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TECHNICAL MEMORANDUM REGARDING WORK PLAN FOR DESIGN INVESTIGATION FOR TCE CONTAMINATION AT SITE 57 NSWC INDIAN HEAD MD

5/30/2008

TETRA TECH NUS

TECHNICAL MEMORANDUM

Date: May 30, 2008

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David Steckler – NAVFAC Washington
Dennis Orenshaw – EPA Region 3
Curtis DeTore – MDE

From: Scott Nesbit – Tetra Tech NUS, Inc.

cc: Kim Turnbull - Tetra Tech NUS, Inc.

Subject: Work Plan for Design Investigation
Site 57 – Building 292 TCE Contamination
NSF-IH, Indian Head, Maryland

1.0 INTRODUCTION

A draft Remedial Design Report was prepared in November 2007 to address the in-situ bioremediation component of the selected remedy identified in the Record of Decision for the Source Area Plume and Downgradient Plume Area at Site 57– Building 292 Trichloroethene (TCE) Contamination at the Naval Support Facility, Indian Head (NSF-IH) located in Indian Head, Maryland. The Remedial Design Report provided the details to be used by the Navy's Remedial Action Contractor to prepare the Remedial Action Work Plan.

The proposed design for the source area plume included injection of bioremediation chemicals in a grid pattern in the largest area where contaminated soil had been removed. The chemical dosage was conservatively based on the maximum contaminant concentrations detected in groundwater. The proposed design also included injection of bioremediation chemicals in a treatment barrier downgradient of the grid treatment area to address uncertainties and prevent further migration of groundwater contaminants. The proposed grid treatment area and treatment barrier locations are shown on Figure 1 along with proposed monitoring wells that would be installed as part of the remedy.

A subsequent optimization review of the Remedial Design Report identified the need for additional investigation and site characterization of the Source Area Plume. The primary comments from that review focused on the delineation of the target treatment zone (TTZ) and recommended a Direct Push Technology (DPT)/ Membrane Interface Probe (MIP) investigation in the source area due to the limited

number of data points available as the basis for design. A secondary recommendation resulting from the plan review involved a DPT/MIP investigation to identify the potential presence of contamination beneath Building 292.

The purpose of this work plan is to outline the data collection procedures to further refine the Site 57 Remedial Design. It is anticipated that implementation of this plan will result in a reduction of the size of the TTZ and the number of injection points, optimization of chemical dosage requirements, and a determination of whether the proposed treatment barrier and associated monitoring wells are needed.

2.0 DPT/MIP INVESTIGATION RATIONALE

During the May 2007 IHIRT meeting, an overview of this work plan was presented. The scheduled work includes the placement of DPT/MIP borings within the previously defined limits of the TTZ. Following collection of these data, follow-up DPT/MIP borings will be placed in an outward direction as necessary to refine the TTZ.

2.1 Initial Investigation

The DPT/MIP locations are proposed at the following locations (Figure 1):

- Three (3) initial DPT/MIP locations will be placed between the TTZ and Building 292 to confirm that there is no source emanating from beneath the building. These locations may be adjusted in the field based on the location of the former drum pad.
- Ten (10) initial DPT/MIP locations will be placed within the perimeter of Removal Area A to determine if the previously proposed grid treatment area can be reduced. These locations will also be used to determine the depth/strata of the maximum contaminated areas and to identify the top of the upper aquitard in the grid treatment area. The borings will be advanced to a depth of approximately 25 feet (2 to 3 feet into the upper aquitard) to confirm that the contamination has not penetrated this strata.
- Three (3) initial DPT/MIP boring locations will be placed within the 2003 pilot study area to further identify the contaminant depth and depth to the top of upper aquitard within the TTZ. The depth of these borings will be the same as those above.
- Fourteen (14) potential follow-up DPT/MIP boring locations have been identified in the case that elevated volatile organic compounds (VOC) concentrations are identified at one or more of the perimeter locations called out above. The design of these borings will be as described above. The determination of which follow-up locations are utilized will be made during the investigation based on the real-time results generated; additionally, further step-outs may be required in some areas.

The site characterization effort will utilize a DPT drill rig. The MIP probe is mounted on a standard direct-push rod, and a carrier gas line runs from the probe to the detector through the inside of the tooling. The device allows the user to detect VOCs as the MIP is driven to depth. VOCs are drawn through the system's semi-permeable membrane and transported via a clean carrier gas to a detector at the surface where VOCs are measured. There are a variety of detectors that could be used. An electron capture detector (ECD) is recommended for chlorinated compounds such as TCE. A photoionization detector (PID) is generally used for aromatic hydrocarbons (e.g., benzene, toluene, ethylbenzene, and xylene). A flame ionization detector (FID) is best suited for straight-chain hydrocarbons such as methane, but can be used for chlorinated compounds. These detectors cannot identify individual compounds. They can, however, provide semi-quantitative results (low, medium, and high concentrations based on the relative response of the detector) for total VOCs appropriate to the specific detector. They are also useful for identification of potential DNAPL (based on high VOC concentrations). The specific detector(s) to be used will be based on vendor and drilling subcontractor recommendations.

The MIP also incorporates a lithologic sensor to evaluate the subsurface characteristics of the area and the presence of any confining unit or aquitard.

Measurements of total VOCs will be obtained between the water table and any confining unit to obtain a vertical profile of groundwater contamination at each location. It is envisioned that this will allow a three-dimensional characterization of the contaminant plume. The data collected with the MIP can also be used to identify conventional sampling points (soil borings and monitoring wells) during subsequent site work.

The MIP is a screening tool and is not a replacement for conventional soil and groundwater sampling. It cannot be used to definitively rule out the presence of a contaminant plume if none is detected. Contaminants may be present in groundwater at concentrations below the detection limits of this screening method.

2.2 Follow-up Investigation

Following the completion of the initial DPT/MIP investigation, a follow-up DPT investigation will be performed to verify/correlate the MIP results (VOC measurements and lithology). The investigation will be used to verify soil types and the depth of the upper aquitard. Four of the initial MIP locations will be identified for follow-up boring advancement; two locations with high FID and/or ECD response, one with a moderate response, and one with low response. At each of these locations, borings will be advanced via DPT with continuous soil sampling to the depth of the associated MIP boring. Two soil and two groundwater samples will be collected at each location and laboratory-analyzed for VOCs. The soil

samples will also be analyzed for total organic carbon. The sample depths will be based on the suspected depths of maximum contamination at each location.

3.0 FIELD INVESTIGATION

It is intended that the field investigation will conform to the procedures described in the Master Field Sampling Plan (FSP) (TtNUS, 2004a) and the Facility Standard Operating Procedures (SOPs) (TtNUS, 2004b).

3.1 Field Operations

3.1.1 Mobilization/Demobilization

Mobilization and demobilization operations will be performed as described in Section 2.1.1 of the Master FSP.

3.1.2 Utility Clearance

A subcontractor will be procured to perform utility clearance at the proposed DPT/MIP investigation locations.

3.1.3 DPT/MIP Investigation

The DPT/MIP tasks will be conducted in conformance with equipment vendor and drilling subcontractor SOPs and Section 2.2.3 of the Master FSP.

3.1.4 Site Restoration

If required as a result of the soil boring, DPT/MIP, and sampling activities, site restoration will be performed in accordance with Section 2.1.2 of the Master FSP.

3.1.5 Decontamination

Decontamination procedures will be conducted in accordance with Section 2.11 of the Master FSP and facility SOP SA-7.1.

3.1.6 Investigation-Derived Waste Handling

The investigation-derived waste (IDW) that will be produced during this investigation includes borehole cuttings, decontamination fluids, personal protective equipment, and miscellaneous trash. The handling and disposal of IDW will be conducted in accordance with Section 2.12 of the Master FSP.

3.1.7 Surveying

TtNUS personnel will determine horizontal locations of the calibration soil boring and DPT/MIP locations using a global positioning system survey in accordance with Master FSP Section 2.10.

3.2 Field Sampling Procedures

3.2.1 Sampling Procedures

This section describes the field sampling procedures for the design investigation at Site 57. General field sampling procedures are described in the Master FSP and facility SOPs. Table 1 provides the location, sample number, and analytes for each sample.

3.2.1.1 Groundwater Samples

Groundwater samples will be collected from four DPT/MIP locations depending upon the results observed. Groundwater samples will be collected in accordance with Section 3.1.1 of the Master FSP and facility SOPs SA-1.1 and SA-2.5.

3.2.1.2 Soil Samples

Two soil samples will be collected from each of four DPT/MIP locations. Soil samples will be collected in accordance with Section 3.1.4 of the Master FSP and facility SOPs SA-1.3 and SA-2.5.

3.2.1.3 Quality Assurance/Quality Control

To assure data obtained during the investigation are accurate, various quality assurance (QA)/quality control (QC) requirements have been established for fieldwork, laboratory analysis of collected samples, and validation of analytical results from the laboratory. Detailed information regarding this subject is presented in the Master Quality Assurance Project Plan (QAPP) (TtNUS, 2004c).

The field QC samples consist of field duplicates, field blanks, trip blanks, and equipment (rinsate) blanks. A detailed description of each type of sample is presented in Section 3.6 of the Master QAPP.

Validation of the analytical results is discussed in detail in Section 9.0 of the Master QAPP. One hundred percent of the data for the investigation will be subject to full data validation in accordance with Section 9.2 of the Master QAPP.

3.2.2 Sample Handling

3.2.2.1 Field Documentation

Field documentation will be conducted as described in Section 3.2.1 of the Master FSP and facility SOP SA-6.3.

3.2.2.2 Sample Nomenclature

Each sample collected will be assigned a unique sample tracking number consisting of a 12-digit alphanumeric code conforming to facility SOP CT-04.

3.2.2.3 Sample Containers, Preservatives, and Holding Times

Table 2 provides a summary of the analyses, methodologies, bottle requirements, preservation requirements, and holding times for the samples to be submitted for fixed-base laboratory analysis.

3.2.2.4 Sample Packaging and Shipping

Samples will be packaged in accordance with Section 3.2.4 of the Master FSP and facility SOP SA-6.1.

3.2.2.5 Sample Custody

Custody of samples will be in accordance with Section 3.3 of the Master FSP and facility SOP SA-6.3.

ENCLOSURES

Figure 1 Source Area DPT/MIP Investigation

REFERENCES

TtNUS (Tetra Tech NUS, Inc.), 2004a. Master Field Sampling Plan for Installation Restoration Program Environmental Investigations at Naval District Washington, Indian Head, Indian Head, Maryland. Prepared for Engineering Field Activity Chesapeake, Naval Facilities Engineering Command, Washington Navy Yard, D.C. King of Prussia, Pennsylvania.

TtNUS, 2004b. Facility Standard Operating Procedures for Installation Restoration Program Environmental Investigations at Naval District Washington, Indian Head, Indian Head, Maryland. Prepared for Engineering Field Activity Chesapeake, Naval Facilities Engineering Command, Washington Navy Yard, D.C. King of Prussia, Pennsylvania.

TtNUS, 2004c. Master Quality Assurance Project Plan for Installation Restoration Program Environmental Investigations at Naval District Washington, Indian Head, Indian Head, Maryland. Prepared for Engineering Field Activity Chesapeake, Naval Facilities Engineering Command, Washington Navy Yard, D.C. King of Prussia, Pennsylvania.

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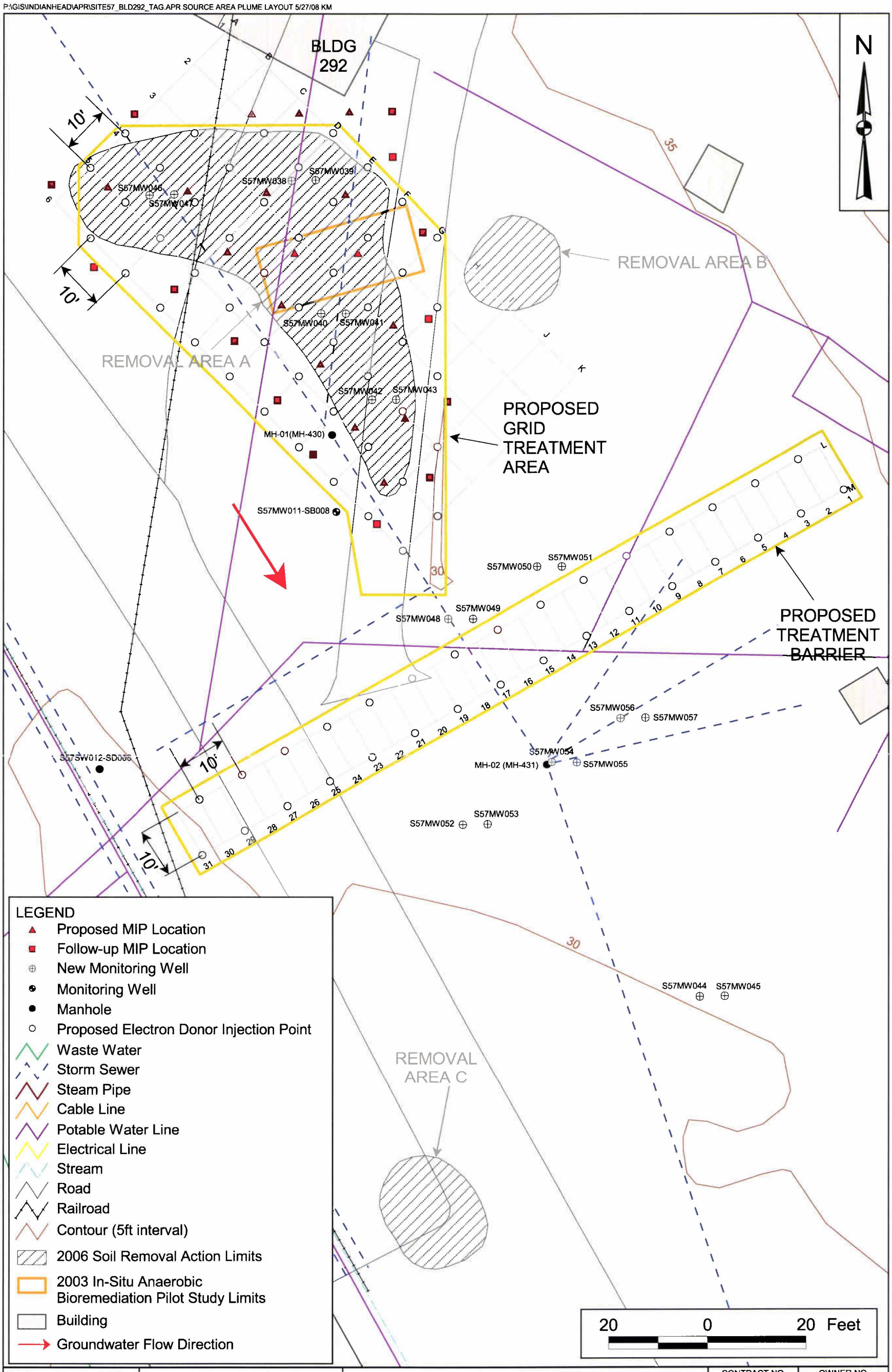

DRAWN BY: K. MOORE	DATE: 10/18/07	CONTRACT NO.: 2144	OWNER NO.: 005
CHECKED BY: S. NESBIT	DATE: 5/29/08	APPROVED BY: ___	DATE: ___
COST/SCHEDULE-AREA		APPROVED BY: ___	DATE: ___
SCALE: AS NOTED		DRAWING NO.: FIGURE 1	REV.: 0

Tetra Tech NUS, Inc.

SOURCE AREA DPT/MIP INVESTIGATION
SITE 57 - BUILDING 292 TCE CONTAMINATION
NAVAL SUPPORT FACILITY, INDIAN HEAD
INDIAN HEAD, MARYLAND