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

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September 7, 2010

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

RE: Technical Review of the Draft AOC R Remedial Investigation Report, 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 AOC R Remedial Investigation Report, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico, dated July 2010. Enclosed our comments.

Please contact me at (787) 767-8181 X.6129 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
Brett Doerr – CH2MHILL

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PREQB Technical Review, Draft AOC R Remedial Investigation Report, Former Naval Ammunition Support Detachment, Vieques, Puerto Rico Dated July 2010

1. Page ES-2, Bullet #2: The text states that chloroform is a common laboratory contaminant. However, chloroform is not considered a common laboratory contaminant per EPA Region 2 and EPA National validation guidelines. Please clarify.

2. Page ES-3, Executive Summary: Please clarify if the range of aluminum, iron and manganese concentrations in groundwater are consistent with concentrations detected in background wells. It may be helpful to mention background concentrations for background wells located on Vieques installed in the same lithology.

3. Figure ES-4: Please include groundwater flow direction arrows on this figure.

4. Figures ES-4 and ES-5: The executive summary states that the potable water lift/chlorination station is adjacent to the site. However, this figure shows the station as being within the use and access restriction boundary. Please indicate the site boundary, if different than the access restriction boundary. Please clarify how this restriction boundary was established and whether it is an enforceable institutional control.

5. Page 1-3, Section 1.1.3: Please discuss the potable water lift/chlorination building in this section, noting why it is not being investigated as part of AOC R even though it is within the use and access restriction boundary. Also, discuss this boundary – how and why it was established and by what entity and what legal mechanism or other agreement is in place to enforce this boundary.

6. Page 1-4, Section 1.1.4.2, Paragraph 1: Please modify the first sentence to indicate that the PA/SI was conducted subsequent to the EBS and that it did include AOC R.

7. Figure 1-4: Please label the water lift/chlorination station on this figure.

8. Page 2-4, Section 2.4: Please add the "i" to form the word "in" in the second sentence.

9. Page 2-4, Section 2.4.1:
    a. Consistent with Section 2.2, which includes a general discussion of where soil samples were collected at the site, please include a description of where the wells were located at the site and the rationale for their placement.
    b. Please note if any of the wells are background wells.
    c. Bullets 1 & 2 (Work Plan Deviations): Please provide a brief explanation as to why the secondary sand pack was not installed per the SOP and why well development was commenced prior to 24 hours following installation.

10. Page 2-6, Section 2.4.3, Paragraph 1: Please provide an indication in the text as to why MW01 was not subjected to hydraulic testing.

11. Page 2-6, Section 2.4.3, Paragraph 2: Please clarify/expand upon what is meant by the following sentence, "However, although the tests were conducted because they were specified in the work plan, the uncertainty associated with the slug test data did not affect the ability to sufficiently characterize the groundwater conditions at AOC R such that determinations for the site can be made."

12. Page 2-7, Section 2.6.1, Paragraph 3: The validation guidelines cited (1994 for organic and 1993 for inorganic) are not the most recent versions of the guidelines. Please clarify if the most recent guidelines were used and if not, please explain.

13. Page 2-8, Section 2.6.2:
    a. Please clarify what compound or class of compounds the Land Pollution Control Corrective Action Level applies to in the third bullet at the top of the page.
    b. Please clarify if groundwater sample results were screened against Puerto Rico class SG Water Quality Standards (dated March 2010).

14. Page 3-2, Section 3.1.3: Please include the classification for groundwater at this site and note in the text that the groundwater is considered potable.

15. Page 4-1, Section 4.1.1.1, VOCs: The text states that methylene chloride was above the SSL but this compound is a common laboratory contaminant and not expected to be site related. Concentrations of methylene chloride were as high as 68 µg/kg in the March and April 2009 soil samples. It is unclear how this can be attributed to laboratory contamination if (1) methylene chloride was not detected in the associated laboratory blank and (2) there were greater than trace levels present in the samples. Typically, the result for this compound would be qualified as a nondetect (U) during data validation if due to blank contamination. Please clarify.

16. Page 4-3, Section 4.1.1.4: Please revise this section to note that 2,4-DNT was also detected, which is an explosive that is reported as an semi-volatile organic compound (SVOC).

17. Page 4-3, Section 4.1.1.6:
    a. For all metals where exceedances of the background UTL is reported, please present the range of background concentrations to demonstrate the variability of background concentrations and compare site concentrations to the range of background concentrations.
    b. Arsenic: please discuss any potential site-related sources (or lack thereof) for arsenic, as an additional line of evidence.
    c. Barium: please add text indicating whether the industrial uses/activities were known to occur at this site to the second to the last sentence.
    d. Lead: Please discuss the lead concentration(s) detected in the site background well to further clarify if lead detected in groundwater samples mentioned in this section is attributable to background and not leaching from overlying soils.

18. Section 4-5, Section 4.1.2: Please discuss that MW01 is a background well in this section.

19. Page 4-6, Section 4.1.2.2, SVOCs: The text states that bis(2-ethylhexyl)phthalate was above the screening criteria but this compound is a common laboratory contaminant and not expected to be site related. Concentrations of bis(2-ethylhexyl)phthalate were as high as 62 µg/L in the August 2009 groundwater sample from WAR-GW07-09A. It is unclear how this can be attributed to laboratory contamination if (1) bis(2-ethylhexyl)phthalate was not detected in the associated laboratory blank and (2) there were greater than trace levels present in the samples. Typically, the result for this compound would be qualified as a nondetect (U) during data validation if due to blank contamination. Please clarify.

20. Page 4-6, Section 4.1.2.4: Additional information is needed to conclude that perchlorate is not site-related. Is the basis for concluding perchlorate is not site-related the fact that it was detected in the background well? If so, please revise the first sentence to remove this information as a parenthetical statement and provide further discussion of this point. Please discuss the concentration detected in the background well as compared to site wells and discuss any upgradient sources for perchlorate.

21. Page 4-6, Section 4.1.2.5, Inorganic Constituents:
    a. Chromium: The text states that the adjusted RSL for tap water is 11 µg/L. However, this value is 0.043 µg/L in Table 4-4. Please clarify.
    b. Vanadium: The text only discusses the exceedance of the adjusted RSL for tap water at MW01. However vanadium also exceeded the screening criteria at MW-02 and MW03. Please revise the text accordingly.

22. Page 4-7, Section 4.1.2.5, Iron: Please provide a rationale for concluding that iron is likely naturally occurring, including a discussion of concentrations detected in the background well and any other information (present in soils, etc) to support this conclusion.

23. Page 4-8, Section 4.1.3.1:
    a. Please discuss whether the volatile organic compounds (VOCs) detected in surface water were detected in groundwater as an additional line of evidence concerning the assumption that the VOCs detected in surface water are associated with laboratory contamination.
    b. The text states that chloroform is a common laboratory contaminant. However, chloroform is not considered a common laboratory contaminant per EPA Region 2 and EPA National validation guidelines. Please clarify.

24. Page 4-8, Section 4.1.3.5, Inorganic Constituents:
    a. Barium: The text states that the ecological screening level is 150 µg/L. However, this value is 4 µg/L in Table 4-5. Please clarify.
    b. Iron: Please revise the units in this paragraph to be mg/kg instead of µg/L.

25. Tables 4-1 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 discuss why analytical modifications were not pursued to achieve the project action levels and discuss the effect on the achievement of the project objectives in the Data Quality Evaluation in Appendix M.

26. Page 5-5, Section 5.2.2.3: Please add additional discussion for inorganics in this section, as they were detected in soil and groundwater. Further understanding of the leaching mechanisms for inorganics in soil and groundwater (i.e., impact of aquifer matrix on groundwater quality) would be helpful.

27. Page 6-1, Section 6.1: For clarity and transparency, please include a brief discussion of the screening process conducted for human health risk assessments and include a statement that chemicals were not eliminated based on a comparison to background.

28. Page 6-2 to 6-3, Section 6.3: Further detail is requested for this section. A discussion of what chemicals caused the exceedances in each media for each receptor would be helpful to present in this summary so that a reader is not required to read through the more detailed risk assessment presented in Appendix Q to determine which chemicals had risks and hazards above regulatory levels.

29. Page 6-3, Section 6.4: Chemicals that are attributable to background are not considered chemicals of concern. However, chemicals that are primarily attributable to background have some contribution of risk or hazard that is site related. Please discuss that portion of the risks or hazards that is attributable to site impacts.

30. Page 8-1, Section 8.1: Please clarify the text of the second bullet reproduced below. It appears that text is missing? Should the text read that "confirmatory samples *were collected* where debris and impacted soil were removed?"

> "Collection of 187 soil samples (surface and subsurface including duplicates) to characterize potential source areas, to confirm the findings of the Expanded Phase II PA/SI, as confirmatory samples in areas where debris and impacted soil were removed…"

31. Page 8-2, Section 8.2.2.1, VOCs: The text states that chloroform is a common laboratory contaminant. However, chloroform is not considered a common laboratory contaminant per EPA Region 2 and EPA National validation guidelines. Please clarify.

32. Page 8-2, Section 8.2.2.2: Please consider adding a discussion of whether there is any record of atrazine use or storage at this site as a line of evidence as to whether atrazine is a site-related contaminant or applied as an herbicide, similar to the discussion presented in Section 8.2.2.3.

Appendix I, In-Situ Permeability Test and Flow Velocities

1. Please note that the worksheets contained in Appendix I reference the ground water velocity calculated from the geometric mean of the gradient and hydraulic conductivity as being 15.1 feet per year. The text (including the Executive Summary) reference the estimated velocity as 14 feet per year. Please clarify.

Appendix Q, Human Health Risk Assessment

1. Page 2-4, Section 2.3.3: Please clarify the following statement: "it is important to note that while the groundwater data from well MW-01 are used for background comparisons, the data from this well represent a single point in the range of concentrations for each inorganic constituent..." Three sampling events were conducted at MW01, and the highest concentration was used as the background concentration. Although a single point was used, this point concentration is the highest concentration detected from this well and, therefore, the least conservative value that could have been used out of the range of concentrations detected in this background well. Please clarify if the intent of the statement was to convey that sample results from MW01 represent groundwater quality for groundwater within the localized sphere of influence of the well and may not be sufficiently representative of the natural variability associated with entire aquifer for AOC R. If so, a presentation of inorganics concentrations detected in other background wells in Vieques installed in the same lithology would be more useful for showing the natural variability of background inorganics concentrations. Please clarify and revise the text as appropriate.

2. Page 3-1, Section 3.1, Bathroom Air: For clarity and transparency, please discuss why two volatile organic compounds (VOCs) detected in groundwater (carbon disulfide and chloromethane), but not for inhalation associated with volatilization in bathroom air.

3. Page 5-5, Section 5.4: The presence of aluminum, arsenic, iron, manganese, and vanadium in groundwater can be attributable to the weathering of volcanic rock; however, the presence of several of these inorganics can also be attributed in part to the site due to the presence of debris. Therefore, additional discussion is needed to support solely attributing the concentrations detected in groundwater to weathering of volcanic rock.

4. Page 5-5, Section 5.6: Please discuss uncertainties that may underestimate actual risks or increase uncertainty in the HHRA. Examples are uncertainty in data collection (using soil samples to characterize all soils at a site) and laboratory analysis; using animal studies as the basis for human toxicity criteria, using surrogate toxicity criteria, and not evaluating antagonistic or synergistic effects of multiple chemicals.

Attachment Q-1, RAGS Part D Tables

1. Table 7s:

a. Please present the calculated risks for both species of chromium presented in this HHRA in Table 7. Currently, these sets of tables only list "chromium." Please add which species for which each table is calculating risk.
b. Numerical cancer risks, hazard quotients and hazard indices in Table 7s are presented to two significant digits, while they are presented in a mix of one or two significant digits in the Table 9s (Table 9.5 is an example). Please clarify or revise the text for consistency.

Attachment Q-2, Figures

1. Figure 1: Please clarify why vapor intrusion is considered insignificant even though it was quantitatively evaluated via screening in the risk assessment.

Attachment Q-5, Screening Vapor Intrusion Evaluation

1. Table 2:
   a. Please provide a reference for the system temperature used in this table.
   b. For clarify, please present the equation used to calculate the Henry's Law Constant at system temperature below the table.

2. Table 3:
   a. Please verify the equation presented in this table. It appears that symbols (e.g., alpha) did not print out.
   b. Please label the last two columns "Target Groundwater Concentration" for clarity.

Attachment Q-6, Chromium Speciation

1. Please provide a reference for the following statement, presented on the second page of this attachment "...The range of chromium concentrations found at AOC R (1.2 – 106 mg/kg, average of 19 mg/kg) is within the *expected natural range for soil and sediment derived from intermediate igneous (i.e., granodiorite) terrain....*"

Attachment Q-8, Risk Estimates Incorporating Hexavalent Chromium Toxicity Values

1. For clarity, please refer to chromium as chromium (VI) in the RAGS Part D tables presented in this attachment.

Appendix R, Ecological Risk Assessment

1. Page R-23, Section 1.5.4.2: Inorganic sampling data collected from the substrate of the ephemeral stream were compared to ecological sediment and soil screening values. In addition, the sampling results were also compared to the surface soil upper tolerance levels (UTLs) developed for soil type Qa from the West Vieques surface soil background sampling data (CH2M Hill, 2002). Please provide the rationale for not comparing ephemeral stream surface water and substrate sampling data adjacent to the site with

upgradient stream surface water and substrate sampling data. As discussed in the Master Standard Operating Procedures, Protocols and Plans (CH2M Hill, 2010), site-specific background concentrations represents another evaluation method to assess both surface water and soil/sediment data relative to background concentrations. In addition, please verify that substrate from the ephemeral stream also is representative of soil type Qa.

2. Tables R-7, R-9 and R-10: In order to avoid confusion, please correct these tables to indicate Table R-8 is the source of the equations for the bioaccumulation factors.