TECHNICAL MEMORANDUM

Date: October 6, 2004

To: Indian Head Installation Restoration Team

From: Kim C. Turnbull, Tetra Tech NUS, Inc.

Subject: Decision Document
Site 46 – Cadmium Sandblast Grit
Naval District Washington, Indian Head
Indian Head, Maryland

1.0 INTRODUCTION

This technical memorandum is a Decision Document (DD) addressing Installation Restoration (IR) Program Site 46, Cadmium Sandblast Grit, at Naval District Washington, Indian Head (NDW-IH) in Indian Head, Maryland. The DD describes the history of Site 46, summarizes key findings from a review of available documents from the period 1992 to 2004, presents the results of a site visit in April 2004, and recommends a site management decision based on the document review and site visit findings.

This DD was prepared by Tetra Tech NUS, Inc. (TtNUS) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62472-03-D-0057, Contract Task Order Number 0006.

Site 46 is listed in Section 9.2A of the Federal Facility Agreement (FFA) (EPA Region III and DoN, 2000) for NDW-IH as requiring a remedial investigation (RI); however, there is sufficient information available to determine whether the site poses unacceptable risks to human health or the environment. Therefore, this DD was prepared in accordance with Section 9.3D(3) of the FFA for a Site Screening Area (SSA) that has been determined to not warrant an RI or status as an Accelerated Operable Unit (AOU) (FFA Section 2.1A).

2.0 SITE DESCRIPTION AND OPERATIONAL HISTORY

Site 46 is located in the west-central portion of the Main Area at NDW-IH. The site is a gravel-covered area southeast of and immediately behind Building 855. Since the mid-1960s, rocket catapult tubes plated with cadmium have been sandblasted at the building as part of a resurfacing operation. An

unknown quantity of the cadmium-contaminated grit was sometimes disposed in the gravel area behind the building or in a nearby drainage ditch. From the mid-1970s until the early 1980s, the grit was normally placed in ash cans and disposed at Bronson Road Landfill (IR Site 21). The Defense Reutilization and Marketing Office (DRMO) has been in charge of grit disposal since the early 1980s.

The topography of the area is relatively flat and drainage is poor. A drainage ditch extends along the back of Building 855 and turns southeast. Several mounds in the open and wooded areas behind the building are composed of fine-grained sand and may be spent sandblast grit.

3.0 INVESTIGATION HISTORY

Site 46 was initially identified as an IR site because of potential releases of cadmium. The site was first examined during the Preliminary Assessment (PA) in January 1992 (NEESA, 1992). Following the PA, a Site Inspection (SI) was performed in 1992 and documented in the Final SI Report, Phase II (E/A&H, 1994). The SI is the most recent investigation at the site.

4.0 DOCUMENT REVIEW

The following documents were reviewed as part of the preparation of this DD for Site 46:

- Preliminary Assessment Report (NEESA, 1992)
- Final Site Inspection Report, Phase II (E/A&H, 1994)

4.1 PA Report

Analytical data for the sand blasting grit were reviewed as part of the PA. Based on the analysis, the PA concluded that the grit disposed at various locations around Building 855 contained cadmium. Estimates as to the amount, frequency and time period over which grit was disposed near the building could not be confirmed during the PA. The PA recommended soil sampling and analysis for cadmium in the gravel area behind Building 855 and the nearby ditch.

4.2 SI Report

Nine surface soil samples were collected as part of the SI and analyzed for metals. The analytical results for metals that were detected are tabulated in Table 1. Samples 43SA01 and 43SA02 were collected from a drainage ditch. The remaining samples were collected from an area of approximately 50 feet by

50 feet. Samples 43SA04 and 43SA09 were collected from the gravel parking lot on the southwestern end of Building 855. The remaining samples were collected from open and wooded areas behind the building. Areas of mounded soil or other areas believed to represent disposal sites were targeted for sampling. The SI recommended additional sampling for lead because detected concentrations in some samples were greater than 200 mg/kg, which was the assumed action level at the time of the SI.

5.0 SUMMARY OF KEY FINDINGS

The analytical data collected during the SI were evaluated in this DD to estimate potential risks to human health. Table 2 summarizes information presented in Table 1 and provides the frequency of detection, range of detections, range of nondetects, the sample containing the maximum detected concentration, and the average concentration for each metal detected during the SI sampling. Table 2 also provides a comparison of the maximum detected concentrations to representative NDW-IH background concentrations and EPA Region 3 risk-based concentrations (RBCs) for residential soil. Metals that were detected above the background concentration and the RBC were retained as chemicals of potential concern (COPC). COPCs for Site 46 include arsenic, cadmium, chromium, lead, and mercury.

Table 3 provides a human health risk evaluation for the COPCs. The incremental lifetime cancer risk (ILCR) and hazard quotient (HQ) were estimated for each COPC based on the RBC. The ILCR was estimated by dividing the maximum concentration for each chemical by its carcinogenic RBC (based on residential exposure and a 1.0E-06 cancer risk) and adding the results for each chemical. The HQ was estimated by dividing the maximum concentration for each chemical by its noncarcinogenic RBC (based on residential exposure) and adding the results for each chemical. The estimated ILCR is 2.2E-05, which is within the EPA acceptable risk range of 1E-04 to 1E-06. The hazard index (HI), which is the sum of the HQ for each metal, is 1.05. This value slightly exceeds the EPA threshold value of 1.0; therefore, target organ effects from individual COPCs contributing to the risk were considered. Only those chemicals that affect the same target organ(s) or exhibit similar effect(s) are regarded as truly additive. The HI for each target organ is less than 1.0, which indicates there is minimal potential for adverse health effects. The average lead concentration is less than the EPA screening value of 400 mg/kg for residential soil.

An ecological risk evaluation was not conducted. Much of the site area is a gravel-covered parking lot, and the area of suspected disposal covers a relatively small area (approximately 50 feet by 50 feet).

6.0 RECOMMENDATIONS

No further action is recommended for Site 46 under the IR Program. Human health carcinogenic and noncarcinogenic risks based on residential exposure are within the guidelines acceptable by the EPA. The site does not provide even marginal ecological habitat.

7.0 REFERENCES

E/A&H (EnSafe/Allen & Hoshall), 1994. Final Site Inspection Report, Phase II, Indian Head Division, Naval Surface Warfare Center. Memphis, Tennessee.

EPA (United States Environmental Protection Agency), 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. EPA/540/F-94/043, Office of Emergency and Remedial Response, Washington, D.C.

EPA Region III and DoN (United States Department of the Navy), 2000. Federal Facility Agreement under CERCLA Section 120, Naval Surface Warfare Center, Indian Head Division, Indian Head, Maryland. Administrative Docket Number III-FCA-CERC-018.

EPA, 2003. EPA Region 3 Risk-Based Concentration Table: Technical Background Information, Revised April 16, 2003. Philadelphia, Pennsylvania.

EPA, 2004. EPA Region III Risk-Based Concentration Table, April 14, 2004 Update. Philadelphia, Pennsylvania.

NEESA (Naval Energy and Environmental Support Activity), 1992. Preliminary Assessment Report, Naval Ordnance Station, Indian Head, Maryland. Port Hueneme, California.

TtNUS (Tetra Tech NUS, Inc.), 2002. Background Soil Investigation Report of Indian Head and Stump Neck Annex, Naval Surface Warfare Center, Indian Head, Maryland. King of Prussia, Pennsylvania,

TABLE 1

SUMMARY OF POSITIVE RESULTS - SOIL
SITE 46 - CADMIUM SANDBLAST GRIT
NDW-IH, INDIAN HEAD, MARYLAND

Location	46SA01	46SA02	46SA03	46SA04	46SA05	46SA06	46SA07	46SA08	46SA09
Depth Range (ft)	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	9/3/1992	9/3/1992	9/3/1992	9/3/1992	9/3/1992	9/3/1992	9/3/1992	9/3/1992	9/3/1992
Inorganics (mg/kg)									
Aluminum	2720	2170	1990	1790	3340	2510	1790	2530	1860
Arsenic	4.4 J	0.95 J	1.4 J	1.7 J	0.62 UJ	1.4 J	1.8 J	2.6 J	9.4 J
Cadmium	2.8	1.3	1.7	1.1 U	10.7	6.8	12	1.1 U	3.7
Calcium	785 B	297 B	203 B	79.7 B	3960	5010	429 B	194 B	312 B
Chromium	13.1	4.5	4.6	2.6	30.5	4.7	14.7	19.2	31.6
Copper	17.1	20.6	5.1 B	14.8	18.7	3.3 B	14.3	9.9	89.8
Iron	4380	3230	5540	2170	7560	3210	6520	5130	9680
Lead	407	18	8.8 J	20 J	12.7 J	9.1 J	46.1 J	52.5 J	132 J
Magnesium	1040 B	271 B	172 B	144 B	6500	277 B	655 B	234 B	233 B
Manganese	192	43.3	161	210	102	186	105	107	265
Mercury	4.3	0.22 U	0.22 U	0.22 U	0.21 U	0 22 U	0.21 U	0.35	0.22 U
Nickel	14.3	3.6 B	3.3 U	3.2 U	57.4	3.8 B	11.9	5.8 B	4.8 B
Silver	3.8	1.1 U	1.7 B	1.1 U	1 U	1.1 U	3.8	1.1 U	1.9 B
Sodium	59.2 U	28.4 U	16.3 J	24.5 U	157 B	22.5 U	31.2 U	25.1 U	29.4 U
Vanadium	19.4	6.3 B	5.8 B	4.7 B	10 B	7.4 B	8.7 B	10.8 B	13.8
Zinc	188	69.7	40.7	13.4	12.5	16.4	24.3	35.2	127

Source: E/A&H, 1994.

TABLE 2

DATA EVALUATION - SURFACE SOIL
SITE 46 - CADMIUM SANDBLAST GRIT
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Frequency of Detections	Range of Detections	Range of Nondetects[1]	Sample Containing Maximum Detection	Average of All Results[2]	Concentration Used for Screening[3]	Representative Background Concentration for Surface Soil[4]	Exceeds Background? (Y/N)	Region 3 RBC Residential Soil[5]	Selected as a COPC? (Y/N)	Rationale
Inorganics (mg/kg)											
Aluminum	9/9	1790 - 3340	---	46SA05	2300	3340	18329	N	7800	N	BSL, BKG
Arsenic	8/9	0.95 - 9.4	0.62	46SA09	2.7	9.4	4.25	Y	**0.43**	**Y**	ASL
Cadmium	7/9	1.3 - 12	1.1	46SA05	4.5	12	0.26	Y	**3.9[6]**	**Y**	ASL
Calcium	2/9	3960 - 5010	79.7 - 785	46SA06	1100	5010	409	Y	---	N	NUT
Chromium	9/9	2.6 - 31.6	---	46SA09	14	31.6	24.2	Y	**23[7]**	**Y**	ASL
Copper	7/9	9.9 - 89.8	3.3 - 5.1	46SA09	21	89.8	18.7	Y	310	N	BSL
Iron	9/9	2170 - 9680	---	46SA09	5300	9680	43170	N	2300	N	BKG
Lead	9/9	8.8 - 407	---	46SA01	78	407	149	Y	**400[8]**	**Y**	ASL
Magnesium	1/9	6500	144 - 1040	46SA05	890	6500	1382	Y	---	N	NUT
Manganese	9/9	43.3 - 265	---	46SA09	150	265	2248	N	160[9]	N	BKG
Mercury	2/9	0.35 - 4.3	0.21 - 0.22	46SA01	0.6	4.3	0.087	Y	**2.3[10]**	**Y**	ASL
Nickel	3/9	11.9 - 57.4	3.2 - 5.8	46SA05	11	57.4	18.2	Y	160	N	BSL
Silver	2/9	3.8	1.0 - 1.9	46SA01/46SA07	1.3	3.8	ND	Y	39	N	BSL
Sodium	1/9	16.3	22.5 - 157	46SA03	23	16.3	51.9	N	---	N	NUT, BKG
Vanadium	2/9	13.8 - 19.4	4.7 - 10.8	46SA01	6.7	19.4	53.5	N	7.8	N	BKG
Zinc	9/9	12.5 - 188	---	46SA01	59	188	38.1	Y	2300	N	BSL

Rationale Codes:
For selection as a COPC:
ASL = Above screening level.

For Elimination as a COPC:
BKG = Equal to or less than background.
BSL = Below screening level.
NUT = Essential nutrient.

Abbreviations:
COPC Chemical of Potential Concern
ND Not Detected
OSWER Office of Solid Waste and Emergency Response
RfDo Oral Reference Dose
RBC Risk-Based Concentration

Footnotes:
1 Values presented are sample-specific quantitation limits.
2 Averages are calculated using 1/2 of the detection limit for nondetects.
3 The maximum detected concentration is used for screening purposes.
4 TtNUS, 2002.
5 EPA, 2004. Value is based on a hazard quotient of 0.1 for noncarcinogens or an incremental lifetime cancer risk of 1E-6 for carcinogens.
6 The screening level for residential land use calculated using the RfDo for water is presented. The screening level for residential land use calculated using the RfDo for food is 7.8 mg/kg.
7 The value for hexavalent chromium is presented.
8 OSWER soil screening level for residential land use (EPA, 1994).
9 The screening value for residential land use calculated using the RfDo for nonfood is presented. The screening value for residential land use calculated using the RfDo for food is 1,100 mg/kg.
10 The value for mercuric chloride is presented.

TABLE 3

CHEMICAL-SPECIFIC HUMAN HEALTH RISKS
SITE 46 - CADMIUM SANDBLAST GRIT
NDW-IH, INDIAN HEAD, MARYLAND

Chemical	Maximum Concentration	Carcinogenic Risks		Noncarcinogenic Risks			Evaluation of Target Organ HIs	
		RBC[1]	Estimated ILCR	Primary Target Organ	RBC[1]	Estimated HQ	Target Organ	Total HI
Surface Soil (mg/kg)								
Arsenic	9.4	0.43	2.2E-05	cardiovascular	23[2]	0.41	cardiovascular	0.41
Cadmium	12	NA[3]	NA	kidney	39	0.31	kidney	0.31
Chromium	31.6	NA	NA	respiratory	230	0.14	neurological	0.19
Lead	407	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	respiratory	0.14
Mercury	4.3	NA	NA	neurological	23	0.19		
		Total ILCR	2.2E-05					

Abbreviations:

CSF	Cancer Slope Factor
HI	Hazard Index
HQ	Hazard Quotient
ILCR	Incremental Lifetime Cancer Risk
RBC	Risk-Based Concentration

Footnotes:

1 RBCs (EPA, 2004) for residential soil.
2 Calculated using the RfD per EPA guidance (EPA, 2003).
3 NA - Not Applicable. The EPA has not established a CSF or noncarcinogenic RfD for this chemical.
4 The average concentration for lead in surface soil is 78 mg/kg, which is less than the residential screening level of 400 mg/kg. Therefore, lead does not pose a significant risk to potential receptors.

CONCURRENCE FOR NO FURTHER ACTION
SIGNATURE PAGE

Site 46 – Cadmium Sandblast Grit
Naval District Washington, Indian Head
Indian Head, Maryland

In 2004, in partnership with the United States Environmental Protection Agency (USEPA) Region III and the Maryland Department of the Environment (MDE), the Navy prepared this decision document for Site 46 (Cadmium Sandblast Grit) at the Naval District Washington, Indian Head in Indian Head, Maryland. Based upon a review of available information, it is the consensus of the Department of the Navy (DoN), the USEPA Region III, with concurrence from the MDE, and members of the Indian Head Installation Restoration Team (IHIRT), that Site 46 requires no further action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. As appropriate, constituent concentrations, pathways, and receptors were evaluated by comparing analytical data to the most recent version of USEPA Region III risk-based concentrations (RBCs), conducting a human health risk evaluation, reviewing historical site data, and applying best professional judgment. In the event that contamination posing an unacceptable risk to human health or the environment is discovered after execution of this agreement, the IHIRT agrees to reevaluate Site 46 as deemed necessary.

Dennis Orenshaw 10/14/04
Dennis Orenshaw Date
Remedial Project Manager
USEPA Region III

Shawn Jorgensen 10/14/04
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