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LETTER REGARDING THE SUBMITTAL OF THE FINAL TECHNICAL MEMORANDUM FOR
THE TEST PIT EXCAVATIONS AT HORSE STABLES SKEET RANGE #1 UNEXPLODED
ORDNANCE 3 MILLINGTON NSA MIDSOUTH TN

5/4/2011
TETRA TECH



May 4, 2011

Project No. 112G01642

Mr. Howard Hickey
Naval Facilities Engineering Command Midwest
201 Decatur Avenue, Building 1-A
Great Lakes, Illinois 60088-2801

Subject: CLEAN Contract Number N62472-03-D-0057
Contract Task Order F275

Reference: Final Technical Memorandum - Test Pit Excavations at Horse Stables Skeet Range #1 (UXO 3),
Revision 02
Naval Support Activity (NSA) Mid-South
Millington, Tennessee

Dear Mr. Hickey:

Enclosed are two copies of the Final Technical Memorandum - Test Pit Excavations at Horse Stables Skeet Range #1 (UXO 3) at NSA Mid-South. No changes other than the revision number have been made to the draft technical memorandum dated March 28, 2011 based on the April 14, 2011 letter from the Tennessee Department of Environment and Conservation approving the draft technical memorandum as submitted.

On behalf of the Department of the Navy, Tetra Tech is forwarding additional copies of the subject technical memorandum as listed below.

Please contact me (email lawson.anderson@tetrattech.com) at (501) 319-7594 or Geoff Pope (email geoff.pope@tetrattech.com) at (901) 523-9500 regarding any questions or comments.

Sincerely,

A handwritten signature in black ink that reads 'Lawson Anderson'.

Lawson Anderson, CHMM
Task Order Manager

LMA/
Enclosures (2)

cc: Rob Williamson, NSA Mid-South (2)
Charlie Burroughs, TDEC (2)
Harold Taylor, USEPA Region 4
John Trepanowski, Tetra Tech
Ralph Basinski, Tetra Tech
Geoff Pope, Tetra Tech
Glenn Wagner, Tetra Tech
File copy – CTO F275

TECHNICAL MEMORANDUM - FINAL

DATE: May 4, 2011

TO: Mr. Howard Hickey, Naval Facilities Engineering Command Midwest
Mr. Rob Williamson, Naval Support Activity Mid-South

FROM: Lawson Anderson, Tetra Tech
Geoff Pope, Tetra Tech

COPIES: Mr. John Trepanowski, Tetra Tech
Mr. Ralph Basinski, Tetra Tech
Project File – Contract Task Order F275

SUBJECT: Test Pit Excavations at Horse Stables Skeet Range #1 (UXO 3), Revision 02
Naval Support Activity Mid-South
Millington, Tennessee

1.0 BACKGROUND

This Technical Memorandum describes the test pit excavation program that will be performed at the former Horse Stables Skeet Range (HSSR) #1 at Naval Support Activity (NSA) Mid-South to better define the extent of polynuclear aromatic hydrocarbon (PAH) contamination in surface soil at two locations identified by Site Inspection (SI) sampling performed in February 2010 by Tetra Tech, Inc. (Tetra Tech). The test pit excavation program will consist of excavation of PAH-contaminated soil to a depth of 1 foot below ground surface (bgs), confirmation sampling, backfilling with clean soil, and sampling and disposal of excavated soil as investigation-derived waste (IDW). The field activities will be performed by a subcontractor to Tetra Tech under Navy CLEAN IV Contract Number N62472-03-D-0057.

The former HSSR #1 site covers approximately 36 acres on the northern portion of the installation, east of Attu Street Extended (Figure 1). The skeet range was built in 1945 and closed in the summer of 1952 for the construction of a Navy family housing area that was recently demolished (prior to conducting the SI) and the site topography reworked in anticipation of building a new housing area. As a result, the area is primarily grass-covered with scattered old-growth trees. Munitions use was limited to small arms ammunition, primarily 12- and 20-gauge shotgun shells. A more detailed site description and history are provided in the "Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Small Arms Range Site Inspections" (herein referred to as the SAP; Tetra Tech, 2009).

2.0 PREVIOUS INVESTIGATIONS

Six Navy Munitions Response Program (MRP)-eligible sites, including HSSR #1, were identified at NSA Mid-South during a Preliminary Assessment (PA) completed in August 2005 (Malcolm Pirnie, Inc., 2005).

As a result, a SI was performed for the MRP sites in February and March 2010, in accordance with the SAP. The primary objective of the SI was to build on the historical documentation contained in the PA report by gathering site-specific field data to determine whether munitions constituents (i.e., lead, nitroglycerine, and PAHs) that may have been released during previous site activities or operations are present and potentially contributing to environmental impacts associated with the soil at the MRP sites, and to collect an appropriate amount of data to ensure a decision for each site could be made regarding whether a Remedial Investigation/Feasibility Study (RI/FS) is required, whether a site required an immediate response, or whether the site qualified for no further action (NFA).

The results of the SI conducted at HSSR #1 indicated PAHs present at concentrations exceeding the Tennessee Department of Environment and Conservation (TDEC) benzo(a)pyrene (BaP) equivalent Project Action Limit (PAL) of 0.015 milligrams per kilogram (mg/kg) in 16 of the 20 surface soil samples collected for PAH analysis. However, PAHs are ubiquitous in surface soils at NSA Mid-South; therefore, in 1997, the BRAC Cleanup Team (BCT), comprised of representatives of the Navy, TDEC, and Region 4 of the U.S. Environmental Protection Agency (USEPA), established a background concentration during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of 0.565 mg/kg for BaP equivalents. When compared to the background PAL, only two sample locations, HSR1-SS009 and HSR1-SS022, contained BaP equivalent concentrations exceeding 0.565 mg/kg (at concentrations of 0.8 mg/kg and 1.0 mg/kg, respectively). Soil sampling locations and PAH results converted to BaP equivalent concentrations are shown on Figure 1.

The SI sampling investigation and results are described in detail in the "Site Investigation Report for Munitions Response Program Site Inspections at NAVFAC Midwest and BRAC Program Management Office Southeast Munitions Response Sites and Areas of Concern" (herein referred to as the SI Report), Tetra Tech, 2010a). The SI Report recommended soil excavation and confirmation sampling for the two PAH sample locations that exceeded the NSA Mid-South BaP equivalent background concentration. Details of the proposed soil excavations and sampling were provided in the Navy responses to TDEC comments on the draft version of the SI Report. TDEC concurred with this recommendation during a review of the responses to comments at the September 8, 2010 NSA Mid-South BCT meeting.

3.0 TEST PIT EXCAVATION IMPLEMENTATION

Tetra Tech will procure subcontractors, oversee their work, perform test pit confirmation sampling, and prepare an SI Report Addendum as described in the following paragraphs.

3.1 Kick-off Meeting and Permit Approvals

Prior to implementation of the test pit activities, Tetra Tech, the selected excavation subcontractor, and Navy representatives will meet at NSA Mid-South to outline the proposed work to be completed at HSSR #1. Following the kick-off meeting, Tetra Tech will coordinate with NSA Mid-South personnel to obtain the necessary permit approvals (including underground utility location) for conducting the excavation work at HSSR #1.

This Technical Memorandum amends the approved SAP to reflect the responsibilities, requirements, and performance standards for the test pit excavation activities. Additionally, Tetra Tech will amend the approved "Health and Safety Plan for Small Arms Range Site Inspection at Naval Support Activity Mid-South" (Tetra Tech, 2010b) to address the test pit excavation activities.

Tetra Tech's subcontractor Statement of Work will require the selected subcontractor to prepare an additional Work Plan, that includes, but is not limited to, a Soil Excavation and Handling Plan (excavation and handling procedures, proposed work areas, loading areas, decontamination areas, staging areas, site traffic patterns, equipment lay down areas, and material storage areas), an Environmental Protection Plan, a Traffic Control Plan, an Erosion and Sediment Control Plan that complies with the most recent TDEC Tennessee Erosion and Sediment Control Handbook, and a Transportation and Disposal Plan.

3.2 Test Pit Excavation, Confirmation Sampling, and Analysis

The initial limits of excavation will be marked by Tetra Tech in the field using stakes, flagging, and/or marking paint prior to commencement of excavation activities. The locations of the test pit excavations will be centered on sample locations HSR1-SS009 and HSR1-SS022 and extended outward to create square test pits with sidewalls approximately 10 feet long (Figure 1). The initial pit excavation will extend from the ground surface to a depth of approximately 1 foot bgs.

Once the initial limits of excavation have been reached, Tetra Tech will collect a four-point composite soil sample from the floor and each directionally facing sidewall of each test pit for confirmation that all of the PAH-impacted soil has been removed. The confirmation samples will be collected from native soils at 0 to 6 inches into the subsurface of walls and floors at a rate of one four-point composite from each exposed sidewall and exposed excavation floor. Initial confirmation samples will be collected and analyzed for PAHs in accordance with the Standard Operating Procedures (SOPs) specified in Worksheet #14 of the approved SAP. Quality Control (QC) samples will also be collected and analyzed for PAHs in accordance with the SOPs specified in Worksheet #14. Laboratory analytical services will be provided by the same laboratory used during the SI investigation, Empirical Laboratories of Nashville, TN.

Additional excavation may be performed at each test pit, if the initial confirmation samples indicate concentrations of PAHs in the floor or sidewalls remain that exceed the BaP background concentration (0.565 mg/kg). If additional excavation of a sidewall is required, the sidewall containing the impacted soil will be horizontally over-excavated five feet. If additional excavation of the floor of the excavation is required, the entire floor will be excavated downward one additional foot. Following over-excavation, additional confirmation samples will be collected from native soils at 0 to 6 inches into the subsurface of walls and floors at a rate of one four-point composite from each exposed sidewall and excavation floor. Additional confirmation samples will be collected by Tetra Tech and analyzed for PAHs in accordance with the SOPs specified in Worksheet #14 of the approved SAP. The sequence of excavation/sampling/analysis will repeat as necessary until confirmation samples demonstrate that all exceedances of the BaP background concentration in soil at each test pit location have been removed.

Tetra Tech will request 72-hour analysis by the fixed-base laboratory for all confirmation samples collected to minimize excavation equipment and field personnel downtime while samples are analyzed. The turnaround time for fixed-base laboratory sample results may take up to five calendar days, depending on when the samples are shipped from the field and received by the fixed-base laboratory (e.g., samples shipped on a Wednesday and delivered on a Thursday, should have results available by close of business on the following Tuesday).

4.0 IDW MANAGEMENT AND SITE RESTORATION

Based upon an initial excavation area at each test pit of 10 feet x 10 feet x 1 foot deep, approximately 8 to 10 total cubic yards (CY) of excavated soil should be generated. Following completion of the soil removal and confirmation sampling activities, all excavated soil will be maintained on-site by Tetra Tech's subcontractor and staged to meet applicable NSA Mid-South and TDEC criteria for stormwater run-off protection (e.g., contained in covered roll-off bins, bermed and covered if stockpiled, etc.). Tetra Tech will assist their subcontractor in identifying an appropriate landfill for final disposition of the soil, as well as characterizing the soil, per the identified landfill's acceptance criteria. Any characterization samples required by the landfill for disposal will be collected and analyzed per the landfill's requirements in accordance with the SOPs specified in Worksheet #14.

All excavated soil and any equipment decontamination fluids will be containerized in accordance with the SAP and staged at a location identified by NSA Mid-South until disposal at appropriate off-site facilities. Upon receipt of the IDW characterization results, Tetra Tech will provide the analytical results to the selected subcontractor, for completion of waste profiling documentation for disposal. Completed waste

manifests and bills of lading will be provided to NSA Mid-South to review and sign prior to transportation to the disposal facility.

All test pit excavations will be backfilled to pre-construction grades in accordance with NSA Mid-South guidelines. The excavation subcontractor will be responsible for providing backfill material meeting the following criteria:

- Backfill material will have properties similar to the native HSSR#1 soil.
- Backfill material will come from a source where due diligence shows no evidence of a release of a regulated substance has occurred (i.e., "clean" fill).
- Certification will be provided by the subcontractor regarding the origin of the clean fill, including a statement that, to the best of the provider's knowledge, the backfill soil has not been contaminated through the release of regulated substances.

5.0 TEST PIT TECHNICAL MEMORANDUM REPORT

Tetra Tech will prepare a technical memorandum summarizing all work conducted during the test pit excavations, including at a minimum, the following information:

- Field documentation generated during sampling events, including subcontractor generated information (e.g., daily site condition reports, weight tickets, disposal manifests, etc.).
- Validated analytical results.
- Figures showing sampling locations and final extents of excavation.
- Comparison of analytical results to background BaP criteria.
- Recommendations and conclusions based upon the test pit sampling activities.

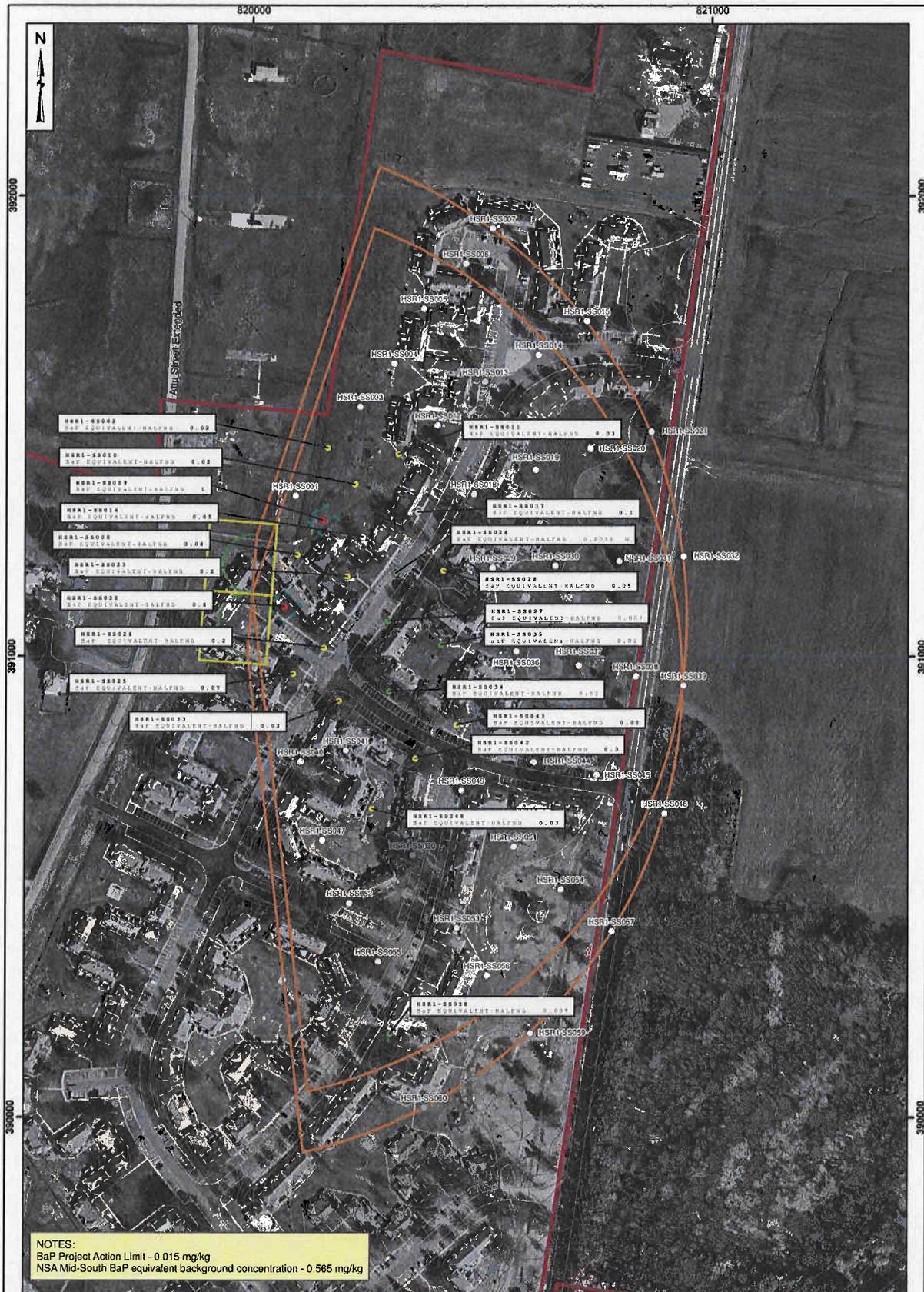
REFERENCES

Malcolm Pirnie, Inc., 2005. Final Preliminary Assessment, Naval Support Activity Mid-South, Tennessee.

Tetra Tech, Inc. (Tetra Tech), 2009. Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Small Arms Range Site Inspections, Naval Support Activity Mid-South, Millington, Tennessee.

Tetra Tech, 2010a. Site Investigation Report for Munitions Response Program Site Inspections at NAVFAC Midwest and BRAC Program Management Office Southeast Munitions Response Sites and Areas of Concern, Naval Support Activity Mid-South, Millington, TN.

Tetra Tech, 2010b. Health and Safety Plan for Small Arms Range Site Inspection at Naval Support Activity Mid-South, Millington, Tennessee.



NOTES:
 BaP Project Action Limit - 0.015 mg/kg
 NSA Mid-South BaP equivalent background concentration - 0.565 mg/kg



Legend

- BaP > 0.565 mg/kg
- BaP > 0.015 mg/kg and < 0.565 mg/kg
- BaP < 0.015 mg/kg
- Not Analyzed
- Composite Sampling Area
- Horse Stable Skeet Range #1

- ▭ Firing Line
- ▭ Road
- ▭ Demolished Structure
- ▭ Proposed Limits of Excavation
- ▭ Installation Boundary
- ▭ Contour (1-ft interval)



Figure 1 - Proposed Test Pit Excavation Areas
Benzo(a)pyrene (BaP) Equivalent Results
Horse Stables Skeet Range #1 (UXO 3)
NSA Mid-South
Millington, Tennessee

Drawn By: K. MOORE 4/20/10
 Checked By: G. POPE 1/31/11
 Revised By: K. MOORE 8/26/10
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