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FINAL TECHNICAL MEMORANDUM WORK PLAN FOR PRE-EXCAVATION SAMPLING FOR
LEAD AND MERCURY SITE 8 NSWC INDIAN HEAD MD
3/1/2008
CH2MHILL

Final Technical Memorandum

Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8

Naval Support Facility, Indian Head
Indian Head, Maryland



Prepared for

Department of the Navy
Naval Facilities Engineering Command
Washington

Contract No. N62470-02-D-3052
CTO-0050

March 2008

Prepared by

CH2MHILL



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March 11, 2008

314070.PP.FP

Commander
NAVFAC Washington
Mr. Joe Rail
Washington Navy Yard, Bldg. 212
1314 Harwood St., SE
Washington Navy Yard, DC 20374-5018

Subject: Navy CLEAN III Program
Contract N62470-02-D-3052
Contract Task Order 0094
Final Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8
Naval Support Facility, Indian Head, Indian Head, Maryland

Dear Joe:

CH2M HILL is pleased to submit one PDF CD and two hard copies of the subject document. Copies of the document have also been distributed as shown below.

If you have any questions regarding this deliverable, please call me at (703) 376-5154.

Sincerely,

CH2M HILL

Chris English, P.E.
Activity Manager

cc: Jeff Bossart/NSF-IH (2 hard copies, 2 CDs)
Curtis DeTore/MDE (1 hard copy, 1 CD)
Dennis Orenshaw/EPA (1 hard copy, 1 CD)
Kim Turnbull/TTNUS (1 CD)
CH2M HILL (4 hard copies, 1 CD)



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March 11, 2008

Subject: Final Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8
Naval Support Facility, Indian Head, Indian Head, MD

Dear RAB Member:

On behalf of the Navy, we are forwarding the Final Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8, Naval Support Facility, Indian Head (NSF-IH), Indian Head, Maryland of March 2008 for your review and comment. Please direct all correspondence that you may have concerning the Installation Restoration Program at NSF-IH to:

Attn: Joe Rail
Washington Navy Yard, Bldg. 212
1314 Harwood St. SE
Washington D.C. 20374-5018

Please provide your comments to Mr. Joe Rail by April 11, 2008. You may mail your comments to the address above, or fax them to Mr. Rail at (202) 433-6193 or e-mail them to joseph.rail@navy.mil.

Sincerely,

CH2M HILL

Margaret Kasim

Margaret Kasim, Ph.D.
Activity Manager

Cc: RAB Members

Mr. Elmer Biles (1 hard copy; 1 pdf CD)

Mr. Vincent Hungerford (1 pdf CD)

Mr. Wayne McBain (1 pdf CD)

Ms. Faye Reed/Environmental Health, Charles County Health Department (1 pdf CD)

Ms. Karen Wigger/ Planning & Growth Management, Charles County Government (1 pdf CD)

Mr. Devin Ray/ U.S. Fish & Wildlife Service (1 pdf CD)

Mr. Jeff Bossart/NSF-IH

Mr. Joe Rail/NAVFAC Washington

Mr. Curtis DeTore/MDE

Mr. Dennis Orenshaw/EPA

Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8, NSF-IH, Indian Head, Maryland

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DATE: March 10, 2008

Introduction

The Navy is considering a removal action for Site 8, Mercury Contamination at Building 766. Site 8 is located at the Naval Support Facility, Indian Head (NSF-IH) in Indian Head, Maryland. This work plan presents the proposed approach to delineate lead and mercury in sediment in the lower section of the stream downgradient of Site 8.

This memorandum supplements and references the following documents:

- CH2M HILL, 2004. *Site Screening Process Investigation Work Plan for Sites 19, 26, 27, Wetland Area Adjacent to Site 45, and Stump Neck SWMUs 14 and 30, Naval District Washington, Indian Head, Indian Head, Maryland* (hereinafter referred to as SSP Investigation Master Plan).
- CH2M HILL, 2005. *Work Plan for Additional Investigation at Sites 8 and 56, NDWIH, Indian Head, Maryland* (hereinafter referred to as Sites 8 and 56 Work Plan).
- CH2M HILL, 2006. *Final: Additional Investigation Results for Sites 8 and 56 at Naval Support Facility, Indian Head.*
- Tetra Tech NUS Inc., 2004. *Master Plans for Installation Restoration Program Environmental Investigations, Naval District Washington, Indian Head, Indian Head, Maryland* (herein referred to as Master Plans).

Rationale for Field Investigation

A synopsis of historical uses, previous environmental investigation results, and removal actions at Site 8 is contained in *Final Desktop Evaluation for Site 8 - Mercury Contamination at Building 766, and Site 56 - Lead Contamination at Industrial Wastewater Outfall 87, Naval District*

Washington Indian Head (CH2M HILL, 2006). To reduce duplication of information, this material will not be presented in this technical memorandum.

In September 2005, CH2M HILL conducted an additional investigation for lead and mercury contamination within the middle and lower stream sections associated with Sites 8 and 56 (CH2M HILL, 2006). These results were compared to historical values from previous investigations. Fish tissue samples from 2005 were compared to previous biomonitoring results. Most of the data showed a decreasing trend in fish bioaccumulation. Pond sediment concentrations in 2005 were comparable to previous concentrations. Stream sediment concentrations of mercury were statistically higher in 2005 than previous concentrations. The initial ecological risk screening suggested that lead and mercury in sediment of the lower stream and the upper part of the pond may pose an unacceptable risk to ecological receptors. The results of this investigation were presented to the Indian Head Installation Restoration Team (IHIRT) at the March 2006 partnering meeting. The U.S. Environmental Protection Agency (EPA)'s Biological Technical Assistance Group (BTAG) representative suggested that sediment removal should be considered for the lower stretch of the stream, from IW-87 to the mouth of the stream, given the high mercury concentrations. CH2M HILL presented several options as a path forward for this site to the IHIRT.

This site was further discussed during the December 2006 and May 2007 partnering meetings. The discussions are presented in the *Indian Head Installation Restoration Team (IHIRT) Final Meeting Minutes: December 2006 and May 2007*. Information taken from these meeting minutes is summarized below.

December 13, 2006: EPA suggested that a removal action would be the next step at this site, documented by an engineering evaluation/cost analysis. The Team (consisting of the Navy, EPA, and the Maryland Department of the Environment) agreed to open the valve on the weir, drain the water from the upper pond, propose a removal action for the lower area of the stream, and then completely remove the weir. It was recommended that pre-excavation sampling be conducted to determine the extent of the removal action.

May 24, 2007 meeting: The Team was informed that the valve on the downstream pond's weir has been opened, and water is slowly draining out of the pond. It is unclear what the new footprint of the pond will be after the water level has reached equilibrium conditions. CH2M HILL recommended that a pre-removal characterization be conducted in the stream from IW-87 to the upper part of the pond to delineate the lateral and vertical extents of mercury in sediment for the proposed removal action. The Team agreed that the study boundary should not include areas currently inundated with water. The investigation will focus on areas of elevated mercury concentrations to enable the Team to make an informed decision on the proposed sediment removal action. The sampling approach was presented for discussion.

Preliminary risk evaluations show that mercury concentrations above the screening value of 0.18 mg/kg do not currently pose an unacceptable risk to upper-trophic-level organisms. Because the Team has not identified a range of acceptable mercury concentrations, it was decided that a cost-benefit analysis of the potential excavation and cleanup areas be performed.

This work plan is the result of the discussions that took place during the March 2006, December 2006, and July 2007 meetings and during a conference call that was held on May 29, 2007. It documents the scope of work to complete the tasks in support of the objective outlined below.

Objective

The objective of this investigation is to delineate the horizontal and vertical extents of lead and mercury in sediment in the lower section of the stream, specifically from IW-87 to the upper part of the pond. The analytical results will be used to perform a cost-benefit analysis. The IHIRT will use the data and cost-benefit analysis results to select an appropriate cleanup goal and excavation footprint and depth at Site 8, thereby eliminating the need for post-excavation sampling.

Scope of Work

Field activities to be conducted include the following:

- Mobilization/demobilization
- Sediment sampling
- Sampling frequency, quality assurance/quality control (QA/QC) samples, and sample handling
- Survey of sample locations
- Decontamination of sampling equipment
- Investigation-derived waste (IDW) handling

Mobilization/Demobilization

Mobilization will be coordinated with the Navy and will include staking out sample locations and orienting field personnel with the site. Prior to mobilization, CH2M HILL field personnel will review this work plan. The Navy will verify the accessibility of the investigation area (accessibility may be an issue because of nearby explosives operations and magazines). Demobilization will consist of following proper decontamination procedures for all personnel and equipment and making sure that the site is left in its original condition prior to mobilization.

Sediment Sampling

Ten transects (IS08SD09 through IS08SD18), from IW-87 to the upper part of the pond, are proposed to delineate the lateral and vertical extents of lead and mercury (Figure 1). The length of each transect is based on its intersection with the 1-foot contour interval; therefore, they are not of equal length. It is assumed that flooding and resultant sediment deposition did not occur frequently above this elevation. Five samples will be collected along each transect for lateral delineation. Along each transect, one sample will be collected from the centerline and two samples will be collected laterally on each side of the stream centerline. There are rivulets throughout the area as the water meanders towards the pond; thus, if a clear centerline does not exist due to the rivulets, then a sample will be collected in at least

one of the rivulets. The extreme outermost lateral sample locations will end at the 1-foot contour line from the stream centerline. To vertically delineate lead and mercury at each sample location, a sample will be collected from three depth intervals: 0 to 6 inches, 18 to 24 inches, and 24 to 30 inches below ground surface.

A total of 150 samples will be collected. The medium is assumed to be sediment; however, medium that is dry and does not meet the definition of sediment (i.e., unconsolidated geologic materials that are saturated with sufficient frequency and duration to sustain aquatic ecological communities) will be labeled soil. Samples will be identified and labeled accordingly, upon observation of site conditions when the samples are collected.

In areas with standing water, sediment samples will be collected using a hand core sampler with pre-cleaned liner tubes and core catchers, if necessary. This methodology will ensure minimal loss of fine material from the upper sediment during sediment collection. The core liner will be inserted into the sediment to a depth of at least 30 inches and will be capped after insertion to prevent loss of the sample upon retrieval. After retrieval, the core will be extruded with a wooden dowel from the bottom end into a stainless steel mixing bowl and homogenized. The samples will then be transferred to the sampling container, which will then be placed in a cooler with ice and stored at 4 degrees Celsius for shipment to an offsite laboratory. For samples that are defined as soil, a hand auger will be used to collect the samples. The procedures for homogenization and sample transfer into container will be the same as for sediment samples.

Figure 1 shows transect and sample locations. The samples will be analyzed for lead, mercury, and total organic carbon. The 0- to 6-inch depth interval sample from all transects (for a total of 10 samples) will also be analyzed for methyl mercury. All samples will be analyzed on a standard 28-day turnaround time.

The appropriate number of field QA/QC samples, including field blanks, equipment blanks, and duplicates, will be analyzed in addition to laboratory QA/QC samples, including matrix spike/matrix spike duplicate samples. These samples are discussed further below.

Sampling Frequency, QA/QC Samples, and Sample Handling

Table 1 presents the sample media, number of samples, analyses, and procedure for sample collection. Table 2 presents the analytical procedures and the frequency at which field QA/QC samples will be collected. Tables 3 and 4 list the sample containers, preservatives, and holding times required for the intended analyses for solid and aqueous samples, respectively. Samples will be labeled, handled, documented, packaged, and shipped as detailed in the Master Plans.

Survey of Sample Locations

The horizontal locations (northing and easting coordinates) of the sediment samples will be surveyed with a portable global positioning system (GPS) unit. The horizontal locations will be referenced to the 1983 North American datum.

Decontamination of Sampling Equipment

All non-dedicated sampling equipment will be decontaminated prior to sampling activities and after each use. Decontamination procedures are presented in the standard operating procedures provided in the Master Work Plan.

Investigation-Derived Waste Handling

All handling and disposal of IDW will be performed in accordance with the Master Plans. A minimal amount of IDW, consisting entirely of decontamination fluids, will be generated during this sampling program. Decontamination fluids will be stored in 5-gallon buckets for sampling and disposal. It is assumed that soil remaining after sampling will be put back into the hole from which it was removed. All personal protective equipment used during sampling will be disposed of in the facility dumpsters.

Documentation

All sampling and field information will be documented in a field log book.

Data Evaluation and Reporting

Following laboratory analyses of the samples, a third-party data validator will validate the sediment data. The data will be used to perform a risk screening and cost benefit analysis for various cleanup levels. Field activities conducted, analytical results, interpretation, cost analysis, and recommendations for management decisions will be presented in a technical memorandum and submitted to the IHIRT.

Standard Operating Procedures

Fieldwork will follow the standard operating procedures provided in the Master Work Plan and will be consistent with procedures described in the SSP Investigation Work Plan, and Sites 8 and 56 Work Plan.

Health and Safety

Health and safety procedures will follow those described in the Master Plans, the CH2M HILL Master Health and Safety Plan for NSF-IH, and a site-specific health and safety plan.

Schedule

This work is planned for fall / winter 2008.

TABLE 1
 Sampling and Analysis Summary
Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8
NSF-IH, Indian Head, Maryland

Media	Number of Samples	Analysis	Procedures
Surface Soil/ Sediment	50	Mercury, Lead, TOC, Methyl Mercury	Hand auger/core sampler
Subsurface Soil/Sediment	100	Mercury, Lead, TOC	Hand auger/core sampler

Notes:
 TOC = Total organic carbon

TABLE 2

Summary of Samples to be Submitted for Analysis
 Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8
 NSF-IH, Indian Head, Maryland

Matrix	Laboratory Parameter (Method)	Samples	Field Duplicates ¹	Field Blanks ²	Equipment Blanks ³	Trip Blanks	Solids Total ⁵	Aqueous Total	MS/MSDs ⁴
Surface Soil/ Sediment	Lead and Mercury by EPA CLP ILM04	50	5	1	5		55	6	3/3
	TOC by Lloyd Kahn	50	5				55	0	3/3
	Methyl Mercury by SW- 846 1630	50	5	1	5		55	6	3/3
Subsurface Soil/Sediment	Lead and Mercury by EPA CLP ILM04	100	10				110	0	5/5
	TOC by Lloyd Kahn	100	10				110	0	5/5

Notes:

- ¹ Field duplicates are collected at a rate of 1 per 10 samples per matrix.
- ² Field Blanks are collected at a rate of 1 per sampling event per week.
- ³ Equipment Blanks are collected at a rate of 1 per day where equipment is decontaminated (i.e., if dedicated disposable equipment is not used).
- ⁴ Matrix Spikes/Matrix Spike Duplicates (MS/MSDs) are collected at a frequency of 1 per 20 per matrix. MS/MSDs represent samples for which extra volume must be collected for the laboratory to perform required QC analyses. Triple the normal volumes will be collected for all analyses.
- ⁵ Solids total consists of the samples and their field duplicates.

TOC = Total Organic Carbon
 CLP = Contract Laboratory Program

SW846 = Test Methods for Evaluating Solid Waste

TABLE 3

Summary of Required Containers, Preservatives, and Holding Times for Solid Samples
*Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8
NSF-IH, Indian Head, Maryland*

Parameter	Container Type	Preservation	Holding Time	Notes
Lead and Mercury	One 8-oz jar	Cool to 4°C	6 months (28 days for mercury)	Share one 8-oz jar
TOC	One 8-oz jar	Cool to 4°C	14 days	
Methyl Mercury	One 4-oz jar	Cool to 4°C	28 days	

Notes:

TOC = Total organic carbon

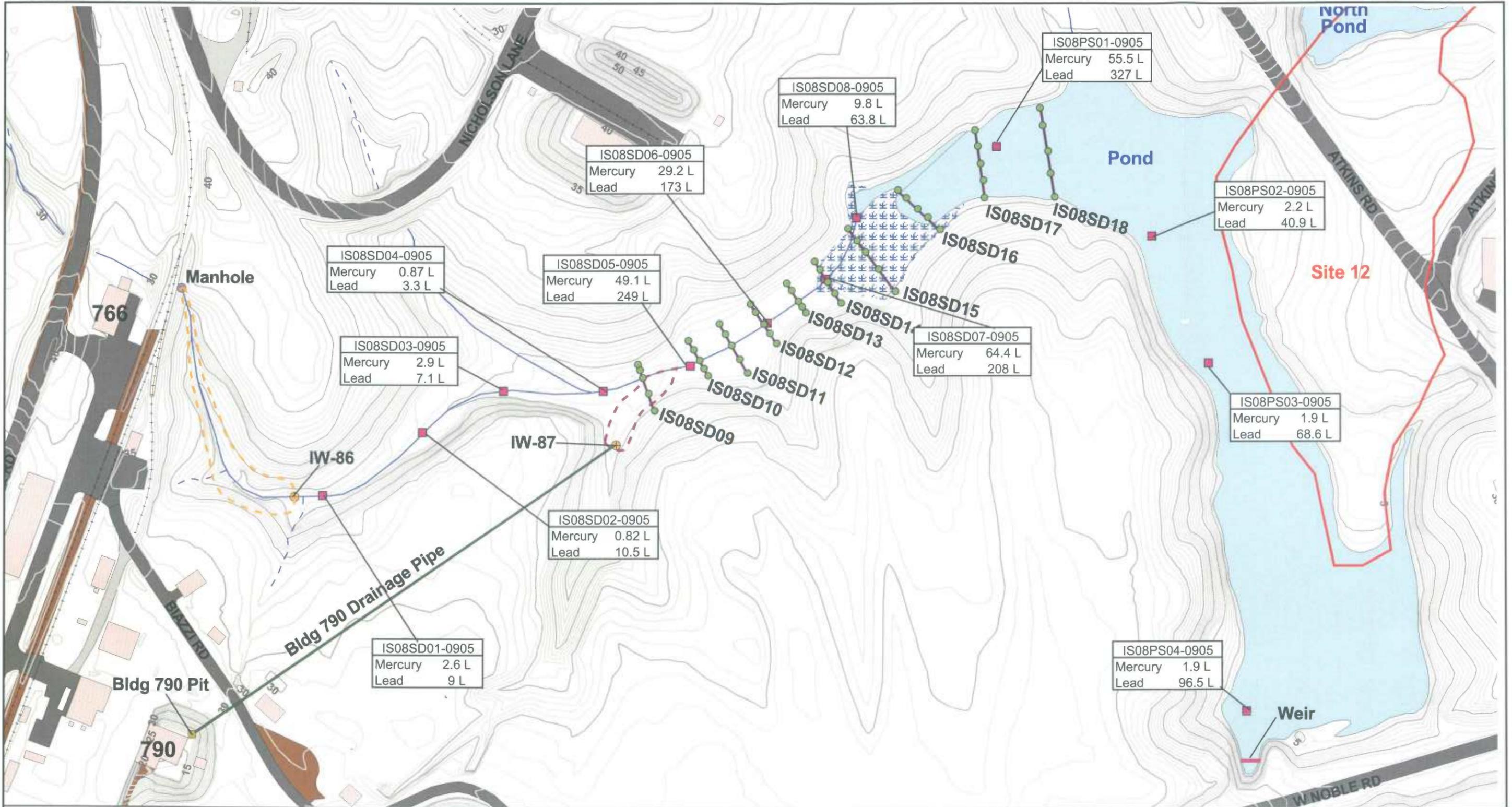
TABLE 4

Summary of Required Containers, Preservatives, and Holding Times for Liquid Samples
*Work Plan for Pre-Excavation Sampling for Lead and Mercury at Site 8
NSF-IH, Indian Head, Maryland*

Parameter	Container Type	Preservation	Holding Time	Notes
Lead and Mercury	One 250-mL HDPE	HNO ₃ to pH<2; cool to <4°C	6 months (28 days for Mercury)	
TOC	One 250-mL HDPE	HCl or H ₂ SO ₄ to pH<2 and cool to <4°C	14 days to analysis	
Methyl Mercury	One 250-mL HDPE	HCl to pH<2 and cool to <4°C	28 days to analysis	Minimize headspace

Note:

HDPE= high-density polyethylene



- LEGEND**
- Sediment Sample Location
 - Proposed Transect and Sample Locations
 - Approximate Extent 1994 Removal Action at Site 8
 - Approximate Extent 1996 Removal Action at Site 56
 - Building 790 Drainage Pipe
 - Perennial Swale
 - Intermittent Swale
 - Elevation Contours (1ft Interval)
 - Railroads
 - Marsh
 - Buildings
 - Asphalt Road
 - Dirt Road
 - Gravel Road

All results in mg/kg (milligrams per kilogram)
 ND - Non Detect
 K(m) - Positive result is estimated and biased high due to high matrix spike recovery
 J - Analyte was positively identified but the quantitation is an estimate

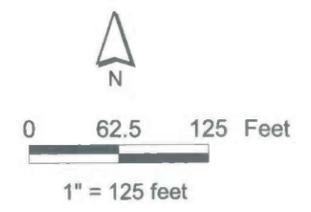


Figure 1
 Proposed Transect and Sample Locations
 Work Plan for Pre-Excavation Sampling for
 Lead and Mercury at Site 8
 NSF-IH, Indian Head, Maryland