228

COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board

Environmental Emergencies Response Area

December 17, 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 Draft Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico

Dear Mr. Cloe:

The Puerto Rico Environmental Quality Board (PREQB) has completed its review of the Draft Site Inspection/Expanded Site Inspection Report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico, dated October 2009. Enclosed our comments.

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

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator

cc: Daniel Rodriguez - EPA
Richard Henry - FWS
Brett Doerr - CH2M Hill
Christopher Penny - Navy

Cruz A. Matos Environmental Agencies Bldg., San José Industrial Park Urbanization
1375 Ponce de León Ave., San Juan, PR 00926-2604
PO Box 11488, San Juan, PR 00910
Tel. 787-767-8181 • Fax 787-766-0150

PREQB Technical Evaluation of the Draft Site Inspection/Expanded Site Inspection report, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico

I. GENERAL COMMENTS

1. The realistic evaluations presented in Step 6 only address cumulative effects for each individual media. However, human receptors are exposed to chemicals of potential concern (COPCs) for more than one media. For example, a residential receptor would be exposed to surface and subsurface soil, groundwater and for recreational purposes, would also be exposed to surface water and sediment for those sites with surface water features. For each site, please add a quantitative evaluation of cumulative risks for exposure to all media to which a receptor would be exposed, similar to the quantitative evaluation that is done for each individual media.

2. The calculation of exposure point concentrations (EPCs) for soil in Step 6 assumes exposure across the entire site for a residential receptor. For those where additional data evaluation is conducted, please add text that discusses whether future land use includes the potential for residential development. Also, for those sites that exceed a ¼-acre in size where residential development is possible, please add text clarifying why combining data for the entire site to calculate EPCs is protective of residential receptors who may only be exposed to soils within a ¼-acre lot potentially located in an area of the highest contaminant concentrations.

3. Please provide a reference to the Appendix where the ProUCL output sheets are presented for those COPCs where EPCs were calculated using ProUCL.

4. Please clarify what data were used in calculating average EPCs for groundwater for each site where an average EPC was calculated. Please add text to each applicable site section that discusses the rationale for combining data across all wells to represent the reasonable maximum exposure point concentration for a private drinking water well installed at the apparent center of a source area (if any).

5. For those Regional Screening Levels (RSLs) that are not adjusted, please consider referring to them as RSLs, rather than adjusted RSLs in the text for clarity. Benzo(a)pyrene is an example of where the value, 15 ug/kg, is referred to as an adjusted RSL, yet the value has not been adjusted.

6. In the site-specific discussions of pesticides and dioxins, please provide the range of concentrations detected at the site and the range of concentrations associated with normal pesticide application detected across Vieques.

7. For the site-specific Dilution/Attenuation Factor (DAF) discussions, please describe the similarities of the hydrogeology of the particular site to sites where data demonstrate that a DAF of 1 is too conservative.

8. Currently, the only data presented to support the interpretation of risks discussed in Step 6, Data Evaluation are shaded raw data tables for each site. Some of the Step 6 discussions present average concentrations and hazard quotients (HQs) in a screening-level ERA and HHRA. For consistency with the risk assessment process, please add a data summary and evaluation table that presents the calculations of mean concentrations and corresponding HQs that are now only partly discussed in the text in Step 6, Data Evaluation. For human health risks addressed in this step, please include the frequency of detection, minimum and maximum detected concentrations, minimum and maximum non-detect quantitation limits, the calculated exposure point concentration (EPC) along with the type of statistic the value represents, the background concentration for the site soil type, and the calculated cancer risks and hazard quotients for each media currently presented in the text for each chemical for which the maximum detected concentration exceeds the screening criteria. For ecological risks addressed in this step, please include the frequency of detection, average, minimum and maximum detected concentrations, minimum and maximum non-detect quantitation limits, the background inorganic concentration for the site soil type, and maximum and average HQs for all COPECs for the site and background soils. These tables are needed to present the numerical risk calculations that incorporate evaluations typically done in a human health risk assessment (calculation of EPCs and risk characterization using EPCs) or in Steps 2 and 3A of a SLERA e.g., Step 3A calculation of average HQs and comparison to background to refine COPECs that are being conducted in Step 6 of this SI/ESI Report.

9. Historical evidence indicates that leaded gasoline was stored and handled at several of the sites and detected soil concentrations of total lead exceed the background soil lead concentrations in many samples of many sites. For many sample locations at several sites, lead concentrations exceed the avian EcoSSL of 11 mg/kg for lead in soil, which is based on bird sensitivity to dietary exposures to inorganic lead. For sites where lead exceeds both the avian EcoSSL and background lead concentrations, please evaluate lead as a key contaminant of potential ecological concern (COPEC) in a SLERA. It appears that it was assumed that all of the lead occurs as inorganic lead, rather than a mixture of inorganic lead with the more highly toxic tetraethyl lead. Because organic lead found in leaded gasoline (tertaethyl lead) is much more toxic to birds, mammals and humans than inorganic lead, please add a discussion of the potential for some fraction of site-derived and/or fuel-associated lead detected in surface soil to consist of tetraethly lead released from fuel spills, leakage of tanks/pipelines, and/or the handling of fuel tank bottom sludge.

10. The SI/ESI was conducted in accordance with the *Site Inspection/Expanded Site Inspection Sampling and Analysis Plan, 7 Consent Order Sites and 16 PI/PAOC Sites, Former Vieques Naval Training Range, Vieques, Puerto Rico* (CH2M HILL, 2009b), herein referred to as the SAP. All of the screening-level evaluations of exceedances of soil ecological screening values (ESVs) performed for each of the 23 sites were based on the ESVs prescribed in the SAP, which in turn were based on the Ecological Risk Assessment (ERA) Standard Operating Procedure (SOP) in the 2007 Vieques Master QAPP. Because that ERA SOP is currently being revised and incorporates many lower, more conservative/protective soil ESVs than those used in the SI/ESI, please revise this report using the ESVs agreed upon in the Master SOP.

11. Due to recent agreements among the Navy, USEPA, NOAA, and EQB, the Navy's July 2009 Vieques Master ERA SOP proposes to apply the lower of the avian and mammalian ecological soil screening levels (EcoSSLs) to pre-screen COPECs for food chain considerations. The current report does not include comparisons to EcoSSLs or other soil ESVs for wildlife on Vieques, including native species of birds and mammals (i.e., bats) for which EcoSSLs are available. As a result, the SI/ESI reaches ecological risk conclusions that pertain only to plants and soil invertebrates. Step 5 of the SI/ESI also should apply the lowest wildlife EcoSSLs to identify food chain COPECs that may pose risk to birds and/or mammals. This should be done along with the use of the lower of the plant and soil invertebrate EcoSSLs to assess potential risks to plants and soil biota from direct exposures to soil COPECs. Site-specific examples of incorrect conclusions of no ecological risk, arising from the narrow focus of the SI/ESI on plants and soil invertebrates and lack of consideration of risks to birds and mammals, are discussed in applicable sections on individual sites below.

12. Please use the ESVs for explosives that are being included in the revised Master Vieques ERA SOP in a revised SI/ESI, including Talmage *et al.* (1999) and the lowest available soil ESVs for explosives from version 2.3 of the Los Alamos National Labs (LANL) Ecorisk Database, which include values that are protective of plants, soil invertebrates, and diverse feeding guilds of birds and mammals.

13. Because the selenium EcoSSLs for herbivorous wildlife are not based on bioaccumulation factors (BAFs) for selenium hyperaccumulator plant species, please address whether hyperaccumulator plant species are present at sites where selenium concentrations in soil exceed the ESV and background. Note that there are several tropical plant families common in Puerto Rico that include hyperaccumulators, including *Fabaceae* (legumes), *Asteraceae, Lecythidaceae, Rubiaceae* and *Scrophulariaceae*. If present, please address potential risks to terrestrial food chains associated with hyperaccumulation of selenium in plant species.

II. PAGE-SPECIFIC COMMENTS

1. Table 1-1, Surface Soil and Subsurface Soil Screening Criteria. In Footnote No. 5, it is stated that the pH-dependent EcoSSLs for aluminum and iron will not be evaluated "*because not all samples were analyzed for pH.*" As this statement implies that some samples were analyzed for pH, please calculate an average soil pH using the available data, present the average and range of pH and corresponding averages and ranges of aluminum and iron concentrations among those samples, and evaluate concentrations of these inorganics in soils lacking pH data based on the mean pH of similar soils for which data are available.

2. Page 2-2, Section 2.3, paragraph 3. Please clarify what is meant by the sentence that states, "In the eastern portion of the site, the pipeline extended over the cliff edge, so the surveying was offset in that area, with perpendicular transects run to try to locate the pipeline." Please clarify whether the pipeline pathway shown as superimposed from the hand drawing onto the aerial photograph was shown to extend over the cliff edge, and, therefore, adjustments had to be made to the geophysical survey plan to account for a more likely pipeline placement scenario.

3. Page 2-4, Section 2.6, paragraph 1. There is a reference to filling excavations with clean backfill in this section. Please clarify whether the borrow materials are subjected to laboratory analysis prior to use as backfill to establish that they are, in fact, free of contaminants.

4. Page 2-6, Section 2.7, paragraph 2. Please remove the comma between "Puerto" and "Rico".

5. Page 2-6, Section 2.7, paragraph 2. The diameter of the hollow stem augers used during borehole advancement (2.25 inches) differs from that stated in SOP A-1 (Soil Boring Drilling and Abandonment) as being typically used. Although this does not constitute a major technical issue, please note in the text that this is a variance from the SOP which states that augers within an inside diameter of at least 3.25 inches are used.

6. Page 2-7, Section 2.7, paragraph 3. For clarification, please reword the first sentence of the second bullet to read, "The last three turbidity readings varied by more than 10%, but were lower than 5 NTUS…."

7. Page 2-8, Section 2.7, paragraph 1. Please clarify the statement, "The most likely reason for this is the surveyed well elevations used local benchmarks that were not current with the national standard." This appears to contradict SOP H-7 (Surveying Specifications) which calls for conformance with the national standards.

8. Page 2-8, Section 2.9, paragraph 1. The report states that tubing utilized for low-flow ground water sampling was disposed of after use in a single well (thereby

implying the use of dedicated tubing for this activity). Please confirm that the tubing utilized for well development purposes was also dedicated to each well location to minimize the potential for cross-contamination.

9. Page 2-9, Section 2.9, paragraph 3. Please remove the word "in" from the sentence that reads, "Pesticide contaminated soil and concrete debris from PAOC L was stored *in* on plastic sheeting……."

10. Table 2-2. It was noted that several of the ground water monitoring wells installed as part of previous deployments to the site(s) were constructed using 15 feet of screen (or greater) as opposed to five-foot or ten-foot [the "typical" screen lengths as noted in the current SOP D-1 (Monitoring Well Installation)]. These wells included: CGW10MW02, 03 and 04 and EPI07-MW01, 02 and 03. As contaminant concentration averaging increases across longer screen lengths, the analytical results obtained from wells constructed with longer screen lengths should be specifically identified in the text and tables.

11. Table 2-3.
    a. Please alter the formatting in the table such that the dates appear correctly for the 2009 SWMU1 well sampling.

    b. The 2009 sampling dates are spread out for some of the sites. As an example, the PI 4 ground water sampling was initiated on March 24, 2009 for a three day period. Several days elapsed between finishing the initial sampling and returning to sample the final well on April 3, 2009. For these sites, please clarify whether heavy rain events occurred in the interim that would represent a changed site condition for groundwater sampling (i.e., alter the depth to the water table).

12. Table 2-4. Please clarify the meaning of the dashes in the "Depth to Water" column. Were the wells dry or were the water level readings not acquired? (There are other entries in the table that specify that certain wells were dry at the time that water level measurements were being recorded; therefore, it is not clear what the dash implies.)

13. Page 2-7, Section 2.7, Groundwater Sampling. This section states that groundwater samples collected for perchlorate were not filtered in the field. Also, the Groundwater Sampling Data Sheets in Appendix E state that samples for perchlorate were not field filtered per the Project Chemist. Please explain why this was not performed although required by SAP Worksheet 19. As per the analytical methods, once representative samples are obtained, they need to be filtered at the time of collection to remove any native microorganisms. Perchlorate is known to be susceptible to microbial degradation by anaerobic bacteria. Please discuss this deviation and the impact on the data.

14. Page 3-5, Section 3.2. Please provide details on how EnCore samples from within the waste profile were composited for VOC analysis by the laboratory.

15. Page 3-5, ESI Ephemeral Stream Soil Sampling. Please verify that the default depth at which the subsurface soil sample was collected at SO26. Please include the depth in the text of the second full paragraph on this page.

16. Page 3-6, Section 3.2, paragraph 2. Please replace the wording "piece of soil" in the first sentence with "clod of soil". Also, please confirm whether a sample from the 7 to 9-foot interval in TP-4 was submitted to the laboratory for analysis based on the elevated PID reading.

17. Page 3-6, Section 3.2, paragraph 5. Please clarify how it was determined that the existing wells need not be redeveloped. Was this based on sounding the depth of the wells to determine if there was silt at the bottom of the screened sections?

18. Page 3-10, Step 4. If the Navy placed soil containing hazardous substances on an unpermitted landfill even if the purpose was for daily cover, then please clarify why the placement of the contaminated soil would not constitute disposal of soil containing hazardous substances into the environment.

19. Page 3-12, Section 5, Tin. Please clarify how tin concentrations are above background when the text indicates that no background concentration is available.

20. Page 3-30, Step 6. Please discuss the organic contamination detected in the background well, including potential sources for the contamination. Please discuss whether other sites or potential sites (i.e., PI or PAOC sites) are located upgradient from this well.

21. Figure 3-12. Please add the orange square with the "TP" designation to the legend of this figure.

22. Page 4-4, Section 4.2, paragraph 2 and Figure 4.8.
    a. Please clarify the statement regarding the location of the eastern-most soil boring (SS/SB-25). Is the boring location shown on Figure 4-8 not representative of where the boring was actually drilled? Please revise Figure 4-8 as needed to show where soil samples were collected.

    b. The eastern-most transect does not appear to cross or only barely crosses the estimated location of the former pipeline. Please add text to this section clarifying the rationale for the placement and extent of this transect, as Figure 4-8 shows this transect covering an area well north of the estimated pipeline location, but barely crossing the pipeline location to the south.

23. Page 5-7, Copper. Minor typographical error – please add an "e" after "on" to state "one" detection, rather than "on" detection.

24. Page 6-4, Section 6.2, ESI. Please confirm in the text that no organic material indicative of historic sludge material was encountered below the liner. The intent of sampling just above the base of the lagoon material was to ensure that historic sludge material, if left in the lagoon regardless of if it was above or below the plastic liner, was sampled during the ESI.

25. Page 6-11, Step 6, Groundwater. For antimony, please clarify what well data were used as background for SWMU 10. Based on information provided in Section 6.2, the background well may not be up gradient based on an evaluation of groundwater flow directions.

26. Page 6-11, Step 6, Groundwater. The maximum detected arsenic concentration exceeds the MCL. Please include this information in the discussion of arsenic results.

27. Page 7-2, Section 7.2., paragraph 2. In describing the excavation dimensions in the first sentence, please replace the word "high" with the word "deep".

28. Page 7-3, Section 7.2. Please clarify why the sample depth for samples SB11A to SB19A is 0 to 6 inches below the bottom of the excavation, but the sample depth for samples SBSB11B to SB19B and SB11C to SB19C is 0 to 1 foot below the depth of the base of the backfill material. Also, please replace the words "were collected" with the words "were excavated" in the first sentence of the second paragraph (referencing the soil transects).

29. Page 7-3, Section 7.2. According to the February 2009 Sampling and Analysis Plan (SAP: Worksheets #11 and 14), field assay test kits for diesel range organics (DRO) were to be used to ensure sufficient soil was removed at AOC A. There is no discussion of these results in this section and it is therefore unclear if this was performed. If the field assay test kits were not used, please explain. Some of the confirmatory soil samples were still above the project action level and the SAP required that if the field assay test kit exhibited a result for TPH >100 mg/kg, another backhoe bucket was to be excavated and a new sample collected on-site for field testing.

30. Page 11-1, Section 11.1, paragraph 3. Please add the words noted in italics in the following sentence, "The general observation made by ERI for PI 6 was that the site *was* comprised *of* vertical tanks, a large surface impoundment, and a pump house at a probable water treatment plant."

31. Page 12-2, Section 12.1, paragraph 3. Please add the word "were" to the sentence that reads, "In addition, 18 subsurface metallic anomalies *were* found."

32. Page 12-7, Section 12.3. Please change the title of the section to state *PI 7 Release Assessment Decision Analysis* instead of *PI 5 Release Assessment Decision Analysis.*

33. Page 12-6, Section 12.2, paragraph 3. Please provide information to validate why soil samples SO30 and SO31 were collected from the 1.5-foot interval above where refusal was encountered as opposed to 2-feet above the depth of refusal as outlined in the SOP. (Was there not a sufficient soil column left following the drum excavation and the collection of the soil sample from the 6-inch interval beneath the drums to collect a 2-foot sample?)

34. Page 12-12, Section 12.3, Step 5, Central Subsection (former quarry), EBS (2002) Surface Soil. For indeno(1,2,3-cd)pyrene, please note that the adjusted RSL is 150 ug/kg rather than the value listed in this bullet item (945 ug/kg).

35. Page 12-16, Section 12.3, Northern Subsection (former radar communication facility). Please discuss the range of copper concentrations for this soil type rather than presenting the maximum concentration detected in other soil types. In addition, copper EcoSSLs for birds (28 mg/kg) and mammals (49 mg/kg) are lower than those for plants and soil invertebrates, so that the mean avian risk for copper is HQ=3.5, which is higher than the HQs presented in the text for plant or invertebrates. Please revise the SI/ESI using the full suite of available EcoSSLs for all four receptor groups and identify those COPECs for which a SLERA warranted, based on exceedances of both background and ESVs.

36. Page 15-2 to 15-6, Section 15. Please correct the header on each page to state *PAOC I - Former Power Plant and Mechanics Shop* instead of *PAOC L – Former Paint and Transformer Storage Areas.*

37. Page 16-4, Section 16.2, paragraph 1. The word "for" should be added to the third sentence to read, "All samples were analyzed *for* pesticides."

38. Page 16-4, Section 16.2, ESI Groundwater Sampling. The third paragraph of this section states "Although no further action is likely appropriate for groundwater at PAOC L, a second round of groundwater data is warranted to confirm this supposition." The text does not indicate whether this second round of groundwater data was collected prior to abandoning the well, and the recommendation for this site is no further action. The data table only shows one round of ESI groundwater sample data for MW-01. Please clarify the apparent discrepancy between the recommended collection of a second round of ESI groundwater data although the well has been abandoned and the recommendation for no further action.

39. Page 18-1, Section 18.1, paragraph 4. Please remove the word "it" from the third sentence to read, "However, due to the presence of the former fuel tanks, and

because they had not been investigated for possible leaks, the site was included in the 2006 PA/SI (CH2M HILL, 2008)."

40. Pages 20-2 to 20-4, Section 20. Please correct the header on each page to state *PAOC P - Former Water Treatment Pumphouse* instead of *PAOC S – Former Boiler Room in Heat Plant*.

41. Page 21-1, Section 21.1, Physical Setting. Please clarify when the USFWS placed soil/gravel over the soil sampling locations at PAOC Q/R.

42. Pages 22-2 to 22-8, Section 22. Correct the header on each page to state *PAOC S - Former POL Pipeline and Power Plant* instead of *PAOC S – Former Boiler Room in Heat Plant*.

43. Appendix A.
    a. Sheet 4 of 4 is repeated for the log associated with CGW1-MW13.

    b. There are several logs (specifically, VEP5-SO06, VEP8-SO10 and 12) in which the symbol for the water table is depicted at one depth, while the notation related to the end of the boring (EOB) notes the water table at a different depth. Please clarify these apparent discrepancies.

44. Appendix B.
    a. Please explain the deletion of the indications that no debris was encountered in VEW01-SO02 and VEW01-SO03 and the addition that debris was encountered. Likewise, please explain the strike-outs of the composite and sub-surface soil information.

    b. Please provide the PID readings for PAOC-X-E. This log is not as detailed as the others.

45. Appendix C.
    a. Please clarify the method of grout placement for wells CGW1-MW07 and MW08. It is currently noted on the logs as "TRCMIX".

    b. Please clarify how the borehole associated with well CGW1-MW13 was backfilled from 60 to 55-feet below grade. The backfill material is not noted.

    c. Please re-submit the well construction logs for wells VECG-MW1 and MW2, as the numbers associated with the descriptions do not match the numbers shown on the diagrams.

46. Appendix D.
    a. It was noted that the turbidity meter malfunctioned during the early stages of development of well EPI04-MW06. It appeared from the log that the

development activities continued and visual observations were noted. Was the turbidity in well EPI04-MW06 re-checked or was the well redeveloped at a later date to attain compliance with the well development SOP?

b. It did not appear from the notes in the log associated with VECG-MW02 that the 5 NTU standard was achieved during development of this well. Also, there was no indication that the well was surged during development. Please provide additional information regarding the development process at this location, including an explanation as to why compliance with the SOP was not attained.

47. Appendix E, Groundwater Sampling Data Sheets.

a. PI 4: MW01: Sample collection occurred on March 25, 2009 and well redevelopment occurred on April 2, 2009. Please explain why this sample was collected prior to redevelopment.

b. PI 4: MW04: Please explain why the depth of the pump was equivalent to the bottom of the well. The pump is typically located at least 2-3 feet from the bottom of the well. It is unclear if there was possible sedimentation at the bottom of the well with the possibility that this well should have been redeveloped prior to sampling. Please clarify.

c. PI 4: MW05: Please explain why the depth of the pump was only 0.25 feet from the bottom of the well. The pump is typically located at least 2-3 feet from the bottom of the well. It is unclear if there was possible sedimentation at the bottom of the well with the possibility that this well should have been redeveloped prior to sampling. Please clarify.

48. Appendix G:

a. On page 6, please note if there was an "X" chiseled into the concrete base at well MW-4. This was noted for the other wells, but not for MW-4.

b. On page 6, the text indicates that there is survey data associated with the surface of the concrete at each of the wells except for well MW-5. Please provide this information or an explanation as to why it was not surveyed.

49. Appendix N, Data Validation Report:

a. SDG CTO196-21: Please explain why the nondetect VOC results were not rejected in sample VEP7-SB29-46-0409 due to internal standard recoveries. Two of the internal standards exhibited recoveries <25% which causes rejection of associated nondetect results per the EPA Region 2 data validation guidelines.

b. SDG CTO196-23: Please explain why the nondetect VOC results were not rejected in sample VEP7-SB4OP-H1H-0509 due to internal standard

recoveries. Three of the internal standards exhibited recoveries <25% which causes rejection of associated nondetect results per the EPA Region 2 data validation guidelines.