COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board

Environmental Emergencies Response Area

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October 21, 2009

Mr. Kevin Cloe, P.E.
Remedial Project Manager
Commander Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, VA 23508-1278

RE: Technical Evaluation of the Draft Remedial Investigation Report, Solid Waste Management Unit 4, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico

Dear Mr. Cloe:

The Puerto Rico Environmental Quality Board (PREQB) has completed its review of the Draft Remedial Investigation Report, Solid Waste Management Unit 4, Former Naval Ammunition Support Detachment, Vieques Puerto Rico, dated August 2009. Enclosed our comments.

Please contact me at (787) 767-8181 X.6141 if you have any questions or comments about our review.

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator

cc: Daniel Rodríguez - EPA
Richard Henry - FWS
Daniel Hood - Navy
Christopher Penny - Navy

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PREQB Technical Evaluation of the Draft Remedial Investigation Report, Solid Waste Management Unit 4, Former Naval Ammunitions Support Detachment, Vieques, Puerto Rico

GENERAL COMMENTS

1. Please compile a list of the munitions constituents based on the type of munitions and OB/OD activities conducted at this site. A table of this information would be helpful to provide context for the statement that COPCs detected in site samples are from natural background sources or are unrelated to site activities.

2. The ecological risk assessment (ERA) summarized in Section 8 and presented in Appendix W was conducted in accordance with the July 2009 Draft of the *Revised ERA Protocol for the Vieques Environmental Restoration Program* (CH2M HILL, July 2009). The methods and values presented in the July 2009 draft ERA Protocol are currently under discussion between the Navy and the agencies. The resolution of comments on this draft may likely affect parameter values used in this ERA for SWMU 4, necessitating revision of this ERA.

PAGE-SPECIFIC COMMENTS

1. Page ES-6, Human Health Risk Assessment for Environmental Media Contaminants, bullet 3. Although lead was identified at background concentrations outside the OB/OD pits, this is not adequate justification for concluding that lead concentrations in sediment are "… most likely not indicative of site-related impacts" unless it can be shown that site-related lead concentrations are not mobile and could not have migrated to the aquatic environment. Please address.

2. Figure ES-3. This figure only shows the terrestrial portion of the Explosive Safety Arc. Please add text to the Executive Summary that clarifies the scope of this investigation (similar to the last paragraph of Section 1.0).

3. Page 1-1 to 1-2, Section 1.1. Minor editorial note – Please delete ES in front of the page numbers.

4. Page 1-2, Section 1.1, paragraph 1. Minor editorial request – please change "in confidence" to "with confidence."

5. Page 2-23, Section 2.2.7: The validation guidelines cited were from 1994 and 1993 for organic and inorganic analyses, respectively. The most current validation guidelines are from June 2008 for organic analyses and October 2004 for inorganic analyses. Please clarify if the most recent guidelines were used and if not, please explain.

6. Table 2-1. This table identifies soil samples collected from 1-3 feet below ground surface (bgs). Please provide the data quality objective for collecting samples from this depth interval, since this depth range differs from the Master Protocol specified depth ranges for surface soil.

7. Page 3-7, Section 3.2 Ecological Setting and Table 3-6. Although native species of omnivorous and piscivorous bats occur on Vieques, only the mongoose and wild horse are identified as mammals inhabiting and/or using the site. Please discuss available information about resident colonies of bats on Vieques, their potential foraging range, and whether those populations might conceivably inhabit or forage within upland, wetland or aquatic habitats of the site.

8. Page 4-7, Section 4.2.1, VOCs and SVOCs. The text states that select contaminants were detected in laboratory blank samples and are therefore not indicative of site impacts. However, it is unclear why these contaminants are reported as detected if indeed due to laboratory blank contamination. Typically, these compounds would be qualified as nondetects (U) during data validation if due to blank contamination. Please clarify.

9. Page 4-10, Inorganic Constituents. For each paragraph where this information is not provided, constituents, please add text that indicates whether each inorganic is associated or is not associated with munitions, pyrotechnics or other site-related contaminant source materials.

10. Page 4-13, Section 4.2.2, VOCs and SVOCs: The text states that select contaminants were detected in laboratory blank samples and are therefore not indicative of site impacts. However, it is unclear why these contaminants are reported as detected if indeed due to laboratory blank contamination. Typically, these compounds would be qualified as nondetects (U) during data validation if due to blank contamination. Please clarify.

11. Page 4-14, Section 4.2.2, Explosives. Please discuss whether the extent of the groundwater contamination for perchlorate has been delineated, given the exceedances detected at MW-18. Based on groundwater flow directions presented on Figures 3-9 and 3-10, it appears there is no upgradient well for MW-18. Also, please discuss potential sources for the low detections of perchlorate in the background wells MW-16 and MW-17 and whether these levels are expected in background wells on Vieques.

12. Page 4-15, Section 4.2.2, Groundwater, Inorganic Constituents:
    a. Barium: The text states that subsequent sampling events for MW04 and MW08 were below the tap water RSL. However, MW04 was not sampled in the subsequent sampling rounds. Please correct the text and provide further justification for why barium is not a site contaminant.
    b. Cadmium: The text states that subsequent sampling events for MW01, MW03 and MW04 were below the tap water RSL. However, MW04 was

not sampled in the subsequent sampling rounds. In addition, the reporting limit for cadmium in the subsequent sampling of MW03 and MW04 in 2008 exceeded the tap water RSL. Please correct the text and provide further justification for why cadmium is not a site contaminant.

13. Page 4-16, Section 4.2.3, VOCs and SVOCs: The text states that select contaminants were detected in laboratory blank samples and are therefore not indicative of site impacts. However, it is unclear why these contaminants are reported as detected if indeed due to laboratory blank contamination. Typically, these compounds would be qualified as nondetects (U) during data validation if due to blank contamination. Please clarify.

14. Page 4-17, Section 4.2.3, Surface Water and Sediment, Pesticides/PCBs: The text states that all of the 4,4'-DDD detections were below screening criteria. However, 4,4'-DDD was above the ecological screening levels in both samples where it was detected. Please revise the text accordingly.

15. Page 4-17, Section 4.2.3. Please clarify the apparent discrepancy between Section 4.2.3 and Appendix W. Statements regarding the lack of Vieques background data for surface water and sediment presented in Section 4.2.3 appear to contradict statements and the data comparisons of site versus background concentrations of COPCs in these media in ERA discussions in Appendix W. In Section 4.2.3, after stating that no background sediment and surface water data are available for Laguna Boca Quebrada or the ephemeral stream, the Navy used comparisons to soil and groundwater background data to conclude that none of the contaminants of potential concern (COPCs) should be retained as COCs for evaluation in a baseline ERA (BERA). However, comparisons to Vieques-wide background sediment and surface water COPC concentrations in Appendix W, Tables W- 34 and W-35, do indicate exceedances of surface water and sediment background concentrations for several inorganic COPCs. Please resolve this discrepancy and revise relevant sections of the RI and/or ERA to discuss the types of aquatic and wetland reference habitats sampled on Vieques for sediment and surface water.

16. Page 4-17, Section 4.2.3 Surface Water and Sediment – Pesticides/PCBs. Please provide the range of pesticides in surface water and sediment detected at other sites where pesticides were used as intended similar to the data provided by the Navy for soils as supporting documentation for assuming pesticide detections in sediment and surface water above screening criteria are associated with normal pesticide application.

17. Pages 4-17 to 4-20, Section 4.2.3 Surface Water and Sediment – Inorganic Constituents. In the first sentence of this paragraph, Navy states that "No background data are available for the surface water and sediment inorganic constituents of Laguna Boca Quebrada and the ephemeral stream." The last sentence then states "To determine potential site impacts in sediment and surface water from overland flow transport and/or groundwater discharge, concentrations

of inorganics observed in soil and groundwater at the site are considered in the discussion of those observed in the lagoon media." As noted in General Comment 2, these statements contradict the site vs. background comparisons of sediment and surface water data for COPCs in Tables W-34 and W-35 in Appendix W, which do indicate exceedances of background COPC concentrations in these media. Please clarify why comparisons to surface water and sediment background concentrations are conducted in the ERA, yet are not discussed in Section 4.2.3. Historical and ongoing migration of munitions-derived or waste-related inorganic COPCs in groundwater from SWMU 4 source areas into the lagoon could occur at concentrations below groundwater criteria but still contribute to surface water and/or sediment concentrations that now exceed ecological screening values (ESVs) within the lagoon. Therefore, please provide additional technical basis for concluding that inorganics detected in the lagoon are from natural background sources.

18. Pages 4-18 to 4-20, Section 4.2.3 Surface Water and Sediment – Inorganic Constituents. For some COPCs, the discussions of exceedances of surface water and sediment ESVs presented here provide more detail, such as the number of sample locations with ESV exceedances, than do the corresponding discussions in the ERA Summary of Section 8. Please see Comment No. 4 below and revise the corresponding discussion of COPCs in Section 8 to provide more detail.

19. Section 4, Tables 4-2 through 4-6: There were several instances where the majority of reporting limits were above the associated project action level (i.e., Regional Screening Level, eco screening level, etc.). In these instances, please provide justification as to why analytical modifications were not pursued to achieve the project action levels and provide the effect on the achievement of the project objectives.

20. Table 4-4: Groundwater Samples
    a. For the metals analyses of groundwater samples, please explain why the reporting limits for most metals were significantly higher in 2008 than in the other sampling rounds. In many cases, the reporting limits were above the project action levels (antimony, arsenic, cadmium, chromium, cobalt, copper, selenium, and thallium). In addition, the text in Section 4.2.2 for groundwater uses the fact that results for select metals were nondetect in subsequent rounds as a justification for not considering the metals as a contaminant of concern. However, if the result in subsequent rounds was nondetect and the reporting limit was above the project action levels, this justification should not be used.
    b. Please explain why the reporting limits of aluminum and iron in the 2007 groundwater samples were significantly higher than other sampling rounds and also above the project action levels.

21. Table 4-5: Surface Water Samples:
    a. The reporting limits of aluminum, antimony, cobalt, iron, mercury, and nickel were above the project action levels in the majority of 2007 and

2008 surface water samples. Please explain why more sensitive analyses (i.e., SW-846 method 6020A: ICP/MS) were not utilized.

22. Table 4-6: Sediment Samples:
    a. The reporting limits for most pesticides are almost one order of magnitude higher than typical reporting limits for these compounds (e.g., 3 ug/kg) and as a result, exceed the project action levels. Please explain.
    b. The reporting limits of cadmium, cobalt, selenium, and silver were above the project action levels in the majority of 2007 and 2008 surface water samples. Please explain why more sensitive analyses were not utilized.

23. Section 7. Please note that this section summarizes information presented in Appendix V – Human Health Risk Assessment. Rather than reiterate comments here that duplicate comments provided on Appendix V, please refer to PREQB comments on Appendix V and revise Section 7 as needed.

24. Pages 8-3 to 8-7, Sections 8.4.1 Terrestrial Habitats and 8.4.2 Aquatic Habitats. In the media specific discussions of each COPC, please describe the number of samples with exceedances of ESVs (as done in Section 4.2.3) and discuss the distribution of locations with ESV exceedances in soil, sediment and surface water, including cross references to data presentations illustrating these ESV exceedances on the aerial images in the Section 4 figures. 1.

25. Page 8-3, Section 8.4.1 Terrestrial Habitats, 4th paragraph and Appendix W, Section 1.5.2 Food Chain Exposures. The first sentence of Section 8.4.1 states that "results of terrestrial food web modeling did not identify any COPCs" and the last sentence concludes that "no unacceptable risks were identified for terrestrial wildlife receptors associated with SWMU 4." The discussion of food web exposures of birds and mammals in Appendix W states that "No chemical had a HQ that exceeded 1 based upon the MATC." However, since bird and/or mammal HQs of several COPCs do exceed one based on the LOAELs and/or NOAELs (see Table W-32), the conclusion of no terrestrial wildlife risk is not adequately supported by the evidence presented. Please also see General Comment 2.

26. Page 8-4, Section 8.4.2 Aquatic Habitats. The third line of evidence listed in the first paragraph is a "comparison of site surface water and sediment concentrations with background soil and groundwater concentrations." However, this comparison between dissimilar media is qualitative and does not address the potential for accumulation of contaminants over time within depositional environments. Also, there are exceedances of background surface water and sediment concentrations as shown in Tables W-34 and W-35. Additional supporting documentation is needed to justify attributing OB/OD related chemicals that exceed background concentrations to natural background sources.

27. Pages 8-4 to 8-7, Section 8.4.2 Aquatic Habitats and Appendix W, Section 1.5 Risk Characterization – Surface Water. Although identified as surface water COCs in the ERA of Appendix W due to exceedances of their surface water

criteria and/or food chain risks to wildlife, inorganic COPCs such as aluminum, barium, copper, manganese, and selenium were eliminated as surface water COCs for the ephemeral stream and/or lagoon in Section 8.4.2 based solely on their hypothetical influx from natural background sources. However, this analysis does not address accumulation of site-related contaminants in depositional environments over time. In addition, the fourth paragraph on page 8-4 states that "copper was not identified as a COC in Laguna Boca Quebrada surface water" for aquatic communities and wildlife exposures; however, copper (a) is a component of munitions; (b) exceeds surface water background concentrations and media-specific ESVs, as documented in Section 9.2.3 (page 9-5) and in Appendix W; and (c) has a mean food chain exposure hazard quotient exceeding one (HQ of 1.17), based upon the MATC for the green heron. Please address the apparent discrepancies in the text and retain copper and all other surface water COPCs identified in Step 3A of Appendix W as COCs to be further evaluated in the BERA unless additional technical justification is provided for eliminating OB/OD related chemicals as naturally occurring.

28. Pages 8-5 to 8-7, Section 8.4.2 Aquatic Habitats and Appendix W, Section 1.5 Risk Characterization – Sediment. Despite being identified as sediment COCs in the ERA of Appendix W due to exceedances of their sediment criteria and/or risks to wildlife receptors, inorganic COPCs such as aluminum, barium, copper, manganese, and selenium were eliminated as surface water COCs for the ephemeral stream and/or lagoon in Section 8.4.2, based on their hypothetical influx to these depositional habitats solely from natural background sources. As documented in Section 9.2.3 (page 9-5), many of these inorganic COPCs exceed their background concentrations in soil and groundwater. Please address the apparent discrepancies in the text and retain all inorganic COPCs in sediment that exceed background concentrations in comparable reference habitats and exceed sediment ESVs and/or wildlife ingestion TRVs for estimated dietary doses for further evaluation in a BERA unless adequate justification is provided for eliminating OB/OD related chemicals as naturally occurring.

29. Page 8-5, Section 8.4.2 Aquatic Habitats – Sediment. The list of COPCs identified in the first paragraph excluded two phthalate compounds that exceeded sediment ESVs at several locations in Laguna Boca Quebrada, as illustrated in Figure 4-33A and discussed in the ERA of Appendix W. Please revise this text to include a discussion of these sediment COPCs.

30. Page 8-5, Section 8.4.2 Aquatic Habitats – Sediment. In the second paragraph of this section, it is stated that "site soils would not serve as a significant source of selenium to the lagoon via the storm water runoff pathway. Therefore, selenium is not retained as COCs for lagoon sediment." However, selenium exceeds the Vieques background selenium concentration for sediment. Please discuss this exceedance and whether selenium is an OB/OD related COPC. In addition, please discuss the relevance of groundwater transport discussed as a transport mechanism elsewhere in the report and in the conceptual site model and the potential for accumulation of selenium in sediments over time.

31. Page 8-5, Section 8.4.2 Aquatic Habitats – Sediment. In the fourth paragraph of this section, barium was eliminated as a sediment COC, despite having a mean HQ of 1.5. The conclusion that barium in lagoon sediments (and surface water) is not site-derived appears to contradict the statement on page 9-6 that "Barium was primarily observed in soil in the area of the OB/OD pits, but was also found outside the SWMU 4 boundary within surface soil at concentrations above background levels." Since it is spatially associated with OB/OD pits, please provide additional discussion that supports the conclusion that barium is not site-related. Please clarify whether barium is an OB/OD related COPC, present the concentration range for barium with in the pits as compared to barium concentrations detected in soils outside SWMU 4, and provide further information on the locations sampled outside SWMU 4 (e.g., what soil type and depths, whether these locations are upgradient from potential anthropogenic sources of barium) to strengthen the rationale for eliminating barium as a sediment COC.

32. Page 8-6, Section 8.4.2 Aquatic Habitats – Sediment. In the last paragraph, copper was eliminated as a sediment COC despite its status as a common constituent of munitions, its exceedances of Vieques background sediment concentrations, exceedances of sediment (and surface water) ESVs, and a MATC-based food chain exposure HQ of 1.2 for the green heron. Because the Vieques ERA Protocol requires retention of COCs when MATC-based HQs exceed one and copper is a site-related COPC, it should be retained as a COC for further evaluation in a BERA. Please revise this discussion and retain copper as a sediment COC for the BERA.

33. Sections 8.5 and 9.2.8 – ERA Summary and Conclusions. Please note that issues raised in General Comment 1 and in the foregoing specific comments need to be resolved prior to PREQB concurrence with the conclusions presented in these sections.

34. Section Page 9-6, 9.2.3, paragraph 3. Please address the contradictory statements in this paragraph that "…copper, lead and zinc can be an alloy component of munitions casings" which is followed in the last paragraph on the same page by the statement that these (and other metals) "are not munitions constituents." Please provide a list of all potential chemical constituents of munitions and other materials found and/or disposed of within the site as additional context for evaluating the relative contributions of natural geological sources versus site activities to the total concentrations of inorganic COPCs detected in site media.

35. Page 9-9 to 9-10, Section 9.2.7, paragraph 2. Please include fish consumers as potential current/future receptors evaluated in the HHRA.

36. Page 9-10, Section 9.2.7, paragraph 5. Please note that PREQB has requested additional supporting documentation concerning whether inorganics are site-related or naturally occurring. Note that lead is a constituent of munitions and was detected in the OB/OD pits, indicating it is a site-related constituent.

Additional documentation is needed to support the conclusion that lead concentrations in sediment are not site-related, as discussed in previous comments.

37. Page 9-11, Section 9.3, paragraph 1. Please clarify the benefit of combining the marine operable unit for SWMU 4 with other marine sites around Vieques. Also, please clarify why including this information about marine sites is pertinent to the decision-making process for the terrestrial portion of SWMU 4.

Appendix O – Data Quality Evaluation and Data Validation Reports

1. According to the table of contents, Appendix O should contain the Data Quality Evaluation and the Data Validation Reports. The data validation reports were not present on the CD copy of Appendix O. Only the data quality evaluation was present. Please provide the data validation reports.

Appendix V – Human Health Risk Assessment

1. Page 2-2, Section 2.2.2, paragraph 3. Please provide a reference citation for the discussion held with EPA Region 2 referred to in this paragraph, and please clarify if the discussion resulted in deviations from the Master QAPP or decisions made during the February 27, 2009 teleconference between the Navy, EPA and PREQB.

2. Page 2-2, Section 2.2.2, Recreational Users/Trespassers. Please clarify why only tapwater screening criteria were used to screen surface water rather than the lower of the tapwater or NAWQC, as PREQB commented on for the Interim Deliverable.

3. Page 2-3, Section 2.2.1, Residents. The use of soil data from 0 to 6 feet below ground surface (bgs) is to address PREQB's preferred approach, as stated in the Master SOP. The text is misleading in stating that the 0-6 foot bgs depth range is PREQB's preferred soil depth. As stated in our comments on the Interim Deliverable, "EQB's preference is for the dataset, either 0-2 feet or 0-6 feet bgs that has the highest contaminant concentrations to be evaluated for residential exposure. This is EQB's understanding of the agreement reached on this issue with the Navy and EPA…" If contaminant concentrations in the top 2 feet are higher than the top 6 feet, then 0-2 feet is PREQB's preferred soil depth. If contaminant concentrations in the top 6 feet are higher than in the top 2 feet, then 0-6 feet is PREQB's preferred soil depth. This agreement was reached in order to ensure that the residential exposure scenario, designed to evaluate unrestricted land use, considers soils deeper than 2 feet. Please revise the text of this and future risk assessments accordingly.

4. Page 2-4, Section 2.2.2, paragraph 2. Please clarify why the surface water and sediment background concentrations discussed in this section are not listed on

Tables 2.4 and 2.5. Please provide a summary of the suitability of the surface water and sediment background data for comparison to SWMU 4 surface water and sediment data in this section, as is provided for the soil background data. Background concentrations for arsenic and silver are not presented in the Risk Characterization, yet these inorganics are considered to be associated with background conditions. Please clarify why Section 2.2.2 mentions the availability of surface water and sediment background data, yet this data does not appear to be presented or used in the Risk Characterization. Please also include a discussion of the range of pesticide concentrations observed on Vieques that are consistent with use as intended for all environmental media. This information is needed because pesticides are attributed to use as intended for all receptors and environmental media in the Risk Characterization section. Also, please correct minor typo – "as presented" stated twice.

5. Page 2-5, Section 2.3, paragraph 1. The first sentence states "The analytes with maximum detected concentrations exceeding RSLs were identified as COPCs." These screening criteria were not used for the fish ingestion exposure pathway and no screening was conducted for the crab ingestion exposure pathway. Please note these deviations in the text of this introductory paragraph.

6. Page 3-2, Section 3.1, Land Crab Consumers. Please clarify in this section whether tissue concentrations represent crab tissue or whole body crab tissue data and present the rationale why the specific type of tissue data was used.

7. Page 3-2, Section 3.1, Land Crab Consumers and Table 3.6, Supplement A. Please clarify why BSAFs for mollusks and crabs are listed for some chemicals on Table 3.6, Supplement A if the tissue data from the NOAA study was used rather than modeling crab tissue concentrations.

8. Page 3-3, Section 3.2.1, paragraph 1. Please note that PREQB and US Fish and Wildlife also participated in the teleconference held on February 27, 2009, and all agencies came to agreement on the approach for nondetects. It is of benefit to the public to accurately reflect all agencies that participated in the decision-making process. Please revise the text accordingly.

9. Page 4-2, Section 4.4. Please include a discussion in the text that clarifies why the meat ingestion rates provided in the IEUBK model were used rather than the established fish ingestion rate of 113.5 g/day and why the IEUBK ingestion rates are protective for child fish consumers in Puerto Rico.

10. Page 5-3, Section 5.3. Similar to the general equations presented for calculating ELCR for non-MMOA chemicals, please include the general equations used to calculate the ELCR for MMOA chemicals for clarity. Table 7.3, Attachment A only presents the results of the calculations, not the method used to calculate the ELCR.

11. Pages 5-5 and 5-6, Section 5.4, Adult, Youth and Child Fish Consumers. Please provide a discussion of arsenic and silver concentrations detected in the background sediment samples mentioned in Section 2.2.2, whether these inorganics are OB/OD related constituents to support the statement that arsenic and silver are associated with background.

12. Pages 5-5, Section 5.4, Adult Fish Consumers. PREQB agrees that BEHP, butylbenzylphthalate, and di-n-butylphthalate are typical laboratory contaminants, but further clarification is needed to demonstrate that the unqualified detections are associated with laboratory contamination rather than related to site contamination, since phthalates are constituents of plasticizers, which are components of munitions.

13. Page 5-7 to 5-8, Adult, Youth and Child Crab Consumers. Please provide a quantitative evaluation of site vs. background for the inorganic risk drivers in soil (copper, nickel and manganese). The data provided in Table 2.1 lists the minimum and maximum detected concentrations for site data and the background concentration. However, since some maximum concentrations exceed the background value, a description of the number of site concentrations above and below the background or a more detailed statistical evaluation would be helpful to support the statement that site concentrations for these inorganics are similar to background.

14. Page 6-1, Section 6, paragraph 5. Please note that the values and methods proposed in the Master SOP for ERAs are currently under review. Resolution of PREQB comments on the BAF/BSAF values and references proposed in the Master SOP is needed prior to approval of these specific BSAFs used to calculate fish tissue concentrations. Also, lead is a munitions constituent and was detected at elevated concentrations within the OB/OD pits, indicating it is site-related. Please provide additional information on whether sediment concentrations are elevated above background and the potential for accumulation of lead in the lagoon from source areas.

15. Page 6-2, Section 6. In the first full paragraph on this page, the Navy discusses the overestimation of risk to the general public associated with the fish and crab ingestion exposure scenarios. However, the risk assessment evaluated two specific receptor groups, receptors who fish and receptors who crab at SWMU 4, since it is known that some people who live on Vieques do fish and crab for subsistence purposes. These receptors do not represent the general public, rather they represent a specific receptor group, just as a construction worker receptor represents a specific receptor group. Therefore, a discussion of risks to the general public does not address risks to a specific receptor group involved in specific activities that result in exposure to site-related contaminants. This section appears to discuss uncertainties with the fish ingestion rate. Therefore, please discuss the uncertainty associated with the use of EPA's default fish ingestion rate to characterize those citizens who fish or crab at SWMU 4. Data in the study by Berger and Gochfeld (1991) provided by CH2MHill shows that the value used is

lower than the mean derived in that study and higher fish ingestion rates were reported. Therefore, the use of EPA's default value may underestimate risks to people who fish or crab at SWMU 4, especially in the future. Please address.

16. Page 6-2, Table 6-1. One line of evidence for concluding that lead should not be a COC is that if the minimum BSAF is used to calculate fish tissue concentrations, the resulting risk is acceptable. However, this rationale presumes that herbivorous fish are being ingested. Please provide a discussion on the fish species that are typically caught from the lagoon and whether they are herbivorous, omnivorous or carnivorous.

17. Page 6-2, Section 6. The third full paragraph appears to lead the reader to conclude that risks are overestimated for fish and crab consumers due to current restrictions on access to SWMU 4. However, based on the proposed land uses presented in the Executive Summary, future use of SWMU 4 includes recreational use. Therefore, please revise this paragraph to indicate that exposures are likely to be lower for current receptors but not future receptors.

18. Page 6-3, Table 6-2. Based on the Berger and Gochfeld (1991) study of fish ingestion rates for Puerto Rico, the fish ingestion rate used in the risk assessment is less than the mean daily ingestion rate from that study, and much higher rates were reported. Therefore, the use of EPA's default fish ingestion rate to characterize fisherman and crabbers may underestimate risks. Furthermore, it is not reported whether the 51 respondents in the ATSDR study were people who fish or crab on Vieques. Please revise the table accordingly.

19. Table 3.6, Supplement A.

    a. Please discuss why methymercury is not evaluated as a COPC for fish and crab tissue.
    b. Please discuss differences in BSAFs used in the HHRA and ERA, examples are shown on the table below. Please address for all COPCs listed on Table 3.6, Supplement A.
    c. PREQB has provided its preferred BSAFs for inorganics and pentachlorophenol. Note that pesticides values are not presented due to their elimination as COCs based on use as intended.
    d. Please note that the Washington Department of Ecology reference was not available for review. Please provide.

Comparison of Navy's Biota-Sediment Accumulation Factors in Fish and Benthic Macroinvertebrates for ERA and HHRA

Inorganic COPC	Values Used by Navy in Vieques ERA SOP, SWMU 4 ERA and SWMU 4 HHRA						EQB Recommended Biota-Sediment BAFs			
	Invertebrate			Fish			Invert.	Invertebrate Source	Fish	Fish Source
	ERA SOP	SWMU 4 ERA	SWMU 4 HHRA	ERA SOP	SWMU 4 ERA	SWMU 4 HHRA				
Arsenic	0.69	0.69	0.12	0.126	0.126	None	2.4	1	NA	3
Cadmium	3.07	3.07	None	0.164	0.164	0.18	35.6	1	NA	3
Chromium	0.19	0.19	None	0.038	0.038	0.043	NA	3	NA	3
Copper	7.96	7.96	0.36	0.1	0.1	None	19.2	1	NA	3
Lead	0.33	0.33	None	0.07	0.07	0.16	0.33	4	NA	3
Mercury (Inorganic)	2.87	2.87	None	4.58	4.58	0.35	2.9	1	4.58	5
Nickel	0.21	0.21	None	1	1	1	0.23	1	NA	3
Selenium	1	1	None	1	1	1	8	2	NA	3
Silver	0.18	0.18	None	1	1	1	38.3	2	NA	3
Zinc	4.76	4.76	None	0.147	0.147	1.3	59.2	1	NA	3
bis(2-Ethylhexyl)phthalate	--	--	--	--	--	337	NA	3	NA	3
Butylbenzylphthalate	--	--	--	--	--	337	NA	3	NA	3
Di-n-butylphthalate	--	--	--	--	--	337	NA	3	NA	3
Pentachlorophenol	1	1	NA	1	1	2.33	NA	3	NA	3

NA - BAF not available and/or EQB Recommendation is pending

None - Navy HHRA did not specify BAF for this food item

-- Not listed as COPC

Sources:

1 Thomann (1995) Table 1 - oyster mean

2 Thomann (1995) Table 1 - mussel mean

3 Currently under review by EQB

4 ERA SOP from Bechtel-Jacobs 1998b

5 ERA SOP from Cope et al. 1990