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Final
**Supplemental
Remedial Investigation Work Plan
for Area of Concern (AOC) E**

**The Former U.S. Naval Ammunition
Support Detachment (NASD)
Vieques Island, Puerto Rico**



Prepared for
**Department of the Navy
Atlantic Division
Naval Facilities Engineering Command**

Contract No. N62470-02-D-3052
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CH2MHILL

Resumen Ejecutivo

Los resultados de la Investigación de Remediación (RI por sus siglas en inglés), y muestreos anteriores conducidos en el área de preocupación E (AOC E por sus siglas en inglés), identificaron excedentes en las metas remediadoras preliminares (PRGs por sus siglas en inglés), Criterios de Evaluación Ecológicos de la Investigación, Niveles de Evaluación de Suelos, (también conocidos como Criterios de Evaluación de “leachability”), y concentraciones de trasfondo de varios componentes en suelos y aguas subterráneas en las áreas de preocupación E. Este suplemento al borrador final del Plan de Trabajo de la Investigación de Remediación provee la razón fundamental y enfoque técnico para obtener datos adicionales del suelos y aguas subterráneas con el propósito de estudiar más a fondo la extensión de contaminación en el suelo y aguas subterráneas, basado en los resultados analíticos obtenidos de investigaciones de remediación previas y actividades de muestreos anteriores. Específicamente, se recogerán información adicional del suelo para refinar aun más el conocimiento sobre la extensión de la contaminación alrededor del antiguo tanque de almacenamiento soterrado (UST por sus siglas en inglés), y estructuras asociadas a éste. Muestras de agua subterráneas serán tomadas de pozos de monitoreo ya existentes para detectar la presencia de Hidrocarburo de Petróleo Totales para suplementar la información recolectada de estos pozos durante los eventos de muestreo llevados a cabo en agosto/septiembre del 2004.

Note: This summary is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the text is the official version.

Nota: Este resumen se presenta en inglés y en español para la conveniencia del lector. Se han hecho todos los esfuerzos para que la traducción sea precisa en lo más razonablemente posible. Sin embargo, los lectores deben estar al tanto que el texto en inglés es la versión oficial.

Executive Summary

Results from the Remedial Investigation (RI) and previous sampling events conducted at Area of Concern E (AOC E) identified exceedances of Preliminary Remedial Goals (PRGs), Ecological screening criteria, soil screening levels (SSLs) (also referred to as leachability screening criteria), and background concentrations of various constituents in AOC E soils and groundwater. This Final Supplemental RI Work Plan provides the rationale and technical approach for additional soil and groundwater data to be collected to further characterize the extent of soil and groundwater contamination, based on the analytical results obtained from previous RI and earlier sampling activities. Specifically, additional soil data will be collected to further refine the understanding of the extent of contamination around the former underground storage tank (UST) and associated structures.

Additionally, groundwater samples will be collected from the existing monitoring wells for Total Petroleum Hydrocarbons to supplement the data collected from these wells during the August/September 2004 sampling event.

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A Preliminary Response to Preliminary Comments on Draft Sampling and Analysis Plan for Additional Sampling at AOC E, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico (CH2M HILL, March 1, 2005)	
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- B Final Meeting Minutes - Vieques Technical Subcommittee Meeting, March 7 - 8, 2005 (CH2M HILL, March 21, 2005)
- C Final Meeting Minutes - Vieques Technical Subcommittee Meeting, June 21 - 22, 2005 (CH2M HILL, August 23, 2005)
- D Final Meeting Minutes - Vieques Technical Subcommittee Meeting, October 11, 2005 (CH2M HILL, October 16, 2005)

List of Acronyms

AOC	Area of Concern
AST	aboveground storage tank
bls	below land surface
CSM	conceptual site model
DRO	diesel range organics
FID	flame ionization detector
GRO	gasoline range organics
NASD	Naval Ammunition Support Detachment
PCB	polychlorinated biphenyl
PREQB	Puerto Rico Environmental Quality Board
PRG	Preliminary Remedial Goal
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance and quality control
RI/FS	Remedial Investigation/Feasibility Study
SSL	soil screening level
SVOC	Semi-volatile organic compound
TCL/TAL	target compound list/target analyte list
TDS	total dissolved solids
TOC	total organic carbon
TPH	total petroleum hydrocarbon
TPH-ORO	Total Petroleum Hydrocarbons - Oil Range Organics
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

SECTION 1

Background and Technical Approach for the Supplemental Remedial Investigation at AOC E

Area of Concern (AOC) E is the former location of a 550-gallon fiberglass, single-wall, used oil UST with associated single-wall steel pipes. The UST was installed in 1970 during construction of the main operational area to store used oil generated from vehicle maintenance activities that took place in Building 2016 of the former Naval Ammunition Support Detachment (NASD) on west Vieques. The UST was removed in 1996 and was replaced with a 500-gallon aboveground storage tank (AST) (CH2M HILL, February 2004).

A Remedial Investigation (RI) was conducted at AOC E on west Vieques from April through June 2002 in general accordance with the *Final Remedial Investigation/Feasibility Study Work Plan for Area of Concern E at the Former U.S. Naval Ammunition Support Detachment, Vieques Island, Puerto Rico* (CH2M HILL, May 2002). The *Draft Remedial Investigation Feasibility Study Report, Area of Concern (AOC) E, Former Naval Ammunition Support Detachment, Vieques Island, Puerto Rico* (CH2M HILL, February 2004) was produced that summarized and evaluated the data collected during the RI. Based on the RI/FS Report findings, the *Draft Sampling and Analysis Plan for Additional Sampling at AOC E, Former Naval Ammunition Support Detachment, Vieques Island, Puerto Rico* (CH2M HILL, August 2004) was prepared for collection of additional soil and groundwater data to further refine the understanding of the extent of soil and groundwater contamination. Preliminary regulatory agency comments were addressed in a memorandum shown in Attachment A entitled *Preliminary Response to Preliminary Comments on Draft Sampling and Analysis Plan for Additional Sampling at AOC E, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico* (CH2M HILL, March 1, 2005).

A Technical Subcommittee Meeting, attended by representatives of the United States Environmental Protection Agency (USEPA) Region II, the Puerto Rico Environmental Quality Board (PREQB), and the Navy, was held on March 7, 2005. During the meeting, various topics regarding the response to comments were discussed, as well as the technical approach for the Supplemental RI. These discussions, as well as consensus reached, are documented and shown in Attachment B entitled *Final Meeting Minutes – Vieques Technical Subcommittee Meeting, March 7 – 8, 2005* (CH2M HILL, March 21, 2005).

This Supplemental RI Work Plan has been prepared in accordance with the Preliminary Response to Preliminary Comments (CH2M HILL, March 1, 2005), the Final Meeting Minutes (CH2M HILL, March 21, 2005), and the shown in Attachment C *Final Meeting Minutes – Vieques Technical Subcommittee Meeting, June 21 – 22, 2005* (CH2M HILL, August 23, 2005), the latter of which documents the Navy's approach for total petroleum hydrocarbon (TPH) evaluation at Vieques sites.

The *Final Meeting Minutes – Vieques Technical Subcommittee Meeting, October 11, 2005* (CH2M HILL, October 16, 2005) are included as Attachment D. This meeting discussed the parameters to be collected during groundwater sampling at AOC E, which included a full

TPH suite consisting of TPH gasoline range organics (GRO)/diesel range organics (DRO)/oil range organics (ORO), and additionally total dissolved solids (TDS).

The following subsections describe the technical approach for the supplemental field investigation to be accomplished at AOC E. Applicable procedures in the Final Remedial Investigation/Feasibility Study (RI/FS) Work Plan for AOC E (CH2M HILL, May 2002) will be followed unless otherwise defined in this Supplemental RI Work Plan.

1.1 AOC E Supplemental RI Field Investigation

Additional soil and groundwater sampling is proposed for AOC E.

1.1.1 Surface Soil Sampling

A total of seven new locations will be sampled for surface soil. Four from soil boring locations (SB-13 through SB-16) and three from surface soil only locations (SS-01 through SS-03). Table 1 presents the sampling proposed for these seven surface soil samples. Table 2 presents the methods to be used, and Figure 1 presents the proposed surface and subsurface soil sample locations. Quality assurance and quality control (QA/QC) samples will also be collected in accordance with the Quality Assurance Project Plan (QAPP) included in the Master Work Plan (CH2M HILL, 2001). All seven surface soil samples will be analyzed for target compound list/target analyte list (TCL/TAL) analytes, comprising volatile organic compounds (VOCs), semivolatiles organic compounds (SVOCs), metals including thallium, pesticides and polychlorinated biphenyls (PCBs). Additionally, surface soil samples will be analyzed for TPH diesel range organics (DRO)/gasoline range organics (GRO)/oil range organics (ORO), and total organic carbon (TOC). The surface soil samples will be obtained from 0 to 24 inches. VOC samples will be collected immediately from this soil by inserting the Encore sample syringe at the interval exhibiting the highest flame ionization detector (FID) readings or, in the absence of elevated FID readings, the 12 to 18-inch interval will be sampled. Once the VOC sample is removed, the rest of the soil will be homogenized and collected for other analytical parameters accordingly. Section 2 of the Master Field Sampling Plan within the Master Work Plan for the Former NASD (CH2M HILL, January 2001) presents details regarding the required containers, preservatives, and holding times for soil samples.

1.1.2 Subsurface Soil Sampling

Figure 1 presents the sampling locations for the newly proposed soil borings, along with the existing soil boring locations. At each of the four new soil boring locations, continuous soil sampling will occur (using a 2-foot split spoon sampler or comparable method) to the water table to collect surface (0 to 24 inches) and subsurface soil samples. On the day of sampling, water levels will be measured in existing monitoring wells to develop an understanding of the approximate terminal depth of the soil borings (i.e., the water table). Split spoon soil samples will be screened in the field visually and with a flame ionization detector (FID) or comparable monitor. FID screening will be done by opening the split spoon sampler, inserting the FID probe at various locations along the soil core to get direct readings, and recording the readings on the soil boring logs. If contaminated soil is suspected (either by visual observation or FID readings substantially higher than background), a sample will be

collected directly from the split spoon sampler and submitted for VOCs, SVOCs, TPH GRO/DRO/ORO, inorganics plus thallium, pesticides, PCBs, and TOC using methods consistent with those listed in Section 1.1.1. Readings deemed elevated (i.e., substantially above background) will be based on professional judgment and will be influenced by such factors as physical characteristics of the soil and adjacent FID readings. However, because one of the objectives of the RI is to adequately assess the nature and extent of contamination in site media, soil samples will be collected for analysis if there is a reasonable suspicion of potential contamination.

Based on the screening process above, all soil borings will have a subsurface soil sample collected from a 2-foot interval within the 2 to 6-foot depth in order to provide data for the risk assessment. Further, continuous soil samples collected to the water table will be screened as above for the presence of potential contamination. If contamination is suspected, additional subsurface soil samples will be collected from the sample depth containing the highest FID reading and at a depth deeper than the highest FID reading, but within the suspected area of contamination, to ensure the soil column average concentrations are represented for leachability evaluations.

TABLE 1
 Additional Sampling and Analysis
 Former NASD, Vieques, Puerto Rico

Parameter	Surface Soil Samples	Subsurface Soil samples*	MW-01 - Free Product	MW-01 - Dissolved	MW-05 - Free Product	MW-05 - Dissolved	MW-02	MW-03	MW-04	MW-06	MW-07	MW-08
Pesticides	7	12	1	1	1	1	NA	NA	1	1	NA	NA
PCBs	7	12	1	1	1	1	NA	NA	1	NA	NA	NA
SVOCs	7	12	1	1	1	1	1	1	1	1	1	1
VOCs**	7	12	1	1	1	1	1	1	1	1	1	1
Metals and cyanide	7	12	1	1	1	1	1	1	1	1	1	1
TOC	7	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	7	12	1	1	1	1	1	1	1	1	1	1
TPH - as DRO, GRO, and ORO fractions	7	12	1	1	1	1	1	1	1	NA	1	NA
TPH Fractionation	NA	NA	1	NA	1	NA	NA	NA	NA	NA	NA	NA

Note: * - Three soil boring locations with one, two, or three sample depths at each of the locations

** - VOC list includes MTBE

TPH – ORO analysis in groundwater will be run on all monitoring wells except those containing free product,

TABLE 2
Soil Sample Parameters, Methods, and Quantities for AOC E
Former NASD, Vieques, Puerto Rico

Parameter	Method	No. of Samples	Trip Blanks	Equipment Blanks	Field Blanks	Field Duplicates	Matrix Spike/Duplicate	Total Number of Samples
Metals/cyanide	ILM05.3	19	-	3	1	2	2	27
Thallium	ILM05.3	19	-	3	1	2	2	27
TPH GRO	SW846 8015M	19	--	3	1	2	2	27
TPH DRO/ORO	SW846 8015M	19	--	3	1	2	2	27
SVOCs	OLM04.3	19	-	3	1	2	2	27
VOCs	OLM04.3	19	1	3	1	2	2	28
TOC	SW846 9060A	19	--	3	1	2	2	27
Pesticides	OLM04.3	19	-	3	1	2	2	27
PCBs	OLM04.3	19	-	3	1	2	2	27

Table 1 indicates the sample quantities for the subsurface soil samples. Table 2 presents the analytical methods to be used during the sampling. Figure 1 shows the locations of the soil borings. The specific approach for the four new soil borings is as follows:

- SB-13 – will be drilled close to the old soil boring SB-09. Continuous split spoon (or comparable) samples will be screened to the water table. One sample will be collected above 6 ft bls and, as applicable, from the highest FID reading location below 6 ft bls and below the highest FID reading location, if possible. Therefore, a minimum of three subsurface samples will be obtained if there is an elevated FID reading. If no elevated FID readings are noted, only the subsurface soil sample above 6 ft bls will be collected.
- SB-14 – will be drilled slightly north-northeast of former SB-01 and the well MW-01 location. In addition to the subsurface soil sample above 6 ft bls, samples will be collected at the highest FID reading location and below the highest FID reading location, if possible. If no elevated FID readings are noted, one additional subsurface soil sample will be collected just above the water table, which will be defined by sounding the existing wells on site the day the soil boring is conducted.
- SB-15 – will be drilled midway between MW-04 and MW-05. The screening and sampling approach will be the same as that for SB-13.
- SB-16 – will be drilled from the area north of the vehicle service platform. The screening and sampling approach will be the same as that for SB-13.

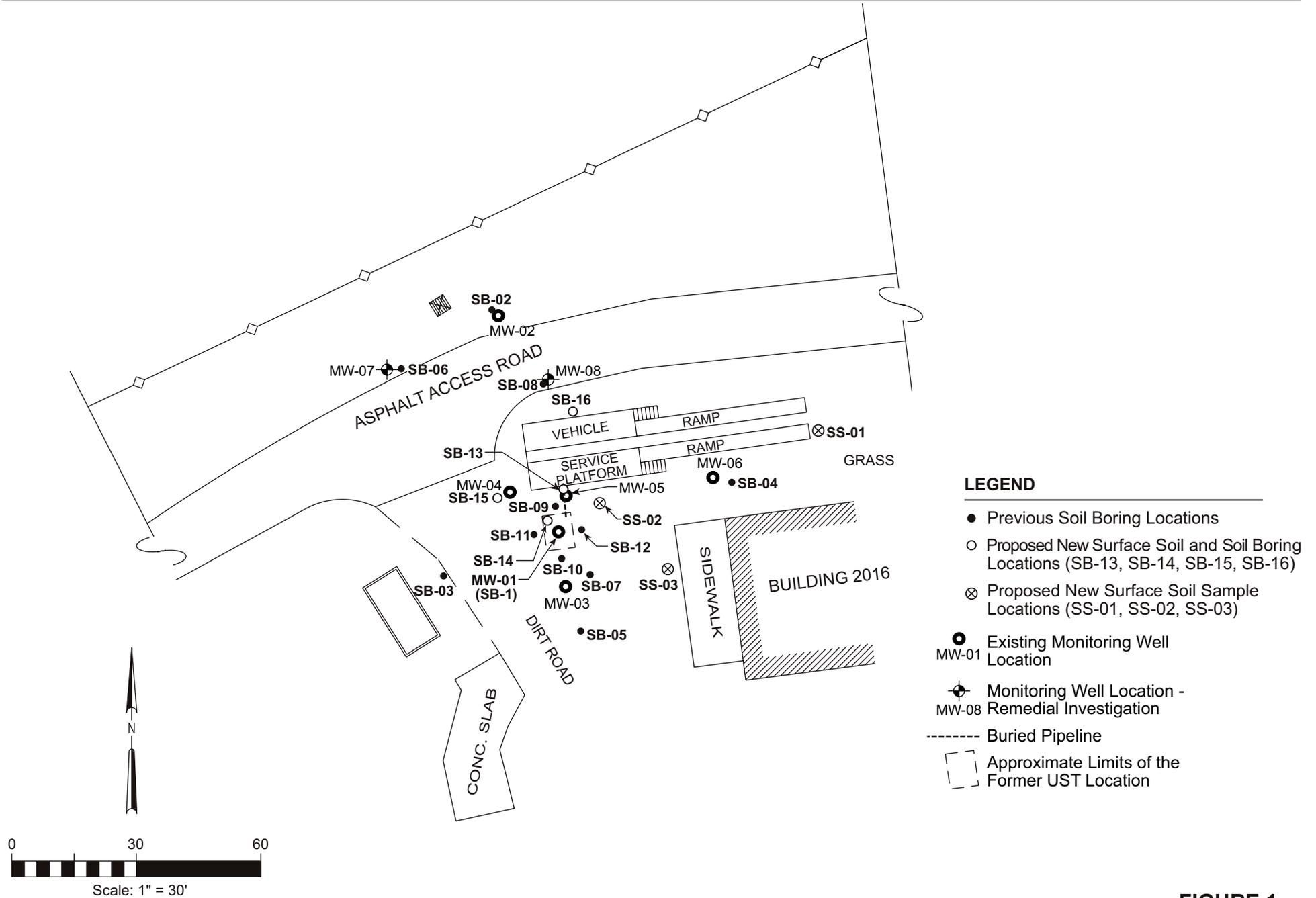


FIGURE 1
 Proposed New Sample Locations for AOC-E
 Former NASD, Vieques, Puerto Rico

As described above, all four borings will be continuously sampled from ground surface to the water table, with multiple subsurface soil samples being collected if contamination is suspected and a single subsurface soil sample collected if contamination is not suspected (except at SB-14, where a minimum of two subsurface soil samples will be collected). Thus, each soil boring will have a minimum of one surface and one subsurface soil sample, but could have up to three subsurface soil samples – one from above 6 ft bls, one from the highest FID reading below 6 ft bls, and one just below the highest FID reading area.

Although each boring will have a minimum of one subsurface soil sample (two for SB-14), Table 1 identifies three subsurface soil samples from each boring (representing the maximum number collected). Sample collection and analysis will be the same as that described in Section 1.1.1.

1.1.3 Groundwater Sampling

The existing eight monitoring wells were sampled for the constituents (except TPH-ORO) shown in Table 3 in August/September 2004. Additional groundwater samples will be collected from all monitoring wells at AOC E except those containing free product, and analyzed for TPH-GRO/DRO/ORO analysis. The remainder of Section 1.1.3 documents the sample collection activities from August/September 2004.

1.1.3.1 Wells MW01 and MW05

Free Product - Wells MW-1 and MW-5 were monitored for free product presence, and thickness of the free product was measured, if present. The free product was sampled for TPH carbon-chain fraction analysis, as well as for the presence of TCL and TAL constituents.

Dissolved Petroleum Contaminants - Two wells (MW01 and MW05) with free product were bailed and purged until free product was no longer present and a sample of the dissolved constituents was collected and analyzed for TPHs by DRO/GRO method, as well as for analysis of TCL and TAL constituents.

1.1.3.2 Wells MW-02, MW-03, MW-04, MW-06, MW-07 and MW-08

Wells MW-02, MW-03, MW-04, MW-06, MW-07, and MW-08 were sampled and analyzed for VOCs, SVOCs, and metals. Wells either within the contaminated area or in the downgradient direction (MW-02, MW-03, MW-04 and MW-07), were also analyzed for TPHs. Additionally, well MW-04 was analyzed for pesticide because of its close proximity to the contaminated area. MW-06 was also included for pesticides analysis because of past presence of low level of dieldrin in this well. Table 3 includes the analytical suite of chemicals for all the wells, and necessary QA/QC samples included as per the QAPP in the Master Work Plan (CH2M HILL, January 2001). Groundwater samples were and will be collected following the EPA Region II low stress (low flow) sampling protocols.

TABLE 3
Groundwater Sample Parameters, Methods, and Quantities for AOC E
Former NASD, Vieques, Puerto Rico

Parameter	Method	No. of Samples	Trip Blank	Equipment Blank	Field Blank	Field Duplicates	Matrix Spike/Duplicate	Total Number of Samples
Total Metals	6010B	8	--	1	1	1	2	13
Dissolved Metals	6010B	8	--	1	1	1	2	13
VOCs	8260B	8	1	1	1	1	2	14
SVOCs	8270C	8	--	1	1	1	2	13
Thallium	7841	8	--	1	1	1	2	13
Mercury	7470A	8	--	1	1	1	2	13
Cyanide	9012	8	--	1	1	1	2	13
TPH	8015E	6 (wells 1,2,3,4,5,7)	--	1	1	1	2	11
Pesticides	8081	3 (wells 1,5,6)	--	1	1	1	2	8
PCBs	8082	3 (wells 1,4,5)	--	1	1	1	2	8

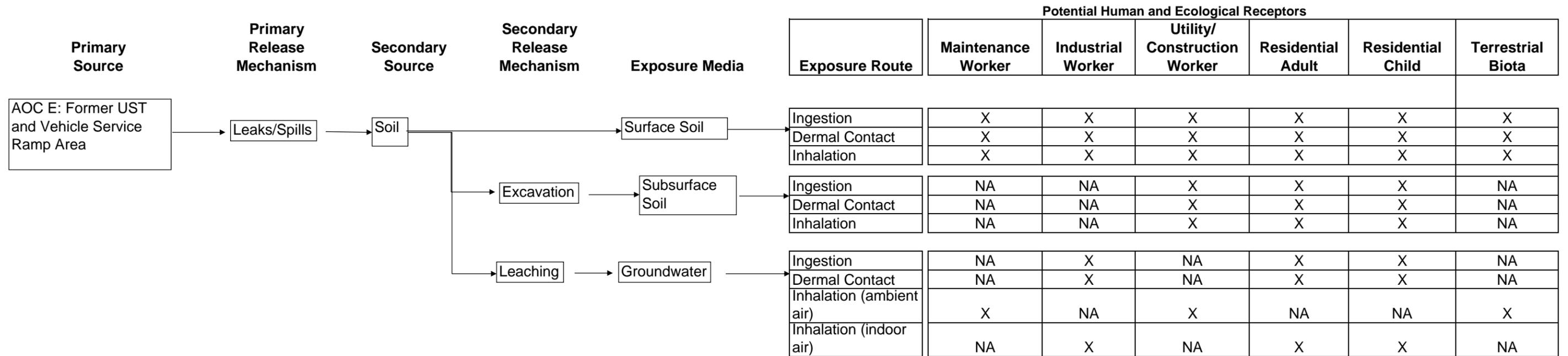
1.1.4 Additional Groundwater Sampling

In accordance with the *Final Meeting Minutes – Vieques Technical Subcommittee Meeting, June 21 – 22, 2005* (CH2M HILL, August 23, 2005) and the *Draft Meeting Minutes – Vieques Technical Subcommittee Meeting, October 11, 2005* (CH2M HILL, October 16, 2005), groundwater samples will be collected from all existing wells for TPH-GRO/DRO/ORO by Method SW846 8015M except those wells containing free product, during this supplemental RI field effort. Groundwater samples collected during this additional groundwater sampling event will also be analyzed for total dissolved solids (TDS) by MCAWW 160.1.

SECTION 2

Conceptual Site Model

Figure 2 presents the Conceptual Site Model (CSM) for the AOC E site.



Note: X - Potentially complete exposure pathways

Figure 2
 Conceptual Site Model for Human Health and Ecological Risk Assessment at AOC E
 Former NASD, Puerto Rico

SECTION 3

Project Schedule

Table 4 presents the proposed project schedule for the supplemental sampling activities at AOC E. It is important to note that the dates are estimates, and may vary substantially depending on such factors as reviewer comments, subcontractor availability, and weather.

TABLE 4
Project Task Schedule, Supplemental Sampling For RI For AOC E
Former NASD, Vieques, Puerto Rico

Task	Estimated Submittal Date
Final Supplemental Work Plan	November 9, 2005
Field Work	On or about November 14, 2005
Laboratory Analysis	Approximately 4 weeks from completion of field work
Data Validation	Approximately 4 weeks from receipt of all analytical data from laboratory
Human Health Risk Assessment Interim Deliverables	Approximately 4 weeks from upload of validated data to environmental database
Draft RI Report	Approximately 8 weeks from EPA approval of Interim Deliverables

SECTION 4

References

- CH2M HILL. 2001. *Final Master Work Plan for the Former U.S. Naval Ammunition Support Detachment, Vieques Island, Puerto Rico*. January.
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- USEPA. 2001. *Contract Laboratory Program National Functional Guidelines for Low Concentration. EPA540-R-00-006*. June.
- USEPA. 2004. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. EPA 540-R-04-004*. October.

ATTACHMENT A

**Preliminary Response to Preliminary
Comments on Draft Sampling and Analysis
Plan for Additional Sampling at AOC E, Former
Naval Ammunition Support Detachment,
Vieques, Puerto Rico (CH2M HILL, March 1,
2005)**

Preliminary - Response to Preliminary Comments on Draft Sampling and Analysis Plan for Additional Sampling at AOC E, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico

TO: CERCLA Technical Committee
COPIES: CH2M HILL
FROM: NAVFAC, Atlantic
DATE: March 1, 2005

This memorandum compiles the Navy's preliminary responses to the preliminary comments received on the *Draft Sampling and Analysis Plan for Additional Sampling at AOC E, Former Naval Ammunition Support Detachment, Vieques Island, Puerto Rico* (CH2M HILL, August 2004), hereafter referred to as the Draft SAP. For ease of review, each comment has been reproduced in **bold type**, followed by the Navy's response.

In common to all comments are requests to define rationale and procedural information for data collection, analysis, validation and verification, and use. It is important to note that the Draft SAP is not intended as a stand alone Work Plan. It is an addendum to the *Final Remedial Investigation/Feasibility Study Work Plan for Area of Concern E at Former U.S. Naval Ammunition Support Detachment, Vieques Island, Puerto Rico* (CH2M HILL, May 2002), hereafter referred to as the Final RI/FS Work Plan, and as such adopts the procedural information defined therein.

Environmental Protection Agency (EPA) Comments

- 1) The work plan should identify what data gaps will be filled by performing the proposed sampling and analysis. Please delineate the systematic planning approach used to select the number, locations and analyses to be used in this project.**

This sampling plan is an addendum field sampling plan (FSP) that resulted from AOC E RI Report review comments from EPA and PREQB and its contractor. The development of this additional sampling plan was discussed with the agencies, prior to its preparation, and provided to the agencies as an attachment to the comment responses. It is not designed to be a stand alone work plan. The analytical methodology proposed is in accordance with the analytical methods that were part of the Master Work Plan for the environmental program for the former NASD on west Vieques and the Final RI/FS Work Plan. The analytical results, data quality, and usability will be included in the future revised RI report, as indicated in the responses to the comments, to which this FSP is an attachment.

- 2) An organization chart should be provided showing the relationships and the lines of communication among all project participants. The organization chart must**

also identify any subcontractor relationships relevant to environmental data operations, including laboratories providing analytical services.

Section 9 of the Final RI/FS Work Plan presents the Project Management structure. This information will be updated and presented with the revised SAP.

- 3) The work plan should identify the contaminants of potential concern (CPOCs) and describe in unambiguous terms what decisions will be made based on the results of this investigation, i.e. describe what will happen if the results exceed the defined action levels and what will happen if these levels are not exceeded.**

COPCs were identified in the *Draft Remedial Investigation/Feasibility Study Report, Area of Concern (AOC) E, Former Naval Ammunition Support Detachment, Vieques Island, Puerto Rico* (CH2M HILL, February 2004). The COPCs will be revised, as necessary, following the additional investigation.

- 4) The work plan should describe the process to be used for verifying and validating data. Discuss how issues shall be resolved and the authorities for resolving such issues. Describe how the results are conveyed to data users. Precisely define and interpret how validation issues differ from verification issues for this project. Provide examples of any forms or checklists to be used. Identify any project-specific calculations required. It is recommended that EPA Data Validation SOPs be used. These can be found at: <http://www.epa.gov/region02/qa/documents.htm>.**

Because the additional investigation is intended to supplement the RI data, validation and verification will be conducted in accordance with the processes defined in the original Final RI/FS Work Plan (CH2M HILL, May 2002).

- 5) The work plan should also describe how the results obtained from the project or task will be reconciled with the requirements defined by the data user or decision maker. Outline the proposed methods to analyze the data and determine possible anomalies or departures from assumptions established in the planning phase of data collection. Describe how reconciliation with user requirements will be documented, issues will be resolved, and how limitations on the use of the data will be reported to decision makers.**

The additional investigation proposed will be conducted in accordance with the original Final RI/FS Work Plan (CH2M HILL, May 2002). Data collection, use, and reporting are the same as those described in that Work Plan. The additional investigation is intended to supplement the data collected during the RI.

- 6) Surface Soil Sampling: Surface soil samples should be collected from the top 12" to better represent the depth most likely associated with exposure to ecological receptors. Surface soil samples may be collected from the top 2', when concern about burrowing organisms (i.e. land crab) is an issue. Justification should be provided for sampling from 0-24 inches.**

Surface soil sample depths were 0 to 6 inches during the majority of previous investigations on West Vieques. Several rounds of discussion among the agencies were held on the issue of soil sampling depths for the former NASD program during work plan review for AOC I, where no land crab habitat is identified. The attached

memorandum includes the final agreement reached for surface soil sampling, which applies to AOC E as well. The agreed upon depth of sampling for surface soil is 0 to 24 inches, unless otherwise determined through concurrence of the agencies.

Puerto Rico Environmental Quality Board (TRC) Comments

Attachment 1 – Sampling and Analysis Plan

- 1) Surface soil samples should be screened for the presence of volatile organic compounds (VOCs) using field instrument (e.g., jar headspace) observations. Such field observations should be used to refine the interval sampled, rather than using the predetermined depth as the sole determinant. A sample should be collected from the interval exhibiting elevated field screening detections.**

The purpose of the surface soil sampling is to verify that there are no unacceptable risks to potential human health and ecological receptors. As noted in response to EPA comment #6, several rounds of discussion among the agencies were held on the issue of surface soil sampling depths for the former NASD program during work plan review for AOC I. The attached memorandum includes the final agreement reached for surface soil sampling, which should apply to AOC E. The agreed upon depth of sampling for surface soil is 0 to 24 inches, as a better representation for human health and ecological exposure.

The eighth sentence of the Surface Soil Sampling section will be revised to read: “The surface soil sample will be obtained from 0-24 inches, headspace readings collected with a PID, then shipped and analyzed for TCL TAL parameters.”

- 2) The text describing surface soil should be expanded to include a discussion of the TPH analysis and the use of the data. If appropriate, the analytical method should be switched to VPH/EPH.**

Because TPH is a composite of various hydrocarbons and that there is no risk-based screening criteria for TPH, it is proposed that further environmental media samples be analyzed for petroleum-related constituents (e.g., VOCs, PAHs) for which risk-based screening criteria are available and for which quantitative risk assessments can be performed, rather than analyzed for TPH.

- 2) For subsurface soil samples, the last sentence of the first paragraph states that “...an additional soil sample will be collected at a depth deeper than the highest PID reading to ensure the soil column average concentrations are represented for leachability evaluations.” Please ensure that this sample is collected from within the source area and not below the source area. A sample should not be collected only from soils that do not exhibit impacts during PID screening. Also, please note that in accordance with the SSL guidance, each soil boring may be averaged, and the highest mean soil boring concentration is then used for screening purposes.**

The Navy concurs with the comment. The purpose of the soil boring is to collect samples within the source area. Where elevated PID readings are noted, a minimum

of two samples will be collected, with one sample collected at the highest PID reading, and one sample collected below the high PID reading. The subject sentence of the comment will be revised to clarify that it will be collected to help define the vertical extent of contamination. The reference to the SSL guidance will also be noted.

- 3) **Please clarify the depth at which the former buried pipeline was buried. This information would be helpful in evaluating the proposed depths of the soil borings.**

Per Pedro Ruiz/NAPR, who is a Navy employee, who managed the UST program for Roosevelt Roads and Vieques, and is familiar with the UST removal in 1996, the buried line was approximately 2 feet bls and ran straight from the platform to the UST. Several soil borings have been completed to a depth of 2 feet to assess any potential leakage from the pipeline. This information will be added to Section 2.2 Site History and Past Operations of the AOC E RI Report, which will be revised and re-submitted with the additional information collected.

- 4) **The first bullet should be revised so that the sample will be collected from the interval with the highest PID reading, not from below the highest PID reading as presently stated.**

The bullet, as well as other applicable bullets, will be revised to clarify that the sample below the highest PID reading is in addition to one at the highest PID reading. As noted above, the sample collected from below the highest PID reading is intended to help define the vertical extent of contamination.

- 5) **The soil boring log for SB-09 shows that the soils at 46 feet to 48 feet below ground surface (bgs) are not moist or saturated. Therefore, it should be anticipated that SB-14 would be drilled to at least 48 feet.**

The wording will be changed in the second bullet of the Subsurface Soil Sampling section to read: "This boring will be drilled to a maximum depth of 48 feet bls or to the water table, whichever comes first."

- 6) **The fourth bullet should be revised so that the sample will be collected from the interval with the highest PID reading, not from below the highest PID reading as presently stated.**

The bullet, as well as other applicable bullets, will be revised to clarify that the sample below the highest PID reading is in addition to one at the highest PID reading. As noted above, the sample collected from below the highest PID reading is intended to help define the vertical extent of contamination.

- 7) **The third paragraph should be revised to clarify the purpose for analyzing samples for Total Organic Carbon (TOC) and explain how the data will be applied. Table 1 must be expanded to include this total organic carbon analysis for the 4 new subsurface soil samples.**

The total organic carbon (TOC) measurement is an indicator of the organic matter content of the soils. The TOC value from uncontaminated soils is used to calculate potential for partition of organic chemicals to the soil matrix. It is used during data

interpretation such as fate and transport evaluations, and can also be used in the site-specific soil screening levels (SSL) estimations. This information will be added to the third paragraph. The table will be revised to include TOC analysis.

- 8) Provisions should be included for the collection of additional samples to characterize contamination based on observations other than PID readings and the professional judgment of the supervising geologist/engineer.**

A sentence will be added to the first paragraph after the bullets in the Subsurface Soil Sampling section that indicates other professional judgement considerations (e.g., soil staining, etc.) will also be used (in conjunction with PID measurements) in determining at what depths to collect samples.

- 9) The fifth paragraph should be revised to indicate that the two-foot cores will be screened for the presence of volatile organic compounds (VOCs) using field instrument (e.g., PID) observations. Such field observations should be used to refine the interval sampled, rather than using the predetermined 12-18 inch depth as the sole determinant.**

The Navy concurs with this comment. The proposed revision will be made to indicate the VOC sample will be collected from the interval exhibiting the highest PID readings or, in the absence of PID readings above background, the 12 to 18-inch interval.

- 10) Groundwater sampling should adhere to EPA Region II low stress (low flow) sampling protocols.**

A statement will be added to the section of Groundwater Sampling entitled Wells MW-02, MW-03, MW-04, MW-06, and MW-08 that reads: "Groundwater samples will be collected following the EPA Region II low stress (low flow) sampling protocols."

- 11) The text should clarify the intended use of the data obtained from TPH analysis by DRO/GRO. If appropriate, the analytical method should be switched to VPH/EPH.**

Because TPH is a composite of various hydrocarbons and that there is no risk-based screening criteria for TPH, it is proposed that further environmental media samples be analyzed for petroleum-related constituents (e.g., VOCs, PAHs) for which risk-based screening criteria are available and for which quantitative risk assessments can be performed, rather than analyzed for TPH.

- 12) The text should clarify whether cyanide analysis will be conducted for all media. Cyanide analysis is part of the TAL.**

Where the TAL analyses are specified, cyanide will be included as part of the analyses.

Figure 5-1, Conceptual Site Model for Human Health and Ecological Risk Assessment

- 1) Residents can become exposed to subsurface soil. The diagram should indicate the Residential Adult and Child as potential receptors for subsurface soil.**

The conceptual model will be revised as suggested.

- 2) **The conceptual site model (CSM) indicates that the indoor air pathway is a potentially complete exposure pathway. Please clarify how this exposure pathway will be evaluated and what type of data will be used to evaluate this pathway.**

Currently, there are no buildings within the contaminated area of AOC E, but the pathway has been considered complete for a potential future resident. The data will be evaluated for this pathway using EPA's November 2002 Draft Vapor Intrusion Guidance. This information will be added to the revised SAP.

- 3) **A construction worker is exposed to surface soil in addition to subsurface soil. Please indicate that ingestion, dermal contact and inhalation of surface soil are potentially complete exposure pathways for surface soil for the construction worker.**

Originally, subsurface and groundwater was investigated at the site, because the potential source was identified as a buried UST, and surface soil had been removed. Because the proposed sampling includes surface soil sampling, the site conceptual model (and corresponding figure) will be updated to include surface soil as an exposure medium for all the receptors identified during exposure pathway evaluation. This information will be provided in the revised AOC E RI Report, which will be updated to include the additional information gathered.

Table 1 Groundwater Sample Parameters, Methods, and Quantities for AOC E and Table 2 Soil Sample Parameters, Methods, and Quantities for AOC E

- 1) **The tables should be revised to indicate the method for thallium analysis. The table currently states "special method."**

If the Technical Subcommittee deems it appropriate to utilize a thallium analytical method that has a reporting limit below the adjusted PRG, the table will be revised to reflect thallium analysis by SW-846 Method 7841.

- 2) **The TPH method may be switched to should be changed to VPH/EPH, based on the intended use of the data.**

Because TPH is a composite of various hydrocarbons and that there is no risk-based screening criteria for TPH, it is proposed that further environmental media samples be analyzed for petroleum-related constituents (e.g., VOCs, PAHs) for which risk-based screening criteria are available and for which quantitative risk assessments can be performed, rather than analyzed for TPH.

- 3) **A trip blank should be included for GRO (or VPH) analysis.**

See response to comments on previous comment.

- 4) **The cyanide method needs to be included.**

The method to be used for Cyanide will be SW 846 Method 9012, Total and Amendable Cyanide, Colorimetric. This information will be added to the table.

ATTACHMENT B

**Final Meeting Minutes – Vieques Technical
Subcommittee Meeting, March 7 – 8, 2005
(CH2M HILL, March 21, 2005)**

Final Meeting Minutes - Vieques Technical Subcommittee Meeting, March 7 - 8, 2005

ATTENDEES: Yarissa Martinez/PREQB
Katarina Rutkowski/TRC
Michael Sivak/EPA
Andy Crossland/EPA
Danny Rodriguez/EPA
Jeff Harlow/NAVFAC
John Tomik/CH2M HILL

Brett Doerr/CH2M HILL
Dianne Wehner/NOAA
Mindy Pensak/EPA
Reyhan Mehran/NOAA
Sergio Lopez/EPA (by phone)
Tim Gordon/EPA
Chris Penny (by phone)

FROM: G. Brett Doerr

DATE: March 21, 2005

This document summarizes the discussions and resulting concurrences made for various topics regarding West Vieques AOC I and AOC E and East Vieques Background Soil during the Vieques Technical Subcommittee Meeting held on March 7 and 8, 2005.

Monday March 7, 2005

AOC I

Applicability and Use of Soil Screening Levels (SSLs)

The Technical Subcommittee concurred that SSLs, both generic and site-specific, do not account for migration through fractured bedrock, which is believed to make up a component of leaching at AOC I. However, because constituents detected in soil at the site are also detected in groundwater, it was recognized that it is important to attempt to estimate the concentrations of constituents in soil that may represent an ongoing source of constituents in groundwater above acceptable levels. The Subcommittee concurred that the soil constituent data will be compared to SSLs at a dilution attenuation factor of 1 (i.e., SSL1). In addition, existing data (e.g., soil pH, % moisture) will be evaluated to see if site-specific SSLs can be calculated. Evaluation of the soil data and these SSLs will be made in the context of the constituents that have been detected in groundwater in order to see if the SSL1 values or site-specific SSLs may be appropriate for estimating concentrations of soil constituents that represent unacceptable leaching to groundwater scenarios.

If site-specific SSL calculations are performed, a table will be prepared that summarizes the values selected for the various parameters and how they were derived. In addition, the SSL conceptual model will assume that the water table depth corresponds to the depth of the unconsolidated/bedrock interface. In other words, the conceptual model assumes there is no attenuation of constituents once they enter the bedrock.

Data Quality Objectives (DQOs) and Evaluation

For the AOC I Report (as well as other reports that present and discuss data), the data evaluation write-up needs to identify if and how the data met the DQOs. The discussion either needs to restate the DQOs or reference where they are stated.

Additionally, in the Data Quality Evaluation discussion (e.g., Appendix I in the AOC I Interim RI Report), the text should describe what the data qualification means in terms of data use (i.e., site-specific data quality evaluation). EPA QA/G-9 will be referenced, which includes a qualitative process for Data Quality Evaluation. This process will be considered, rather than the statistically based random sampling approach described in EPA QA/G-9. The document will be referenced to present the rationale for data collection in work plans.

Background Data Comparison

The Technical Subcommittee discussed the appropriateness of performing a statistical comparison of site-specific data to background data using EPA's *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (EPA, September 2002) because site-specific sample locations are generally biased toward areas of known or suspected contamination and/or are based on existing data (i.e., not randomly selected). The Subcommittee concurred that the 95% UTL levels will continue to be used when comparing site-specific data points to the background inorganic concentrations. However, when performing population-to-population comparisons, appropriateness (or inappropriateness) of the guidance use (and the methods previously agreed to by the agencies in the Background Investigation Report) will be re-evaluated by a statistician and, if concurrence that the guidance is not applicable when one or both datasets are not randomly selected, the Navy will propose an alternate approach for performing the background comparison, which may be based on a non-statistical, professional judgement process. One option suggested is the descriptive comparison of data (e.g., minimum, maximum, and range of concentrations) for background and site soil datasets.

Drainage Ditch Near Eastern AOC I Boundary

The Technical Subcommittee discussed the drainage ditch adjacent to the eastern boundary of AOC I with respect to its designation, extent, potential to receive runoff from AOC I, and need for sampling. The Subcommittee concurred that because the ditch is only several hundred feet long, begins at the topographically downgradient end of the rock quarry, and terminates at Highway 200, it is appropriately designated a drainage ditch rather than a stream. The Subcommittee also concurred that, based on its description and designation, it is not an ecologically significant feature.

The relatively flat characteristic of the site (where probable contaminant source(s) are located) and the presence of soil berms along the eastern side of the site and along the drainage ditch likely prevent or inhibit current runoff from the site entering the drainage ditch. However, it is recognized that the berm may not have existed in the past. However, even in the absence of the berm, the relatively flat topography would have limited surface runoff. Further, surface soil data collected around the probable contaminant source areas and adjacent to where runoff would leave the site via the eastern and southern gravel roads exhibit relatively low concentrations with respect to human health screening criteria.

Based on the above information, the Technical Subcommittee concurred that it is unlikely soil constituents attributable to AOC I have been transported to the drainage ditch. Therefore, sampling of the drainage ditch was not deemed warranted.

Asphalt-related Material Pile Southwest of AOC I

During the discussion of the drainage ditch at AOC I, it was noted that there is a pile of asphalt material adjacent to an ephemeral stream to the southwest of AOC I. While it was concurred that constituents at AOC I are not affecting the ephemeral stream, the question was raised as to whether the asphalt-pile could be affecting the stream and whether the pile warrants consideration in light of its probable association with road construction. It was agreed that the regulatory agencies would discuss the concerns and provide feedback to the Navy. At this time, the pile will not be considered part of AOC I.

Adequacy of Existing Soil Dataset

The discussion of the adequacy of the existing soil dataset included that the fact that the only inorganics analyses performed on the RI samples were chromium and hexavalent chromium. Although the cumulative effects of inorganics can be evaluated near the contaminant source area from the samples collected during the EBS and PA/SI, it was noted that because the full TAL suite of inorganics was not analyzed for, it is not possible to look at cumulative effects that involve inorganic constituents other than chromium at the RI sample locations, which were away from the source areas. However, it was also noted that the soil concentrations of inorganics are relatively low (compared to human health screening criteria). Therefore, the Subcommittee concurred that the existing data will be evaluated in a quantitative risk assessment, and that the uncertainty discussion will include an explanation of why some samples were analyzed for chromium/hexavalent chromium only and what effect this may have on the level of uncertainty associated with the risk assessment.

If the risk assessment indicates that the cumulative potential risk is substantially below the threshold, risk management decisions that do not require remediation may be appropriate, recognizing that the inorganics dataset is not comprehensive. Additional evaluations that will be performed to assist in making risk management determinations will include comparing chromium concentrations from the EBS and/or PA/SI to the RI chromium concentrations to see if they are comparable. If so, it may be appropriate to conclude that the concentrations of the other inorganics would also be comparable.

For subsurface soil sample collection, the Subcommittee concurred that as a general approach, screening should be done to characterize the soil and that sample intervals with the highest PID readings and/or with visual indication of contamination should be collected for analysis. If these conditions do not apply, then the sampling interval will default to the 4-to-6-foot interval in the unconsolidated soil. Consideration should also be made for collecting samples just above the unconsolidated/consolidated interval in an unsaturated setting.

TPH Analysis

The Technical Subcommittee discussed the applicability of TPH to the CERCLA process and, if applicable, the appropriate analysis and risk evaluation process. One potential

option is to eliminate TPH analysis and use VOC/SVOC constituent analysis in evaluation of nature and extent and associated potential risk. With respect to this option, it was noted that TPH contains hydrocarbons other than those analyzed for in the TCL. To account for this, Massachusetts and other states have developed risk screening criteria for groups of petroleum hydrocarbons that do not include the VOCs/SVOCs in the TCL. Therefore, a second option is to adopt an analytical protocol and risk evaluation process that accounts for TPH specifically.

Based on the above discussion, it was concurred that EPA Region II would confirm its position with EPA Headquarters on whether TPH is regulated by or exempt from CERCLA. In addition, the existing TPH data at AOC I will be compared to the most stringent Massachusetts surrogate screening criteria (after subtraction of VOC/SVOC concentrations) to provide a worst-case risk screening assessment using the criteria. Should the criteria be exceeded other, methods for assessing the risk associated with TPH will be evaluated.

Coring/Video Logging/Geophysics at Sites

The Technical Subcommittee discussed the importance of the information that can be gathered through various downhole techniques and the site-specific conditions that have been encountered, especially at AOC I, that can hinder its collection. The information collected can provide nature, extent, and degree of fracturing; potential interconnectivity of fractures, etc. It was also recognized that site-specific conditions may warrant a flexible approach to selecting a technique(s) to gather the information and that in some cases, it may not be possible to collect the information (e.g., due to spawling of bedrock fragments into borehole). Potential techniques to consider on a site-specific basis include coring, video logging, caliper, flow logging.

The Subcommittee also concurred that information would be gathered on the potential use of acoustical televiewer in boreholes and the information would be provided back to the Subcommittee for evaluation.

For AOC I, it was concurred that coring would be attempted on the two wells proposed in the Supplemental Work Plan, because the water level is known and the water removed from coring is not anticipated to be contaminated. It is recognized as acceptable that where core retrieval is limited or prevented by bedrock condition, this information will be documented. It was also agreed that reports will include additional discussion and interpretation of the results of the coring/video logging to further facilitate the overall understanding of the subsurface and contaminant fate and transport through the bedrock.

Groundwater Sampling Methodology

The Technical Subcommittee discussed the use of low-flow purging/sampling and a potential limitation in low-producing units. Specifically, at AOC I, the low-flow guidance was followed with respect to purging/sampling rates, but the drawdown in the wells still exceeded the recommended maximum drawdown. It was concurred that the low-flow purging/sampling technique will continue to be used and that the groundwater sampling logs (and associated report text) will indicate where the drawdown exceeds the recommended amount and why. Further, any well that purges dry will be allowed to recover sufficiently to permit sampling.

The purpose of the two additional wells that will be installed during the Supplemental Investigation is to delineate the extent of groundwater contamination. It was agreed that if contamination is not encountered in these wells, the data from these wells will be excluded from the calculation of the groundwater exposure point concentrations. There was discussion on the use of all monitoring wells within a groundwater plume to calculate exposure point concentrations. EQB requested that the monitoring wells from the source area be used to calculate exposure point concentrations because a drinking water well could be installed within the source area. Further, there is no information on the sphere of influence of wells, so it is unknown the extent to which groundwater from all areas of a plume would contribute to an individual well. However, EPA Region 2 requested that all monitoring wells within a groundwater plume be included in the calculation of exposure point concentrations, because EPA Region 2 considers that groundwater collected from a drinking water well comes from throughout the aquifer. The Navy concurred with this approach, stating that it represents a more realistic condition of groundwater withdrawal.

Other AOC I Topics

The Technical Subcommittee concurred that in reports, separate figures will be created that show exceedances of ecological screening criteria.

The Technical Subcommittee concurred that in the Executive Summary of reports, a breakdown of the total number of samples collected by investigation will be included. For example, one sentence may list the total number of samples collected for a given medium at a site. A subsequent sentence(s) will be added that breaks down the total number of samples into how many were collected during each "phase" of the investigation process and for what parameters the samples were analyzed.

The Technical Subcommittee concurred that future investigations should utilize the TCL/TAL analytical protocol (or subsets, as deemed appropriate) for sample analysis. Inclusion or exclusion of TPH to the analytical protocol is pending resolution of CERCLA applicability.

For AOC I, it was concurred that the revised Supplemental Work Plan will be submitted as a stand-alone work plan that references the Final Work Plan for AOC I and R, rather than an addendum to that work plan. In addition, the Draft Interim RI Report will not be finalized. Instead, its content, the supplemental data collected, and the resolution to comments on the Draft Interim RI Report will be incorporated into a Draft RI Report following the supplemental investigation.

The Subcommittee discussed the use of headspace screening to provide qualitative information regarding the vertical distribution of volatiles in soil. It was concurred that the revised plan will clearly indicate that headspace screening will be performed on subsurface soil to aid in the selection of sample(s) for laboratory analysis.

Tuesday March 8, 2005

AOC E

Headspace Analysis of Soil Samples

The Subcommittee discussed the use of headspace screening to provide qualitative information regarding the vertical distribution of volatiles in soil. It was concurred that the revised plan will clearly indicate that headspace screening will be performed on subsurface soil to aid in the selection of sample(s) for laboratory analysis.

For soil boring SB-14, preference will be given to collecting soil samples from just above the water table if field screening results are the same for soil sample intervals screened from the ground surface down to the water table.

Depth of Soil Borings

The Subcommittee discussed the approach for determining the terminal depth of the SB-14 soil boring. In order to ensure the soil borings are completed to the water table, the text of the revised plan will state that on the day of sampling, the water table will be measured in surrounding wells and the borings will be completed to the depth of the measured water table, rather than to a pre-defined depth.

Depth of Surface Soil Samples

The Subcommittee concurred that because the West Vieques background soil dataset indicated that the 0-to-6-inch interval was statistically comparable to the 4-to-6-foot interval, and that human health risk assessments generally utilize the 0-to-2-foot interval to represent residential exposure to surface soil, surface soil samples at AOC E will be collected from 0 to 2 feet. This rationale and that it was agreed upon by the Technical Subcommittee will be added to the revised plan. There was discussion on the applicability of 0-to-2-foot interval sampling for ecological risk assessment purposes. EPA Region 2 recognized and supported attempting to concur upon a single surface soil interval that would meet the needs of both ecological and human health risk assessments. However, EPA and NOAA stated that the recommendation to use the same surface soil depth for both human health and ecological risk assessments should be assessed on a site by site (e.g. AOC, SWMU, etc.) basis and that the 0-to-24-inch interval should not be the default depth for ecological purposes. The recommendation to collect surface soil samples from the 0-to-12-inch or the 0-to-24-inch interval for ecological purposes should be based on the site-specific characteristics and reflect the habitat and organisms of concern for the site. Prior to any sampling event, the appropriate depth to collect surface soil samples to support both ecological and human health risk assessments should be discussed and agreed upon.

Other AOC E Topics

Figure 1, which shows the proposed sample locations, will be revised to include the existing monitoring wells.

The Subcommittee concurred that all other topics have been resolved to the Technical Subcommittee members' satisfaction. The SAP will be revised and submitted as a Final Work Plan Addendum to the May 2002 RI/FS Work Plan for AOC E.

East Vieques Background Soil Investigation

Limiting Current Background Investigation to Soil Inorganics

The Subcommittee discussed the proposed scope of the Background Investigation – that is, to limit the current investigation medium to soil, and the current investigation analytical parameter list to inorganics. The Subcommittee concurred that the current Background Investigation will be for soil inorganics only. It was also agreed that additional discussion is necessary regarding the potential need for and approach to background investigations for other media, including surface water and sediment. EPA (ecological risk assessor) and NOAA suggested a regional approach to evaluating potential impacts on sediment and surface water because it was recognized that an upgradient site may be impacting downgradient sites.

Collection of Background Soil Characteristic Information

The Subcommittee agreed that it was important to document physical characteristics regarding the background soil in order to provide additional information to support the assertion that the soil samples are representative of naturally occurring material. CH2M HILL will discuss this with in-house geologist(s) and geochemist(s) to determine if/what data (e.g., x-ray diffraction of soil) are beneficial for this type of evaluation.

Use of Background Data

The Technical Subcommittee discussed how the background data will be used in site-specific evaluations. The Navy stated that, with respect to the risk assessment, the background data will not be used to screen out inorganic constituents prior to determination of potential risk. Rather, once the risk assessment has been completed and any inorganic Contaminants of Concern (COCs) identified, the background data will be compared to the inorganic COC data to determine if their concentrations, while representing a potential risk, are consistent with background soil inorganics concentrations. In addition, the Navy stated that the background inorganics data may be used in the investigation process to help collect data that adequately delineate the nature and extent of inorganics contamination, which will be completed prior to conducting the risk assessment. Use of the background inorganics data may assist in determining what site-specific data are consistent with background and what site-specific data may represent a release. This will help ensure data collection does not continue beyond areas deemed to be representative of background with respect to inorganics concentrations.

EPA noted that the background data use procedure outlined above does not appear to be consistent with what is stated in the June 2004 East Vieques Phase I RFI Report. It was concurred that additional discussion regarding the use of background data and the RFI Report will be included in the March 29 - 30, 2005 Technical Subcommittee meeting agenda. In preparation for the March 29 - 30, 2005 Technical Subcommittee Meeting, a flowchart that shows the flow of data from collection through the data evaluation and risk assessment process, including the use of background data, will be developed. This flowchart will be included with the response to comments on the Background Investigation Technical

Memorandum. Additionally, use of the background data will be defined consistently and clearly in future work plans and reports.

Background Sampling Locations

The Subcommittee concurred that it was not necessary to access locations that are significant distances into vegetated areas in order to collect a background sample that could be collected from more accessible areas and still be representative of background. It was agreed that background samples will be collected a minimum of 100 feet away from roads in undisturbed areas of vegetation. Further, it was concurred that each background location will be approved during a site visit by agency representatives during the May 2005 CTC meeting. Prior to the site visit and re-submittal of the revised Work Plan, revised figure(s) showing the proposed background sample locations (and several contingency locations) will be provided to the Subcommittee for review.

Other East Vieques Background Soil Investigation Topics

EPA recommended that the rationale, successes, and lessons learned from the West Vieques Background Investigation Work Plan be incorporated into the East Vieques Background Investigation Work Plan.

The Introduction of the revised Background Soil Investigation Work Plan will clearly define the scope and purpose of this particular background investigation.

The background samples to be collected for thallium will be analyzed using SW-846 Method 7841 in order to achieve reporting limits below the adjusted PRG, in addition to analyzing thallium as part of the method previously specified in the Background Investigation Work Plan. Analyzing for thallium using both methods will provide for comparison of results and consistency in the data use when conducting statistical analyses.

ATTACHMENT C

**Final Meeting Minutes – Vieques Technical
Subcommittee Meeting, June 21 – 22, 2005
(CH2M HILL, August 23, 2005)**

Final Meeting Minutes - Vieques Technical Subcommittee Meeting, June 21 - 22, 2005

ATTENDEES:

Yarissa Martinez/PREQB (via video phone)
Katarina Rutkowski/TRC
Michael Sivak/EPA (Tuesday only)
Andy Crossland/EPA
Danny Rodriguez/EPA (via video phone)
Mindy Pensak/EPA (via phone)
Felix Lopez/EPA (via phone)
Sergio Lopez/EPA
Dianne Wehner/Ridolfi (Tuesday only)
Jeff Harlow/NAVFAC
Chris Penny/NAVFAC (Tuesday only)
John Tomik/CH2M HILL (via phone, Tuesday only)
Brett Doerr/CH2M HILL

FROM: G. Brett Doerr/CH2M HILL-VBO

DATE: August 23, 2005

This document summarizes the discussions and resulting concurrences made for various topics during the Vieques Technical Subcommittee Meeting held on Tuesday June 21 and Wednesday June 22, 2005 at EPA Region 2 headquarters in New York. Topics discussed during the meeting comprised:

1. Adoption of CERCLA processes/terminology for east Vieques
2. Comments/response to comments and technical approach for eight PI/PAOC sites proposed for Phase I RFI (i.e., November 2004 Draft Phase I RFI Work Plan)
3. Comments/response to comments for and technical approach for various other PI/PAOC sites.
4. Path forward for gravel/asphalt pile near AOC I
5. Path forward for TPH analysis and evaluation
6. Navy CLEAN database format versus EPA Region 2 database format

Tuesday June 21, 2005

The Subcommittee reviewed the March 7-8, 2005 Meeting Summary in track changes mode, discussed and approved revisions, and concurred on the summary as final.

The Subcommittee reviewed the May 4-6, 2005 Site Visit Summary in track changes mode, discussed and approved revisions, and concurred on the summary as final.

Adoption of CERCLA Processes/Terminology for East Vieques

The Subcommittee concurred that all future environmental investigations (and applicable documentation) for east Vieques will follow the CERCLA process. Therefore, when the Draft Phase I RFI Work Plan for the eight PI/PAOC sites and the Draft Phase I RFI Report for the original 12 sites are revised and resubmitted, their titles will be changed to reflect the equivalent CERCLA terminology (e.g., PA/SI). Further, revised figures will be organized to display sites that are adjacent to each other, rather than necessarily producing one figure per site. This will allow better comprehension of potential site interactions and, therefore, a potentially coordinated sampling approach.

Technical Approach for the Eight PI/PAOC Sites Included in the Draft Phase I RFI Work Plan

The Subcommittee discussed each of the eight PI/PAOC sites and reached concurrence on the scope and technical approach. It is noted here that although not all Navy responses included in the Draft Phase I RFI Work Plan response-to-comments memorandum (submitted under cover letter dated May 27, 2005) were acceptable to the regulatory agencies, concurrence on the scope and technical approach was reached during the June 21-22, 2005 Technical Subcommittee Meeting, which is documented in these meeting minutes, and supersede previous comments and response to comments, as applicable. Once the meeting minutes are approved by the meeting attendee agencies, they will be used to revise the Phase I RFI Work Plan as final, obviating the need for an additional round of comments and response to comments.

The summaries below reflect modifications made to the proposed scope of work in the Draft Phase I RFI Work Plan (November 30, 2004). Therefore, the proposed scope in the Draft Work Plan is accepted, with the additions, deletions, and changes summarized below.

General Comments

Where contamination is encountered at depths below 6 feet below ground surface (bgs), then two subsurface soil samples will be taken - one at 4 to 6 feet bgs for risk assessment purposes and one at a lower depth where contaminations present for the purpose of determining the nature and extent of subsurface impacts.

PI-4

Referring to Figure 2-1 of the Draft Phase I RFI Work Plan, two soil borings will be added to the "white" area in the southwest portion of the figure. At each location, a surface soil and subsurface soil sample will be collected in accordance with the surface soil and subsurface soil sampling protocol previously concurred upon by the Subcommittee. In addition, a well will be installed in the southernmost of these two borings. The analytical protocol will be the same as that for the other soil and groundwater samples.

Referring to Figure 2-1, the well located near the southeast corner of the site will be moved toward the west, to a more central downgradient location.

A copy of Figure 2-1 was made and marked up by EPA to show the two additional soil borings discussed above, the relocated well discussed above, and the additional well within the trenched areas proposed in the Navy response to comments.

In addition to the above, it was concurred that the EBS sample locations PI4-1 and PI4-2 will be resampled. At each location, both surface and subsurface soil samples will be collected for VOCs, SVOCs, and metals.

PI-7

The Subcommittee concurred that prior to selecting sampling locations, a reconnaissance of the former quarry portion of the site will be conducted. The reconnaissance will include a visual site inspection to identify debris, including drums that were previously observed. Any debris observed will be located using GPS. Results of the reconnaissance will be used to prepare a schematic map of the general site topography, showing the locations of prominent features, including debris. During the site inspection, a shovel or auger will be used at locations where debris is observed and along each transect to help evaluate the extent of debris, including drums, in the subsurface and to determine general soil depths. A metal detector will also be used during the site inspection to help identify any buried metallic items. The site inspection will be conducted throughout all open areas of the former quarry. Where there is dense vegetation, transects will be cut using the TAZ, with coordination with FWS. The Work Plan will be revised to reflect this reconnaissance, but the Subcommittee concurred that it can take place prior to revising the Work Plan in order to expedite preparation of the final Work Plan.

Once the reconnaissance is completed, a schematic map of the general site topography, including the locations of any identified debris, will be prepared and submitted to the agencies for review, together with a revised proposed sampling approach (in the form of a Work Plan Addendum), based on the results of the reconnaissance. The Subcommittee will review the reconnaissance results and proposed sampling approach and come to concurrence, including whether well(s) are needed and, if so, its(their) location(s).

In addition to the above, an attempt will be made to identify the person(s) who reported the drum disposal in order to get additional information on how the disposal took place (e.g., surficial, burial, etc.). Felix Lopez faxed a markup of Figure 2-4 of the Draft Phase I RFI Work Plan showing the approximate locations of drums that he observed and photographed.

Regarding the northern portion of PI-7 (i.e., former radar communication facility), EPA would also like a reconnaissance performed, comprising a visual inspection to identify any debris or disturbed areas. If debris or disturbed areas are identified, samples will be proposed in those areas; if not, three composite samples will be collected from 0 to 2 feet, representing individual samples collected at locations evenly distributed across the presumed site area.

PAOC J, K, and L

The Subcommittee reviewed the proposed sampling approach for these three sites together, due to their close proximity. It was concurred that one figure will be produced that shows all three sites and proposed samples. Sample locations at adjacent sites will

be adjusted to provide reasonable spacing between them. In addition, two wells will be installed - one at the PAOC J southeasternmost boring location, and one at the PAOC L southernmost location (referring to Figures 2-6 and 2-8, respectively, of the Draft Phase I RFI Work Plan). These two wells will provide groundwater data at the downgradient edges of PAOC J/K (PAOC K is immediately adjacent to the northern portion of PAOC J) and PAOC L.

A copy of Figure 2-7 was made and marked up by EPA to show the two new well locations discussed above.

PAOC N (and power house portion of PAOC S)

The Subcommittee reviewed the proposed sampling locations at PAOC N and the power house portion of PAOC S together. Based on their proximity and the groundwater sampling objectives, the three proposed wells will be relocated. Referring to Figure 2-9 of the Draft Phase I RFI Work Plan, the southernmost well at PAOC N will be moved to coincide with the soil boring on the south side of the filling station. The northern well in Figure 2-9 will be moved to the west side of the rectangular building to the north. Finally, the central soil boring at PAOC S will be completed as the third well.

A copy of Figure 2-9 was made and marked up by EPA to show the three new well locations discussed above.

PAOC S (pipeline portion)

The Subcommittee concurred that two surface soil samples (0 to 2 feet) will be added in the depositional area downgradient of the pipeline, but upgradient of the saltflat, in the area where the land crabs were collected. The locations will be identified in the field by FWS and NOAA during the Phase I RFI fieldwork.

Soil samples will be collected every 500 feet along the pipeline.

PAOC U

The Subcommittee concurred that samples for pH will be collected at all soil sampling locations. In addition, one soil boring in the approximate center of the site will be completed as a well.

A copy of Figure 2-14 of the Draft Phase I RFI Work Plan was made and marked up by EPA to show the well location. It coincides with the soil boring in the approximate center of the site.

Other Topics from June 21, 2005 Meeting

TPH

The Subcommittee discussed analysis/evaluation of TPH at CERCLA sites in Vieques. Jeff Harlow/NAVFAC stated that analysis/evaluation of TPH at CERCLA sites is an agency-wide position; therefore, a unique approach cannot be applied to Vieques without Navy approval. To that end, Jeff Harlow/NAVFAC will find out at what level the decision regarding TPH analysis/evaluation at Vieques will be made. He will also take OSWER Directive 9285.7-53 (Human Health Toxicity Values in Superfund Risk

Assessments) to Navy management for review. This directive does not specifically discuss TPH with respect to human health risk assessments in Superfund, but does state that PPRTVs are the second tier of toxicity values (IRIS being Tier 1). Michael Sivak/EPA passed out the PPRTV for TPH used by EPA during a previous Subcommittee Meeting.

Michael Sivak/EPA will find out if TPH is being remediated at Superfund sites (especially Federal Facilities), and, if so, if the PPRTV for TPH is being used.

Until the issue is further resolved, Jeff Harlow/NAVFAC stated that the Navy will address TPH at sites where USTs were located in accordance with the Puerto Rico UST regulations (e.g., TPH, BTEX), and will address TPH at sites where USTs were not located by evaluating CERCLA constituents (e.g., VOCs, PAHs).

Data Presentation

The Subcommittee concurred that on future detection tables, the qualifiers and reporting limits will be included. In addition, the text will note detects, but will focus detailed discussion on exceedances.

Wednesday June 22, 2005

Environmental Database Format

The Navy discussed the Navy environmental database format versus the EPA Region 2 format with Andy Crossland/EPA. Brett Doerr/CH2M HILL gave Andy Crossland/EPA a spreadsheet showing the differences between the two databases. Because the Navy environmental database is Navy-wide rather than region- or site-specific, its format is established by a Navy standard. It was concurred that CH2M HILL will re-evaluate the differences to determine which of the Region 2 fields are designated as "required." In addition, Brett Doerr/CH2M HILL will see if the Navy database can be "dumped" into the EPA Region 2 format, leaving blanks for fields that are not stored. Jeff Harlow/NAVFAC will find out if there is a Navy database spec that can be shared with EPA.

Asphalt/Gravel Pile Near AOC I

The need for sampling at the asphalt/gravel pile near AOC I was discussed, based on the regulatory site visit that was conducted in May 2005. Andy Crossland/EPA stated that the regulatory agencies had not reached a consensus on the sampling specifics, but agreed some sampling should be done. The Subcommittee discussed potential sample types and locations and the regulatory agencies proposed that two surface soil/subsurface soil samples be collected between the pile and where runoff most likely moves toward ephemeral stream. The surface soil would be collected from 0 to 1 foot and the subsurface soil sample would be collected from the interval of the highest PID reading or 4 to 6 feet in the absence of an elevated PID reading.

In addition to the soil samples, one sediment sample (0 to 6 inches) would be collected from the ephemeral stream channel where runoff from the pile most likely enters, and one sediment sample would be collected upgradient of this location. All samples would be collected following procedures in previously approved work plans.

Considerable discussion took place regarding the nature of the asphalt/gravel pile, its likely relationship to the asphalt roads in Vieques, and the likelihood of finding asphalt-related constituents (i.e., BTEX, PAHs) associated with road-building materials. One of the stated regulatory concerns is that when the gravel/asphalt material was stockpiled, solvents may have been used to clean the truck bed. Based on this concern, Jeff Harlow/NAVFAC proposed to collect the samples proposed by the regulators, but to analyze them for constituents not related to road-building materials (i.e., VOCs less BTEX, and SVOCs less PAHs). Mindy Pensak provided some feedback from EPA personnel that suggested relatively high levels of PAHs are found in the soil adjacent to asphalt roads. EPA took an action to discuss among the regulatory agencies the applicability of BTEX and PAHs to the proposed sampling associated with the asphalt/gravel pile. Additional discussion among the Subcommittee members will be necessary to make a final determination on the need for sampling and, if so, the analytical protocol.

PI/PAOC Sites Not Included in Phase I RFI Work Plan

The Subcommittee discussed the background information, the Navy's proposed path forward, and the regulatory agencies' positions regarding the proposed path forward for several PI/PAOC sites that were not proposed for further investigation in the Phase I RFI Work Plan. The discussion utilized a table prepared by CH2M HILL that listed each PI/PAOC site, a brief description, the EBS sampling results (as applicable), the EBS recommendation, the Phase I RFI Report recommendation, and regulatory comments made on the recommendation.

A number of sites (PI-13, 14, 18, 19, PAOC EE, FF) are proposed for an MEC inspection. If the MEC inspection does not identify the presence of MEC, the sites are recommended for NFA. If MEC is identified, the sites are recommended for transfer to the MRP. EPA requested that clarification of how the MEC inspections are to be conducted be provided because EPA is not comfortable with a visual inspection being the only means of verifying the presence/absence of MEC (if that is what an "MEC inspection" means). CH2M HILL will provide clarification of how the MEC inspection is to be conducted.

A number of sites (PI-1, 2, 3, 9, 15, 16, 17, PAOC Y, Z, AA, BB, CC, DD) are proposed for transfer to the MRP. EPA and EQB concur conceptually with this proposal under the assumption that after/during the MRP, the same environmental evaluation process that is being done for other PI/PAOC sites is done for the sites transferred to the MRP.

For PI-5, it was concurred that the photographs in the EBS appendix will be re-evaluated to determine what potential sources are present. A figure will be prepared that shows the relative relationship of the areas noted and distributed to the Subcommittee to determine if/where samples need to be collected.

For PI-6, EPA wants a minimum of four surface soil samples (0 to 1 foot) around the pad (one on each side) analyzed for PCBs because EPA does not consider wipe samples sufficient for making an assessment of the presence/absence of contamination. In addition, EPA requested a better figure for PI-6 that is larger scale and shows site features. Based on the revised figure, EPA may request additional samples.

For PI-11, further evaluation of this site is warranted. Piping is underground; however, only surface soil samples were collected during the EBS.

For PI-12, FWS is concerned that although the site was a residence prior to the 1940s, that it was being maintained (e.g., vegetation mowed) into the 1980s for some unknown reason. If historical knowledge of the activities cannot be found, FWS suggests a site reconnaissance be done to select sample locations to verify no releases occurred.

For PI-20, EPA/EQB recommended a site reconnaissance be performed to attempt to locate the debris area at the location of the 1964 photograph, including the use of a shovel.

Because there is discrepancy among the various regulatory agency members (and between the agency members and the Navy) regarding the need for and scope of sampling at the various PI/PAOC sites and because regulatory comments on the EBS were not taken into consideration in making the recommendations for the PI/PAOC sites, further discussion on the PI/PAOC sites was deferred until the next Subcommittee Meeting.

Upcoming Technical Subcommittee Meeting

The Subcommittee set the following tentative date (and potential agenda topic) for the next Subcommittee Meeting:

August 16 and 17, 2005 - PI/PAOC sites

ATTACHMENT D

**Final Meeting Minutes – Vieques Technical
Subcommittee Meeting, October 11, 2005
(CH2M HILL, October 16, 2005)**

Final Meeting Minutes - Vieques Technical Subcommittee Conference Call, October 11, 2005

ATTENDEES:

Yarissa Martinez/PREQB
Wilmarie Rivera/PREQB
Katarina Rutkowski/TRC
Diana Cutt/EPA
Danny Rodriguez/EPA
Mindy Pensak/EPA
Sergio Lopez/EPA
Oscar Diaz/FWS
Felix Lopez/FWS
Dianne Wehner/Ridolfi
Jeff Harlow/NAVFAC
Chris Penny/NAVFAC
Jennifer Ottoson/CH2M HILL
Brett Doerr/CH2M HILL

FROM: G. Brett Doerr/CH2M HILL-VBO

DATE: October 16, 2005

This document summarizes the discussions during the Vieques Technical Subcommittee conference call held on October 11, 2005. Topics discussed during the meeting comprised:

1. Outstanding topics on Former NASD AOC E and I Draft Final Supplemental RI Work Plans
2. Site reconnaissance performed at Former VNTR PI-7 and proposed technical approach for the PA/SI
3. Other outstanding topics on Former VNTR PI/PAOC Draft Final PA/SI Work Plan
4. Outstanding topics on Former NASD AOC R Draft Final RI Work Plan

AOC E and I Draft Final Supplemental RI Work Plans

It was noted that not all of the analytical methods in the work plans were the most current. The text/tables of the work plan will be modified to ensure the most current analytical methods being utilized by laboratories are shown. However, it should be noted that the groundwater analytical methods shown in the AOC E Work Plan reflect the methods that were current when the samples were collected, so they will not be revised.

The AOC E Work Plan proposed collecting additional groundwater samples for only TPH-ORO to supplement existing groundwater TPH results (i.e., GRO and DRO). The team

agreed to analyze all groundwater samples collected during the upcoming fieldwork for the full TPH suite (i.e., TPH-GRO/DRO/ORO).

Total dissolved solids (TDS) analysis will be added for groundwater samples at these sites in order to help determine whether the groundwater is considered potable.

PI-7 Site Reconnaissance and Proposed Sampling Approach

The results of the PI-7 site reconnaissance were discussed, specifically focusing on the figures showing the area of site reconnaissance and the observations made. Referring to the work plan figures showing the site reconnaissance findings and proposed sampling (Figures 2-4, 2-5, and 2-6), the following clarifications/changes were concurred upon:

- To avoid the misconception that the boundaries shown in the figures represent formal site boundaries, the legend descriptors will be changed to “areas” rather than “boundaries.”
- It was concurred that in addition to the sampling to be conducted during the PA/SI, additional site reconnaissance will be performed. Prior to performing the additional reconnaissance, historical aerial photographs and LIDAR results will be evaluated, together with additional information provided by FWS, and the proposed area of reconnaissance provided to the Technical Subcommittee for review. The area will include a debris area identified by Oscar Diaz in the northern part of the site.
- During the PA/SI sampling activities, a shovel will be used in an attempt to identify the subsurface anomalies shown in Figures 2-4, 2-5, and 2-6. If any of them are identified as a potential source of contamination from historical waste disposal practices, additional surface/subsurface soil samples will be collected at their locations. A notation about contingency samples will be added to the work plan.
- In Figure 2-5, one of the soil samples adjacent to the drum location will be revised to be a surface soil, subsurface soil, and monitoring well location.
- In Figure 2-6, the two small white dots in the northwest quadrant of the figure were actually subsurface anomalies located within several feet of each other. The dots will be changed to co-located red dots in the revised figure and the soil samples shown adjacent to them will be removed.
- It was agreed that the soil samples to be collected and monitoring wells to be installed at the drum piles will be installed as close to (or within) the drum piles as possible. The text will be revised to reflect this information and Figure 2-6 will be revised to show the dots closer to drum piles.
- In Figure 2-6, an additional surface/subsurface soil sample will be added adjacent to the east side of the easternmost white dot labeled “Approx. 10 drums.”
- It was agreed that if the drums can be moved in order to sample under them, that this is the preferable sampling approach.

8 PI/PAOC Sites Draft Final PA/SI Work Plan

- The last paragraph in Section 3.2.2 will be revised as follows:

“Subsurface soil samples will be collected using the hollow stem auger drilling method with a 3-inch-diameter stainless steel split spoon. At each location, continuous split-spoon samples will be collected from ground surface to bedrock or the water table, whichever is shallower. Subsurface soil samples will be collected for analysis as follows:

- At each location, a subsurface soil sample will be collected in a 2-ft interval within the 2 to 6 ft zone, based on where visual and/or OVA screening suggests the presence of contamination. In the absence of visual or screening evidence of potential contamination, the subsurface soil sample will be collected from the 4 to 6-ft interval (or just above the water table or bedrock, if encountered before this depth).
- If bedrock is found deeper than 6 feet, and if contamination is suspected below 6 feet, based on visual and/or OVA screening, an additional subsurface soil sample will be collected from the interval where the highest level of contamination is suspected.”
- In the second paragraph of Section 2, regarding elimination of herbicides from the analytical protocol, text will be added that indicates there is no historical information that suggests there was disposal of herbicides at the 8 PI/PAOC sites included in this investigation.
- In the last paragraph before Section 1.1, the text about acute and chronic hazards will be removed and the last two sentences combined to read: “It is noted that if there are relatively few exceedances of screening criteria in the PA/SI data and the magnitude of the exceedances is small, professional judgment, in coordination with discussion among the stakeholder agencies, will be used to determine if several additional samples may be adequate to make risk management decisions for a particular site (including the need for a full RI).”

AOC R Draft Final RI Work Plan

It was concurred that the same change to the subsurface sampling protocol described above will be made to the AOC R Work Plan.

It was noted that some of the guidance documents referenced have had more recent versions published. It was further noted that the documents referenced were current at the time the work plan was submitted. It was concurred that text will be added to the work plan that states the most current versions of the guidance documents will be used during report preparation.

In Figure 3-1, the plants and animals will be removed as receptors for subsurface soil. In addition, the term “ditch” in the legend will be renamed “ephemeral stream” to be consistent with the text of the work plan.

In the third paragraph in Section 3.3, where it refers to the use of the Puerto Rico Water Quality Standards, text will be added that other criteria will be used (e.g., AWQC) if Puerto Rico Water Quality Standards are not available for particular constituents.

In Section 4.2.3, for NDARMW06, “100 feet north” will be removed from the bullet to indicate that the well is at the immediate downgradient edge of the target area.

Katarina Rutkowski will e-mail requested revisions for Table 5-1.

Mindy Pensak will e-mail additional ecological comments.