Baker

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September 9, 2004

U.S. Environmental Protection Agency - Region II
290 Broadway – 22nd Floor
New York, New York 10007-1866

Attn: Mr. Adolph Everett, P.E.
Chief, RCRA Programs Branch

Re: Contract N62470-95-D-6007
Navy CLEAN, District III
Contract Task Order (CTO) 0271
U.S. Naval Activity Puerto Rico (NAPR), Ceiba, PR
RCRA/HSWA Permit No. PR2170027203
Navy Responses to EPA Comments Dated August 20, 2004 on the Additional Data Collection Work Plan for SWMUs 1 and 2 dated July 23, 2004

Dear Mr. Everett:

Baker Environmental, Inc. (Baker), on behalf of the Navy, is providing you with the formal Navy response to comments on the EPA letter dated August 20, 2004 (Attachment 1). On August 26, 2004 the Navy submitted via e-mail preliminary responses to EPA comments for review. On September 7, 2004 via e-mail the EPA's contractor stated that the Navy's responses to all comments are acceptable.

The Navy response to comment 3 of the technical review indicates that Figure 1 from the July 23, 2004 Additional Data Collection Work Plan for SWMUs 1 and 2 needs to be revised. This revised figure is provided to you as Attachment 2 to this letter to finalize the work plan. Revised text of the work plan is also submitted as Attachment 2 due to a typographical error on the amount of subsurface soil samples to be collected from SWMU 1. The text read 3 subsurface soil samples when it actually should have been 8 subsurface soil samples. A revision to Table 1 of the work plan is also submitted as Attachment 2 due to di-n-butylphthalate being removed from the footnotes as described in the Navy response to comment 6 of the technical review. Please replace the text, Table 1, and Figure 1 from the July 23, 2004 submission with the revised text, Table 1, and Figure 1 provided as Attachment 2 to this letter.

If you have questions regarding this submittal, please contact Mr. Kevin Cloe, P.E. at (757) 322-4736. Additional distribution has been made as indicated below.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Mark E. Kimes, P.E.
Activity Manager

MEK/lp
Attachments

cc: Mr. Kevin R. Cloe, LANTDIV - Code EV24KC (1 hard copy and 1 e-copy via e-mail)
Mr. Peter Cummings, LANTDIV – Code AQ114 (letter only)
Ms. Madeline Rivera, NSRR (1 hard copy and 1 e-copy via e-mail)
Mr. Tim Gordon, US EPA Region II (1 hard copy and 1 e-copy via e-mail)
Ms. Kathy Rogovin, Booz Allen & Hamilton (1 e-copy via e-mail)
Mr. Carl Soderberg, US EPA Caribbean Office (1 hard copy)
Mr. Julio I. Rodriguez Colon, PR EQB (1 hard copy)
Mr. John Tomik, CH2M Hill Virginia Beach (1 e-copy via e-mail)

ATTACHMENT 1

NAVY RESPONSES TO EPA COMMENTS DATED AUGUST 20, 2004 ON THE ADDITIONAL DATA COLLECTION EFFORT WORK PLAN FOR SWMUs 1 AND 2 DATED JULY 23, 2004

NAVY RESPONSE TO EPA COMMENTS DATED AUGUST 20, 2004 ON THE ADITIONAL DATA COLLECTION EFFORT WORK PLAN FOR SWMUs 1 AND 2 DATED JULY 23, 2004

EPA REGION II COMMENTS

Additional Data Collection Work Plan for SWMUs 1 & 2

EPA has several comments on the *Additional Data Collection Work Plan for SWMUs 1 & 2* also submitted on July 23. As discussed in the enclosed Technical Review, EPA recommends that additional pesticide, metals, and dioxin/furan samples also be collected. EPA requests that, if possible, the additional samples needed be collected during implementation of the sample collection under the *Additional Data Collection Work Plan*. However, since it is EPA's understanding that the Navy intends to implement the field work in the *Additional Data Collection Work Plan* during September, 2004, the additional sampling EPA recommends may not be completed as part of that work.

If the recommended additional samples are not collected when the Navy implements its field activities under the *Additional Data Collection Work Plan*, then please submit, within thirty days of your receipt of this letter, either: a) a supplemental work plan to gather the additional samples recommended in the enclosed Technical Review, and responses regarding all other issues raised in the enclosed Technical Review comments; or b) a written reply as to why the Navy considers the additional sampling recommended in the enclosed Technical Review to be unnecessary, along with written responses regarding any other issues raised in the enclosed Technical Review.

Navy Response: *Please see the responses to the comments in the technical review provided below. It is the intent of the Navy to incorporate the changes identified in the response to comments below during the upcoming field investigation to be initiated at the end of September.*

BOOZ ALLEN & HAMILTON INC.
TECHNICAL REVIEW OF THE ADDITIONAL, DATA COLLECTION EFFORT WORK PLAN FOR SWMU 1 AND 2

I. SWMU 1 - Army Cremator Disposal Site

Surface and Subsurface Soil Sampling

1. Verify that sample location 1 SS08 has been previously analyzed for pesticides, and that no pesticides were reported above ecological levels of concern. If this sample location has not been tested for pesticides, the proposed surface soil sample from location 1SS12 should be analyzed for pesticides to delineate the eastern edge of pesticide impacts detected at 1SD0l.

   Navy Response: *The Navy offers the following points of clarification relative to this comment. As shown in Appendix G.1 (page 12 of 14) of the Draft Additional Data Collection Report and Screening-Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment At SWMUs 1 and 2, Naval Station Roosevelt Roads, Ceiba, Puerto Rico (Baker, 2004b), pesticides were not detected in the 1SS08 surface soil sample. Due to this fact, the additional data collection effort work plan for SWMUs 1 and 2 did not specify pesticide analyses*

for the 1SS12 surface soil sample. As such, the Navy believes that further action related to this comment is not necessary.

2 Historical and proposed sampling locations will contribute to delineation of pesticide contamination in soil around sample locations 1SS06 and 1SS03. However, even after the proposed investigation is implemented, no information will be available to delineate the extent of pesticide contamination west of sample location 1 SS06. At least one additional pesticide sample should be collected along the edge of the SWMU boundary in this location.

Navy Response: *The Navy disagrees with this comment. As evidenced by Figure 1 of the additional data collection effort work plan for SWMUs 1 and 2, three surface soil samples (1SS04, 1SS05, and 1SB02) were collected upgradient (northwest) of 1SB03 during the 1996 RFI field investigation. One additional surface soil sample (1MW04) and one subsurface soil sample (05SS128) also were collected southwest of 1SB03 during the 1996 RFI and 1992 Supplemental Investigation respectively. Detected pesticide concentrations in these five samples are listed in the table below.*

Pesticide	*1SS04 (ug/kg)*	*1SS05 (ug/kg)*	*1SB02 (ug/kg)*	*1MW04 (ug/kg)*	*05SS128 (ug/kg)*
4,4'-DDD	*10 U*	*9.6 U*	*9.7 U*	*9.4 U*	*0.26 J*
4,4'-DDE	*1.7 J*	*1.6 J*	*9.7 U*	*7.4*	*2.2 J*
4,4'-DDT	*1.2 J*	*3.6*	*1.2 J*	*14*	*2.9 J*

Based on the locations of 1SS04, 1SS05, 1SB02, 1MW04, and 05SS128 relative to 1SB03 (especially 1SS04, 1SS05, and 1SB02, which are located upgradient from 1SB03), as well as the pesticide concentrations reported for these five samples (see table above) the Navy does not believe additional sampling west of 1SB03 is warranted. As such, the Navy believes that further action related to this comment is not necessary.

3. Historical data show higher levels of 4,4'-DDT in subsurface soil (1 - 2 feet below ground surface [bgs]) than recorded for surface soil (0 - 1 ft bgs) at SWMU 1 (sampling location 05SS103). In fact, surface soil samples frequently indicated nondetected concentrations for this pesticide. To ensure that the highest contaminant concentrations are captured during the proposed investigation, pesticide sample locations currently proposed for surface soil sampling only should be changed to include both surface and subsurface soil sampling, particularly in the southwestern corner of SWMU 1.

Navy Response: *The Navy agrees with this comment and offers the following point of clarification. Proposed surface/subsurface soil sample locations ISS15, 1SS16, and 1SS17 were placed incorrectly on Figure 1 of the Work Plan. It was the Navy's intention to depict their locations downgradient from 05SS103, not 05SS101. Figure 1 of the Work Plan will be revised to show the intended locations of 1SS15, 1SS16, and 1SS17. Beyond revision of the figure, the Navy believes that further action related to this comment is not necessary.*

4. Although dioxins and furans were previously detected in surface soil samples from locations lSD0l and 1SD02, no subsurface investigation has been completed. To verify that the maximum dioxin and furan concentrations have been identified, expand the proposed scope of investigation to include collection of subsurface soil samples in the area (e.g., at proposed sample locations lSS10 and 1SS13).

Navy Response: *The Navy disagrees with this comment and offers the following points of clarification. First of all, the maximum 2,3,7,8-TCDD equivalent surface soil concentration at SWMU 1 (0.923 ug/kg) is three orders of magnitude below the surface soil screening value for 2,3,7,8-TCDD (500 ug/kg [USEPA, 1999]). As such, even if the maximum dioxin/furan equivalent concentration at SWMU 1 occurs in subsurface soil, it is not likely that concentrations would exceed the surface soil screening value. Secondly, the Step 3a risk calculation for SWMU 1 terrestrial food web exposures showed that potential risks from dietary exposures to dioxin/furan chemicals were limited to the American robin (Baker, 2004b). Terrestrial avian omnivores are not likely to experience any significant exposure to chemicals in subsurface soil (i.e., surface soil greater than 1 foot below ground surface [bgs]). Although not quantitatively evaluated in the ERA at SWMU 1, burrowing reptiles would be expected to experience the most significant exposure to chemicals in SWMU 1 subsurface soil. However, dioxin/furan chemicals are not known or suspected to be of concern via dermal adsorption (USEPA, 2000). Scale coverings would also be expected to offer protection from potential exposures via dermal adsorption. Given that reptiles do not exhibit cleaning/preening activities, incidental ingestion of subsurface soil also is expected to be insignificant relative to dietary food exposures. Finally, the surface soil samples previously collected at SWMU 1 were not analyzed for specific dioxin/furan congeners. As such, there is no evidence that the toxic dioxin/furan congeners are even present in SWMU 1 surface soil or subsurface soil. Based on the discussion presented above, the Navy does not believe that subsurface soil samples at 1SS10 and 1SS13 are warranted. As such, the Navy believes that further action related to this comment is not necessary.*

Estuarine Wetland System Sediment Sampling

5. To fully delineate pesticide contamination in the vicinity of sample location 1EWS06, at least one additional sample should be collected to the southeast for pesticide analysis.

Navy Response*: The Navy disagrees with this comment and offers the following points of clarification. 4,4-DDE was detected at 1EWSSD06 at 24 J ug/kg (4,4'-DDD and 4,4'-DDT were not detected at this estuarine wetland sediment sampling location). These results compare to detected 4,4'DDD and 4,4'-DDE concentrations of 63 J ug/kg and 250 J ug/kg, respectively at 1EWSSD01 and 190 ug/kg and 130 J ug/kg, respectively at 1EWSSD01. Based on the detected pesticide concentrations at 1EWSSD06 relative to the detected concentrations at 1EWSSD01 and 1EWSSD02, the Navy believes that the proposed sediment sampling program will adequately delineate the extent of 4,4'-DDE and 4,4'-DDD concentrations downgradient from locations of maximum detections. As such, the Navy believes that further action related to this comment is not necessary.*

Open Water Marine Sediment Sampling

6. Di-n-butylphthalate (DNBP) has historically been reported in sediment from sampling locations 1OW02 and 1OW06; however, no follow-up investigation is proposed. Because this constituent is a common laboratory artifact, it is possible that the "detected" contamination may not reflect actual site conditions. Review available data to determine if DNBP results are associated with laboratory contamination, or expand the proposed scope of investigation to include additional semi-volatile organic compound (SVOC) sampling in the southeastern corner of SWMU 1.

Navy Response: *The Navy disagrees with this comment and offers the following points of clarification. Di-n-butylphthalate was not detected in SWMU 1 surface soil or subsurface soil (Baker, 2004b). These data indicate that this SVOC is not site-related. Furthermore, the maximum detected concentration (610 J ug/kg at 1OW02) is well below a Sediment Quality Benchmark (SQB) of 11,000 ug/kg reported by the USEPA (USEPA, 1996). Based on the absence of detections in SWMU 1 surface and subsurface soil and the comparison of the maximum detected concentration to a SQB reported by the USEPA (1996), the Navy does not believe that the proposed scope of investigation requires the inclusion of SVOC sampling in the southeastern corner of SWMU 1. As such, the Navy believes that further action related to this comment is not necessary.*

7. Although the absence of arsenic detections in SWMU 1 estuarine sediment does support the Navy's argument, the Navy should develop additional evidence that arsenic in SWMU 1 open water sediment is not site related because: 1) the magnitude of the arsenic hazard quotient for the West Indian manatee is quite high, and 2) detected site concentrations of arsenic are two to three times greater than detected background concentrations, It appears that the Navy's background sampling program may not have adequately captured anthropogenic contamination from sources that are not site related. The Navy should discuss potential inadequacies of the background sampling program, and consider expanding it to demonstrate that arsenic in SWMU 1 sediment is not site related.

   Navy Response*: Although the Navy believes sufficient evidence was presented in the Draft Additional Data Collection Report and Screening-Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment at SWMUs 1 and 2, Naval Station Roosevelt Roads, Ceiba, Puerto Rico (Baker, 2004b) and the responses to USEPA comments dated July 23, 2004, the report (Baker, 2004b) will be revised to include additional information supporting a recommendation of no further investigation.*

8. Based on discussions with the Navy during an August 3,2004, conference call, it is understood that mercury and selenium were also identified as potential risk drivers to the manatee based on revised risk calculations. The Navy indicated, however, that the magnitude of these risks was very low (i.e., a hazard quotient [HQ] < 2), and available background and site data indicate that no release of mercury or selenium has occurred. Accordingly, the Navy is not proposing additional sampling for these metals in the open water sediment.

   Navy Response: *The Navy agrees with the summary of discussions provided above from the August 3, 2004 conference call. Additional sampling for these metals in Ensenada Honda sediment is not warranted. As such, the Navy believes that further action related to this comment is not necessary.*

SWMU 2 - Langley Drive Disposal Site

Surface and Subsurface Soil Sampling

9. Although dioxins and furans were previously detected in the surface soil sample from location 2SB03, no subsurface investigation was completed or proposed. To verify that the maximum dioxin and furan concentrations have been identified, expand the proposed scope to include collection of subsurface soil samples at locations 2SS01 through 2SS04.

Navy Response: *The Navy disagrees with this comment and offers the following points of clarification. First of all, the maximum 2,3,7,8-TCDD equivalent surface soil concentration at SWMU 2 (0.505 ug/kg) is three orders of magnitude below the surface soil screening value for 2,3,7,8-TCDD (500 ug/kg [USEPA, 1999]). As such, even if the maximum dioxin/furan equivalent concentration at SWMU 2 occurs in subsurface soil, it is not likely that concentrations would exceed the surface soil screening value. Secondly, the Step 3a risk calculation for SWMU 2 terrestrial food web exposures showed that potential risks from dietary exposures to dioxin/furan chemicals were limited to the American robin (Baker, 2004b). Terrestrial avian omnivores are not likely to experience any significant exposure to chemicals in subsurface soil (i.e., surface soil greater than 1 foot bgs). Although not quantitatively evaluated in the ERA at SWMU 2, burrowing reptiles would be expected to experience the most significant exposure to chemicals in SWMU 2 subsurface soil. However, dioxin/furan chemicals are not known or suspected to be of concern via dermal adsorption (USEPA, 2000). Scale coverings also would be expected to offer protection from potential exposures via dermal adsorption. Furthermore, given that reptiles do not exhibit cleaning/preening activities, incidental ingestion of subsurface soil also is expected to be insignificant relative to dietary food exposures. Finally, the surface soil samples previously collected at SWMU 2 were not analyzed for specific dioxin/furan congeners. As such, there is no evidence that the toxic dioxin/furan congeners are even present in SWMU 2 surface soil or subsurface soil. Based on the discussion presented above, the Navy does not believe that subsurface soil samples at 2SS02 and 2SS04 are warranted, and no further action related to this comment will be taken.*

10. Metals exceedances have historically been detected in surface soil samples from location 2SB05. While it appears that these impacts will be adequately delineated in surface soil during the proposed investigation, vertical delineation has not been addressed to the south or west. To ensure that the maximum concentration has been identified, subsurface soil samples should also be collected in this area (e.g., at locations 2SS09, 2SSll, 2SS12, and 2SS14) for metals analysis.

    Navy Response: *The Navy disagrees with this comment and offers the following points of clarification. First of all, the 0 to 1-foot depth range is the most active biological zone (most soil heterotrophic activity occurs within the surface soil and soil invertebrates occur on the surface or within the oxidized root zone [Suter II, 1995]). As such, subsurface soil is not expected to represent a significant exposure point relative to surface soil. While surface and subsurface soil samples were proposed at locations 2SS01 through 2SS08, this decision was based on the uncertainty associated with the existing data. Specifically, soils at location 06SS103 were sampled from 0 to 0.5 feet and 0.5 to 1.5 feet bgs, while soils at location 06SS101 were sampled from 0.5 to 1.5 and 1.5 to 2.67 feet bgs. The proposed sampling and analytical program at 2SS01 through 2SS08 will determine if the observed contamination in the vicinity of 06SS101 and 06SS103 is present within surface soil (i.e., 0 to 1.0 feet bgs) or subsurface soil (1.0 to 2.0 feet bgs).*

Open Water System Sediment Sampling

11. See Comments 7 and 8.

    Navy Response: *Please see the responses to Comment Nos. 7 and 8*

References For Navy Responses:

Baker Environmental, Inc. (Baker). 2004a. Draft Additional Data Collection Report and Screening-Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment at SWMUs 1 and 2, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. Coraopolis, Pennsylvania. January 30, 2004.

Baker Environmental, Inc. (Baker). 2004b. Draft Additional Data Collection Report and Screening-Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment at SWMU 45, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. Coraopolis, Pennsylvania. February 13, 2004.

Suter II, G.W. 1995. Guide for Performing Screening Ecological Risk Assessments at DOE Facilities. Oak Ridge National Laboratory, Environmental Restoration Division, ORNL Environmental Restoration Program. ES/ER/TM-153.

USEPA. 1996b. Ecotox Thresholds. Eco Update, Volume 3, Number 2. Office of Solid Waste and Emergency Response, Washington, D.C. EPA 540/F-95/038.

ATTACHMENT 2
REVISIONS TO ADDITIONAL DATA COLLECTION EFFORT
WORK PLAN FOR SWMUs 1 AND 2

ATTACHMENT 2
ADDITIONAL DATA COLLECTION EFFORT
SWMUs 1 AND 2
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO
SEPTEMBER 9, 2004

Purpose

This brief work plan provides the proposed sample locations and sample analyses for the additional data collection effort at SWMUs 1 and 2 in support of the baseline ecological risk assessment. The information provided in this document is compiled from the information provided in the Draft Screening Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment for SWMUs 1 and 2 (Baker, 2004) and the Navy Responses to EPA Comments Dated April 9, 2004 on the Draft Additional Data Collection Report and Screening Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment at SWMUs 1 and 2 dated February 13, 2004.

The objective of this additional data collection effort is listed in the following bulleted items:

- Establish nature and extent,
- Establish and/or verify that maximum concentrations have been captured,
- Reduce uncertainties with existing analytical data,
- Establish a final list of potential ecological risk drivers for evaluation in the baseline ERA, and
- Collect data for evaluation of chemical bioavailability.

All of the work proposed in this document will be conducted in accordance with the procedures outlined in the EPA approved Additional Data Collection Work Plan in Support of Ecological Risk Assessment at SWMUs 1 and 2 (Baker, 2001). The proposed sample locations and analysis for the collection of soil and sediment samples at SWMUs 1 and 2 for this additional data collection effort is provided below. The following sections identify the steps to be performed in the field to address these data needs in the following subsections.

Proposed Sampling

The sampling methodology to be employed at these sites consist of obtaining surface soil samples from a depth of 0 to 1 foot bgs utilizing a stainless steel hand auger and/or stainless steel spoon. The subsurface soil samples are to be collected from a depth of 1 to 2 feet bgs utilizing a stainless steel spoon and stainless steel hand auger. All sediment samples will be obtained from a depth of 0 to 4" bgs utilizing either an acetate sediment core liner and/or stainless steel spoon. Detailed sampling procedures are provided in the above referenced work plan for inclusion into this data collection effort.

SWMU 1

It is proposed that eleven surface soil and 8 subsurface soil samples be collected from SWMU 1 to assist in meeting the objectives described above. Figure 1 shows the proposed locations for obtaining these soil samples. Table 1 provides the requested analysis for each of the samples along with the QA/QC samples.

Sediment sampling is proposed from the estuarine wetland sediment system from SWMU 1. A total of eleven sediment samples are proposed to be collected for analysis from the top 4 inches of sediment as shown in Table 1. Figure 2 shows the proposed sampling locations from the estuarine wetland system.

Three open water sediment sample locations are identified on Figure 3 to address data needs from open water sediment sample location 1OW05. These samples are to be analyzed for seven different SVOCs as listed in Table 1 and total organic carbon.

SWMU 2

It is proposed that 14 surface soil and 8 subsurface soil samples be collected from SWMU 2 to assist in meeting the objectives described above. Figure 4 shows the proposed locations for obtaining these soil samples. Table 1 provides the requested analysis for each of the samples along with the QA/QC samples.

Sediment sampling is proposed from the estuarine wetland sediment system from SWMU 2. A total of ten sediment samples are proposed to be collected for analysis from the top 4 inches of sediment as shown in Table 1. Figure 5 shows the proposed sampling locations from the estuarine wetland system.

QA/QC

QA/QC samples are proposed for this investigation in accordance with the procedures outlined in the above referenced work plan. Duplicate, matrix spike, matrix spike duplicates, field blanks, and equipment rinsate samples are listed on Table 1 along with the requested analysis.

Reporting

Upon receipt of the validated analytical data from this additional data collection effort the Draft Screening Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment for SWMUs 1 and 2 (Baker, 2004) will be revised to include all the new data and other modifications as outlined in the Navy Response to EPA Comments on April 9, 2004.

References

Baker Environmental, Inc. (Baker). 2004. Draft Screening Level Ecological Risk Assessment and Step 3a of the Baseline Ecological Risk Assessment for SWMUs 1 and 2, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. Moon Township, Pennsylvania. February 13, 2004.

Baker. 2001. Draft Additional Data Collection Work Plan in Support of Ecological Risk Assessment at SWMUs 1 and 2, Naval Station Roosevelt Roads, Ceiba, Puerto Rico. Coraopolis, Pennsylvania. August 10, 20

TABLE 1
PROPOSED SAMPLE MATRIX
SWMUs 1 AND 2 ADDITIONAL DATA COLLECTION

		Solid Samples										Aqueous Samples					
		Analysis Reguested										Analysis Reguested					
Sample ID	Sample Depth (bgs)	Cu, Sn	Pb, Hg, Cu, An, Zn	An, Cd, Cu, Pb, Hg, Ni, Sn, Zn	Pb, Hg, Cu	Copper	SVOCs[1] (8270C)	TOC (9060)	Pesticides[2] (8081A)	Dioxins/Furans (8290)	AVS/SEM	Metals	SVOCs[1] (8270)	Pesticides[2] (8081A)	Dioxins/Furans (8290)	Previous Sample Location Reference	Comments
SWMU 1																	
Soil																	
1SS09	0-1'			X					X	X						1SD02	Surface Soil
1SS09D	0-1'			X					X	X						1SD02	Duplicate
1SS09MS/MSD	0-1'			X					X	X						1SD02	Matrix Spike/ Matrix Spike Duplicate
1SS10	0-1'			X					X	X						1SD02	Surface Soil
1SS11	0-1'			X					X	X						1SD02, 1SS07	Surface Soil
1SS12	0-1'			X						X						1SD01	Surface Soil
1SS13	0-1'			X					X	X						1SD01, 1SS07	Surface Soil
1SS14	0-1'			X					X	X						1SD01, 1SS07	Surface Soil
1SS15	0-1'								X							05SS101	Surface Soil
1SB15-01	1-2'								X							05SS101	Subsurface Soil
1SS16	0-1'								X							05SS101	Surface Soil
1SB16-01	1-2'								X							05SS101	Subsurface Soil
1SS17	0-1'								X							05SS101	Surface Soil
1SB17-01	1-2'								X							05SS101	Subsurface Soil
1SS18	0-1'								X							1SB03, 1SS06	Surface Soil
1SS18D	0-1'								X							1SB03, 1SS06	Duplicate
1SS19	0-1'								X							1SB03, 1SS06	Surface Soil
Open Water System Sediment																	
1OWSD10	0-4"						X	X								1OWSD05	
1OWSD10D	0-4"						X	X								1OWSD05	Duplicate
1OWSD10MS/MSD	0-4"						X	X								1OWSD05	Matrix Spike/ Matrix Spike Duplicate
1OWSD11	0-4"						X	X								1OWSD05	
1OWSD12	0-4"						X	X								1OWSD05	
Estuarine Wetland System Sediment																	
1EWSD10	0-4"	X						X	X		X					1EWSD01	
1EWSD10D	0-4"	X						X	X		X					1EWSD01	Duplicate
1EWSD10MS/MSD	0-4"	X						X	X		X					1EWSD01	Matrix Spike/ Matrix Spike Duplicate
1EWSD11	0-4"	X						X	X		X					1EWSD01	
1EWSD12	0-4"	X						X	X		X					1EWSD01	
1EWSD13	0-4"					X		X	X		X					1EWSD02	
1EWSD14	0-4"					X		X	X		X					1EWSD02	
1EWSD15	0-4"					X					X					1EWSD05	
1EWSD16	0-4"					X					X					1EWSD05	
1EWSD17	0-4"					X					X					1EWSD05	
1EWSD18	0-4"					X					X					1EWSD05	
1EWSD19	0-4"					X					X					1EWSD05	
1EWSD19D	0-4"					X					X					1EWSD05	Duplicate
1EWSD20	0-4"					X					X					1EWSD05	

Notes:

[1] - 2,4-dinitrotoluene, 2 -nitroaniline, 4-chlorophenyl ether, 4-nitroaniline, di-n-octylphthalate, and phenol.

[2] - 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD

TABLE 1
PROPOSED SAMPLE MATRIX
SWMUs 1 AND 2 ADDITIONAL DATA COLLECTION

		Solid Samples										Aqueous Samples					
		Analysis Reguested										Analysis Reguested					
Sample ID	Sample Depth (bgs)	Cu, Sn	Pb, Hg, Cu, An, Zn	An, Cd, Cu, Pb, Hg, Ni, Sn, Zn	Pb, Hg, Cu	Copper	SVOCs[1] (8270C)	TOC (9060)	Pesticides[2] (8081A)	Dioxins/Furans (8290)	AVS/SEM	Metals	SVOCs[1] (8270)	Pesticides[2] (8081A)	Dioxins/Furans (8290)	Previous Sample Location Reference	Comments
SWMU 2																	
Soil																	
2SS01	0-1'		X							X						2SB03	Surface Soil
2SS01D			X							X						2SB03	Duplicate
2SS01MS/MSD			X							X						2SB03	Matrix Spike/ Matrix Spike Duplicate
2SS01-01	1-2'		X													2SB03	Subsurface Soil
2SS02	0-1'		X							X						2SB03	Surface Soil
2SS02-01	1-2'		X													2SB03	Subsurface Soil
2SS03	0-1'		X							X						2SB03	Surface Soil
2SS03-01	1-2'		X													2SB03	Subsurface Soil
2SS04	0-1'		X							X						2SB03	Surface Soil
2SS04-01	1-2'		X													2SB03	Subsurface Soil
2SS05	0-1'		X													2SB03	Surface Soil
2SS05-01	1-2'		X													2SB03	Subsurface Soil
2SS06	0-1'		X													2SB03	Surface Soil
2SS06D	0-1'		X													2SB03	Duplicate
2SS06-01	1-2'		X													2SB03	Subsurface Soil
2SS07	0-1'		X													2SB03	Surface Soil
2SS07-01	1-2'		X													2SB03	Subsurface Soil
2SS08	0-1'		X													2SB03	Surface Soil
2SS08-01	1-2'		X													2SB03	Subsurface Soil
2SS09	0-1'		X													2SD02, 2SD05	Surface Soil
2SS010	0-1'		X													2SD02, 2SD05	Surface Soil
2SS011	0-1'		X													2SD02, 2SD05	Surface Soil
2SS012	0-1'		X													2SD02, 2SD05	Surface Soil
2SS013	0-1'		X													2SD02, 2SD05	Surface Soil
2SS013D	0-1'		X													2SD02, 2SD05	Duplicate
2SS013MS/MSD	0-1'		X													2SD02, 2SD05	Matrix Spike/ Matrix Spike Duplicate
2SS014	0-1'		X													2SD02, 2SD05	Surface Soil
Estuarine Wetland System Sediment																	
2EWSD10	0-4"					X					X					2EWSD03	
2EWSD11	0-4"					X					X					2EWSD03	
2EWSD12	0-4"				X						X					2EWSD02	
2EWSD13	0-4"				X						X					2EWSD02	
2EWSD13D	0-4"				X						X					2EWSD02	Duplicate
2EWSD13MS/MSD	0-4"				X						X					2EWSD02	Matrix Spike/ Matrix Spike Duplicate
2EWSD14	0-4"				X						X					2EWSD02, 2EWSD06, 2EWSD01	
2EWSD15	0-4"				X						X					2EWSD06, 2EWSD01	
2EWSD16	0-4"				X						X					2EWSD06, 2EWSD01	
2EWSD17	0-4"				X						X					2EWSD06, 2EWSD01	
2EWSD18	0-4"				X						X					2EWSD06, 2EWSD01	
2EWSD19	0-4"				X						X					2EWSD06, 2EWSD01	

Notes:

[1] - 2,4-dinitrotoluene, 2 -nitroaniline, 4-chlorophenyl ether, 4-nitroaniline, di-n-octylphthalate, and phenol.

[2] - 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD

TABLE 1
PROPOSED SAMPLE MATRIX
SWMUs 1 AND 2 ADDITIONAL DATA COLLECTION

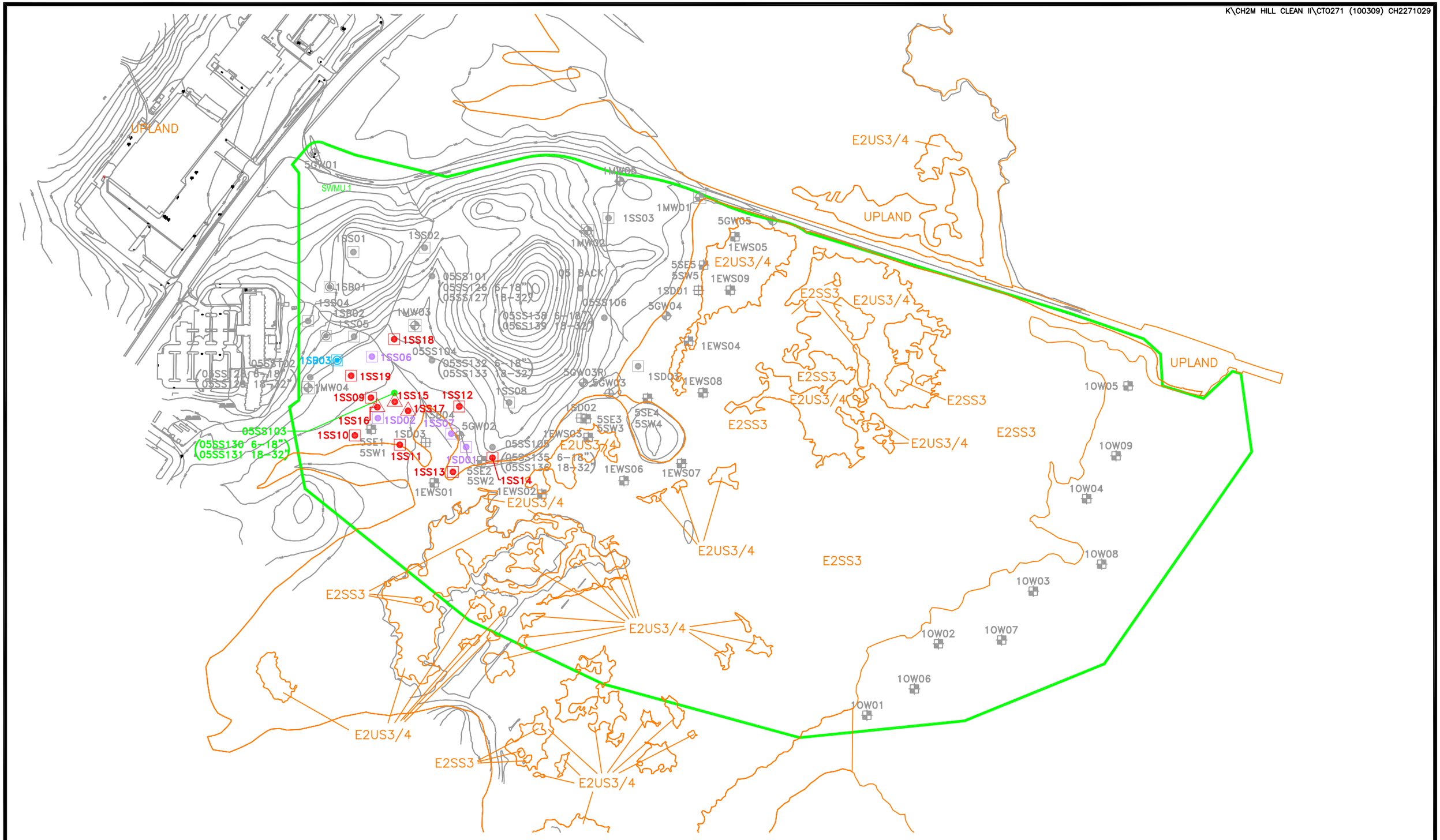
		Solid Samples										Aqueous Samples					
		Analysis Reguested										Analysis Reguested					
Sample ID	Sample Depth (bgs)	Cu, Sn	Pb, Hg, Cu, An, Zn	An, Cd, Cu, Pb, Hg, Ni, Sn, Zn	Pb, Hg, Cu	Copper	SVOCs[1] (8270C)	TOC (9060)	Pesticides[2] (8081A)	Dioxins/Furans (8290)	AVS/SEM	Metals	SVOCs[1] (8270)	Pesticides[2] (8081A)	Dioxins/Furans (8290)	Previous Sample Location Reference	Comments
QA/QC																	
Field Blanks																	
2005FB01												X	X	X	X		Lab Grade D.I. Water
Equipment Rinsates																	
2005ER01												X	X	X	X		S.S. Spoon
2005ER02												X		X	X		S.S. Hand Auger
2005ER03												X	X	X	X		Al Pie Pan
2005ER04												X	X	X			Sediment Core Liner

Notes:

[1] - 2,4-dinitrotoluene, 2 -nitroaniline, 4-chlorophenyl ether, 4-nitroaniline, di-n-octylphthalate, and phenol.

[2] - 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD

K\CH2M HILL CLEAN II\CTO271 (100309) CH2271029



LEGEND

- 1 – SWMU
- E2SS3 – E2SS3 WETLANDS BOUNDARIES (SEE FIGURE 4-4 FOR CLASSIFICATIONS)
- – REPORTED LOCATION OF 5GW03 (NOT LOCATED DURING 1996 RFI FIELD INVESTIGATION)
- – SEDIMENT SAMPLE LOCATION (RELATIVE RISK RANKING)
- – SURFACE WATER/SEDIMENT SAMPLE LOCATION (CONFIRMATION STUDY)
- – SOIL SAMPLE LOCATION (SUPPLEMENTAL INVESTIGATION)
- – SOIL BORING LOCATION (1996 RFI)
- – MONITOR WELL LOCATION (1996 RFI)
- – EXISTING MONITOR WELL LOCATION (CONFIRMATION STUDY)
- – SURFACE SOIL SAMPLE LOCATION (1996 RFI)
- – PROPOSED SURFACE SOIL SAMPLE LOCATION
- – PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

ESTUARINE WETLAND SYSTEM

- – SURFACE WATER/SEDIMENT SAMPLE LOCATION (ADDITIONAL DATA COLLECTION INVESTIGATION)

OPEN WATER MARINE

- – SURFACE WATER/SEDIMENT SAMPLE LOCATION (ADDITIONAL DATA COLLECTION INVESTIGATION)

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

350 0 175 350

1 inch = 350 ft.

Baker

FIGURE 1
PROPOSED SOIL SAMPLING LOCATIONS
SWMU 1 – ARMY CREMATOR DISPOSAL SITE

NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO