

TECHNICAL MEMORANDUM

CH2MHILL

Desktop Evaluation for Site 40 - Palladium Catalyst in Sediment, Naval District Washington Indian Head

PREPARED FOR: Indian Head Installation Restoration Team

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This technical memorandum presents a Desktop Evaluation (DE) of Installation Restoration (IR) Program Site 40, Palladium Catalyst in Sediments, at Naval District Washington Indian Head (NDWIH) in Indian Head, Maryland. The DE describes the current and past use(s) of Site 40, summarizes key findings from a review of available documents from the period 1992 to 2004, and recommends a site management decision based on the document review findings.

This DE was prepared by CH2M HILL under the Comprehensive Long-Term Environmental Action Navy II (CLEAN II) Contract N62470-02-D-3052, Contract Task Order 050.

Site 40 was listed in Section 9.2A of the Federal Facility Agreement (FFA) for NDWIH (December 9, 2000) as requiring a Remedial Investigation (RI); however, the site was reassigned as a Site Screening Area (SSA) in January 2004. Based upon review of the existing site information, a DE, documented in this technical memorandum, was performed in accordance with Section 9.3E of the FFA for an Area of Concern (AOC).

Site Description and Operational History

Site 40 is cited as the location of Palladium Catalyst in Sediments in the FFA (2000). The site is located on the southeast side of the Indian Head peninsula, the main area of NDWIH, overlooking Mattawoman Creek; Figure 1 shows the location of Site 40. The site encompasses the area of Mattawoman Creek southeast of Building 232, and the prior location of Buildings 1552 and 1599.

Buildings 232, 1552, and 1599 were the location of the former hydrogenation facility, which was used to produce unsymmetrical dimethylhydrazine (UDMH) from dimethylnitrosamine using a palladium catalyst. The catalyst consisted of five percent palladium bound to ninety-five percent carbon black (a soot-like carbon form). UDMH, which is a propellant used in rocket fuel, was produced at Site 40 buildings between 1974 and 1975; however, on-base production discontinued following process failures.

Buildings 1552 and 1559 have been demolished, and only concrete pads remain as an outline of the prior buildings. A discharge pipeline that leads approximately 150 feet from the site and exits through a brick outfall adjacent to Mattawoman Creek was visible during a March 2004 site visit. The area surrounding Building 232 and the prior locations of Buildings 1552 and 1559 is either gravel or grass covered. Southeast of the buildings, the site extends down a steep, partially wooded bank to Mattawoman Creek.

Site 39, the Organics Plant encompassing the areas around Buildings 497, 497A, and 498, is located adjacent to and downstream of Site 40. A second discharge pipeline leads from Building 497 to an outfall approximately 150 feet downstream of the Site 40 outfall. The Site 39 buildings were used in the production of explosives between 1942 and 1994, including the production of UDMH at Building 497. Site 41, the Scrap Yard, is located upstream of Site 40 and was used to store materials such as empty drums, electrical transformers, and spent batteries.

Investigation History

Site 40 was initially identified as an IR Site due to potential releases of palladium catalyst into sediments in Mattawoman Creek. The site was first examined during the Preliminary Assessment (PA), completed in January 1992. Following the PA, Site 40 was investigated as part of a Final Phase II Site Inspection (SI) (Ensafe/Allen & Hoshall, 1994). The 1994 SI is the most recent investigation that specifically considered potential contamination at Site 40.

Since 1994, two Remedial Investigations (RIs) (Tetra Tech, 1999 and HydroGeologic, 2003) and a Mattawoman Creek Study (Tetra Tech, 2004) have encompassed Site 40 within their study areas.

Document Review

The following documents were reviewed as part of the DE for Site 40:

- *Preliminary Assessment Report, Naval Ordnance Station, Indian Head, Maryland.* January 1992. (Addendum to the Initial Assessment Study). Prepared by Naval Energy and Environmental Support Activity (NEESA) for the Department of the Navy, Facilities Engineering Command. Document number NEESA 13-021A.
- *Final Site Inspection Report, Phase II, Indian Head Division, Naval Surface Warfare Center.* March 4, 1994. Prepared by Ensafe/Allen & Hoshall for the Department of the Navy, Chesapeake Division, Naval Facilities Engineering Command, Washington D.C. under Contract Number: N62467-89-D-0318.
- *Remedial Investigation Report, Sites 12, 39/41, 42, and 44, Indian Head Division, Naval Surface Warfare Center.* July 1999. Prepared by Tetra Tech NUS, Inc. for the Engineering Field Activity Chesapeake, Naval Facilities Engineering Command, Washington Navy Yard, D.C. under Contract Number: N62472-90-D-1298.
- *Remedial Investigation Report (Draft Final) Sites 6, 39 and 45, Indian Head Division – NSWC, Indian Head, Maryland.* October 2003. Prepared by HydroGeologic, Inc. for the

Department of the Navy, Engineering Field Activity, Chesapeake Naval Facilities Engineering Command under Contract Number: N62470-95-D-6007.

- *Mattawoman Creek Study, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland.* January 2004. Prepared by Tetra Tech NUS, Inc. for the Engineering Field Activity Chesapeake, Naval Facilities Engineering Command, Washington Navy Yard, D.C. under Contract Number: N62467-94-D-0888.

1992 PA / 1994 SI Reports

The 1992 PA and 1994 SI summarize the spills reported for Site 40. Unknown quantities of materials were reportedly spilled during the start-up of the production of UDMH in 1974. The chemicals used in UDMH production corroded parts resulting in equipment failures; thus it was suspected that additional undocumented spills occurred during the 1974 to 1975 timeframe. The most significant known spill at the site involved a hydrogenation tank in Building 1599 that released near the full 2000-gallon capacity of the tank through a faulty valve in 1975. This spill created a visible black plume in Mattawoman Creek, presumably from the carbon black-palladium catalyst. The quantity of palladium released was estimated in the 1992 PA to be 88 pounds.

The PA report (NEESA, 1992) noted that palladium was not a regulated hazardous substance, and consequently, an SI was not recommended for the site. However, the Navy requested that the site be investigated under the Installation Restoration (IR) program. Thus, between 1992 and 1994 an SI was conducted on 14 sites at NDWIH including Sites 39 and 40. This investigation resulted in the March 1994 Phase II SI Report.

The objective of the SI for Site 40 was to determine if palladium was present in sediments in Mattawoman Creek. Six sediment samples were collected at the site in September 1992; these locations are identified in Figure 2. The samples included two surface sediment samples - one collected at the drainage pipeline outfall and the second collected at the confluence of the effluent from the outfall and Mattawoman Creek. Four surficial sediment samples were collected from Mattawoman Creek, three of which were downstream of the pipeline outfall and one sample upstream.

The six sediment samples collected at Site 40 during the SI were analyzed for palladium only. Palladium was not detected in any of the samples at concentrations greater than laboratory reporting limits. The SI report also observed that vegetation along the path of the drainage from the Site 40 outfall to Mattawoman Creek did not show any signs of stress.

Sites 39 and 41 were investigated concurrently during the SI. Sediment samples from near the discharge point and Mattawoman Creek were collected for Site 39; and sampling areas for Sites 39 and 40 overlapped in the creek. Semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), and explosive compounds were detected in sediments from Site 39 and SVOCs were detected in sediment samples collected from Site 41.

The Site 39 samples collected during the 1994 SI indicated that explosives detected in sediment samples were likely the product of Site 39 activities. Analysis results of samples collected from the Site 39 drainage pipeline outfall and at the confluence of the outfall and Mattawoman Creek, 39DP01 and 39DP02, respectively, were found to contain nitroguanidine. Figure 2 depicts the Site 39 and Site 40 sample locations for the 1994 SI

report. The three sediment samples collected downstream of the Site 39 outfall were found to contain UDMH. The upstream Site 39 creek sediment sample, which is located downstream of Site 40 (39DP05), did not contain detections of either UDMH or nitroguanidine at concentrations greater than laboratory reporting limits, indicating Site 39 is the source of the explosives found in this segment of Mattawoman Creek.

The SI report recommended further investigation of the sediments in Mattawoman Creek for Sites 39 and 41, and that this continued work should combine the areas investigated to include Sites 39, 40, and 41.

1999 RI Report for Sites 12, 39/41, 42, and 44

The first RI report that encompassed Site 39 was completed in 1999; fieldwork for Sites 39 and 41 was completed in October 1997. In this RI, soil and groundwater samples were collected for Site 41, and surface water and sediment samples were collected for Sites 39 and 41. Analysis conducted on sediment samples included SVOCs, VOCs, metals, explosives, pesticides, acid volatile sulfide/simultaneously extracted metals (AVS/SEM), polychlorinated biphenyls (PCBs), and total organic carbon. Palladium was not included in the metals analysis; however, the historical environmental data from the 1994 SI, including Site 40 palladium analyzed sediment samples, were incorporated into the database used for the RI report.

The 1999 RI report recommended a more complete ecological assessment of Mattawoman Creek near Sites 39 and 41 as the surface water and sediment samples collected were shown to pose a potential ecological risk. Further studies were also recommended based on the human health and ecological risk assessments conducted for the soil samples at the Sites.

2003 RI Report for Sites 6, 39 and 45

A draft final version of this report exists currently; a final RI report is expected in May 2004. During the 2003 RI at Site 39, 20 surface soil and 20 subsurface soil samples were collected. Two of these sample locations were adjacent to Building 1599 (a building originally considered part of Site 40). Soil was the only medium addressed in this investigation. The RI data led to the conclusion that contaminants present in soils did not pose a threat to groundwater quality, and thus no groundwater monitoring wells were installed. The contaminants detected in soils during the Site 39 RI included metals, explosives, and SVOCs. Soil samples were not analyzed for palladium. Recommendations were presented for the site based on the results Human Health Risk Assessment (HHRA) and the Ecological Risk Assessment (ERA); the HHRA and ERA recommended no further action be performed at the site.

2004 Mattawoman Creek Study Report

The Mattawoman Creek Study assessed potential contamination in surface water, sediment, fish tissue and vegetation samples along an approximately 4-mile length of the creek. The creek segment adjacent to Sites 39, 40, and 41 was investigated as Area 4 in this study. Five sediment samples were collected in this area during 2001. In addition, sediment samples collected in 1997 for the RI of Sites 39/41 (Tetra Tech, 1999) were incorporated into the Mattawoman Creek study and risk assessments. Sediment samples were analyzed for

VOCs, SVOCs, Pesticides, PCBs, explosives, AVS/SEM, total organic carbon and percent silt. Palladium was not included in the metals analysis.

Potential ecological risks to benthic macroinvertebrates were identified in the Mattawoman Creek Study from contaminants detected in the sediment samples. The main contaminants of potential concern identified for Area 4 sediment samples were silver and mercury. The Area 4 analytical results for Mattawoman Creek sediments did not indicate any detections of UDMH or nitroguanidine above laboratory reporting limits. Nitrocellulose was the only explosive compound positively identified in Area 4 sediment samples. The report recommended further study of the creek sediment and surface water.

Summary of Key Findings

The following DE key findings are based on a review of the above-mentioned documents:

- Site 40 has been narrowly defined - not only by the specific area of Mattawoman Creek sediments downgradient of Buildings 232, 1552, and 1599, but more pertinently by the contaminant in question - namely palladium.
- Palladium was not detected in any of six sediment samples collected from Site 40 (Ensafe/Allen & Hoshall, 1994).
- Outside of the narrow Site 40 area definition, an investigation of soil, surface water, and sediments has been conducted as part of studies for Sites 39 and 41, and for Mattawoman Creek (Tetra Tech, 1999, HydroGeologic et. al., 2003, and Tetra Tech, 2004). Potential contamination from constituents other than palladium will continue to be addressed for all media under these ongoing studies.

Recommendations

Because palladium was not detected in Site 40 sediments, no further action is recommended at Site 40 based on the findings of this DE.

References

- Ensafe/Allen & Hoshall. March 4, 1994. *Final Site Inspection Report, Phase II, Indian Head Division, Naval Surface Warfare Center.*
- HydroGeologic, Inc., CH2M HILL, Baker Environmental, and CDM Federal Programs Corp. October 2003. *Remedial Investigation Report (Draft Final) Sites 6, 39 and 45, Indian Head Division - NSWC, Indian Head, Maryland.*
- Naval Energy and Environmental Support Activity (NEESA). January 1992. *Preliminary Assessment Report, Naval Ordnance Station, Indian Head, Maryland.* Document number NEESA 13-021A.
- Tetra Tech NUS, Inc. July 1999. *Remedial Investigation Report, Sites 12, 39/41, 42, and 44, Indian Head Division, Naval Surface Warfare Center.*

Tetra Tech NUS, Inc. January 2004. *Mattawoman Creek Study, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland.*

United States Environmental Protection Agency (USEPA) Region III, United States Department of the Navy. December 9, 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.

CONCURRENCE FOR NO FURTHER ACTION

SIGNATURE PAGE

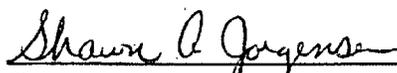
Site 40 - Palladium Catalysts in Sediments

Naval District Washington, Indian Head

In 2004, the Navy in partnership with the United States Environmental Protection Agency (USEPA) Region III and Maryland Department of the Environment (MDE) conducted desktop evaluation for Site 40 at the Naval District Washington, Indian Head in Indian Head, MD. Based upon the results of the desktop evaluation, it is the consensus of the Project Managers, defined as the Department of the Navy (DoN), the USEPA Region III, MDE, and members of the Indian Head Tier I Partnership, that this site requires no further action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, at this site. As appropriate, constituent concentrations, pathways, and receptors were evaluated using the most recent version of USEPA Region III Risk-Based Concentrations (RBC Tables) (USEPA, April 2002), facility background, historical site data, and best professional judgment. In the event contamination posing an unacceptable risk to human health or the environment is discovered after execution of this agreement, the Partnership agrees to reevaluate the Site as deemed necessary.


Date

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LEGEND

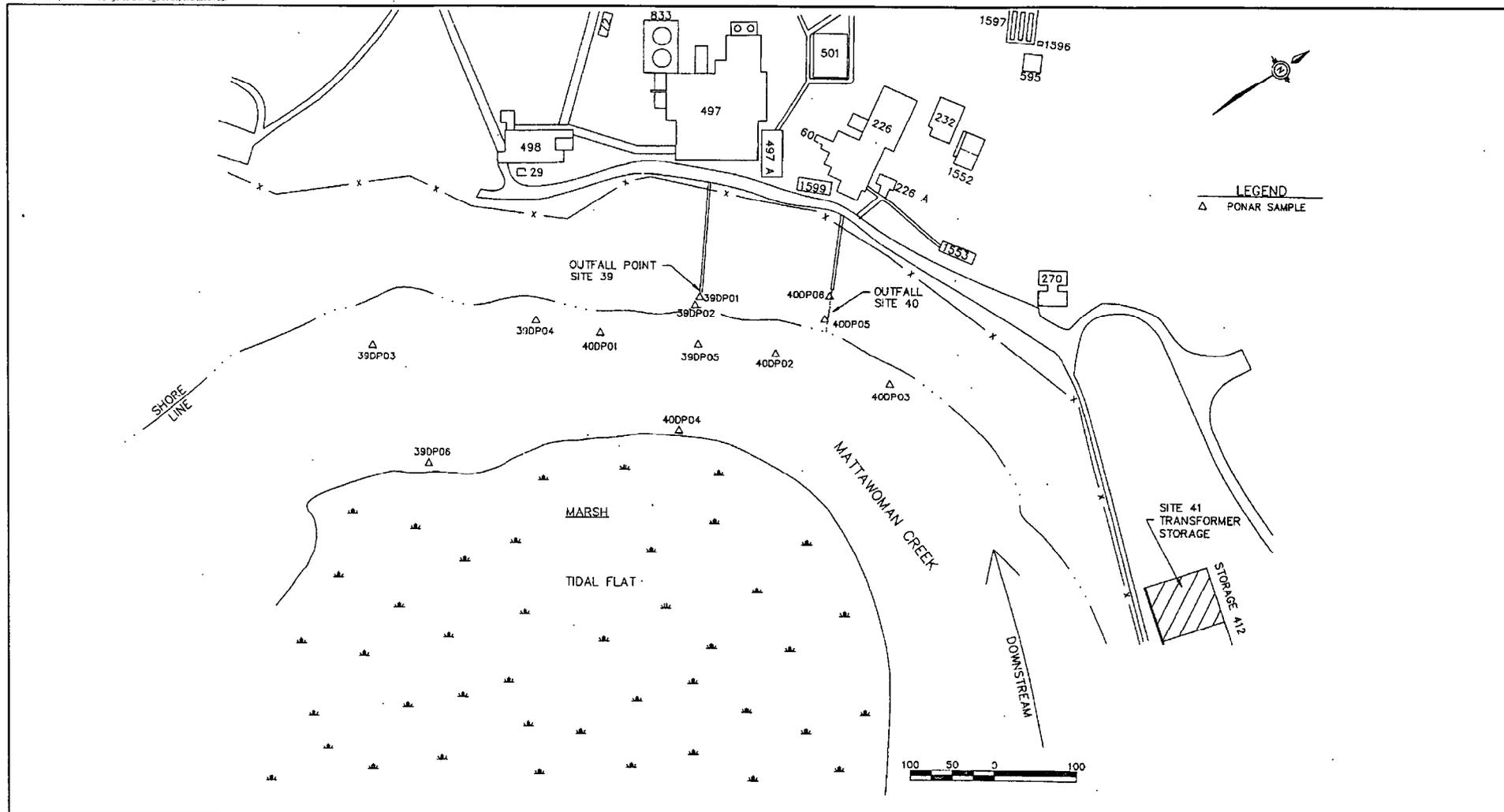
-  Approximate Site Boundary
-  Activity Boundary
-  Buildings
-  Roads and Paved Areas
-  Water Bodies



0 2000 4000 Feet



Figure 1
Site 40 Location map
Site 40 Desktop Evaluation
NDWIH - Indian Head Maryland



Notes:

Six sediment samples were collected September 17, 1992 (SI - Phase II). Palladium was analyzed for but not detected in all samples.

Figure 2
Locations Sampled for Palladium
Site 40 Desktop Evaluation
NDWIH - Indian Head, Maryland