire fragments and glass also observed in waste layer. Soil is stained.
SS06	0.8'	1.5'	crushed battery casings	0.8'-1.5' bgs	>400 mg/kg	2'-3' bgs	100-200 mg/kg	Sample collected below waste appears to be old marsh sediment. It contains dried plant materials which may be phragmites.
SS07	0.4'	1.5'	battery casings and other plastic	0.4'-1.5' bgs	NM	1.5'-2.5' bgs	100-200 mg/kg	Sample collected below waste appears to be old marsh sediment. It contains dried plant materials which may be phragmites.
SS08	2'	2.5'	crushed battery casings	2'-2.5' bgs	>400 mg/kg	NA	NA	3" layer of concrete at approximately 2' bgs
SS09	1'	2.0'	crushed battery casings	1'-2' bgs	>400 mg/kg	NA	NA	Soil is stained within sample interval.
SS10	1.5'	2.0'	crushed battery casings	1.5'-2' bgs	NM	NA	NA	Some white plastic is mixed in with the battery fragments.
SS11	1.75'	2.25'	crushed battery casings	1.75'-2.25' bgs	>400 mg/kg	NA	NA	
SS12	1.5'	2.0'	battery casings and brick fragments	1.5'-2' bgs	NM	NA	NA	
SS13	1.5'	2.0'	crushed battery casings	1.5'-2' bgs	NM	NA	NA	
SS14	1.5'	2.0'	crushed battery casings	1.5'-2' bgs	300 - 400 mg/kg	NA	NA	
SS15	1.75'	2.0'	crushed battery casings	1.75'-2' bgs	>400 mg/kg	NA	NA	oily sheen on soil
SS16	1.25'	1.75'	plastic fragments and brick	1.25'-1.75' bgs	300 - 400 mg/kg	NA	NA	No battery fragments were found, but soil is stained
SS17	1.75'	2.25'	crushed battery casings	1.75'-2.25' bgs	>400 mg/kg	NA	NA	Soil is stained within sample interval
SS18	2.5'	3.0'	one battery fragment, oily wood	2.5'-3.0' bgs	300 - 400 mg/kg	NA	NA	Battery fragments are mixed with clayey soil that is oily
SS19	2.0'	3.0'	crushed battery casings	2.0'-3.0' bgs	>400 mg/kg	NA	NA	
SS20	1.5'	2.0'	crushed battery casings	1.5'-2.0' bgs	NM	NA	NA	
SS21	1.75'	2.25'	battery casings and wood	1.75'-2.25' bgs	NM	NA	NA	Sample is oily within sample interval.
SS22	1.75'	2.25'	battery casings and brick fragments	1.75'-2.25' bgs	NM	NA	NA	
SS23	0.75'	1.5'	crushed battery casings	0.75'-1.5' bgs	>400 mg/kg	NA	NA	
SS24	0.5'	3'	plastic and a few battery fragments	0.5'-1.0' bgs	NM	NA	NA	
SS25	1.5'	1.9'	plastic and a few battery fragments	1.5'-1.9' bgs	>400 mg/kg	NA	NA	

NM: Not measured. Due to limited number of test kits, not all samples were field screened



LEGEND

- Sample Locations
- Activity Boundary Line



0 100 200 Feet



Figure 1
Sample Location Map
Oceana Salvage Access Road
Virginia Beach, Virginia



Image 1: Sample OSAL-SS01-02



Image 1: Sample OSAL-SS09-01

Appendix A

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

OSAL-SS02-02

Lab Name: COMPUCHEM Contract: _____
 Lab Code: LIBERTY Case No.: _____ SAS No.: _____ SDG No.: 5558
 Matrix (soil/water): SOIL Lab Sample ID: 555802
 Level (low/med): LOW Date Received: 01/20/05
 % Solids: 92.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	31400			P

Color Before: BLACK Clarity Before: _____ Texture: COARSE
 Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

OSAL-SS06-02

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ SAS No.: _____ SDG No.: 5558

Matrix (soil/water): SOIL Lab Sample ID: 555803

Level (low/med): LOW Date Received: 01/20/05

% Solids: 76.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	127			P

Color Before: GRAY Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

OSAL-SS07-02

Lab Name: COMPUCHEM Contract: _____
 Lab Code: LIBERTY Case No.: _____ SAS No.: _____ SDG No.: 5558
 Matrix (soil/water): SOIL Lab Sample ID: 555804
 Level (low/med): LOW Date Received: 01/20/05
 % Solids: 83.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	18.1			P

Color Before: GRAY Clarity Before: _____ Texture: COARSE

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments: _____

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

OSAL-SS19-02

Lab Name: COMPUCHEM Contract: _____
 Lab Code: LIBRTY Case No.: _____ SAS No.: _____ SDG No.: 5558
 Matrix (soil/water): SOIL Lab Sample ID: 555801
 Level (low/med): LOW Date Received: 01/20/05
 % Solids: 78.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	149000			P

Color Before: BLACK Clarity Before: _____ Texture: COARSE
 Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments: _____

