UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

SEP 17 2009

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Mark E. Davidson
US Navy
BRAC PMO SE
4130 Faber Place Drive
Suite 202
North Charleston, SC 29405

Re: Naval Activity Puerto Rico (NAPR), formerly Naval Station Roosevelt Roads, EPA I.D. Number PR2170027203,

1) SWMU 1 Draft Steps 6 and 7 of Baseline Ecological Risk Assessment, dated July 1, 2009;

2) SWMU 9 Area B Tank 214 Draft Full RCRA Facility Investigation Report, dated July 14, 2009

3) SWMU 62 (Former Bundy Disposal Area) Draft Phase I RFI Report, dated February 6, 2009

Dear Mr. Davidson:

This letter is addressed to you as the Navy's designated project coordinator pursuant to the January 29, 2007 RCRA Administrative Order on Consent ("the Consent Order") between the United States Environmental Protection Agency (EPA) and the U.S. Navy (the Navy).

EPA has completed its review of the above documents, and has the following comments:

SWMU 1 (Army Creator Disposal Site)Steps 6 and 7 of Baseline Ecological Risk Assessment

EPA has completed its review of the July 1, 2009 Report on Step 6 and 7 of the Baseline Ecological Risk Assessment (BERA) report, and has determined that several issues need to be clarified before the BERA report can be considered fully acceptable. As part of that review, EPA requested our consultant, TechLaw Inc., to review the BERA report. In addition, the Puerto Rico Environmental Quality Board (PREQB) in their letter dated August 7, 2009, has numerous

comments on the BERA report. Within 75 days of your receipt of this letter, please submit any revisions to the BERA report that are necessary to address the comments given in the enclosed Technical Review (dated August 26, 2009), and PREQB's letter of August 7, 2009.

In addition, while EPA concurs with the recommendation given in Section 6.2 of the report that an Interim Corrective Measure (ICM) is warranted for surface soils, no details on the proposed ICM are given in the report. Therefore, within 75 days of your receipt of this letter, please submit a complete ICM Work Plan for the proposed soil removal, including a schedule for implementation. Until an acceptable ICM work plan is submitted, EPA cannot give its approval for this ICM.

EPA also concurs with the recommendation given in Section 6.2 of the report that a Corrective Measures Study (CMS) is warranted. Therefore, within 75 days of your receipt of this letter, please submit a draft CMS work plan.

SWMU 9 Area B Tank 214 Draft Full RCRA Facility Investigation Report

EPA has completed its review of the SWMU 9 Area B Tank 214 Draft Full RCRA Facility Investigation Report (the Report), dated July 14, 2009. As part of that review, EPA requested our consultant, TechLaw Inc., to review the Report. TechLaw's comments are given in the enclosed Technical Review. Based on that review and its own review, EPA has determined that the extent of the contamination in the subsurface soils, groundwater, and estuarine wetland areas has not yet been fully delineated. In addition, the Puerto Rico Environmental Quality Board (PREQB) in their letter dated August 27, 2009, had numerous comments on the Report. Within 60 days of your receipt of this letter, please submit any revisions to the Report that are necessary to address comments in the enclosed Technical Review (dated August 31, 2009) and PREQB's letter of August 27, 2009.

While EPA concurs with the recommendation given in Section 7.1 of the report that a Corrective Measures Study (CMS) is warranted, and that a human health risk assessment (HHRA) and a revised ecological risk assessment (ERA) be performed as part of the CMS, these should not be implemented until the extent of contamination is fully delineated.

Accordingly, within 60 days of your receipt of this letter, please also submit:

1) any revisions to the Report, that are necessary to address the above and enclosed comments; and

2) a proposal to fully delineate the extent of contamination in the subsurface soils, groundwater, and estuarine wetlands.

SWMU 62 (Former Bundy Disposal Area) Draft Phase I RFI Report

As per by my Emails of August 21 and 27, 2009, please submit by October 30, 2009, any revisions to the SWMU 62 Draft Phase I RFI Report, dated February 6, 2009, to address comments made in: a) the March 16, 2009 Technical Review prepared for EPA by our consultant TechLaw Inc., and b) PREQB's letter of March 4, 2009.

If you have any questions, please telephone me at (212) 637- 4167.

Sincerely yours,

Timothy R. Gordon

Timothy R. Gordon
Project Coordinator
Resource Conservation and Special Projects Section
RCRA Programs Branch

Enclosures (4)

cc: Ms. Wilmarie Rivera, P.R. Environmental Quality Board, w/encls..
Ms. Maria V. Rodriguez Munoz, P.R.Environmental Quality Board, w/encls.
Mr. Mark Kimes, Baker Environmental, w/encls.
Mr. Anthony Scacifero, TechLaw Inc., w/o encls
Mr. Felix Lopez, USF&WS, w/encls.

ENCL. #1

TECHNICAL REVIEW OF THE DRAFT STEPS 6 AND 7 OF THE BASELINE ECOLOGICAL RISK ASSESSMENT SWMU 1

NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

DATED JULY 1, 2009

Submitted to:

U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Submitted by:

TechLaw, Inc.
One Penn Plaza, Suite 2509
New York, NY 10119

EPA Task Order No.:	**002**
Contract No.:	**EP-W-07-018**
TechLaw TOM:	**Tony Scacifero**
Telephone No.:	**(212) 695-3600**
EPA TOPO:	**Timothy Gordon**
Telephone No.:	**(212) 637-4167**

August 26, 2009

TECHNICAL REVIEW OF THE
DRAFT STEPS 6 AND 7 OF THE BASELINE ECOLOGICAL RISK ASSESSMENT
SWMU 1
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

DATED JULY 1, 2009

Presented below are technical review comments on the *Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment, SWMU 1*, (BERA), *Naval Activity Puerto Rico, Ceiba, Puerto Rico,* dated July 1, 2009. The Draft BERA was reviewed for technical adequacy, completeness, and consistency with the Guidelines for Ecological Risk Assessment (EPA, 1998) and Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final (EPA, 1997).

GENERAL COMMENTS

1. Please include a stand alone executive summary with tables that summarizes the potential for ecological risk for each receptor group at the site. The executive summary should provide a condensed summary of the BERA which is a helpful tool for the risk management decision makers.

2. Food web modeling results from the Screening-Level Ecological Risk Assessment (SERA) and Step 3a identified lead in surface soil as an ecological Chemical of Potential Concern (COC) for the terrestrial avian omnivores and herbivores. According to the BERA, the Navy decided to only model food web exposures to the terrestrial avian omnivores in the BERA, based on the assumption that omnivores are more likely than herbivores to ingest surface soil while eating. It is unconventional to remove a receptor from further evaluation without using risk exposure parameters and site data to prove that the site-related risks are negligible. Please respond to this comment by providing the results of the food web model for the terrestrial avian herbivore (morning dove) exposed to lead in surface soil. This additional information will ensure that future risk management decisions regarding the terrestrial avian herbivore are based on site-specific data.

3. The BERA indicates that the American robin is a suitable surrogate to represent the yellow-shouldered black bird, which is a federally endangered species present at the site. Conservative exposure parameters and Toxicity Reference Values (TRVs) should be used when assessing risk to an endangered species to ensure full protection. The Hazard Quotients (HQs) are calculated using three TRVs, namely: the No Observable Adverse Effect Level (NOAEL), the Lowest Observable Adverse Effect Level (LOAEL), and the Maximum Acceptable Toxicant Concentrations (MATCs). The calculation of these additional HQs can be misleading, even though the risk characterization for the terrestrial avian omnivore relies only on the NOAELs. It is suggested that the Navy state in the third bullet in Section 2.5.4, Data Evaluation and Interpretation – Comparison of mean terrestrial avian omnivore dietary

intakes to literature-based toxicity reference values on Page 2-30, that only NOAELs are used to assess the potential ecological risk for an endangered species. It is also suggested that the Navy remove the calculation of HQs using LOAELs and MATCs from Table 4-20, Summary of Maximum Hazard Quotient Values for American Robin Dietary Exposures to Copper, Lead, and Tin in SWMU 1 and Upland Reference Area No. 2 Surface Soil, and any references in the text. It is also suggested that the Navy remove the use and reference to LOAEL-HQs and MATC-HQs for the West Indian manatee since it, too, is an endangered species evaluated in the BERA. These requested changes do not modify any of the conclusions but will make the text more transparent.

4. MATCs for specific chemicals are derived by taking the geometric mean of the NOAELs and LOAELs values for a given chemical. The calculation of MATCs could not be verified because the input values are not provided in the document. Please provide the input values in a table to allow for independent review. This comment does not need to be addressed if the use of MATCs is removed from Steps 6 and 7 in response to the previous general comment.

5. Several different receptors were evaluated in the SERA and Step 3a, but were not carried into the BERA. It would help future reviewers if the Navy included a table referencing all of the receptors for the site with a brief explanation for the method each is included or excluded from the BERA.

SPECIFIC COMMENTS

1. **Section 2.3, Ecological Chemicals of Concern, Third paragraph, Page 2-8:** This paragraph addresses the food web modeling results from the SERA and Step 3a for the terrestrial avian receptors (i.e., morning dove, American robin, and red-tailed hawk). However, the red-tailed hawk is not explicitly included in the discussion. Please summarize the results for this receptor to justify its removal from further consideration.

2. **Section 2.3, Ecological Chemicals of Concern, Forth paragraph, Page 2-8:** This paragraph discusses the evaluation of lower aquatic trophic level receptors (i.e., aquatic plants, invertebrates, and fish) and upper aquatic trophic level receptors (i.e., great blue heron, belted kingfisher, spotted sandpiper, double-crested cormorant and West Indian manatee) conducted in the SERA and Step 3a. However, the results from the evaluation of the aquatic plants, invertebrates, and fish are not discussed. It is therefore unclear why fish and benthic invertebrates were not further evaluated in the BERA. Please briefly discuss the results of the lower tropic level evaluation in the paragraph.

3. **Section 2.5.4, Data Evaluation and Interpretation, Page 2-30:** A mean food ingestion rate of 0.00383 kg/day-dry-weight is used in the food web modeling for the American robin. The conversion of this ingestion rate to grams of food per grams of bird per day (g/g-day) equals 0.330 (assuming 85% earthworm moisture content and bird body weight of 77.3g). Comparing this converted value to the food ingestion rates listed in the 1993 USEPA Wildlife Exposures Handbook (EPA/300/R-93/187) shows that the food ingestion rated used in the BERA is much smaller than the 1993 EPA food ingestion rates (0.89 g/g-day and 1.52 g/g-day). The re-calculation of the American robin food web modeling is not necessary since the results of the BERA showed unacceptable risks to the American robin. However, if future

soil clean-up goals for the site are back calculated using the American robin food web model, then a more appropriate food ingestion rate will need to be developed.

4. **Section 2.5.4, Data Evaluation and Interpretation, Page 2-30:** The last paragraph on this page lists the American robin's exposure diet as 90.9 percent earthworms and 0.091 percent surface soil. It appears that fraction of surface soil should be 9.1 percent instead of 0.091 percent as the total diet should equal 100 percent. Please change the percent surface soil accordingly.

5. **Section 3.2.2, Earth Worm Toxicity Test, Second paragraph, Page 3-6:** The first sentence states, "[e]ach reference area and SWMU 1 surface soil sample was tested using eight replicate chambers, with ten worms per replicate (eight earthworms per sample)." Accordingly, it would appear that the total number of earthworms per sample should be eighty instead of eight. Please correct the number of earthworms tested per surface soil sample.

6. **Section 4.2.2.1.1, Evaluation of Toxicity Test Negative Control and Reference Surface Soil Samples, First paragraph, Page 4-17:** The second to the last sentence in this paragraph states, "[a]s evidenced by Table 4-16, control survival was 100 percent in each replicate test chamber." Table 4-16, Correlation Coefficient and Coefficient of Determination Values, is not the appropriate table reference. The reference should be to Table 4-15, *Eisenia Fetida* Toxicity Test Results and Associated Analytical Data. Please correct the table reference accordingly.

7. **Section 4.2.4, Turtle Grass Tissue and Co-located Sediment Samples, Bullet 1, Page 4-27:** The calculation of the daily intake for the West Indian manatee includes the maximum concentration of a particular chemical in turtle grass. The maximum turtle grass concentrations listed under bullet 1 represents wet weight values. Please revise this bullet to include only dry weight concentrations because these are the appropriate units for the dietary intake equation. The HQ calculations in Table 4-25, Summary of Maximum Hazard Quotient Values for West Indian Manatee Dietary Exposures to Ecological Chemicals of Concern in SWMU 1 Sediment, appear to be based on daily intake values based on dry weight turtle grass concentrations.

8. **Section 7.0, Uncertainties, Lines of Evidence, Pages 7-2 and 7-3:** The uncertainty analysis could be further strengthened by including a discussion on the uncertainties associated with using American robins as a surrogate for the federally endangered yellow-shouldered black bird. This discussion should address the differences in the diet of these two birds. The yellow-shouldered black bird is an arboreal feeder who consumes mostly insects and spiders, while the American robin is an omnivore feeding mostly on earthworms. Earthworms are at the bottom of the terrestrial invertebrate food chain, whereas insects such as spiders are near the top of the insect food chain. This means that concentrations of bioaccumulating chemicals like 4,4-DDD may be higher in the spiders than the earthworms. Consequently, the potential exists for the yellow-shouldered blackbird to be exposed to higher concentrations of bioaccumulating chemicals than the American robin.

9. **Table 4-20, Summary of Maximum Hazard Quotients Values for American Robin Dietary Exposures to Copper, Lead and Tin in SWMU 1 and Upland Reference Area No 2 Surface Soil:** Table 4-20 summarizes the HQs for the American robin. It is suggested that the Navy add a column to this table titled "Residual Risk" where the reference HQ is subtracted from the SWMU 1 HQ. Those residual risk values above 1.0 should be highlighted to show that the potential risk is site related. It would also be helpful if Table 4-20 was amended accordingly, even though the difference between the site and the reference is discussed in the text.

ENCL. #2

COMMONWEALTH OF PUERTO RICO
OFFICE OF THE GOVERNOR
ENVIRONMENTAL QUALITY BOARD

Environmental Emergencies Response Area

August 7, 2009

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

RE: Review Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment SWMU 1 Naval Activity Puerto Rico (NAPR), Ceiba EPA ID No. PR2170027203

Dear Mr. Gordon:

The Federal Facility Coordinator and the Hazardous Wastes Permits Division from the Environmental Quality Board has finished the review of the above-mentioned document.

Comments from both Divisions have been revised and are being send together to avoid comment duplicity and to facilitate the response process. If you have any additional comment or question please feel free to contact Gloria M. Toro Agrait at (787) 767-8181 extension 3586 or myself at extension 6141.

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator
Environmental Emergencies Response Area

cc: Gloria M. Toro Agrait, Environmental Permits Officer

Cruz A. Matos Environmental Agencies Bldg., San José Industrial Park Urbanization
1375 Ponce de León Ave., San Juan, PR 00926-2604
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PREQB Technical Evaluation of the Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment, SWMU 1, for Naval Activity Puerto Rico, RCRA/HSWA Permit No. PR21700027203, Ceiba, Puerto Rico

I. INTRODUCTION

This technical evaluation is of the Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment for SWMU 1 for Naval Activity Puerto Rico, Ceiba, Puerto Rico. This draft report presents steps 5 through 7 of the baseline ecological risk assessment process for SWMU 1 and presents data and results, as appropriate, for Steps 1 through 4 previously conducted.

II. GENERAL COMMENTS

1. Use of Historical, Upland Soil versus Emergent Wetland Sediment Data. An explanation and look-up table of cumulative data usage from all historical soil/sediment samples of upland and vegetated wetland habitats is needed to clearly identify which subsets of samples were used to calculate soil risks to plants, soil invertebrates, and the American robin. It is not sufficiently clear whether exposures of American robins (and yellow-shouldered blackbirds) were calculated exclusively for terrestrial habitats or if combined foraging risks in uplands and emergent wetlands were estimated. It also is not clear whether: (a) cumulative, historical surface soil data from prior studies, such as those presented in Tables 2-2, 2-3, 2-5 and 2-6, were combined with more recent data such as those in Table 4-11; (b) which historical data from these five tables are included in the data summaries and risk calculations of Tables 4-14, 4-19, and 4-20; and (c) if emergent wetland sediment data are included in these data summaries and risk calculations of Tables 4-14, 4-19, and 4-10. Please provide a table summarizing which datasets were used in the current report and clarify which subsets of terrestrial soil and emergent wetland sediment were used to assess risks to each receptor group.

2. Total Organic Carbon (TOC) Adjustments of Soil Benchmarks for DDT Compounds. The DDD, DDE and DDT soil benchmark criteria used to calculate hazard quotients (HQs) for invertebrates were based on an assumed TOC content of 2 percent, but all 6 surface soil samples included in Table 4-1 had TOC concentrations ranging from 2.5 to 5.9 percent. Please recalculate soil invertebrates' hazard quotients (HQs) using the site-specific data for all soil samples. Also, please use sample-specific soil TOC data for the subset of toxicity testing soil samples to further evaluate statistical correlations between these "TOC-normalized" HQs and observed toxicity test results, to help clarify the soil toxicity drivers.

III. PAGE-SPECIFIC COMMENTS

1. Section 2, Table 2-2. Although Table 2-2 identifies historical surface soil, estuarine sediment, and open water sediment samples collected during the SLERA and Step 3A of the BERA, it is not clear if the emergent estuarine wetland sediment samples were combined with upland surface soil samples when

calculating exposures and risks to plants, soil invertebrates, and the American robin in the current report. Please add text to clarify how emergent wetland soil and sediment data were used.

2. Section 2, Tables 2-8 & 2-9, Ingestion-Based Screening Values. Most ingestion-based screening values used to calculate manatee risks were the same toxicity reference values (TRVs) used by USEPA to derive the Eco-SSLs for mammals (e.g., arsenic, cadmium, copper, and selenium). Although the correct values were used for these avian and mammalian TRVs, the footnotes in these tables do not fully reflect the basis for the USEPA's selection/use of TRVs when deriving EcoSSLs for arsenic (birds), cadmium (birds), copper (birds and mammals), DDT compounds (birds and mammals), lead (birds), and selenium (mammals). Please add the following footnote for each of these TRVs to Tables 2-8 and 2-9, as well as the text clarifications about TRVs for these COCs: "*These TRVs chosen by USEPA for use in developing EcoSSLs were the highest bounded NOAELs that are lower than the lowest bounded LOAELs for each receptor group.*"

3. Section 2, Tables 2-8 & 2-9, Ingestion-Based Screening Values. Please explain why Table 2-9 presents a lower mammalian reproductive NOAEL of 8.23 mg/kg BW/day (reported for pigs) for use in the manatee risk calculation for zinc rather than the geometric mean (GM) for mammalian reproduction and growth NOAELs of 75.4 mg/kg BW/day used by USEPA (2007) to derive the Eco-SSL for zinc. Please also discuss the uncertainties and implications of using this lower zinc TRV for the BERA conclusions and risk management decisions for the manatee.

4. Page 2-5, Section 2.2.3.2. The second paragraph, the scientific name for the magnolia warbler should be corrected to *dendroica magnolia*.

5. Page 2-6, Section 2.2.3.3. The first paragraph when discussing the distribution of the Golden Coqui, the area of collection should be corrected to Cayey instead of Cayeye.

6. Page 2-8, Section 2.3, Ecological Chemicals of Concern. The last paragraph on page 2-8 states that "*The SERA and Step 3a of the BERA also evaluated lower trophic level aquatic receptor group and upper trophic level receptor exposures to chemicals in SWMU 1 estuarine wetland and Ensenada surface water and sediment.*" However, the subsequent text does not summarize the Step 3a results and conclusions for plants, invertebrates, and fish exposed to sediment and surface water COCs. Please add text to summarize these results, which presumably will clarify why no sediment and surface water risks were calculated in the current report for lower trophic level receptors in the aquatic and estuarine wetland habitats of SWMU 1.

7. Page 2-11, Section 2.4.1.3. The first paragraph identified the valence state of Cadmium Cd^{+2} as trivalent the text should be corrected to divalent.

8. Page 2-13, Section 2.4.1.4. The last paragraph of this section on page 2-13 erroneously states that "*A 4-week survival and growth study using the pig (Sus scrofa) indicated that a dose of 4.05 mg/kg-BW/day (oral in diet) had no effect on survival and body weight change (Allcroft et al., 1961 as cited in USEPA, 2007a)*." The correct mammalian TRV cited from Allcroft *et al.* and used by USEPA is 5.6 mg/kg BW/day, as correctly cited in Table 2-9. This erroneous value appears to be carried over from the corresponding sentence in the previous paragraph about the avian TRV used by USEPA, correctly cited there as 4.05 mg/kg-BW/day. Please correct this value in the text and also clarify that it was chosen by USEPA as the avian TRV because it is "*equal to the highest bounded NOAEL below the lowest bounded LOAEL for reproduction, growth, or survival*."

9. Pages 2-19, 2-30, and 4-21, Sections 2.4.1.8, 2.5.4 and 4.2.3.1 and Table 2-8. The last paragraph in Section 2.4.1.8 states "*Tin in SWMU 1 surface soil has the potential to impact terrestrial plants and invertebrates. A single toxicological benchmark was identified from the literature (50 mg/kg [toxicological benchmark for plants], Efroymson et al., 1997a).*" However, potential avian exposures to tin via earthworm ingestion are discussed in the 3rd bullet on page 2-30 [and in Section 3.2.3 Earthworm Tissue on page 3-6]: "*Although antimony, copper, and tin were not identified as ecological COCs for terrestrial avian omnivore food web exposures in Step 3a of the ERA process (Baker, 2006a and 2007), dietary intakes also were estimated for these three metals using earthworm tissue concentrations (see Section 3.2.2) since maximum soil concentrations for these three metals were detected in surface soil collected during the BERA field investigation.*" Table 2-8 presents an avian TRV for tin and Table 4-19 indicated potential avian risk from exposures to tin. Section 4.2.3.1 stated: "*As evidenced by the table, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, copper, lead, and tin NOAEL-based HQ values using 95 percent UCL of the mean surface soil and earthworm tissue concentrations are greater than 1.0.*" Please revise the discussion of Section 2.4.1.8 and other text sections, as needed, to clarify that tin was identified and evaluated as a COC for American robin dietary exposures.

10. Page 2-9, Section 2.4, Conceptual Model and Figure 2-13. The conceptual model for wildlife exposures via food ingestion pathways excludes exposure pathways for birds foraging within the estuarine, emergent wetland habitats for which historical surface soil/sediment data are available (e.g., data in Table 2-3 from the 1996 RFI). Please: (a) verify that wetland soil/sediment data were not used in the BERA; (b) if not used, explain why the wetland was not included as part of the American robin's foraging area; and (c) discuss the potential for additional

increments of site-related risk to occur to populations of robins and other birds from wetland foraging, both here and in the risk characterization and uncertainty sections of the BERA.

11. Page 2-29, Section 2.5.4, Data Evaluation and Interpretation – Use of Total Organic Carbon Data. It is stated on page 2-29 that benchmark criteria, such as the mean of the Dutch target and intervention values for pesticides were applied "*assuming a default organic carbon content of 0.02 (2.0 percent) (MHSPE, 2000)*." However, as noted in General Comment 3, the actual mean TOC concentrations measured in SWMU 1 and reference soils [mean of 3.63% in Table 4-1] should have been used to adjust the surface soil benchmark criteria before calculating HQs for soil invertebrates. Using TOC-adjusted soil HQs also provides valuable context when evaluating the earthworm toxicity test results and may further clarify the extent to which DDD, DDE, and/or DDT were drivers of the observed earthworm toxicity. Because the regressions performed did indicate a strong influence of TOC on the toxicity test results, the soil benchmark criteria for these COCs should be adjusted using site average TOC content for these media and the site-wide HQs should be revised. Soil HQs based on TOC-adjusted criteria for DDD, DDE and DDT also should be calculated for the earthworm toxicity test samples and then used in a supplemental statistical analysis of correlations between these TOC-adjusted HQs and the toxicity test results.

12. Section 3, Table 3-5, SWMU 1 and Upland Reference Area No. 2 Sampling and Analytical Program. This table does not indicate which soil samples were collected from terrestrial versus emergent wetland habitats but at least 3 soil samples (coded as SD in Table 2-3) had been collected from the estuarine wetland during the RFI. Please add comments and/or footnotes to Table 3-5 to indicate for each SWMU 1 and Reference Area surface soil sample: (a) whether it was collected from a terrestrial or emergent wetland habitat; and (b) the type of plant community from which it was sampled (e.g., upland meadow, red mangrove wetland, black/white mangrove community). Please refer to these habitat data when adding report text to clarify the use of analytical data from upland *versus* wetland samples in the exposure assessments for each of the ecological receptor groups, as requested in General Comment 1 and Specific Comments 1 and 4.

13. Pages 3-1 to 3-4, Section 3.1 Verification of BERA Field Sampling Design & Figure 3-1 – Lack of Reference Wetland. Although media samples were analyzed for terrestrial and open water (marine) reference habitats, there is no discussion of a reference habitat sampling and analysis program in emergent, estuarine wetland reference habitats similar to those that were sampled for sediment and surface water between SWMU 1 and Ensenada Honda. Please: (a) explain why reference wetlands were not sampled; (b) present any available sediment and surface water

analytical data for potential estuarine reference wetlands that have not been impacted by SWMU 1 or other NAPR facilities and activities; and (c) discuss the SWMU 1 BERA results for estuarine emergent wetlands within the context of information on background risks within such potential reference wetland habitats.

14. Page 3-4, Section 3.2, BERA Field Investigation and Section 4.2.3, Earthworm Tissue. The text on page 3-4 states that "*earthworm and seagrass tissue analytical data were used in place of modeled tissue concentrations to estimate dietary intakes for American robin and West Indian manatee food web exposures, respectively*." However, using only COC concentrations measured in earthworm samples to calculate American robin exposures fails to incorporate all available surface soil analytical data from prior investigations. Only 14 of the 23 to 37 surface soil samples in Tables 2-5 & 2-6 (*14 of 69 to 89 soil samples in Table 4-14*) were used for the earthworm uptake study. The average COC concentrations detected in a small, spatially-limited subset of earthworm tissue samples, thus, may not be representative of average tissue burdens ingested by robins throughout the SWMU-affected portions of their foraging areas. Analytical data for the paired samples of soils-earthworms should be used to calculate average bioaccumulation factors (BAFs) or derive site-specific uptake regressions for the paired datasets. Those BAFs/regressions then should be applied to the average COC concentrations measured in sediments and surface soils of all affected habitats to estimate an average, site-wide food concentration. At a minimum, please: (a) apply this alternative method to derive a second set of dietary doses and risk calculations for robins to provide additional context and insight for evaluating potential risks and discussing related uncertainties regarding COC bioaccumulation and exposure; or (b) document that the range and average COC concentrations in the surface soil samples used in the earthworm toxicity/uptake studies are representative of the soil COC concentrations exhibited among all historical samples throughout SWMU 1.

15. Pages 4-9 to 4-10, Section 4.1.2.3, Comparison of Analytical Data to Screening Values. Tables embedded on pages 4-9 and 4-10 comparing maximum sediment concentrations in Reference Areas No. 1 and 2 to marine sediment criteria incorrectly cite the TEL for arsenic from MacDonald et al. (1994) as 7.4 mg/kg. Please correct the arsenic sediment TEL as 7.24 mg/kg in all relevant tables.

16. Pages 4-10 to 4-12, Section 4.2.1, Quick-Turn Surface Soil Samples, and Table 4-14. As noted in General Comment 2, site-specific TOC concentrations should have been used to calculate TOC-adjusted soil benchmark criteria for DDD, DDE and DDT before calculating soil HQs for these pesticides in Table 4-14. Please revise both the soil criteria used and resultant HQ calculations for these COCs in Table 4-14 using all available soil TOC data (e.g., 9 samples in Table 3-5).

17. Page 4-18, Sections 4.2.2.1.2, Survival and 4.2.2.1.3, Weight Loss. These discussions of the survival and weight loss effects observed during the earthworm toxicity testing include conclusions that may be premature, stating "*The analytical data indicate that some physical and/or chemical parameter other than ecological COC concentrations may be responsible for or influencing the observed biological response*." However, subsequent discussions of statistical correlations among the test results in Section 4.2.2.2 demonstrate that "*earthworm survival increased*" and "*weight loss decreased as soil TOC concentrations increased*." Because the toxicity of organic COCs such as DDD, DDE and DDT often is a function of TOC concentration, the role of these pesticides as drivers of the observed toxicity cannot be ruled out unless a lack of significant correlation exists between reduced worm weight/survival and the TOC-normalized soil invertebrate HQs for these COCs. Please: (a) perform supplemental correlation analyses among the test results and HQs revised for DDD, DDE and DDT using soil criteria adjusted for sample-specific TOC, as requested in prior comments; and (b) modify these discussions and conclusions regarding potential drivers of earthworm toxicity.

18. Page 4-18, Section 4.2.2.1.4. The last sentence of this section concludes that "*The absence of a significant reduction in earthworm reproduction in each SWMU 1 surface soil sample relative to each reference area surface soil sample is a line of evidence supporting minimal risk on this test endpoint*." Although the site *versus* reference sample differences may not be statistically significant, it is qualitatively noteworthy that earthworm reproduction occurred in only 3 of the 14 site-derived soil samples, whereas it was observed in all of the control and reference soil samples. Please add text here to acknowledge this aspect of the results and also discuss this observation in Sections 5.0, 6.0 and 7.0 as an uncertainty in the interpretation of these reproductive effects results.

19. Pages 4-18 to 4-19, Section 4.2.2.2. Because only upland surface soil was used in the earthworm toxicity testing, please revise the subheading for this section by replacing "Sediment" with "Soil." The same edit is needed at the end of the first sentence of the second paragraph on page 4-19, to replace "sediments" with "soils."

20. Page 4-21, Section 4.2.2.2. The last paragraph of this section, at the top of page 4-21, concludes appropriately that "*the lack of a dose-response relationship in the data paired with the significant pair wise and multiple regression results suggest that the bioavailability and toxicity of the ecological COCs are being influenced by TOC*." It also is stated that "*this modifying factor, as well as other factors . . , prevent the establishment of a clear relationship between individual ecological COC concentrations in surface soil and earthworm responses in the toxicity*

tests." However, as noted in prior comments, this latter conclusion may be premature for DDD, DDE and/or DDT, since the possible role of these pesticides as drivers of the observed toxicity to earthworms cannot be ruled out without further evaluating potential correlations between the test results and revised HQs for these COCs that are based on site-specific, TOC-adjusted soil benchmark criteria.

21. Table 4-20. Dietary HQs for the American robin are missing for DDD, DDE and DDT from Table 4-20. Although it is clear from the text that these COCs were not detected in the reference area soils, please add entries for these robin HQs and the NDs to Table 4-20 so that it contains complete HQ comparisons.

22. Pages 5-1 to 5-2, Section 5.1.2 Comparison of SWMU 1 and Reference Area Surface Soil Toxicity Test Results. The final sentence in the first paragraph of this section states that "*Statistical evaluations performed on the reproduction data (number of juveniles and cocoons per surviving earthworm in each replicate at test termination) indicated that reproduction in SWMU 1 surface soil was not significantly lower relative to reproduction in the reference area surface soil samples*." However, the test results also suggest that site-derived COCs may have reduced reproduction in earthworms, since earthworm reproduction occurred in only 3 of the 14 site samples. Please add this qualitative observation to the discussion and acknowledge that it represents an uncertainty in the test results that should not be overlooked simply because of a lack of statistical significance in the site *vs.* reference samples. Please conduct a statistical analysis of the reproductive results versus site-specific TOC-normalized HQs for DDD, DDE and DDT to further clarify if the lack of reproduction is correlated with concentrations of these COCs.

23. Page 5-3, Section 5.1.3, Evidence of a Significant Correlation between Laboratory Toxicity Test Results and the Chemical/Physical Characteristics of Surface Soil. As noted in prior comments, the first sentence in the second paragraph of this section may have prematurely concluded that "*none of the ecological COCs had a significant influence on earthworm survival and weight loss per surviving earthworm*." Please modify this discussion as needed after evaluating the potential correlations among the test results and the revised DDD, DDE and DDT HQs incorporating site-specific TOC-adjusted criteria.

24. Page 6-1, Section 6.1, Conclusions. The third sentence of the second paragraph on page 6-1 states that "*The statistical evaluations performed by the testing laboratory indicated that earthworm reproduction (juvenile and cocoon production per surviving earthworm) in SWMU 1 surface soil was not significantly lower than reproduction in each reference area surface soil*." As requested in prior comments about similar statements in other report sections,

please follow this sentence with an acknowledgement that earthworm reproduction occurred in only 3 of the 14 site samples, which could indicate an adverse site-related effect of one or more COCs on earthworm reproduction. Please also acknowledge that this uncertainty in the interpretation of test results that should not be overlooked simply because of a lack of statistical significance in the site *vs*. reference samples.

ENCL. #3

REPA4R2-002-ID-140

TECHNICAL REVIEW OF THE DRAFT FULL RCRA FACILITY INVESTIGATION SWMU 9 – AREA B, TANK 214 AREA DATED JULY 14, 2009

NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO
EPA ID NO. PR2170027203

Submitted to:

U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Submitted by:

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EPA Task Order No.:	**002**
Contract No.:	**EP-W-07-018**
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August 31, 2009

TECHNICAL REVIEW OF THE
DRAFT FULL RCRA FACILITY INVESTIGATION
SWMU 9 – AREA B, TANK 214 AREA
NAVAL ACTIVITY PUERTO RICO
CEIBA, PUERTO RICO

DATED JULY 14, 2009

The following comments were generated based on review of the *Draft Full RCRA Facility Investigation, SWMU 9 – Area B, Tank 214 Area* (Draft Full RFI Report), Naval Activity Puerto Rico (NAPR), Ceiba, Puerto Rico, dated July 14, 2009.

GENERAL COMMENTS

1. Based on review of the groundwater sampling data presented on Figures 6-9 and 6-10, it appears that the extent of contamination has not been defined to the north, northwest, and east of Tank 214. According to the figures, concentrations of constituents of concern (COCs) were detected in exceedance of Regional Tap Water Screening Levels for Groundwater and Maximum Contaminant Levels (MCLs) at wells 9SB41, 9SB42, and 9SB44. In addition, no samples were collected downgradient (north and northwest) of these wells. Further, COCs were detected at 95B53 above the Tap Water Screening Levels, and no samples were collected downgradent to the east. Therefore, it is unclear what the bounds of contamination are for the site. Revise the Draft Full RFI Report to propose additional investigation north, northwest, and east of the aforementioned wells in order to fully define the extent of groundwater contamination at the site.

2. Sections 6.3 and 7.1 conclude that the distribution of total petroleum hydrocarbon (TPH) and gasoline range organics (GRO) in subsurface soils is "limited in extent" and that the results suggest a leak or multiple leaks from Tank 214. The sections go on to state: "the lateral extent of subsurface contamination has been fully delineated." However, the analytical results from the subsurface soil samples are only compared to screening levels based on human exposure, and there is no assessment of whether the subsurface soils may be a continuing source of contamination to the underlying groundwater that flows toward the adjacent estuarine wetland. A review of the available file information indicates that the soil is a potential source of future groundwater contamination and the extent of contamination is not limited in extent. For example, a review of the logs for multiple borings surrounding the former tank, including 9SB39 through 9SB42, 9SB44, 9SB47, 9SB50, and 9SB52 through 9SB55, shows elevated photoionization detector (PID) readings in subsurface soils, many with the contamination starting approximately 8 feet below ground surface (bgs). Nearly all of the borings have PID readings greater than 2,000 parts per million (ppm). In addition, most of the boring logs identify "hydrocarbon odors" where the elevated PID readings were found. Also, Table 6-3 shows elevated concentrations of volatile organic compounds (VOCs) and TPH at several of these intervals. For example, see the analytical results for 9SB41 at 9 t-11 feet bgs, where ethylbenzene and xylenes were detected at 2,800 parts per billion (ppb) and 2,300 ppb, respectively, and 9SB50 at 9-11 feet bgs, where ethylbenezene was detected

at 1,700 ppb and TPH at 1,600 ppm. There are several other examples of VOC and TPH detections at similar depths (9-11 feet bgs). Furthermore, boring log 9SB48, the boring log closest to the estuarine wetland, and also the boring log where the saprolite was present closer to the ground surface (2 feet bgs), the PID reading was 2,300 ppm in the one (1) to three (3) foot interval, suggesting that the contaminated subsurface soil may extend from the former tank area toward the wetland to the north.

Based on the information above, it does not appear that the lateral extent of the subsurface contamination has been delineated. Potential contamination has not been delineated in the subsurface soils between the borings described above and the estuarine wetland to the north, northwest, and northeast. This is a concern since the subsurface soils could be a continuing source of contamination to the underlying groundwater. Further delineation of subsurface soil contamination appears warranted for several reasons, including: first, as mentioned above, groundwater contamination has not been delineated to the north, northwest, and east of the site; second, groundwater is flowing radially toward the estuarine wetland; and third, potential contamination in the subsurface soils adjacent to the wetland have not been delineated.

3. According to the Draft Full RFI Report, several deviations were made from the work plan, which included no collection of subsurface soil samples at five (5) locations, collection of only one (1) subsurface sample at two (2) locations, and no collection of a groundwater sample from one (1) location. Text has not been included to discuss the significance of these deviations. Revise the Draft Full RFI Report to comment on the significance of these deviations and discuss whether or not they resulted in any data gaps. In particular, provide a discussion as to whether the lack of a sample from well location 9SB50 resulted in a data gap in the delineation of groundwater contamination at the site and revise the recommendations for further investigation, as necessary.

SPECIFIC COMMENT

1. **Section 7.2, Recommendations, Page 7-2:** The first paragraph of this section refers to the extent of vanadium contamination in sediment around sample location 9SD92 and polynuclear aromatic hydrocarbon contamination in sediment around sample location 9SD96. It appears the sample location IDs have been reversed. Revise this section to address the discrepancy.

ENCL. # 4

COMMONWEALTH OF PUERTO RICO
OFFICE OF THE GOVERNOR
ENVIRONMENTAL QUALITY BOARD

Environmental Emergencies Response Area

August 27, 2009

Tim Gordon
US Environmental Protection Agency – Region II
290 Broadway – 22nd Floor
New York, New York 10007-1866

Re: Draft Full RCRA Facility Investigation
SWMU 9 – Area B, Tank 214 Area
Naval Activity Puerto Rico (NAPR), Ceiba
EPA ID No. PR2170027203

Dear Mr. Gordon:

The Federal Facility Coordinator (FFC) and the Hazardous Wastes Permits Division (HWPD) has finished the review of the above-mentioned document The Environmental Quality Board received it on July 16, 2009.

After a throughout review comments were issued. Joint comments of the HWPD and the office of EQB's Federal Facility Coordinator are being forwarded to EPA and the facility to avoid duplicity. If you have any additional comments or questions please feel free to contact Gloria M. Toro Agrait at (767) 787-8181 extension 3586 or myself at extension 6141.

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator
Environmental Emergencies Response Area

cc. Gloria M. Toro Agrait, Environmental Permits Officer

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PREQB Technical Review of Draft RCRA Facility Investigation
SWMU 9 – Area B, Tank 214 Area (July 14, 2009)
Naval Activity Puerto Rico, Ceiba
PR2170027203

General Comments:

1) According to the Full RFI Work Plan: "Up to 20 surface soil samples will be collected from 20 soil boring locations and will be analyzed at a fixed-base laboratory." The report stated that 21 samples were collected from 19 soil-boring locations. Table 3-1 of the RFI Work Plan repeats sample location 9SB49. It does appear that this repetition causes a confusion regarding the soil sampling locations quantity. Please clarify to avoid this fact to appear as a Work Plan deviation.

2) The work plan included a section to discuss the decontamination processes to be carried at the field activities. If no decontamination was performed it should be clearly explained at the report as a well-justified deviation from the work plan.

3) On Table 3-1 and Page 3-6, Section 3-4 of the work plan, the presented number of sediment samples to be collected is 43. Not withstanding, on page 3-1 of the same work plan the number is 42. Also, on Figure 3-2 of the work plan sample number 9SD109 is not included and the number of samples is 42. Please clarify and present it as necessary into the deviations from the work plan.

4) Use of the Lowest Available EcoSSLs in COC Screening of ERA Steps 2 and 3a. Although the Final RFI Work plan dated February 28, 2008 had stated that surface soil COCs would be selected using Eco-SSLs, where available, it did not specify that only the EcoSSLs for plants and invertebrates would be applied selectively, rather than using the lowest of all available Eco-SSLs. USEPA 's original intent in developing the Eco-SSLs was for the lowest available of all Eco-SSLs for plants, soil invertebrates, birds, and mammals to be used in COC selection. Since avian and mammalian Eco-SSLs are often lower than plant and soil invertebrate EcoSSLs, please apply the lowest of all available EcoSSLs during COC selection of the new ERA using the cumulative analytical dataset. This will assure that no soil COCs that pose a screening-level risk to wildlife receptors are omitted prematurely during Steps 2 and 3a of the ERA.

5) Use of Wildlife EcoSSLs in Wetland Sediment COC Screening of ERA Steps 2 and 3a. COCs such as lead were previously identified for avian receptors as being site-related based on exceedances of background lead concentrations in both terrestrial soils and sediments of mangrove wetlands and associated intertidal mud flats that are diurnally and/or seasonally exposed. Thus, the conceptual site model (CSM) for the new ERA should include both upland soil and wetland sediment exposure pathways for avian (and perhaps mammalian – native bats) receptors. Since USEPA guidance for the use of Eco-SSLs acknowledges their applicability to intermittently exposed soils and sediments of vegetated wetlands or mud flats and precedents exist for this

application of EcoSSLs at other Navy sites in Puerto Rico (e.g., using lower of sediment ESVs or Eco-SSLs), please plan to apply the lower of the avian (and perhaps mammalian) EcoSSLs during wildlife COC selection for estuarine wetland sediments in the intertidal or non-tidal reaches of estuarine wetland habitats. This approach is intended to complement, not replace, the use of marine sediment ESVs to identify COCs for benthic macroinvertebrate communities in the new ERA.

6) Further investigation and sampling should be conducted to speciated lead in soil and sediment, since historic use of this site included the storage and potential release of AVGAS, which contains tetraethyl lead, a far more toxic form of lead than inorganic lead. The new human health and ecological risk assessments should include the speciation data for soil and sediment, a current data gap for the facility investigation.

7) The report indicates that two field blanks were collected from laboratory-grade deionized water and NAPR potable water (the sources of water used for equipment rinsate samples). The work plan stated, "Field blank samples consist of the source water used in equipment decontamination procedures. At a minimum, one field blank for each source of water must be collected and analyzed for the same parameters as the related samples.". "A field blank sample undergoes the full handling and shipping process of an actual sample. It is designed to detect sample contamination that can occur during field operation or during shipment. Field blanks are prepared in the field using certified clean water (HPLC-grade carbon-free water for organic analysis or deionized water for inorganic analysis), preserved in the same manner as other collected samples, and then submitted to the laboratory for analysis."[1] The manner of collecting and handling the field blank is appropriate, not withstanding the interpretation of the usefulness varies from PREQBs understanding. The field blanks intentions are to detect possible contamination of the samples during preparation at the field, due to ambient conditions, this sample is often called Ambient Blank. For these reasons PREQB have been reiterating that although the rinsate samples could be shared by multi-site field investigation, this could not be applied to field blank samples.

8) A discussion of the compounds detected on the Quality Assurance/ Quality Control (QA/QC) samples is presented in a brief and indirect manner through the document. For the convenience of the reviewer and to clearly document Navy claims (acetone detections for example) a discussion of those detections (in the QA/QC samples) should be directly included in the text of the report.

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[1] Zhang Chunlong Fundamentals of Environmental Sampling and Analysis. John Wiley & Sons New York, NY (2007) Page 117.

9) It is not clear from the report if the vertical extension of contamination if being considered fully defined, since discussion focused on the lateral extension. It could be inferred by the surface and subsurface depths, but should be also discussed in the report.

Page-Specific Comments:

1) Page 4-2, Section 4.0 Please include the lack of purging at temporary wells 9TW42 and 9TW48 in the list of work plan deviations. According to the field notes (Darrin Hupe 1/20/09 and Joe Burawa, 1/22/09), indicator parameters were not measured for these wells. In addition, a reduced number of bottles were filled at 9TW48. Please update this section to include these deviations

2) Page 4-2, Section 4.1
   a. The second paragraph incorrectly identified that a field duplicate sample was collected from sampling location 9SB05. The correct sample location number should be 9SB50. Please revise.
   b. According to the chains-of-custody in Appendix A, three vials were collected for GRO analysis at each soil sample location. Please clarify in the text of this section the procedure used for the collection of soil samples for GRO analysis, as was done for VOC analysis.
   c. Please clarify in the text how the samples were frozen in the field, the temperature used for freezing, and how the frozen VOC samples were shipped to the laboratory in a manner to maintain their frozen state.
   d. Please clarify in the text the procedure used for the collection of subsurface soil samples for VOC and GRO analyses.

3) Page 4-3, Section 4.1 Figure 4-1 was not included in the electronic version of this draft report. Please provide.

4) Page 4-3, Section 4.2, Paragraph 1 The text states that 4-1/4 inch inside diameter hollow stem augers (HSAs) were used to install the permanent monitoring wells. However, according to the field log book notes and the boring logs, 3-1/4 inch inside diameter HSAs were used. Please clarify this apparent discrepancy.

5) Page 4-3, Section 4.2 On the second sentence of the third paragraph of the page it is indicated that field parameters were obtained with appropriate instrumentation during sample. Please include the specific instrumentation used at the field to measure the field parameters. Also, indicate the appropriate laboratory supplied containers used

to place the groundwater sampling according to the third sentence of the same paragraph.

6) Page 4-4, Section 4.4 Please clarify in the text the procedure used for the collection and transport of sediment samples for VOC and GRO analyses.

7) Page 4-5, Section 4.5 This section discussed the Investigation Derived Waste (IDW). It indicated that "...the soil cuttings from the subsurface soil sampling, as well as for the monitoring wells, were placed back into the boring from which they came, unless contamination was present.". Please clarify how the presence of contamination was determined during the field activities. This section should be enlarged to include more details regarding the management of the IDW. The information should be, but not limited to, sampling, storage, and disposition of the waste. According to the text, the removal and disposition of the IDW was scheduled for June 2009, hence, evidence of appropriate transportation and disposition could be added to the report.

8) Page 4-5, Section 4.8, Paragraph 1 According to the text, groundwater samples were collected using polyethylene and silicone tubing. According to the Region 2 low-flow groundwater sampling procedure, polyethylene tubing is not allowed when sampling for organic parameters and silicone tubing is not listed as an option in the Region 2 procedure. Silicone tubing is known to have sorption and desorption issues for organic compounds which cause a negative bias to the analytical results. Polyethylene tubing can leach plasticizers into the sampled water, can sorb organic contaminants from the sampled water and later desorb the same contaminants into samples. Please explain why this deviation occurred and qualify the data accordingly.

9) Page 4-8, Section 4.10.5 The approach of collecting rinsate blanks for multi site investigations, in this case the Phase I RFI activities for SWMU 60 (Former Landfill at the Marina), and SWMU 70 (Disposal Area Northwest of Landfill) were being sampled simultaneously with the SWMU 9 (Area b, Tank 214 Area) and one rinsate sample was collected per day per piece of sampling equipment. This approach is being accepted by the PREQB. Nevertheless, this is not PREQB interpretation of the proposed rinsate samples collection at the work plan, hence, this should be listed as a deviation.

10) Table 4-1 Please revise the Comment column for groundwater sample 9GW41 to state "permanent well" instead of "temporary well". This is consistent with Section 4.2 of the report as well as the associated boring log.

11) Table 4-2 Please add TCLP VOCs to the list of requested analyses for JAN09-IDW01.

12) Page 5-1, Section 5.1, last paragraph Please provide a reference to the section of the report that further describes the nature and extent of petroleum impacts observed at this sediment sample location 9SD78.

13) Figures 5-2 to 5-4 Please review the data presented in Figures 5-2, 5-3, and 5-4 for consistency and revised as appropriate. For example, in Figure 5-2 point 9SB41 is located between the 110 and 115 ground surface elevation contours. In Figure 5-3, the elevation of 9SB41 is identified as 108.93. In Figure 5-2, point 9SB44 is located on the 110 ground surface elevation contour, but in Figure 5-4, the elevation of 9SB44 is identified as 107.67. Figure 5-3 illustrates that at the location of intercept with B-B', the saprolite has an elevation of 107 ft MSL and is overlain by Silty Clay. However, at the same point in Figure 5-4 (intercept with A-A') the saprolite is illustrated with an elevation of 101 ft MSL and overlain by Sandy Clay. Additionally, line of Section A-A' terminates at location "E2SS3" and Line of Section B-B' starts at location "E2SS3." However, these points are over 120 feet apart. Revise the figures and/or clarify in the legend(s) as appropriate.

14) Page 5-3, Section 5.2.4, paragraph 2 The source or basis for the effective porosity value of 30 percent for the saprolite should be provided.

15) Page 6-1, Section 6.1 Please clarify why Soil Screening Levels (SSLs) presented in the RSL table were not used to evaluate the potential for soil contamination to be a continuing source for groundwater contamination. Although risk screening is part of the human health and ecological risk assessment process, the nature and extent of contamination and potential migration pathways also need to be determined. Please add a section that discusses exceedances of the SSLs and the migration of contaminants from soil to groundwater.

16) Page 6-1, Section 6.1.1 The USEPA updated the RSL table in April 2009. Since this report is still in draft form, please update the screening using the current version of the table, or discuss the updates and whether any changes to the RSL table impacts the results of the human health risk screening.

17) Page 6-2, Section 6.1.2.1 The first sentence states that "USEPA ecological soil screening levels (Eco-SSLs) for terrestrial plants and invertebrates were preferentially used as soil screening values. The lowest of the available Eco-SSLs should be used, as noted in General Comment 1. Since Navy proposes to perform a new ERA, commencing with Step 1, please apply the lowest of all available Eco-SSLs during the COC screening process.

18) Page 6-2, Section 6.1.1.2 An MCL Goal (MCLG) is calculated to protect human health, consistent with the exposure scenario presented in the second to the last sentence of this section. An MCL is established as close to the MCLG as is technically feasible, and many MCLs are set above the calculated MCLG, so are not necessarily protective of the exposure scenario presented in the second to the last sentence. Please revise the text accordingly.

19) Page 6-3, Section 6.1.2.1 The fourth bullet on this page states that the MHSPE soil standards used to identify soil COCs had assumed a soil TOC content of 2.0 percent. Please explain why soils were not analyzed for TOC and consider collecting TOC

data to enable site-specific adjustments of these soil ESVs before performing the COC selection process in the new ERA.

20) Page 6-4, Section 6.1.2.2, & Appendix D The discussion of the AET marine sediment quality guidelines states that "*For those chemicals lacking a literature-based, bulk-sediment toxicological threshold, EqP-based benchmarks were used as sediment screening values*" In Appendix D, it was stated that the EqP-based sediment screening values were derived using the EPA default assumption of a 1 percent organic carbon content for sediments. Please explain why sediments were not analyzed for TOC and consider collecting TOC data to enable site-specific adjustments of these EqP-based sediment benchmarks before performing the selection of sediment COCs for the benthic macroinvertebrate community in the new ERA.

21) Page 6-5, Section 6.1.2.3 Please add text and footnotes in Table 6-6 to explain why Puerto Rico Water Quality Standards (PRWQS) were not applied as surface water screening values instead of the national Ambient Water Quality Criteria (NAWQC), indicating either that PRWQS are unavailable, the same as the NAWQC, or higher than the NAWQC, so that the lower, most protective available criteria were used.

22) Page 6-8, Section 6.2 In the fifth paragraph, it is stated that "lead exceeded its background screening criteria at five locations" but "did not exceed...ecological surface soil screening values at any location." Lead did exceed its avian and/or mammalian EcoSSL at several locations; therefore, please revise this sentence to acknowledge the exceedances of the avian and/or mammalian Eco-SSLs for lead at numerous locations.

23) Page 6-8, Section 6.2 and Table 6-1 Section 2.2 states that "...*The USTs were constructed in the 1940s for the storage of aviation gasoline (AVGAS) for piston-driven airplanes*." AVGAS contains tetraethyl lead, which is significantly more toxic than inorganic lead. Therefore, tetraethyl lead should be included as a chemical of potential concern (COPC) and further investigation and sampling conducted to determine the nature and extent of tetraethyl lead contamination.

24) Page 6-7, Section 6.1.3 and Tables 6-1 to 6-6 PREQB's Underground Storage Tank Regulations lists a value for each TPH fraction (i.e., 100 ppm for TPH-GRO and TPH-DRO in soil, and 50 ppm for these fractions in groundwater). Although Section 6.1.3 discusses screening TPH-GRO and TPH-DRO to the total TPH criterion (which is the same as the criteria for TPH-GRO and TPH-DRO), the tables indicate that values for TPH-GRO and TPH-DRO have not been established, which is not correct. Please revise the tables to include the criterion for TPH-GRO and TPH-DRO.

25) Page 6-13, Section 6.5, last paragraph Please provide a discussion of whether benzene has been adequately delineated in groundwater, similar to the discussion for other contaminants detected in groundwater and in other environmental media.

26) Tables 6-1 to 6-7 & Appendices A and B The laboratory reported all nondetect results down to the method detection limit (MDL) instead of the reporting limit. Typically, the MDL is a statistically derived value that is not accurately verified by the laboratory analysis. The reporting limits (or quantitation limits) are accurately verified by laboratory analyses of standards at the unadjusted reporting limit. Table 3-2 of the February 29, 2008 RFI Work Plan and Table 4-3 of this report present the required reporting limits for this program, not the MDLs. It should be noted that reporting limits are typically 3-5 times higher than MDLs prior to adjustment for sample-specific parameters, etc. Please revise Tables 6-1 through 6-7, the tables of sample results presented in Appendix B and the tables of IDW results presented in Appendix A to reflect the reporting of nondetect results down to the reporting limit instead of the MDL.

27) Page 7-2, Section 7.1 Please add text to the last paragraph of this section summarizing the results documenting that benzene and ethyl benzene concentrations detected in groundwater do exceed the NAWQC. Please also discuss the implications of these exceedances for further evaluations to be performed in the new ERA. For example, will mixing and dilution estimates be performed for tidal inflows/outflows within the receiving estuarine wetlands to refine the ecological risk evaluation?

28) Page 7-2, Section 7.1 Please correct the typographical error in the third sentence of the first full paragraph on this page - the sample identifications provided in the third sentence should be reversed as sample 9SD96 is associated with the vanadium contamination and 9SD92 is associated with the PAH contamination.

29) Page 7-2, Section 7.1 PREQB concurs with the recommendations provided in this section (incorrectly numbered as Section 7.1) that further investigation under this CMS is needed to further delineate the site contamination above screening levels for several previously identified COCs, such as vanadium and LLPAH in sediment. As noted in prior comments, supplemental sampling to evaluate the potential releases of and ecological risks from organic lead in soil and sediments is also warranted. It is recommended that the additional sampling proposed to further delineate the spatial extent of selected COCs in soil and sediment be designed also to sample/analyze for tetraethyl versus inorganic lead in a subset of those areas with significantly elevated concentrations of total lead, relative to background to cost-effectively establish a correlation between tetraethyl and inorganic lead concentrations. Please revise if the fifth sentence of the first paragraph is referring to this report, if it is, instead of reading: "Further investigation under this CMS...", it should read: "Further investigation under this RFI..."

30) Page 7-3, Section 7.1 The third paragraph of this section (incorrectly numbered as 7.1) states that: "*Toxicity test results indicated that there is no clear dose-response relationship between lead concentrations and amphipod response (survival, growth, and reproduction).*" The purported lack of evidence that lead may be a toxicity driver for any observed adverse effects of site-impacted sediment offers further justification for supplemental sediment analyses to determine what fraction of the detected lead, if

any, may consist of organic lead. Such data would facilitate further considerations of the relative toxicity of inorganic vs. organic lead to the burrowing amphipod test species (*Leptocheirus plumulosus*) and the benthic macroinvertebrate community.

31) Appendix A

a. Field Log Book Notes: None of the field notes related to groundwater sampling recorded the actual flow rates used during purging and sampling. In all cases, notes state "pumped ½ speed", "pumped ½ or less speed", "pump speed is ~ 2/3", or "pump speed – full". It is unclear what these notes signify and how they correlate with actual flow rates. Therefore, it is unclear if the samples were collected at a flow rate of 100-250 mL/minute, as required in the EPA Region II SOP. Please clarify.

b. Soil Boring Logs: Please correct the dates on the boring logs for 9SB52 (1/17/09) and 9SB49 (1/21/09).

32) Appendix C

a. The text discusses how the data validation guidelines were modified for blank contamination actions because the lab reported results down to the MDL instead of the reporting limit. The validation modification used causes positive results between the MDL and the reporting limit to be qualified as nondetect at the reported concentration. This is not consistent with the Region 2 validation guidelines which require that positive results between the MDL and reporting limit be qualified as nondetect at the reporting limit when affected by blank contamination. The methodology used in this report causes the blank-qualified nondetect results to have lower reporting limits which are not technically accurate. Please follow Region 2 guidelines for blank qualification. This comment affects VOC, PAH, TPH-GRO, and TPH-DRO sections in all data validation reports as well as associated data tables. Please revise accordingly.

b. SDG NAPR44001-1: The validator qualified results for select metals in sediment samples from SWMU 9 in this SDG based on the MS and matrix duplicate results of soil samples from SWMU 60. It is not appropriate to use data results from another matrix and site to qualify sediment data for SWMU 9. Please revise the validation report and associated data tables accordingly.

c. SDG NAPR44015-2: The validator qualified results for antimony in sediment samples from SWMU 9 in this SDG based on the MS results of a sediment sample from CABSED01. It is not appropriate to qualify data using results from a different site. Please revise the validation report and associated data tables accordingly.

d. SDG NAPR44015-3: The validator qualified results for antimony in subsurface soil samples from SWMU 9 in this SDG based on the MS results of a surface soil sample from CABSS04. It is not appropriate to qualify data using results from a different site. Please revise the validation report and associated data tables accordingly.

e. SDG NAPR44044-1: The validator qualified results for select metals in surface and subsurface soil samples from SWMU 9 in this SDG based on the MS, matrix duplicate, and serial dilution results of a sediment from SWMU 9. It is not

appropriate to qualify soil data using sediment results. Please revise the validation report and associated data tables accordingly.

f. SDG NAPR44077-3, page 6: The low recovery of phenol-d5 in sample JAN09-FB02 should not cause qualification of all SVOC results, as was performed. As per the Region 2 data validation guidelines, the low recovery affects the results for the acid compounds only. Please revise the data validation memo and any associated tables accordingly.

g. SDG NAPR44155-2: The validator qualified results for select metals in surface soil samples from SWMU 9 in this SDG based on the MS and matrix duplicate results of a soil from CAB SB01-02. It is not appropriate to qualify data using results from a different site. Please revise the validation report and associated data tables accordingly.