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

MAY 13 2008

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. David Criswell
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 PRD2170027203,

1) February 29, 2008 Responses to Comments on Final Phase I RFI Report for SWMU 68;

2) April 17, 2008 Responses to Comments on SWMU 62 and 71 Revised Final Phase I RFI Work Plan;

3) April 17, 2008 Responses to Comments on SWMU 78 Phase I RFI Work Plan;

4) February 26, 2008 Draft Steps 6 and 7 of Baseline Ecological Risk Assessment (BERA), SWMU 45;

5) April 17, 2008 Responses to Comments on Semi-Annual Groundwater Monitoring Report for SWMU 3 (Base Landfill); and

6) April 3, 2008 Revised Groundwater Sampling and Analysis Plan for Base Landfill.

Dear Mr. Criswell:

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 Region 2 has completed its reviews of the above documents, which were submitted by Baker Environmental on behalf of the Navy, pursuant to the requirements of the Consent Order. Based upon our reviews, EPA has several comments, which are discussed below.

I. Final Phase I RFI Report for SWMU 68

EPA requested that our consultant, TechLaw Inc., review the February 29, 2008 Phase I RFI Report. Based on that review, EPA has two comments on the above report. These are:

1. The Final Phase I RFI Report includes an ecological screening assessment of community level receptors (invertebrates and plants), as well as a food chain assessment for a suite of individual target receptors that appears to sufficiently capture the potential receptor settings. However, the Final Phase I RFI Report does not mention the presence/absence of any threatened and endangered species that may occur within or adjacent to the site. Without further detail describing whether these species exist, it is unclear if the ecological risk evaluation is sufficiently protective of sensitive species. Additional information should be provided in order to characterize the threatened and endangered species setting.

2. The Final Phase I RFI Report relies on geospatial lines of evidence for the ecological risk conclusions. However, this information is not displayed in any format that allows the reader to be able to track these lines of evidence. Revise the Final Phase I RFI Report to include a map depicting the sample location results with hazard quotients exceeding a value of 1 in relation to natural setting characteristics (overlie habitat types on to the same map).

Within 45 days of your receipt of this letter, please submit an Addendum to the February 29, 2008 Phase I RFI Report which acceptably addresses the above two comments.

II. SWMU 62 and 71 Revised Final Phase I RFI Work Plan

EPA has completed its review of the April 17, 2008 Responses to our comments sent to Mr. Mark Davidson of the Navy by our letter dated February 26, 2008. Those comments had included Technical Reviews dated February 1, 2008 by EPA's consultant, TechLaw Inc. Our review of the Responses and the Revised Phase I RFI Work Plan for SWMUs 62 and 71 indicates they acceptably addressed those comments. The April 17, 2008 Phase I RFI Work Plans are approved.

III. SWMU 78 Phase I RFI Work Plan

EPA has completed its review of the April 17, 2008 Responses to our comments which were Emailed to Mr. Mark Kimes of Baker Environmental, your consultant, on April 1, 2008. Those comments included comments by EPA's consultant, TechLaw Inc., dated January 2, 2008. Our review indicates that the Responses and the April 17, 2008 Phase I RFI Work Plan for SWMU 78 acceptably addressed those comments. The RFI Work Plan is approved.

IV. Draft Steps 6 and 7 of Baseline Ecological Risk Assessment (BERA), SWMU 45

EPA has completed its review of the February 26, 2008 BERA report. Based on our review and a review by our consultant, TechLaw Inc., EPA has several comments on the BERA that are given in the enclosed Technical Review (Enclosure 1). In addition, the Puerto Rico Environmental Quality Board (PREQB) has reviewed the BERA and submitted comments to EPA. PREQB's comments are given in Enclosure #2 of this letter. Within 45 days of your receipt of this letter, please submit a revised BERA, addressing comments given in the enclosed TechLaw technical review, and the enclosed comments received from PREQB.

V. Responses to Comments on Semiannual Groundwater Monitoring Report for SWMU 3

EPA requested that our consultant, TechLaw Inc., review the April 17, 2008 Responses to Comments on the September 2007 Semiannual Groundwater Report which were given with EPA's previously cited February 26, 2008 letter to Mr. Davidson. Those comments regarded the Semiannual Report submitted by Baker Environmental's letter of January 18, 2008. Based on our review of the April 17th Responses, EPA has several comments, which are discussed in the enclosed Technical Review (Enclosure #3). While EPA will not require submission of a revised groundwater report at this time, please submit, within 35 days of your receipt of this letter, revised Responses to address comments in the enclosed Technical Review.

VI. Revised Groundwater Sampling and Analysis Plan (SAP) for Base Landfill

EPA requested that our consultant, TechLaw Inc., review the April 3, 2008 revised SAP. Based on that review, EPA has determined that the revised SAP is not fully acceptable. There are several comments on the revised SAP, which are discussed in the enclosed Technical Review (Enclosure #4). These comments must be addressed before the revised SAP can be judged to be acceptable. Within 35 days of your receipt of this letter, please submit a revised SAP addressing the comments in the enclosed Technical Review.

If you have any questions on the above or enclosed comments, please telephone me at (212) 637-4167.

Sincerely yours,

Timothy R. Gordon

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

Enclosures (4)

cc: Ms. Wilmarie Rivera, P.R. Environmental Quality Board, w/encls.
Mr. Julio I. Rodriguez Colon, P.R. Environmental Quality Board, w/encls.
Mr. Mark Kimes, Baker Environmental, w/encls.
Mr. Andrew Dorn, TechLaw Inc, w/o encls.

ENCL. #1

EVALUATION OF THE DRAFT STEPS 6 AND 7 OF THE ECOLOGICAL RISK ASSESSMENT FOR SWMU 45

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

The following comments are based on an evaluation of the Draft Steps 6 and 7 of the Ecological Risk Assessment, SWMU 45, dated February 26, 2008.

GENERAL COMMENTS

1. This Baseline Ecological Risk Assessment (BERA) evaluated two ecological receptors, benthic invertebrates and the West Indian manatee. There was no evaluation of wildlife that may feed on fish in Puerca Bay, nor were any fish tissue data collected, even though Aroclor 1260 can bioaccumulate up the food chain. Section 2.3.3.2 (Birds) stated that, "based on the habitat preference and observations recorded at NAPR, only the brown pelican has the potential to use the Puerca Bay cove as a food source." However, the brown pelican was not selected as a wildlife receptor for evaluation in this BERA. Please provide solid justification for omitting piscivorous birds that may feed on fish from Puerca Bay.

2. Maximum Acceptable Toxicant Concentrations (MATCs) for specific chemicals were derived by taking the geometric mean of the adjusted NOAEL (No Observable Adverse Effect Level) and LOAEL (Lowest Observable Adverse Effect Level) value. The calculation of MATCs could not be verified because input values were not available nor were the final calculated MATCs summarized in the document. Please provide the input values and final MATCs in table format to allow for independent evaluation.

3. The results of the West Indian manatee aquatic food web exposure performed in Step 3a was summarized in Section 2.4 (Ecological Chemicals of Concern) and Table 2-4 (Summary of Hazard Quotients for West Indian Manatee Ingestion-based Exposures). Section 2.4 provided no discussion on how these Hazard Quotients (HQs) were calculated. However, Table 2-4 contained a footnote that stated, "hazard quotients values derived by dividing the maximum exposure dose by the ingestion-based screening value." It appears that these results were provided in a previous document. Please specify how ingestion-based HQs were calculated in Section 2.4. In addition, Table 2-4 needs to provide all of the input parameters (i.e., plant and sediment concentrations) used in HQ calculations.

SPECIFIC COMMENTS

1. **Section 2.4, Ecological Chemicals of Concern, 3rd paragraph, pages 2-9 and 2-10:** The last sentence in this paragraph stated that, "detected concentrations of Aroclor 1260 in seventeen samples exceeded the sediment screening value of 21.6 ug/kg." Table 2-2, Analytical Data Summary for Ecological Chemicals of Concern in Sediment, indicates that eighteen concentrations exceeded 21.6 ug/kg. Please review this paragraph and make the appropriate changes to more accurately reflect the number of exceedances.

2. **Section 4.2.3.2, Comparison of Upper Trophic Level Dietary Intakes to NOAELs/LOAELs, Input Variables, page 4-17:** Dietary Intake input variables listed at the top of page 4-7 show the "proportion of diet composed of food item" with units of mg/kg, dry weight. This input variable must be unitless for use in the dietary intake equation. Please correct the units for this input variable. In addition, the "maximum concentration of chemical x in food item" has units of "dry weight basis." This input variable must have units of mg/kg for use in the dietary intake equation. Please revise the units.

3. **Section 7.0, Uncertainties, 2nd bullet, page 7-1**: The first sentence in the second bullet stated, "sediment samples submitted for amphipod toxicity testing were analyzed for metals identified as ecological COPCs (Chemicals of Potential Concern) in Step 2 of the ERA process (arsenic, cadmium, copper, mercury, and selenium)." However, in the second paragraph on page 3-5 it was stated that, "arsenic, cadmium, copper, mercury, and tin represent the Appendix IX metals identified as preliminary COPCs in Step 2 of the SERA (Screening Level Ecological Risk Assessment) for benthic invertebrates." There are additional references in the report to the COPCs identified in Step 2 and it appears based on these references that this sentence should list tin instead of selenium. Please update this sentence to accurately represent the COPCs identified in Step 2.

4. **Section 4.1.3, Comparison of Analytical Data to Screening Values, Table, page 4-3:** The table embedded in this section lists three of the four COPCs (cadmium, mercury, and selenium) and their associated maximum sediment concentration and sediment screening value. Arsenic was not included in this table. Please revise this table to ensure that all of the COPCs are listed.

5. **Section 6.0, Conclusions and Recommendations, 1st paragraph, page 6-1**: The first sentence of this paragraph stated that, "Table 2-4 summarizes the decision rules and criteria that were used to outline potential recommendations and actions associated with the lines of evidence discussed in Section 5.0." Table 2-4 is an incorrect reference; the correct table is Table 2-6. Please change the reference accordingly.

ENCL. # 2

COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board
Environmental Emergencies Response Area

April 28th, 2008

Mr. Timothy R. Gordon
RCRA Programs Branch
Resource Conservation and Special Projects Section
U.S. Environmental Protection Agency
290 Broadway, 22nd. Floor
New York, NY 10007-1866

Re: Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment, SWMU 45, Naval Activity Puerto Rico, RCRA/HSWA Permit No. PR2170027203, Ceiba, Puerto Rico, February 26, 2008

Dear Mr. Gordon:

The Puerto Rico Environmental Quality Board (PREQB) has completed its review of the Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment, SWMU 45, Naval Activity Puerto Rico, RCRA/HSWA Permit No. PR2170027203, Ceiba, Puerto Rico, February 26th, 2008. Enclosed our comments.

If you have any questions or comments about our review, please contact me at (787) 767-8181, extension 6141.

Cordially,

Wilmarie Rivera Otero
Federal Facilities Coordinator

/inj

Enclosure

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1375 Ponce de León Ave., San Juan, PR 00926-2604
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PREQB Technical Evaluation

Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment, SWMU 45, Naval Activity Puerto Rico, RCRA/HSWA Permit No. PR2170027203, Ceiba, Puerto Rico, February 26, 2008

INTRODUCTION

This Technical Evaluation is of the Draft Steps 6 and 7 of the Baseline Ecological Risk Assessment, SWMU 45, Naval Activity Puerto Rico, RCRA/HSWA Permit No. PR2170027203, Ceiba, Puerto Rico, February 26, 2008.

Please note that several specific comments elaborate further on thematic deficiencies summarized as general comments, to identify the locations of all interrelated ERA content that should be revised to address these broader issues.

GENERAL COMMENT

1. ***Omission of Threatened and Endangered Species as Ecological Receptors.*** Please add the brown pelican and one or more sea turtle species to the BERA as ecological receptors to evaluate food chain-mediated risks from dietary exposures to Aroclor 1260 and inorganic sediment contaminants of concern (COCs), including cadmium and mercury, via consumption of seagrass and sponges (green turtles), sponges, crustaceans, mollusks and sea urchins (hawksbill turtles), and/or finfish (brown pelican). Since polychlorinated biphenyls (PCBs) such as Aroclor 1260 bioaccumulate to much higher levels in omnivorous turtles than in vegetarian turtles (e.g., Eisler, 1986), it is recommended that the hawksbill turtle, at a minimum, be added to a revised BERA as an indicator species representing the local sea turtle community.

2. ***Omission of Manatee Exposure Pathways for Aroclor 1260.*** The West Indian manatee (*Trichecus manatus*) exposure assessment should be revised to also evaluate potential risks to the manatee from incidental ingestion of Aroclor 1260 detected in sediments and potentially contained in seagrass. Aroclor 1260 concentrations in seagrass should be estimated using site-specific data on sediment Aroclor 1260 concentrations and published biota-sediment Aroclor 1260 bioaccumulation factors (BSAFs) for marine macrophytes. If biota to sediment bioaccumulation factors (BSAFs) for seagrass or other macrophytes are not available for PCBs in the literature, paired seagrass and sediment samples should be analyzed from locations with elevated Aroclor 1260 to develop a site-specific Aroclor 1260 BSAF.

3. ***Conflicting Manatee Hazard Quotients.*** Please revise Section 2.4 to clearly document the basis for manatee COC selection and identify the data subsets used to calculate the hazard quotients (HQs) presented in Table 2-4 *versus* those in Table 4-13. Please identify which subsets of sediment and seagrass analytical samples and data are represented in the alternative sets of manatee HQs (perhaps as footnotes to the tables). Since the manatee HQs in Table 2-4 are much higher

than those in Table 4-13, please also discuss the basis for these different HQs in Sections 4.2.3.2 and 5.2.

4. ***Incomplete Use of Relevant Historical Sediment Data.*** Please recalculate manatee HQs in the revised BERA using cumulative historical data available for *all* seagrass-vegetated sediment samples, coupled with site-specific seagrass BSAFs (from the paired seagrass and sediment sample analyses), to estimate mean, maximum, and 95% UCL sediment and seagrass COC concentrations and HQs.

5. ***Data Presentation and Lack of Summary Statistics.*** Please rename and/or revise the analytical data tables to add cumulative statistics across *all* sampling events for each COC, other analyte, or water quality parameter, including the number of samples, mean, minimum, 95% UCL, and maximum COC or analyte concentration, and sample location/ID of each maximum detected COC concentration. [Alternatively, please create new, stand-alone statistical data summary tables.]

6. ***Incomplete Evaluation of Sediment Hazard Quotients Using Cumulative Data.*** Please provide a summary table of SWMU 45 *versus* Reference sediment HQs for Aroclor 1260 and all of the inorganic COCs identified during Step 2 as having maximum HQs greater than one. This table should include all relevant historical sediment data from the 53 sediment samples collected since 1997.

7. ***Derivation and Source of Toxicity Reference Values (TRVs).*** **Comment:** Please adjust all of the TRVs used to assess dietary exposures of wildlife receptors (e.g., manatee, sea turtle and pelican) by dividing the test species TRV by an inter-species extrapolation factor of ten, in addition to applying the body weight scaling factor, before calculating the HQs. Please reassess TRV choices for the BERA after reviewing the avian and mammalian TRVs used by USEPA to derive soil ecological screening levels (EcoSSLs) for use in Superfund ERAs.

SPECIFIC COMMENTS

8. ***Table of Contents.*** **Comment:** Please add missing entries for Tables 4-7 and 4-8 to the TOC. Unless statistical data summaries are to be added to those tables that now contain only raw data, please also rename them to accurately reflect their content and thus eliminate the misleading phrase "Summary of" from each title for Tables 4-1, 4-3 through 4-8, and 4-10 through 4-12.

9. ***Executive Summary, COC Identification, page ES-1.*** **Comment:** Please explain the scientific basis for the receptor-specific COC selections in the Executive Summary and all relevant text discussions of COCs in the BERA. **Rationale:** The discussion of COCs identified in Step 3b of the BERA states that Aroclor 1260 was designated as a COC *only* for benthic macroinvertebrate exposures, whereas arsenic, cadmium, mercury and selenium were designated as sediment COCs *only* for manatee exposures. All inorganic constituents identified in the original SERA, as sediment COCs for benthic community exposures, should have been carried into the BERA and included in exposure assessments for *all* receptor groups,

including macroinvertebrates, the manatee, and other wildlife. However, the COC selection process used in Step 3b and scientific justification for dissimilar COC subsets for these different ecological receptors are not explained in the BERA.

10. ***Executive Summary, Assessment Endpoints, page ES-1.*** **Comment:** Please revise the benthic invertebrate exposure assessment and effects measurement endpoints to include exposures to inorganic COCs (not just Aroclor 1260) and revise corresponding manatee discussions include endpoints for Aroclor 1260 (not just inorganic COCs). Please limit discussions of endpoints to those for which toxicity reference values (TRVs) are provided/applied in the BERA. **Rationale:** All receptor groups are potentially exposed, directly and/or indirectly, to both inorganic COCs and Aroclor 1260 in sediments. No TRVs for *growth* effects of COCs were used to assess dietary risks to the manatee (Table 2-5). Endpoints should include only survival (based on the mercury mortality TRV) and reproduction (based on reproductive TRVs for arsenic, cadmium and selenium), unless the BERA is revised to estimate risks using growth-related TRVs.

11. ***Executive Summary, Conclusions, page ES-2.*** **Comment:** Please revise the premature and inadequately supported conclusion in the final paragraph that "Aroclor 1260 is not impacting the benthic invertebrate community at SWMU 45." Please also provide a literaure-based evaluation of potential COC toxicity to and bioaccumulation within other important benthic macrofauna of the SWMU 45 embayment, such as crustaceans, mollusks and sea urchins, that are likely to be eaten by higher trophic level receptors, such as pelicans and sea turtles. Please revise the discussion of the manatee in the Executive Summary, as needed, to reflect all related revisions to the BERA. **Rationale:** The toxicity tests showed only that Aroclor 1260 appears not to pose risks of toxicity to *one* species of amphipod, which may be more tolerant of PCBs than many other benthic species for which tests were not performed. Thus, an absence of impacts or risks from Aroclor 1260 or other sediment COCs cannot be reliably extrapolated to the entire community of diverse benthic populations and species. The toxicity *versus* bioacumulation evaluation is needed for macrofaunal prey of birds and sea turtles because if the COCs are not toxic to these biota, then these sediment COCs are more likely to be passed along to their wildlife predators.

12. ***Section 2.3.2, Aquatic Habitats, page 2-5.*** **Comment:** In the last paragraph, please correct the spelling error for the citation of the wetland classification system of Cowardin et al. (***not*** Cowardi***an***).

13. ***Section 2.3.3.2, Birds, page 2-7.*** **Comment:** As noted previously, the brown pelican should be added to the BERA as a piscivorous receptor that may be exposed to elevated levels of Aroclor 1260 and mercury in fish at SWMU 45. **Rationale:** It is confirmed here that the federally protected brown pelican is a seasonal resident at NAPR and its surrounding waters, and that both juvenile and adult pelicans may forage for food in Puerca Bay and the SWMU 45 embayment.

14. ***Section 2.4 Conflicting Manatee Hazard Quotients.*** **Comment:** Please revise Section 2.4 to clearly document the basis for manatee COC selection and identify the data subsets used to calculate the hazard quotients (HQs) presented in Table 2-

4 *versus* those in Table 4-13. Please identify which subsets of sediment and seagrass analytical samples and data are represented in the alternative sets of manatee HQs (perhaps as footnotes to the tables). Since the manatee HQs in Table 2-4 are much higher than those in Table 4-13, please also discuss the basis for these different HQs in Sections 4.2.3.2 and 5.2. **Rationale:** Conflicting text discussions and summary tables of dietary exposure HQs for the manatee are confusing due to a lack of explanation of the methods used to derive the manatee HQs presented in Section 2.4 (p. 2-10) and Table 2-4, and how/why those HQs differ from HQs presented in Section 4.2.3.2, Table 4-13, and Section 5.2. Discussions of COCs evaluated in the manatee exposure assessment, provided in several sections of the BERA, also do not clearly explain how, where, when, or why Aroclor 1260 was eliminated as a COC for the manatee.

15. ***Section 2.4 Ecological Chemicals of Concern, page 2-9.*** **Comment:** Please expand the parenthetic (*i.e. benthic...*) in the first sentence of the last paragraph to acknowledge the potential impact of Aroclor 1260 on benthic macroinvertebrate communities, local aquatic food chains, and higher trophic level wildlife receptors such as sea turtles and piscivorous birds.

16. ***Section 2.4 Ecological Chemicals of Concern, page 2-10.*** **Comment:** Please explain how, when, where, or why arsenic, cadmium, mercury, and selenium were "identified as ecological COCs for West Indian manatee aquatic food web exposures." Please clarify the source of the manatee HQs in in Table 2-4, explain how these HQs were calculated, and discuss how they differ from manatee HQs presented elsewhere in the BERA. **Rationale:** The second paragraph of the "preliminary conceptual model for SWMU 45" is confusing and incomplete. It implies that food chain exposures to these COCs were evaluated for the manatee *prior to* this BERA. Since Step 6 & 7 of the BERA, presumably, is where manatee dietary HQs are *first* calculated, discussion of and reference to manatee HQs for these inorganic COCs in Table 2-4 is confusing.

17. ***Section 2.4 Ecological Chemicals of Concern, page 2-10.*** **Comment:** Please revise the third and fourth paragraphs to eliminate the attempted justification for omitting sea turtles from the BERA due to a *perceived* lack of ecotoxicological data for sea turtles and other receptors. Additional effort is needed to research the wealth of more recent ecotoxicological literature on sea turtles and other reptiles and compile data needed to add sea turtles to the BERA. **Rationale:** All of the mammalian TRVs used in the BERA were derived from a single published compilation of wildlife toxicological data (Sample et al., 1996). While useful for some empirical data, this reference now offers an incomplete and somewhat outdated source of wildlife TRVs. Many reptilian and sea turtle ecotoxicological data, studies, and ERAs have been presented at scientific meetings and published in peer reviewed scientific journals during the past decade. The claim that there is a paucity of data for retiles is not a compelling rationale for excluding endangered sea turtles as a receptor group in the BERA. A recent ERA sea turtles performed by a leading ERA expert (Sample et al., 2000), who had compiled the mammalian TRVs (Sample et al., 1996) used in this BERA for the manatee, could serve as a model for assessing sea turtle exposure risks in the SWMU 45 embayment.

18. ***Section 2.5.1.1, Aroclor 1260, pages 2-11 & 2-12.*** **Comment:** Please: (a) revise the BERA to add Aroclor 1260 as a COC for the manatee, brown pelican, and sea turtles; (b) add appropriate TRVs for Aroclor 1260 or PCB congeners to the TRV summary in Table 2-5; and (c) discuss Aroclor 1260 toxicity to birds, herbivorous mammals, and turtles/reptiles as context for TRVs to be used in HQ calculations for these three wildlife receptor groups. **Rationale:** The last two paragraphs on page 2-11 and first paragraph on page 2-12 acknowledge both the potentially adverse developmental and physiological effects of Aroclor 1260 on sea urchins and the high biomagnification potential of Aroclor 1260 in food chains, which causes impacts that are "generally more significant" to higher trophic levels in food chains. This underscores the need to assess Aroclor 1260 risks to sea urchin reproduction and dietary risks to the manatee, pelicans, and sea turtles from Aroclor 1260 biomagnification in their prey.

19. ***Section 2.5.1.2, Arsenic, pages 2-12 to 2-13.*** **Comments:** Please expand the arsenic discussion to address its potential bioaccumulation in and toxicity to sea turtles and the brown pelican. Please review USEPA's EcoSSL document for arsenic TRVs more recent than Sample et al. (1996) and consider selecting a more appropriate TRV for use in the manatee HQ calculation. Please also review this EcoSSL document as a critically-reviewed source of avian TRVs for arsenic that could be used to assess dietary risks to the brown pelican. Please adjust the TRVs chosen for the manatee and pelican by dividing the test species TRV by ten, as an inter-species extrapolation factor, before calculating the HQs. **Rationale:** The sensitivity of sea turtles to arsenic has been documented in recent studies that should be discussed here (Kubota et al., 2003). Contrary to the view that significant biomagnification of arsenic does not occur in the marine environment, as expressed in this section of the BERA, Kubota et al. (2003) have shown that arsenic levels may be very high in sea turtles. While the test species arsenic TRV was appropriately converted to scale that TRV to the manatee's body weight, a problem with the manatee TRV derivation for arsenic [and all other COCs] is that the scaled TRV also should be, but was not divided by a factor of ten, to account for the inter-species extrapolation from the test species to the manatee (standard USEPA approach for ERA). The arsenic TRVs compiled from Sample et al. (1996) and modified for used in the manatee toxicity assessment, are unlikely to represent the best available TRVs for mammalian herbivores that could be applied in this BERA. These TRVs used were derived from oral doses of arsenic in water fed to mice, whereas many more ecologically and taxonomically relevant TRVs are available for mammalian herbivores, including goats and rabbits, among the numerous TRVs that were compiled and rigorously screened be ecotoxicologists for use in developing USEPA's arsenic ecological soil screening level (EcoSSL) for herbivorous mammals (USEPA, 2005a).

20. ***Section 2.5.1.3, Cadmium, pages 2-13 to 2-14.*** **Comments:** Please correct TRV discrepancies between the text and Table 2-5 to verify which test species TRV was scaled to the manatee's body weight for use in the BERA. Before correcting the text or table for consistency, please divide the body weight scaled TRV by a factor of ten to account for the inter-species extrapolation from the test species to the manatee. Please review the quality-assured TRV databases for cadmium used to derive soil EcoSSLs for cadmium (USEPA 2005b) for a more appropriate TRV

based on food ingestion exposures of herbivorous mammals to use in the manatee toxicity assessment. When deriving TRVs for the pelican, please also consider the avian TRV database used to derive the avian EcoSSLs for cadmium and apply the same body weight scaling and inter-species extrapolation TRV adjustments, from the test species to the ecological receptor. **Rationale:** The text explanation of the cadmium TRV used in the manatee toxicity assessment contradicts corresponding TRV information presented in Table 2-5. The text says that a NOAEL of 1.0 mg/kgBW/day and a LOAEL of 10 mg/kgBW/day for reproductive effects in rats, as referenced in Sample et al. (1996), were derived from a 6 week study of rats during which the cadmium dose was administered in water by gavage, rather than by ingestion of food. However, Table 2-5 cites that a reproductive LOAEL of 2.52 mg/kgBW/day and NOAEL of 0.252 mg/kgBW/day for mice fed cadmium in water were used to derive the manatee TRV for cadmium by scaling to account for body weight differences. The test species cadmium TRV was appropriately converted to scale that TRV to the manatee's body weight, but the scaled TRV also should have been divided by a factor of ten, to account for the inter-species extrapolation from the test species to the manatee. This is USEPA's default approach for TRV derivation. Finally, more ecotoxicologically appropriate TRVs for herbivorous mammals (and for birds) are likely available in the quality-assured TRV databases for cadmium used to derive soil EcoSSLs for cadmium (USEPA 2005b).

21. ***Section 2.5.1.4, Mercury, pages 2-15 to 2-16.*** **Comment:** Please divide the manatee body weight scaled TRV for mercury by a factor of ten to account for the inter-species extrapolation from the test species to the manatee then recalculate the mercury HQs for the manatee. When deriving mercury TRVs for the brown pelican and sea turtles, please use the same TRV derivation approach of body weight scaling and inter-species extrapolation adjustments. **Rationale:** USEPA's default TRV derivation approach is to scale a test species TRV to the body weight of the receptor species (manatee) then divide that scaled TRV by ten, to account for the inter-species extrapolation from the test species to the receptor species.

22. ***Section 2.5.1.5, Selenium, pages 2-16 to 2-17.*** **Comment:** Please discuss the potential for selenium to bioaccumulate in the plant foods and prey of sea turtles to levels that might result in elevated body burdens of selenium and provide relevant information on potential selenium toxicity to turtles or other reptiles. Please also discuss relevant data on avian toxicity of selenium that will be used to assess dietary risks to the brown pelican from selenium exposure via its piscivorous exposure pathways. **Rationale:** Recent studies (e.g., Anan et al., 2001) have documented the accumulation of selenium and other trace elements or metals in green sea turtles and hawksbill turtles. A significant amount of avian ecotoxicological data also is available for selenium, including case studies of birds poisoned from exposures to contaminated wetlands (see Eisler, 1985).

23. ***Sections 2.6.1 Measurement Endpoints and 2.6.2 BERA Study Design.*** **Comments:** Please revise the statements of measurement endpoints and risk questions to eliminate growth as a measurement endpoint for the manatee. Please add assessment and effects measurement endpoints for the brown pelican and one or more species of endangered sea turtles. Please modify the BERA Study Design

discussion to include the use of all historical sediment analytical data for those samples collected from areas with seagrass. These data should be coupled with seagrass:sediment BSAFs, to calculate the average and maximum estimated seagrass concentrations of all COCs for use in the manatee exposure assessment. **Rationale:** Because *growth* TRVs were not used in the BERA, growth was not evaluated as an assessment or effects measurement endpoint for the manatee. The use of all cumulative sediment data for 53 samples collected since 1997 is needed to provide a more spatially representative BERA and more reliable insights to potential risk throughout the SWMU 45 embayment than can be obtained using the spatially limited coverage of seagrass and sediment analytical data for the three locations with co-located sediment and seagrass samples.

24. ***Section 2.6.4, Data Evaluation and Interpretation, pages 2-22 to 2-24.*** **Comments:** Please revise the first bullet on page 2-23, to read as: "Existence of statistically significant correlations among laboratory toxicity test results, COC concentrations, and other chemical/physical characteristics of the site media." Somewhere in the discussion introduced by the second bullet on page 3-23, please refer to the tables in which all inputs to the HQ calculations are presented and in which all of the resultant HQs are summarized. Finally, in the discussion of TRVs on page 2-24, please explain the source and significance of the MATC, and explain that each of the test species TRVs is divided by a factor of ten to account for uncertainties resulting from the inter-species extrapolation from a test species to receptor species. **Rationale:** These edits and additional data are needed in relation to other requested changes and for greater clarity and accuracy of the text.

25. ***Section 3.1 Verification of BERA Field Sampling Design, pages 3-1 to 3-3.*** **Comment:** Please remove data for copper, lead and zinc from all sediment analytical data tables and text discussions. **Rationale:** Paragraph 2 on page 3-3 says that sediments were analyzed for copper, lead and zinc, but exposures of the benthic community or manatee to these metals were not assessed. Inclusion of analytical data for metals that were not selected as COCs, in tables and text of the BERA, is confusing. Although analyses of these inorganics in reference sediments may have been needed for ERAs at *other* NAPR sites, these data are not relevant to the SWMU 45 BERA.

26. ***Section 3.1 Verification of BERA Field Sampling Design, pages 3-1 to 3-3.*** **Comment:** Please revise the text in all locations to resolve this apparent discrepancy in reference area selection criteria. **Rationale:** Paragraph 3 on page 3-3, states that "only the TOC and grain size analytical data were used in the selection of an appropriate reference area." This contradicts statements about reference habitat selection criteria on pages 3-2 and 4-1, that indicate that a lack of chemical exceedances of benchmarks (TELs) and/or open water background sediment concentrations also were key reference area selection criteria.

27. ***Section 3.2.3 Seagrass Tissue and Co-Located Sediment Sampling, pages 3-35 to 3-6.*** **Comment:** Please identify the scientific name or names for all species of seagrass tissue samples analyzed. Were all analyzed samples identified as the same species, such as *Thalassia testudinum* (turtle grass), or were multiple species mixed into composite samples of plant tissue for analysis? **Rationale:** "Seagrass"

and "turtle grass" (*T. testudinum*) appear to be used loosely as synonyms. As a generic term, "seagrass" implies that a mixture of different species was analyzed, whereas the specific name "turtle grass" would apply to pure samples composited entirely from plants belonging to a single species of turtle grass, *T. testudinum*.

28. ***Section 4.1.3 Comparison of Analytical Data to Screening Values, pages 4-3 to 4-4.*** **Comment:** Please clarify any synonymy in the terminology used here as it relates to the method detection limit (MDL), reporting limit (RL), and sample quantitation limit (SQL). Please also discuss whether the RL was or should be treated as a SQL. If so, RLs for non-detections (NDs) ranging from 58 to 79 ug/kg would suggest possible presence of Aroclor 1260 at one-half of the RL/SQL (i.e., 29 to 39.5 ug/kg), slightly exceeding the TEL. **Rationale:** Aroclor 1260 was not detected in Reference 1 *or Reference 2 sedim*ent samples, for which the RLs ranged from 58 to 79 ug/kg. Although all RLs exceeded the TEL benchmark of 21.6 ug/kg, it is argued that Aroclor 126*0 can be concluded to not* occur in these samples above the MDLs that ranged from 11 to 13 ug/kg. It is concluded here that any Aroclor 1260 that may be present could occur only at concentrations *below* the range of the MDLs. However, SQLs for detections and NDs vary significantly based on a variety of sample-specific factors. USEPA's default procedure for treatment of NDs in an ERA, when at least one positive detection was found for a COC, is to include one-half of the SQL for each ND when calculating mean COC concentrations.

29. ***Section 4.2.1 Quick-Turn Sediment Samples, pages 4-5 to 4-6.*** **Comment:** Please expand the discussions of Aroclor 1260 detections in 18 of 20 sediment samples that exceed the TEL of 21.6 ug/kg to report the associated range, mean, and 95% UCL HQs for Aroclor 1260, and revise Table 4-4 to include Aroclor 1260 analytical summary statistics and these HQs across all 20 samples. Please revise Table 4-4 and related text discussions here and elsewhere in the BERA to incorporate Aroclor 1260 data from analyses of all 53 sediment samples collected since 1997, if available, rather than just the subset of the 20 most recent samples.

30. ***Section 4.2.2 Amphipod Toxicity Testing Sediment Samples, pages 4-6 to 4-14.*** **Comment:** Please discuss the known sensitivities to Aroclor 1260 of other marine benthic test species for which toxicity tests were not performed, such as the sea urchin. Please compare the amphipod toxicity test results with HQs for Aroclor 1260, arsenic, cadmium, mercury, and selenium using relevant literature-based sediment toxicity benchmarks. Please consider running a supplemental linear regression analysis of the toxicity testing results versus the resultant HQs for all five of these COCs, in an effort to further elucidate potential drivers of the apparent reproductive toxicity reported for sediment sample 45B-SD15. **Rationale:** Significant uncertainties remain as to potential exposure risks from Aroclor 1260 to the non-amphipod benthic species of the SWMU 45 embayment sediments, due in part to the significant variability in sensitivity to this COC among different macroinvertebrate species and test organisms. Because the test results do indeed suggest that Aroclor 1260 is not a driver of the observed effects, these results underscore the importance of adding the four inorganic COCs evaluated for the manatee to the list of COCs to be evaluated for direct contact

exposures of the benthic macroinvertebrate community.

31. ***Limitations of Single-species Sediment Toxicity Test.*** **Comment:** Please discuss the limitations of the amphipod testing results as a basis for inferring potential risks to non-amphipod species and populations of the benthic macroinvertebrate community. **Rationale:** As noted by Greenstein et al. (2008), toxicity testing with a single test species often is inconclusive as to potential community-level contaminant impacts due to a lack of correlation between marine sediment toxicity testing results and the overall condition or health of the benthic macroinvertebrate community, so that testing of two or more species is advised. The amphipod, *Leptocheirus plumulosus*, may have been a suboptimal choice for a single-species toxicity testing program for Aroclor 1260 in whole sediment, because some amphipods are less sensitive to PCBs and inorganic COCs than other, larger macroinvertebrates, such as sea urchins (see Carr et al., 1996; Long et al., 1994). Sea urchin gametes and embryos are known to be more sensitive to PCBs than amphipods. Other marine sediment toxicity test methods, such as the widely used spermiotoxicity or embryotoxicity tests for sea urchins (e.g., Geffard et al., 2001; Novelli et al., 2003), might have been more sensitive to Aroclor 1260. Such tests could have provided results that are more ecologically relevant to local marine food chains and benthic ecological processes at SWMU 45. The apparent lack of toxicity of SWMU 45 sediments to *Leptocheirus plumulosus* may indicate absence of risk/impact to amphipod populations in SWMU 45 sediments. However, these test results for amphipods cannot be interpreted conclusively as also indicating absence of risk to all species and populations of the benthic macroinvertebrate community within the SWMU 45 embayment.

32. ***Assessment of Sediment Toxicity and COC Bioaccumulation in Benthic Macroinvertebrates.*** **Comment:** Please provide a literature-based evaluation of the potential for Aroclor 1260 and inorganic COC bioaccumulation within *versus* toxicity to macroinvertebrate prey of pelicans and sea turtles. **Rationale:** Toxicity of these COCs to macroinvertebrates is a key factor influencing the potential for the COCs to bioaccumulate within these prey. Adult and juvenile life stages of sea urchins tolerate low levels of PCBs in sediments and thus bioaccumulate them to elevated levels (Schweitzer et al., 2000). Sea urchins and any other Aroclor-tolerant echinoderm or shellfish species at SWMU 45 may represent a significant source of dietary exposures to predators such as pelicans and sea turtles. Thus, the requested evaluation is needed to supplement the sediment toxicity evaluation and support the food chain exposure assessments for pelicans and sea turtles.

33. ***Evaluation of Sediment Hazard Quotients for Toxicity Test Samples.*** **Comment:** Please calculate sediment HQs for the toxicity test samples, using sediment benchmark criteria, to re-evaluate the toxicity test results in relation to these HQs. **Rationale:** Since a benthic macroinvertebrate community assessment was not performed to complement the sediment chemistry and toxicity testing results, a clear presentation of sediment HQs based on all cumulative data offers valuable context within which to reassess the problematic sediment toxicity testing results. A linear regression of amphipod reproductive toxicity test results *versus* HQs for each COC may further clarify any drivers of potential toxicity.

34. ***Section 4.2.2.4 Establishment of Site-Specific NOAEL, page 4-14.*** **Comment:** Please revise the BERA to incorporate all cumulative data from the 53 sediment samples reportedly analyzed for Aroclor 1260 and inorganic COCs during four prior sampling events since 1997. Please provide summary statistics for these data and calculate the corresponding benthic community HQs based on appropriate sediment benchmarks. **Rationale:** Although 53 sediment samples have been analyzed since 1997, only the most recent subset of these data has been used to assess risks to the benthic community. Data from about 30 sediment samples, thus, were omitted from the benthic community (and manatee) risk evaluations. Failure to use all available data decreases the spatial representativeness of the BERA and increases uncertainty in its results.

35. ***Section 4.2.3 Seagrass Tissue and Co-located Sediment Samples, pages 4-14 to 4-16.*** **Comment:** Please modify the manatee exposure assessment to predictively estimate the mean and maximum COC concentrations in seagrass tissue. This can be done using the site-specific seagrass:sediment BSAF for all COCs detected in the three sets of paired samples together with the corresponding statistics for COC concentrations in seagrass-inhabited sediment samples collected during all prior sampling events. **Rationale:** Because only three locations were sampled for paired analyses of seagrass tissue and associated sediments, the approach to calculating seagrass concentrations of COCs for the manatee exposure assessment fails to incorporate most of the available historical analytical data from prior sediment sampling at locations inhabited by seagrass. As the BERA acknowledges, this led to exclusion from the exposure assessment of the maximum concentrations of several COCs historically detected over prior sampling events. As noted in paragraphs 2 and 3, only 12 of the historical sediment samples were collected from sediments not associated with seagrass. Thus it appears that 41 of the 53 sediment samples collected across all field events can be used to calculate a more representative sediment concentration across all seagrass beds than is now represented by the data subset for the three locations with paired seagrass and sediment samples.

36. ***Section 4.2.3.1 Incomplete Use of Relevant Historical Sediment Data.*** **Comment:** Please recalculate manatee HQs in the revised BERA using cumulative historical data available for *all* seagrass-vegetated sediment samples, coupled with site-specific seagrass BSAFs (from the paired seagrass and sediment sample analyses), to estimate mean, maximum, and 95% UCL sediment and seagrass COC concentrations and HQs. **Rationale:** This will assure that sediment data for all seagrass beds and all locations of historical maximum COC concentrations (e.g., inorganic COCs in sample 11SD01 from the 1997 RFI) are included in the manatee exposure assessment at SWMU 45. It appears that HQs in Table 2-4 are based *only* on sediment data from 1997 and 2003 sampling events, and that these data were *not* combined with recent data to calculate HQs in Table 4-13. As noted in Section 4.2.3.1 (e.g., text and embedded data table on p. 4-16), some sediment samples collected during the 1997 and 2003 field investigations contained concentrations of arsenic, cadmium, mercury, and selenium that were higher than their maximum concentrations detected by the BERA Step 6 sample analyses. As noted on p. 7-3 "the range of cadmium concentrations detected in embayment sediment samples co-located with seagrass tissue samples is less than

the range of cadmium concentrations detected in samples collected during previous field investigations." The uncertainty discussion on p. 7-3 acknowledges that manatee risks in the SWMU 45 embayment are likely to be underestimated for cadmium and/or other COCs, since higher sediment (and presumably seagrass) COC concentrations occurring in seagrass-vegetated sediment locations, *not* sampled for paired seagrass and sediment samples during Step 6, were excluded from manatee HQ calculations in Table 4-13.

37. ***Summary Statistics Used to Calculate Manatee Risk, page 4-16.*** **Comment:** After recalculating the sediment COC summary statistics for these 41 samples, please modify the embedded text table on page 4-16, or create a numbered, stand-alone table to present summary statistics for all sediment COCs used to evaluate dietary exposure risks for the manatee. These same data should be used to assess seagrass ingestion risks to sea turtles. Also, please correct the current text versus embedded table discrepancies in the reported ranges of cadmium detected during the 1997/2003 and Step 6 BERA sampling rounds. For example, was the maximum Step 6 BERA cadmium concentration 0.15 mg/kg (shown in table) or 0.14J mg/kg (stated in text)? **Rationale:** The BERA is insufficiently transparent regarding the subsetting and statistical summaries of sediment analytical data and sample locations used to calculate HQs for the manatee.

38. ***Section 5, Derivation and Source of Toxicity Reference Values (TRVs).*** **Comment:** Please adjust all of the TRVs used to assess dietary exposures of wildlife receptors (e.g., manatee, sea turtle and pelican) by dividing the test species TRV by an inter-species extrapolation factor of ten, in addition to applying the body weight scaling factor, before calculating the HQs. Please reassess TRV choices for the BERA after reviewing the avian and mammalian TRVs used by USEPA to derive soil ecological screening levels (EcoSSLs) for use in Superfund ERAs. **Rationale:** Mammalian test species TRVs were scaled for the manatee's body weight, prior to calculation of dietary risks (HQs) to the manatee. However, USEPA's default approach for TRV derivation in an ERA is to *also* divide the test species TRV by a factor of ten, to account for the inter-species extrapolation. Since this was not done for the manatee, the derived TRVs were an order of magnitude too high and resultant HQs an order of magnitude too low for the manatee. The rodent test species TRVs modified for use in the manatee toxicity assessment are not the most ecologically appropriate of the published TRVs available for use in the BERA. Many of the avian and mammalian TRVs that were rigorously screened by ecotoxicologists, when developing USEPA's EcoSSLs, are more ecologically relevant to the SWMU 45 wildlife receptors. For example, the arsenic TRVs used in the BERA had been compiled by Sample et al. (1996) from the oral doses of arsenic in water fed to mice. However, TRVs for herbivores such as goats and rabbits, presented for arsenic and other COCs in the EcoSSL documents (e.g., USEPA, 2005a), are more physiologically relevant to the herbivorous manatee.

39. ***Section 5.0 Risk Characterization, page 5-1.*** **Comment:** Please modify risk question No. 2 and line of evidence No. 4 to accurately reflect that the BERA did *not* use *growth* TRVs for the manatee, and that the survival endpoint was evaluated only for mercury (mortality TRV was used). Please also indicate that

the risk of possible *reproductive* effects on the manatee were assessed using mammalian TRVs for arsenic, cadmium and selenium. Finally, when revising this section to include the brown pelican and sea turtles, please add corresponding discussions of assessment and measurement endpoints to be evaluated using TRVs for survival, growth and/or reproduction of these additional receptors.

40. ***Section 5.1. Omission of Threatened and Endangered Species as Ecological Receptors*. Comment**: Please add the brown pelican and one or more sea turtle species to the BERA as ecological receptors to evaluate food chain-mediated risks from dietary exposures to Aroclor 1260 and inorganic sediment contaminants of concern (COCs), including cadmium and mercury, via consumption of seagrass and sponges (green turtles), sponges, crustaceans, mollusks and sea urchins (hawksbill turtles), and/or finfish (brown pelican). Since polychlorinated biphenyls (PCBs) such as Aroclor 1260 bioaccumulate to much higher levels in omnivorous turtles than in vegetarian turtles (e.g., Eisler, 1986), it is recommended that the hawksbill turtle, at a minimum, be added to a revised BERA as an indicator species representing the local sea turtle community. **Rationale:** A major deficiency of the BERA is the lack of exposure assessments for local populations of federally endangered or threatened species to persistent and bioaccumulative COCs in SWMU 45 sediments, such as Aroclor 1260 and mercury: the herbivorous (*Chelonia mydas*, green sea turtle) or omnivorous (e.g., *Caretta caretta*, loggerhead turtle and *Eretmochelys imbricata*, hawksbill turtle) sea turtles; and the piscivorous brown pelican (*Pelecanus occidentalis occidentalis*). At the concentrations found in SWMU 45 sediments, these COCs have a much greater potential to pose food chain risks to these protected species and other higher trophic level receptors than to exhibit direct toxicity to benthic macroinvertebrate communities via contact with whole sediments and/or sediment interstitial pore water (see chemical-specific *USFWS Contaminant Hazard Reviews* by Eisler, 1986 through 1996). Discussions in Section 2.3.3.4 on page 2-9 confirm that local benthic invertebrate and pelagic fish communities include many species of prey eaten by the brown pelican and/or protected species of omnivorous sea turtles, such as sponges, corals, anemones, sea cucumbers, sea stars, sea urchins, crabs, and both bottom dwelling and pelagic finfish species. Important sea turtle prey/food species, such as soft corals and sponges, were found growing on the cooling intake tunnel structure associated with elevated sediment concentrations of Aroclor 1260. This confirms a complete dietary exposure pathway at SWMU 45 by which sea turtles may be exposed to levels of Aroclor 1260 [and other sediment COCs] via bioacccumulation in these turtle prey/foods. Since hawksbill turtles eat sponges, mollusks, crustaceans, sea urchins, and fish, in addition to marine algae and seagrass, they are more likely to consume elevated Aroclor 1260 and mercury levels in prey than the herbivorous green turtle would ingest by eating only seagrasses. Inorganics such as cadmium, mercury, and selenium also accumulate to high body burden levels in green and hawksbill sea turtles, due to high trophic transfer coefficients (Anan et al., 2001). The presumed "paucity of data concerning the toxicological effects of chemicals for reptiles," as stated in the third paragraph on page 2-10, is inadequate rationale for not assessing food chain risks from Aroclor 1260 and inorganic COCs to sea turtles in the BERA, especially since "additional evaluation of chemical concentrations in sediment was recommended in Step 3b of the BERA for this

receptor group" (see p. 2-10). Exclusion of sea turtles as receptors also is unjustified given the growing body of ecotoxicological literature on bioaccumulation of organochlorine and inorganic contaminants in turtles and other reptiles. Recent studies include sea turtle studies presented at the *Reptile Ecotoxicology Session* held at the 21st Annual Meeting of the Society for Environmental Toxicology and Chemistry (SETAC) in Nashville, TN on November 16, 2000 and subsequent papers, including those published in the SETAC journal, *Environmental Toxicology and Chemistry* (ET&C; see partial reference list below). Many studies have shown that adverse effects on turtle reproduction occur from the transmission ("maternal dumping") of these contaminants into turtle eggs. An ecological risk assessment (ERA) for sea turtles by Sample et al. (2000) offers a useful methodological precedent for sea turtles that could be adopted in a revised SWMU 45 BERA. This approach to assessing the maternal dumping risks to sea turtle eggs and resultant impacts to reproduction from dietary exposures to Aroclor 1260 and inorganic COCs could be used at SWMU 45, even if published toxicity reference values (TRVs) cannot be found for sea turtles or other surrogate reptile species.

41. ***Section 5.1.2 Evidence of a Significant Correlation between Laboratory Toxicity Test Results and the Chemical/Physical Characteristics of Sediment, page 5-3.*** **Comment:** Please rename this section as "**Absence** of a Significant Correlation between Laboratory Toxicity Test Results and the Chemical/Physical Characteristics of Sediment" unless supplemental regression analyses of test results versus sediment HQs clarifies the driver of amphipod effects in sediment sample 45B-SD15. **Rationale:** The evaluation of sediment chemistry and toxicity test results concluded that there are no clear correlations among these variables that might indicate specific COCs as drivers of the apparent reproductive toxicity observed in sample 45B-SD15.

42. ***Section 5.2 Omission of Manatee Exposure Pathways for Aroclor 1260.*** **Comment:** The West Indian manatee (*Trichecus manatus*) exposure assessment should be revised to also evaluate potential risks to the manatee from incidental ingestion of Aroclor 1260 detected in sediments and potentially contained in seagrass. Aroclor 1260 concentrations in seagrass should be estimated using site-specific data on sediment Aroclor 1260 concentrations and published biota-sediment Aroclor 1260 bioaccumulation factors (BSAFs) for marine macrophytes. If biota to sediment bioaccumulation factors (BSAFs) for seagrass or other macrophytes are not available for PCBs in the literature, paired seagrass and sediment samples should be analyzed from locations with elevated Aroclor 1260 to develop a site-specific Aroclor 1260 BSAF. **Rationale:** The BERA is incomplete for the manatee since Aroclor 1260 was excluded as a COC from the manatee exposure assessment. PCBs such as Aroclor 1260 are known to accumulate to high levels in tissues of manatees, despite their herbivorous diet (see Eisler, 1986; O'Shea et al., 1984).

43. ***Section 5.2, West Indian Manatee, pages 5-3 to 5-4.*** **Comment:** Please reassess manatee exposures and revise the manatee risk characterization for incidental sediment ingestion and consumption of seagrass COC concentrations. Seagrass COC concentrations should be estimated with site-specific seagrass:sediment

BSAFs for each COC. This revised manatee exposure assessment should be done after: (a) adding Aroclor 1260 as an additional COC; (b) revising the calculations of COC concentrations in seagrass and sediments to include all relevant historical sediment data; (c) modifying the manatee TRVs for these COCs to incorporate the inter-species extrapolation adjustment; and (d) incorporating any revised choices of ecologically more appropriate TRVs for herbivorous mammalian test species, such as those that were critically evaluated and used by USEPA to develop mammalian soil EcoSSLs for arsenic and cadmium. Please provide statistical summary tables of all COC concentration data used for all sediment samples from seagrass-inhabited locations, including the mean, range, 95% UCL, location of the maximum COC concentration, and total number of samples. **Rationale:** Potential Aroclor 1260 and inorganic COC dietary risks to manatees foraging on seagrasses growing throughout the SWMU 45 embayment can be inferred most reliably by using all available sediment analytical data, not just data for three locations.

44. ***Tables, Data Presentation and Lack of Summary Statistics.*** **Comment:** Please rename and/or revise the analytical data tables to add cumulative statistics across *all* sampling events for each COC, other analyte, or water quality parameter, including the number of samples, mean, minimum, 95% UCL, and maximum COC or analyte concentration, and sample location/ID of each maximum detected COC concentration. [Alternatively, please create new, stand-alone statistical data summary tables.] **Rationale:** Data presentation in the BERA is cumbersome and fragmented. Raw analytical data and/or toxicity testing results are presented for individual sediment and/or seagrass samples from SWMU 45 and two reference areas, *without* also including summary statistics for SWMU 45 versus Reference sample subsets. Most of the tables containing only raw data are incorrectly entitled "Summary of" and should be renamed to accurately reflect their content (i.e., Tables 4-1, 4-3 through 4-8, and 4-10 through 4-12).

45. ***Tables, Incomplete Evaluation of Sediment Hazard Quotients Using Cumulative Data.*** **Comment:** Please provide a summary table of SWMU 45 *versus* Reference sediment HQs for Aroclor 1260 and all of the inorganic COCs identified during Step 2 as having maximum HQs greater than one. This table should include all relevant historical sediment data from the 53 sediment samples collected since 1997. **Rationale:** The BERA states that arsenic, cadmium, copper, mercury and tin were identified in Step 2 of the screening-level ERA (SERA) as chemicals of potential ecological concern (COPCs) for direct contact exposures of benthic invertebrates. Unless the maximum benchmark-based HQs for these 5 inorganics were below one, all of them should be evaluated as sediment COPCs in the BERA. Because selenium was identified as a COPC for the manatee in the BERA, it should be retained as a sixth inorganic COPC for direct sediment exposures of the benthic community, unless the maximum HQ for selenium was below one. Benchmark-based sediment HQs for benthic macroinvertebrates are not presented in a comprehensive HQ summary table that incorporates summary statistics from all historical rounds of sediment sampling and analysis. Based on accounts of past sampling presented in the BERA, 53 sediment samples have been collected from the SWMU 45 embayment, including seagrass beds and other habitat types. These were analyzed for Aroclor 1260 and inorganic COCs: 9 samples during the 1997 RFI; 14 samples during the 2003 field investigation; 6

samples during verification of the BERA field sampling design; and 24 samples during the BERA field investigation. The BERA presents neither a lookup table identifying all 53 sediment samples and habitat types from which they were collected (e.g. with vs. without seagrass), nor a summary of the benchmark-based sediment HQs for the benthic community, based on either the TELs used in the SERA or other sediment benchmarks, such as the equilibrium partitioning (EqP) benchmarks for Aroclor 1260 that are discussed in several sections of the BERA.

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ENCL #3

TECHNICAL REVIEW OF THE RESPONSE TO THE JANUARY 18, 2008 EPA COMMENTS ON THE SEMI-ANNUAL GROUNDWATER MONITORING REPORT FOR SWMU 3, BASE LANDFILL DATED APRIL 17, 2008

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CEIBA, PUERTO RICO
EPA ID NO. PR2170027203

The following comments are based on a technical review of the *Response to the January 18, 2008 EPA Comments on the Semi-Annual Groundwater Monitoring Report for SWMU 3 Base Landfill* (Responses), dated April 17, 2008. The Nay's responses are considered adequate except as noted below.

1. **Evaluation of the Response to EPA Comment and TechLaw General Comment 1:** The responses states that these concerns will be addressed in the *Revised Groundwater Sampling and Analysis Plan, Base Landfill,* dated April 3, 2008 (SAP). Therefore, TechLaw refers you to the evaluation of the SAP, which has been presented as the second part of this deliverable. These comments should not be considered addressed until the SAP comments have been addressed.

2. **Evaluation of TechLaw General Comment 2:** The response is inadequate. The response states that the lack of groundwater recovery in well R7GW04R is due to subsurface bedrock conditions. This has been a recurring problem, and leaves a portion of the landfill perimeter without sufficient monitoring. Revise the response to indicate that additional steps will be taken to increase yield or that a replacement well will be installed.

3. **Evaluation of TechLaw Specific Comment 1:** The response to this comment is inadequate. The response states that the upper limit of the mean plus two standard deviations will be used. EPA guidance requires that a 95% Upper Confidence Limit (UCL) be used. While these approaches will not likely result in a large variation, the 95% UCL should be used where appropriate.

ENCL. #

TECHNICAL REVIEW OF THE REVISED GROUNDWATER SAMPLING AND ANALYSIS PLAN BASE LANDFILL DATED APRIL 3, 2008

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

The following comments are based on a technical review of the *Revised Groundwater Sampling and Analysis Plan, Base Landfill* (SAP), dated April 3, 2008. The SAP was revised pursuant to the Navy's February 15, 2008, Responses to EPA comments.

GENERAL COMMENTS

1. The SAP provides an insufficient procedure for detecting releases to groundwater from the landfill. In order to detect a release, the analytical result must either 1) be higher than the Precision Quantitation Limit (PQL) (Table 4-16), or 2) it must be above the prediction limit (Table 4-13) and be above the NAPR Background. Then a verification sample is collected, which must also be above the prediction limit. Finally, assessment monitoring must be completed, where the sample must be above the background or regulatory limits. This approach is inadequate, and may lead to an unacceptable amount of false negative results. Several concerns with this approach are noted:

    a. Intrawell sampling requires that the well not be impacted by the landfill. The Navy asserts that no contamination from the landfill has been evident, yet positive detections, including 16 volatile organic compounds (VOCs) in the existing monitoring wells have been presented. It is unclear whether adequate support for the appropriateness of intrawell analysis has been presented. Justify why the historical detections of VOCs do not indicate impacts from the landfill.

    b. Section 4.3.4, Use of Method Detection Levels (MDLs) and PQLs in Groundwater Monitoring, states that PQL or reporting limit will be used for compounds that have not been detected. Table 4-16 presents PQLs as if they were set numbers. PQLs vary from analysis to analysis, and may from time to time exceed the regulatory limits, such as the maximum contaminant levels (MCLs). It is not clear from the SAP the actions that will be taken if the PQL exceeds the MCL. If this is the case, verification sampling appears to be warranted. Revise this section to require additional sampling of a well in the event that a compound is not detected, but the PQL is above the MCL. If there are cases where the Navy knows that the PQL will exceed the MCL on a routine basis, these cases need to be discussed in the SAP.

    c. Section 4.6.1, Interwell Prediction Limit, states that if a sample result is below the PQL, but above the MDL, no action will be taken. This does not appear to be a consistent approach because most of the VOC Prediction Limits are below an

achievable PQL, and therefore may be expressly exceeded, but no action will be required. Revise this section to state that verification sampling will be conducted if a contaminant exceeds the Prediction Limit even if it is below the PQL.

The current evaluation system requires several lines of evidence that there has been a release. Previous comments have requested that the Navy provide several lines of evidence tending to show that a release has *not* occurred. Revise the statistical plan to state that if any of the background, regulatory, or intrawell levels are exceeded, the Navy will provide verification sampling. If any levels are again exceeded during verification sampling, the Navy will either begin corrective action or will justify why the exceedance was not attributable to a release from the landfill.

2. According to Section 4.3.3, the Navy may provide verification sampling more than three months after the detection monitoring. If the Navy waits more than three months, the sampling event may not be discernable from the next semi-annual sampling event. Revise this section to state that verification sampling will be completed not more than three months after the original sampling event.

3. Under Sections 4.3.1 and 4.3.2, the Navy proposes to use the maximum concentration detected in the background set as the prediction limit. EPA guidance requires the use of a 95% UCL, unless the 95%UCL is greater than the maximum concentration. These sections should be revised to state that a 95% UCL will be used where applicable.