1/25/06-02468

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CARIBBEAN ENVIRONMENTAL PROTECTION DIVISION
CENTRO EUROPA BUILDING, SUITE 417
1492 PONCE DE LEON AVENUE, STOP 22
SAN JUAN, PR 00907-4127

January 25, 2006

Mr. Jeffrey Harlow
Western Vieques Remedial Project Manager
Commander Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, VA 23508-1278

Re: Review of the Draft Remedial Investigation Work Plan for SWMU 4 at the Former US Naval Ammunition Support Detachment (NASD) Vieques Island, Puerto Rico

Dear Mr. Harlow:

The U.S. Environmental Protection Agency (EPA) and the Puerto Rico Environmental Quality Board (EQB) have completed the review of the Draft Remedial Investigation Work Plan for SWMU 4 dated June 2004. Enclosed you will find our comments.

If you have any questions or comments, please contact me at (787) 741-5201.

Sincerely yours,

Daniel Rodriguez
Remedial Project Manager
Enforcement and Superfund Branch

Enclosures (2)

cc: Yarissa Martinez, EQB, w/ encl.
Felix Lopez, FWS, w/ encl.
Oscar Díaz, FWS, w/ encl.
Brett Doerr, CH2M Hill, w/ encl.

EPA's Comments
Draft Remedial Investigation Work Plan
for SWMU 4 at the
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico
June 2004

1. Change the cover page to read Naval Ammunition Support Detachment (NASD) instead of Atlantic Fleet Weapons Training Facility (AFWTF).

2. Page IV, Executive Summary: This section notes that 40 soil samples, 15 groundwater samples, six surface water samples, and six sediment samples are proposed to be collected. These numbers do not coincide with the number of samples presented in Tables 4-2, 4-3, 4-4 and 4-5. This discrepancy should be corrected.

3. Page IV and 2-3: All detections of anthropogenic compounds during the PA/SI should be noted, not just those which exceeded PRGs. The text should be amended to indicate all compounds that were detected and which ones were above PRGs. Appendix A does show these other compounds, but in planning an investigation, all compounds known to be present at the site are relevant.

4. Section 1-1: The objectives listed in this section should clearly define the problem to be addressed by this study in unambiguous terms. The objectives should reflect the expected final disposition of the site, the potential contaminants of concern and the required action levels. It is recommended that the DOE DQO web site be consulted for ways to formulate the objectives in a manner that will provide focus to the project: http://www.hanford.gov/dqo/

5. Figure 1-1: The location of the dashed line suggests that Tortola is part of the US Virgin Islands. Please revise the figure to more accurately delineate the US Virgin Islands from the British Virgin Islands.

6. Page 2-2, Section 2.1, Site Setting: This section summarizes the materials that were disposed of or detonated in SWMU-4. Somewhere in the work plan, there should be a more detailed accounting of potential contaminants that are associated with these materials. It should include information on what contaminants may be associated with each of the types of munitions which have been detected at the site, as well as better chemical descriptions of each of the materials noted in this section.

7. Page 2-2, Section 2.2.2, Site-Specific Geology and Hydrology: The work plan notes that no perennial streams are present in the vicinity of the Site and that during storm events local runoff is toward the drainage feature that runs from the northeast to southwest across the Site. The "drainage feature" should be referred to as an "ephemeral stream" and information should be provided in this document on the habitat provided by this stream. The work plan also needs to provide a better description of the wetland area and lagoon present onsite and the hydrology that supports these areas. The approximate boundaries of the wetland area (mangrove swamp?) should be depicted on a map; the National Wetland Inventory (NWI) map of the area may be sufficient at this stage of the investigation. This information is necessary to determine whether areas that could potentially be impacted by the Site via surface runoff are being properly sampled. Figure 2-1, Topography and Drainage Map, does little to clarify this issue as the area occupied by SWMU 4 is highlighted with a blue grid, making it difficult to ascertain any details regarding topography or drainage on the Site.

8. Page 2-2, Section 2, Site Background and Physical Setting: Section 2.3.1 presents a discussion of ecological receptors observed during an ecological survey conducted in 2000. It is noted that no endangered or threatened species were observed during the survey. The work plan should also include, a tabulation of Federally listed plants and animals on and around Vieques Island, including marine species (similar to Table 1-1 in the Phase I RCRA Facility Investigation Report). The section on wildlife should include discussions of aquatic receptors such as those that would be expected in the onsite lagoon, in the mangrove swamps, or in the ephemeral streams. A discussion of the diverse coral reefs found in the waters surrounding the island should also be presented. The possibility that these habitats could be impacted from surface runoff from the Site will need to be evaluated as part of the RI.

9. Page 2-3, Section 2.3.2, Environmental Baseline Study: EPA has not seen the report on the aerial photography review. This needs to be provided in order to properly evaluate the RI work plan. It is noted that, although a number of locations to the north were identified in the aerial photos, for the most part these areas are not being investigated. Barring information justifying their exclusion, these areas should be included in the sampling program.

10. Page 2-3, Section 2.3.4.1, Soil Sampling Results: Since data were not screened against ecological values, soils may be associated with unacceptable risk to ecological receptors.

11. Page 2-4, Section 2.3.4.1, Soil Sampling Results: The description of detections from the previous sampling need to be more fully discussed in relationship to the known pits and site features. The site conceptual model for contaminant release and distribution will be very different depending on whether it is believed that soil contamination is limited to small areas such as pits, versus spread more broadly throughout the area. Existing data needs to be used to this end – and the RI sampling should be geared towards evaluating any preliminary conclusions which can be drawn.

12. Page 2-4, Section 2.3.4.1, Soil Sampling Results: In the third paragraph on this page, the last sentence reads, "Therefore, the present of thallium in these samples is likely attributable to background conditions." It may be premature to draw these conclusions based on only 4 samples collected from SWMU 4. Please remove this language from the paragraph. Also in Paragraph 3, the work plan incorrectly states that six surface soil samples contained individual metals (barium and thallium) at concentrations above PRGs and background levels. It was six subsurface samples that exhibited these results, as per Table 2-2.

13. Page 2-4, Section 2.3.4.2, Groundwater Sampling Results: As always please report and discuss all detections of anthropogenic compounds. Also, review of Appendix A shows that acetone was detected in one sample and several other VOC results were rejected. The text mentions that VOCs were included in the analysis suite, but no mention of the results are included. Include and discuss all results.

14. Page 2-8, Section 2.3.5, Crab Study: The last sentence of this paragraph reads, "The study did not attribute these metal concentrations to SWMU 4 activities." This implies that the conclusions of the study specifically stated that SWMU 4 activities were not associated with increased metals concentrations in fiddler and land crab tissue, rather than implying that no conclusions could be drawn regarding the potential cause or source of metals that were found to bioaccumulate in the crab tissue. Please revise the language to more accurately reflect the conclusions of the study.

15. Page 2-8, Section 2.3.6, MEC RI: The text states that only 16% of the anomalies removed were MEC. Please indicate what made up the other 84% of the material and what was done with it.

16. Page 2-8, Section 2.3.6, MEC RI: It is not clear if the MEC RI is considered complete or ongoing. Also, in previous discussions, it seemed that the plan was to go through remedial action for MEC prior to an environmental investigation. Please clarify and justify the intended sequencing of investigations and remedial efforts.

17. Figures in Sections 2 and 4: The presentation here makes it quite difficult to determine the relative locations of photo identified features, field identified pits/features and sample locations. Areas noted in the field and via aerials are never presented on the same figure, and are given against different backdrops at different scales. Also, in most cases, the samples and features of concern are limited to a very small portion of the figure. As a result, it is not possible to determine where existing and planned sample locations are relative to the likely source areas. The figures need to be redone in order to adequately evaluate both the existing data and the RI sampling scheme.

18. Figure 2-3, PA/SI Sample locations in SWMU 4 Remedial Investigation: The Legend should identify the gray line traversing the Site, especially since many of the samples

were collected along this line (*e.g.*, is it a road and if so what type?). The legends of Figures 2-4 to 2-11 should also include this information.

19. Figure 2-6: Please indicate the tidal stage at the time when the water levels were collected. Also, in looking at other figures, it is unclear if perhaps there is a drainage feature to the east of the exiting wells. Please clarify and include all features that may affect groundwater flow on the map.

20. Figures 2-8 and 2-9: There appears to be an area to the east in columns S, T, U, and V with a high density of anomalies. Please indicate if there is an explanation for this. No pits are noted as located in the area.

21. Figure 2-10: Please indicate in the key what the difference is between red and black numbers.

22. Page 3-1, Section 3.1, Human Health and Ecological Protection Screening Criteria: Impact to groundwater is gauged against the DAF 20 values given in the Region 9 PRG tables. The User's Guide for the tables indicates that DAF 1 values are more appropriate for sites with a shallow water table or with source areas greater than 30 acres. These conditions, provisionally, appear to apply to the SWMU-4. The RI work will yield additional information as to what will be most applicable to the site. More groundwater information will be collected and the conceptual model of the site is likely to be refined. The later may indicate that the source area is either limited to a series of small source areas, or that contamination is more widespread across the SWMU. The site conceptual model section does suggest that contamination is limited to areas proximal to pits – but the data to support this conclusion is limited. Based on the RI results, the Navy should discuss with the Agencies what DAF should be used in preparing the report.

23. Pages 3-1 and 3-2, Section 3.1, Human Health and Ecological Protection Based Screening Criteria: Soil data should be screened against EPA's Ecological Soil Screening Levels (SSLs) (http://www.epa.gov/ecotox/ecossl/) and the Oak Ridge values (Efroymson) referenced under the sediment/surface water list. Sediment values and surface water values should be listed separately and prioritized. National Oceanic and Atmospheric Administration (NOAA) Effects Range-Low (ER-L) values should be correctly cited as Long, E.R., D.D. MacDonald, S.L. Smith and F.D. Calder. 1995. *Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments*. Environmental Management 19: 81-97.

24. Page 3-2, Section 3.1, Human Health and Ecological Protection Based Screening Criteria: A more complete citation for the document listed here as "EPA R4 2000" should be provided. It should also be noted that the EPA QAPP guidance is provided by *EPA Requirements for QA Project Plans* (QA/R-5), March 2001.

25. Pages 3-2 and 3-3, Section 3.2, Conceptual Site Model: It is unclear from the description

provided or the figure (3-1) how the surface water in the wetland and water in the lagoon is supported. Further, it is unclear what the references to "tidal water flow channels near the Site" actually are. As noted above, a clear understanding of the overall surface hydrology of the Site is needed to properly evaluate the proposed RI sampling. The description of surface runoff in this section ("surface runoff is not expected to be a significant migration pathway and that any potential surface waste present may travel with rain or tidal water into the drainage ditches or into the groundwater") does not match surface flow illustrated in Figure 3-1 which depicts surface flow occurring along dirt access roads toward the Caribbean Sea.

26. Page 3-3, Section 3.3, Preliminary Remedial Action Objectives and Goals: Please include Puerto Rico standards for drinking water, groundwater, surface water, and coastal/estuarine waters in this section.

27. Page 3-3, Section 3.3, Preliminary Remedial Action Objectives and Goals and Page 4-2, Section 4.1, Data Quality Objectives: The work plan notes that all existing analytical data results will be used to conduct a baseline risk assessment to determine the need for remedial actions to protect human health and the environment at the Site. The work plan should be clear regarding the sources of existing data. During the risk assessment process, data collected during the RI should be evaluated separately from the existing data to allow for an evaluation of any temporal variation in the data.

28. Figure 3-1, Conceptual Site Model, SWMU 4: The depiction of North is incorrect. Please Revise.

29. Section 4-1 – This section should be expanded to include a discussion on the process used to develop Data Quality Objectives for this project. DQOs should be qualitative and quantitative statements derived from the outputs of the first six steps of the DQO Process that: clarify the study objective; define the most appropriate type of data to collect; determine the most appropriate conditions from which to collect the data; and specify tolerable limits on decision errors which will be used as the basis for establishing the quantity and quality of data needed to support the decision. DQOs are then used to develop a scientific and resource-effective data collection design. Please consult *Guidance for the Data Quality Objectives Process* (QA/G-4) EPA/600/R-96/05, 5 August 2000, available at: http://www.epa.gov/quality1/qs-docs/g4-final.pdf and the DOE DQO Page at: http://www.hanford.gov/dqo/index.html
    a. The term "high level DQOs" should be defined. DQOs should be determined by the DQO process described above.
    b. One of the results of the DQO Process should be a clear rule that will describe the action to be taken if ARARs are exceeded and what will be done if they are not.

30. Page 4-1, Table 4-1, Previously Conducted Sampling at SWMU 4 as Reported in the Expanded PA/SI Report: The table notes that the Ecological Survey conducted during the expanded PA/SI concluded that neither threatened or endangered species nor impacts

were identified. This survey was qualitative in nature and did not involve a level of effort sufficient to support this conclusion.

31. Section 4.3.4, Soil Sampling and Analysis: It appears that the soil sample locations were chosen using a judgmental approach. Since the results of this sampling event will be used to make decisions affecting the entire site, it should be noted that this approach is not statistically valid. As stated in EPA QA/G-9, *Guidance for Data Quality Assessments: Practical Method for Data Analysis*, EPA/600/R-96/084, July 2000: "...This type of [judgmental] sampling should only be considered when the objectives of the investigation are not of a statistical nature, for example, when the objective of a study is to identify specific locations of leaks, or when the study is focused solely on the sampling locations themselves. Generally, conclusions drawn from authoritative samples apply only to the individual samples and aggregation may result in severe bias and lead to highly erroneous conclusions..." An explanation should be given detailing how these sampling locations can be used for determining the risk for the entire study area.

32. Page 4-6, Section 4.3.4, Soil Sampling and Analysis: Subsurface samples should be targeted to the area of highest potential contamination. Contaminants are most likely to be present at horizons that are at or slightly below the historical bottom of the pits. Stratigraphy should be logged continuously in attempts to use the information to target the bottoms of the pits for sampling. Visible contamination or PID readings should also be used to select sampling horizons. Sampling from the horizon just above the water table should only be a fall back if stratigraphy or screening does not indicate the bottom of the pit. Note also that borings can be completed as wells, in line with the comments on well placement.

33. Page 4-6, Section 4.3.4, Soil Sampling and Analysis: Please indicate the common constituents of propellants and igniting fuels which are potentially present.

34. Pages 4-6 - 4-7, Section 4.3.4, Soil Sampling and Analysis: The work plan notes that surface soil samples will be collected from a depth of 0-6 inches which is consistent with previously collected samples. However, the BTAG usually recommends that surface soil samples encompass the top 0-12 inches which better identifies the depth of concern for ecological risk assessment purposes. A discussion should be held with the Agencies prior to collecting samples at these depths to ensure this sampling plan is consistent with assessment endpoints. For example, in the event that land crabs are present at this site, than a more appropriate depth to collect surface soil samples may be from a depth of 0-24 inches to account for the burrowing depth of these organisms of concern.

35. Page 4-6, Section 4.3.4, Soil Sampling and Analysis, Bullets: It would be helpful to number the soil sampling locations and show this on the figures. At present it is difficult to be sure which locations correspond to each bullet item. An enlarged figure is also needed to better assess the number and locations of the borings.

36. Page 4-7, Section 4.3.4, Soil Sampling and Analysis, Second bullet: Please clarify if both surface soil and subsurface soil samples will be collected from the four soil borings proposed for the northwest of the site.

37. Page 4-7, Section 4.3.4, Soil Sampling and Analysis and Figure 4-2, Proposed Soil Boring Locations in SWMU 4 Remedial Investigation: The work plan notes that four soil borings will be completed at the northwest of the Site to assess if contaminants are transported via overland flow from the OB/OD pits to the mangroves and the wetland areas to the northwest of the Site. More details need to be provided on how the sample locations were selected.

38. Table 4-2 and 4-3 – The Contract Laboratory Protocol (CLP) SOWs cited here are out of date and should be replaced with the latest guidance. Please refer to: http://www.epa.gov/superfund/programs/clp/index.htm

39. Page 4-8, Section 4.3.5, Surface Water Sampling and Analysis and Section 4.3.6, Sediment Sampling and Analysis: More details need to be provided on the onsite wetland, lagoon, and mangrove swamp areas as well as the surface runoff patterns. Review of the Conceptual Site Model presented in Figure 3-1 suggests there may also be areas along the coast to the east and north of the Site that could have been impacted by site-related contaminants. Sampling will be needed in each of these areas (mangroves, ephemeral streams, along the coast, etc.). Please note whether these areas are associated with the Lagoon. The four locations proposed are in the Lagoon as shown in Figure 3-1 and Figure 4-3. Sample locations should be labeled. Additional samples may be necessary to better characterize the Lagoon. Further, Section 4.3.6 indicates that samples will be collected from the Laguna Arenas which is shown in Figure 4-4 and is the location of background samples collected for SWMU 6. Therefore, it appears as if this is an error. This should be clarified in the revised report.

40. The work plan indicates that the samples from Laguna Arenas will also be used for background data for SWMU 4 (in addition to using these data as background for SWMU 6). It is unclear whether these are the data from the Soil, Groundwater, Surface Water and Sediment investigation completed in 2002. This should be clarified.

41. Page 4-13, Section 4.6, Data Validation: It is recommended that Region 2 Data validation guidance be used for this project. Please refer to: http://www.epa.gov/region02/qa/documents.htm

42. Page 4-15, Section 4.7, Data Quality Evaluation: The process described in this section only discusses data QA/QC and as such, will not result in a Data Quality Evaluation (DQE) process that will meet EPA guidance. EPA QA/G-9, Guidance for Data Quality Assessment (available at http://www.epa.gov/quality1/qs-docs/g9-final.pdf) specifies that the quality of the data should be evaluated based upon its intended use.

43. Figure 4-1: It is not possible to fully evaluate monitoring well locations without additional information. For instance, the groundwater flow figure needs to be improved to show surface water drainage features. Also, given the unusual flow patterns indicated in the one round of water levels, it should not be definitively concluded that upgradient is to the north. Typically, groundwater would flow towards the ocean rather than away from it. Prior to finalizing well locations, additional data should be collected, including an additional round of water levels at existing wells and a study of the potential impact of tidal changes on wells that are close to the shoreline. Page 4-5 includes mention of such work, but details of the study should be given, as well as an indication that this information will be collected early in the field program so that it can be used to help site new wells. Well locations can then be finalized in consultation with the Agencies. That said, the following notes should be incorporated in the final citing of locations:
    a. Well that are focused on investigating a potential source should be placed directly in source areas rather than targeting an area downgradient. This will be the best barometer of whether or not an impact has occurred.
    b. The two background wells are located in areas where metallic items have been detected, but it appears that no MEC was removed during the MEC RI. Please clarify what these metallic objects were and present a convincing argument as to why these areas are appropriately deemed unimpacted. Note also that the 'boundary' of SWMU-4 based on the 3, 000 ft kickout radius extends well beyond these locations. This should also be discussed in the justification.
    c. The area of high geophysical anomaly de in the eastern portion of the figure does not presently include any investigation of groundwater. A better description of this anomaly is needed, but preliminarily, it seems appropriate to site a well here.

44. Figure 4-2: The proposed soil boring locations shown on the figure do not seem to match up with the locations described in the text. For example, Page 4-7 states that 4 soil borings will be collected at the northwest area of the site, which is assumed to imply all of SWMU 4. However, Figure 4-2 only shows 2 proposed soil boring locations in an area that can be considered the northwest portion of SWMU 4. Also, no soil borings are proposed for the north area of SWMU 4 or the southernmost part of SWMU 4, and only one soil boring is proposed for the eastern portions of SWMU 4. Additional samples are requested in these areas in order to identify the nature and extent of chemical contamination in SWMU 4, which is the purpose of the RI.

45. Figure 4-3: Clarification is needed as to the nature of the drainage feature that runs NE-SW through the area. If this is an area where soils or sediments are likely to collect as a result of overland flow, then the area should be included in the sampling program.

46. Page 5-2, Section 5.2.1, Identification of Contaminants of Potential Concern: EPA Region 2 recommends retaining all Group A carcinogens as chemicals of potential concern (COPCs). Also, using a frequency of detection screen to further refine the list of COPCs is suggested.

47. Page 5-3, Section 5.2.2, Exposure Assessment: EPA Region 2 recommends using ProUCL software (v. 3.00.02), or similar, to identify data distributions and select appropriate exposure point concentrations (EPC). This version of ProUCL identifies data distributions as either normal, lognormal, or gamma and recommends an appropriate EPC based on the distribution, or if data do not follow any of these distributions, suggests an appropriate statistic based on a nonparametric text. Please use this approach when developing EPCs.

48. Page 5-4, Section 5.2.2, Exposure Assessment: In the first paragraph after the numbered list, please revise the depth of the subsurface exposure to the uppermost 8 feet.

49. Page 5-4, Section 5.2.2, Exposure Assessment: In the second paragraph after the numbered list, the text states that the evaluation of VOCs would be qualitative. However, EPA suggests that the Navy and CH2MHill wait until data are generated during the RI to determine the most appropriate way to evaluate potential exposure to contamination. Please revise the language accordingly.

50. Page 5-4, Section 5.2.3, Toxicity Assessment: Regarding the sources for toxicity values, please refer to the December 5, 2003 OSWER Directive 9285.7-53, "Human Health Toxicity Values in Superfund Risk Assessments", which is available at: http://www.epa.gov/superfund/programs/risk/hhmemo.pdf.

51. Page 5-5, Section 5.3, Ecological Risk Assessment Approach: The work plan indicates that the need for *additional* biological sampling at the Site will be identified during the ecological risk evaluation process. If biological sampling has already been conducted at the Site, those data should be included earlier in the discussion on ecological receptors.

52. Page 5-6, Section 5.3.1, Step 1 – Screening Level Problem Formulation and Ecological Effects Evaluation: The paragraph on Complete Exposure Pathways notes, "Although ecological habitats are minimal in most portions of the Former NASD, a conservative approach will be used in this screening evaluation so that potential ecological risks are not missed." The statement regarding ecological habitats being minimal at the former NASD is not supported and should be deleted.

53. Page 5-6, Section 5.3.1.2 Screening-Level Ecological Effects Evaluation: Puerto Rico surface water screening values should be used in addition to those referenced here. Please see previous comments regarding the correct citation for the sediment and soil screening values.

54. Page 5-6, Section 5.3.2.1, Screening Level Exposure Estimates: The work plan notes risk to selected receptors chosen to represent the assessment endpoints, may include fish, aquatic invertebrates, and directly exposed terrestrial organisms. Birds should also be included in this list.

55. Tables 5-1, 5-2, and 5-3: These tables have not been exhaustively reviewed, as it is premature to develop tables of exposure parameters at the workplan stage. However, a cursory review identified the following issues:
    a) The soil ingestion rate for the utility worker should be 330 mg/day. The activities associated with this population are very contact-intensive, and the default soil ingestion rate recommended for the construction worker should be used.
    b) The soil ingestion rate for the maintenance worker should be 100 mg/day. The activities associated with this population are consistent with an outdoor worker, and the default soil ingestion rate recommended for the outdoor worker/landscaper should be used.
    c) The fraction ingested value for all populations should be 1.0.
    d) The exposure scenarios for all recreational populations will need to be revised once a more detailed description of the ultimate land use is developed.

    The recreational adult is listed as a potentially exposed population for the surface water/sediment but not for soils. The recreational adult should be added to the soils scenarios.

    Please note that the Region 9 PRG tables were updated in October 2004; future documents developed for SWMU 4 should utilize these values.

56. Section 7.1, Remedial Investigation Report: The outline includes a heading for "Aquifer Performance Testing" although none is detailed in the work plan. If such activities are planned, they need to be detailed in the work plan. Also, there should be a heading for the study of tidal effects on groundwater elevations, as well as for nature and extent of sediment and surface water contamination.

    It is stated in other related documents that these projects were to be accomplished following Superfund procedures. In accordance with EPA Superfund policy, a Quality Assurance Project Plan (QAPP) must be submitted for approval. The QAPP should comply with *EPA Requirements for QA Project Plans* (EPA QA/R-5, March 2001). Guidance on preparing QAPPs may be found in a companion document, *Guidance for Quality Assurance Project Plans,* EPA QA/G-5, December, 2002. These guidance documents can be found at: http://www.epa.gov/quality1/qa_docs.htmlhttp://www.epa.gov/region02/desa/hsw/sops.htm.. If some of these elements are covered by a separate document, such as a site-wide Master Plan, then this plan should be referenced, and a copy provided to EPA Region 2 for review.

    A Title and Approval Sheet should be provided which includes the title of the plan, the name of the organization(s) implementing the project, the effective date of the plan, and the names, titles, signatures, and approval dates of appropriate approving officials. Approving officials may include:

- Organization's Project Manager
- Organization's QA Manager
- EPA Project Manager
- EPA QA Manager
- Others, as needed (e.g., field operations manager, laboratory managers, State and other Federal agency officials)

The individuals or organizations participating in the project should be identified and their specific roles and responsibilities should be discussed. The project quality assurance manager must be independent of the unit generating the data. The individual responsible for maintaining the official, approved QA Project Plan should also be identified.

An organization chart should be provided showing the relationships and the lines of communication among all project participants. The organization chart must also identify any subcontractor relationships relevant to environmental data operations, including laboratories providing analytical services.

EQB's Comments
Draft Environmental Remedial Investigation Work Plan
Solid Waste Management Unit (SWMU) 4
Former Naval Ammunition Support Detachment
Vieques Island, Puerto Rico
June 2004

INTRODUCTION

TRC has reviewed and provides the attached comments to the Draft Environmental Remedial Investigation Work Plan, Solid Waste Management Unit (SWMU) 4, dated June 2004.

The RI Report presents the proposed environmental sampling activities as apart of an Environmental Remedial Investigation (RI) at a former Open Burn/Open Detonation (OB/OD) site identified as Solid Waste Management Unit (SWMU) 4 with the Former Naval Ammunition Support Detachment (NASD).

The SWMU 4 site was initially investigated as part of the Expanded Preliminary Assessment/Site Investigation (PA/SI) program in 2000 and the Initial Assessment Study (IAS) report in 1984.

The SWMU 4 Work Plan references procedures described in the Master Work Plan for the Former NASD (2001). TRC had not provided previously comments to the Master Work Plan for the Former NASD.

This review presents significant issues identified in the RI Report, as well as requests to clarify cited issues.

GENERAL COMMENTS

1. The boundary of SWMU 4 must be extended to account for "kickouts" that may have fallen into the water. Since the travel distance of "kickouts" may be up to 3,000 feet in any direction, the SWMU 4 boundary should be delineated by extending the arc illustrated in Figure 1-2 and creating a complete circle. The scope of the RI must be adjusted to include assessment of the marine area.

2. The risk assessment work plan was drafted as a generic plan that does not take into consideration information provided in other sections of the work plan or data collected during previous investigations. For example, a conceptual site model is provided in Section 3, but the human health risk assessment work plan states that a conceptual site model will be developed. The conceptual site model should be used in the decision-making process for determining the number, type and location of sampling for the RI. It is unclear that data collected during previous investigations has been used to identify data gaps for the risk assessment that should be addressed during the RI. A preliminary list of chemicals of potential concern should have been developed based on sampling data

collected to date and a preliminary understanding of the fate and transport mechanisms and pathways should be known as a result of this data. This information should be used to develop the scope and purpose of the RI investigation to collect data needed to adequately characterize the site and exposure pathways for risk assessment purposes. Please modify Section 5 to include data and information known about the site and discuss data gaps for the risk assessment. This discussion is necessary to ensure that the investigation provides data needed to move forward with the risk assessment.

PAGE-SPECIFIC COMENTS

1. Page ES-III, Paragraph 1 - The preliminary results should be provided from the Munitions and Explosives of Concern remedial investigation (MEC RI). The text indicates that the MEC RI results indicate the need for additional environmental investigations at this site. Review of this information is needed to evaluate the scope of the proposed work.

2. Page ES-III, Paragraphs 3 and 4 – The text must be reviewed for consistency and revised as appropriate. Paragraph 3 states that the site is approximately 100 acres and Paragraph 4 states that 87 acres of the site were subjected to the geophysical survey. What is the status of the remaining 13 acres?

3. Page ES-III, Paragraph 5 – Given that Paragraph 3 indicates that thermal destruction of fuels took place at the site, the absence of petroleum carbon range analyses, like Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH), appears to be a data gap. Although the results of the soil and groundwater data did not detect volatile organic compounds (VOCs) or semivolatile organic compounds (SVOCs) other than explosive related compounds, and thus indicates limited potential for the presence petroleum contamination, the results could reflect sampling bias. In other words, the locations of the anomalies detected during the geophysical investigation and ground-scarred areas identified from aerial photographs might not be consistent with areas where destruction of fuels took place. The description of site activities on Page 2-1, paragraph 3 does not specifically discuss the use of fuels in destruction processes, the means, methods, and locations for fuel destruction, and the volume and types of fuels used/destroyed. Additional information would be helpful to evaluate the value of, and suitable locations for, petroleum analysis of environmental media.

4. Page 2-1, Section 2.1, Paragraph 3 –
   a. Clarify the location of the "open burn area."
   b. Clarify if the open burn area is separate and distinct from where open detonation was conducted.
   c. Clarify if open burning was conducted in pits.

5. Page 2-1, Section 2.1, Paragraph 3 - Clarify whether the method described for OB/OD was used in the 1940s or if this is a description of more recent methods for OB/OD. Please provide a description of past methods for igniting or detonating munitions and

explosives. This information is useful to verify the appropriateness of the list of chemicals of potential concern.

6. Page 2-2, Section 2.2.2, Paragraph 1 –
   a. Provide preliminary geologic cross-sections based on the available data.
   b. Provide available information regarding the hydraulic gradient of site groundwater and hydraulic conductivity, if available.

7. Page 2-2, Section 2.2.2, Paragraph 2 –
   a. Clarify where the drainage feature noted in the paragraph discharges.
   b. Remove the cross-hatching from Figure 2-1. Figure 2-1 is cited as being illustrative of topography and drainage at SMWU 4, but the cross-hatching obscures the details of topography and drainage.
   c. Note the location of the cited drainage feature on Figure 2-1 or another appropriately scaled figure. The drainage feature cited in the paragraph is not noted on Figure 2-1; however, the scale of the figure may not be appropriate for this level of detail.

8. Page 2-2, Section 2.3.1, Paragraph 1 - Include a figure showing the areas where the ecological survey was performed. Clarify in this section whether the habitat is suitable for threatened or endangered species found in this region.

9. Page 2-2, Section 2.3.1, Paragraph 3 - The last sentence states: "No evidence existed that the historical activities at this SWMU had an impact on wildlife or its habitat." Please provide a brief discussion of the investigation that demonstrated that no impacts occurred due to historical OB/OD. It seems likely that the opening burning or detonation of explosives had an impact on wildlife and habitat at the time OB/OD occurred.

10. Page 2-2 to 2-3, Section 2.3.2 - Provide additional details on areas used for OB/OD. Information whether specific areas were typically used to burn or detonate or whether the locations of OB/OD pits were changed periodically is useful in determining if proposed sample locations are located within potential source areas.

11. Page 2-3, Section 2.3.4.1 - Provide the depth of the magnetic anomalies where soil samples were collected, as this information is useful for reviewing soil sample depths. Also, please indicate whether BIP was conducted at locations where soil samples were collected.

12. Page 2-3, Section 2.3.4.1, Paragraph 1 –
    a. Provide the rationale for the selection of the subsurface soil sample depths. The depth of sample collection should coincide with the highest contaminant concentrations based on field screening and observations.
    b. There is also a data gap for surface soil. Surface soil is characterized as 0 to 2 feet, yet no current data exists for soils from 6 inches to 2 feet below ground surface (bgs). The additional work planned for the site should include greater characterization of the surface soil interval.

c. Clarify the depth to groundwater in the areas were borings were advanced and indicate how the depth to groundwater influenced sample collection depths.
d. See prior comments about the potential data gap associated with the lack of petroleum carbon range data.

13. Page 2-4, Paragraph 1 –
    a. Demonstrate how site conditions are consistent with the use of a PRG based on a DAF of 20.
    b. Clarify why the Navy divided the DAF PRGs by 10 for screening

14. Page 2-4, Paragraph 5 –
    a. Clarify if the groundwater samples were collected consistent with Region II low stress (low flow) purging and sampling guidance.
    b. Provide the depth to groundwater in the areas sampled.

15. Table 2-1 – Provide footnotes to this table explaining all PRG adjustments.

16. Table 2-1 - Please provide supporting documentation for the use of a dilution/attenuation factor (DAF) of 20, including calculations using site-specific hydraulic conductivity, hydraulic gradient, total organic carbon, etc. that show this value is protective for this site.

17. Table 2-2 - Provide footnotes to this table explaining all PRG adjustments.

18. Table 2-3 - Provide footnote to this table explaining PRG adjustment.

19. Page 2-8, Paragraph 2 – See Comment to Page ES-III, Paragraphs 3 and 4 regarding the geophysical survey area.

20. Page 2-8, Paragraph 5 – Clarify if the 1,792 MEC items includes both buried and un-buried items. Page 4-1, Paragraph 3 indicates that 1,300 buried MEC items were detected during the geophysical survey.

21. Page 2-9, Table 2-4 - Provide the depths at which MEC items were found. Clarify what is meant by surface (i.e., clarify whether items were lying on the ground or below ground, and if below ground, how deep).

22. Figure 2-1 – Remove the cross-hatching from this figure. It obscures the topography and drainage in the area of interest.

23. Figure 2-2 –
    a. It would seem that explanation is required to support using a 1967 aerial photograph to illustrate scars and stains observed in 1970.
    b. Clarify if the arc illustrated on the figure is consistent with the "Area of Restricted Landuse" illustrated on Figure 1-2. If so, then consider changing the label used to

illustrate the arc on Figure 2-2 that says [*sic*] "3000' Ft. Arc Based on Radius from MW-01 in SWMU-04 Site"

c. Illustrate/label the drainage feature discussed on page 2-2, paragraph 2 (and elsewhere) in the text.
d. Label the SMWU boundary for clarity.
e. Clarify why samples were not collected in the trench identified on this figure. Also, clarify what the "SWMU 04" Feature Identifiers are referring to in the legend of the figure.

24. Page 2-3, Section 2.3.3 - According to EPA guidance (EPA, 1989), "...background samples are collected at or near the site in areas not influenced by site contamination, but in areas that do have the same basic characteristics as the medium of concern..." If the background comparison contemplated by the Navy for this site does not satisfy this and other applicable guidance, then additional background sampling may be required. Provide all documentation necessary to clearly demonstrate that this guidance is satisfied, or propose measures to ensure compliance with the guidance.

25. Figure 2-3 - Several of the previous sample locations (SB-12 to SB-16) are located in the vicinity of roadways away from OB/OD pits and where the MEC avoidance survey was conducted. Please clarify the rationale for selecting these sample locations.

26. Figures 2-3 and 2-4 –
    a. Add a legend notation indicating what the grid means.
    b. Label or indicate the drainage feature discussed on page 2-2, paragraph 3 (and elsewhere) in the text.

27. Figure 2-4 –
    a. Add a legend notation indicating that the dots represent anomalies from the geophysical survey.
    b. Add a legend notation indicating what the grid means.

28. Figure 2-7 – Clarify the units of perchlorate. The legend notation for units says the following: "All concentrations are of total metals in ug/L unless noted otherwise." No notation is provided for the perchlorate concentration units.

29. Figure 2-10 – Clarify what the numbers in red signify.

30. Page 3-1 to 3-2, Section 3.1 - Please list screening criteria in order of preference and separate the criteria into two sections based on protection of human health and ecological receptors. Please consult the following references prior to using values from Canada or the Netherlands: Jones, D.S. et al, 1997 and Suter, G.W. and Tsa C.L., 1996.

31. Page 3-1, Groundwater Bullets - Include MCLs as screening criteria to be consistent with the discussion of the identification of Contaminants of Potential Concern (COPCs) on page 5-2, Section 5.2.1.

32. Page 3-1, Section 3.1, Soil Screening Criteria - Include EPA Eco-SSLs (EPA, 2003) in the list of screening criteria.

33. Page 3-1, Section 3.1, Migration to Groundwater - Provide supporting calculations for the use of a DAF of 20 for the Migration to Groundwater SSLs.

34. Pages 3-2 and 3-3, Section 3.2 –
    a. Provide available analytical data that quantifies organic content of the soil (e.g., Total Organic Carbon [TOC]). This information will be useful in evaluating the fate and transport of contaminants (e.g., retardation, attenuation) at the site and the degree to which contaminants could leach to groundwater.
    b. Clarify if the locations of existing sampling were consistent with areas of known fuel destruction/use. Earlier descriptions of site activities noted the destruction of fuels at the site, yet no fuel constituents/residues were detected in the sampling. Fuel destruction may have been a minor component of activities conducted at the site. Alternatively, fuel destruction may have been conducted in areas different from the sample locations.
    c. Provide additional information concerning the depths of pits excavated at the site for material disposal/destruction and the typical depth to groundwater in these areas. This information may be helpful in targeting sampling depths and evaluating the proximity of contaminant release to groundwater.
    d. Provide information concerning the groundwater classification at this site, proximity to water supply wells and productive groundwater aquifers containing potable quality water, and potential for saltwater intrusion.
    e. Include a discussion of current and future land uses at the site and a description of the conceptual site model provided in Figure 3-2 clarifying the current understanding of the site and potential receptors.

35. Figure 3-2 –
    a. Include the construction worker as a potential human receptor for surface soil. The construction worker is exposed to surface as well as subsurface soil for all exposure pathways except for root uptake since the construction worker does not spend all their time in an excavation. EPA 2001 describes the Construction Worker as a short-term receptor who is exposed to soil contaminants during the workday for the duration of a single construction project (typically a year or less). The activities for this receptor typically involve substantial on-site exposures to surface and subsurface soils. The construction worker is expected to have a very high soil ingestion rate. EPA assumes the Construction Worker to be exposed to contaminants via the following direct and indirect pathways: incidental soil ingestion, dermal absorption, inhalation of volatiles outdoors, and inhalation of fugitive dust.
    b. Replace the "?s" with "X" and evaluate a future residential land use scenario.
    c. Include the residential receptor as a potential human receptor for subsurface soil Future residents could become exposed to subsurface soils through a variety of mechanisms, including excavations for residential building foundations.

d. Given the scope and duration of ordnance-related activity at this site, a threat to public safety will remain due to the potential presence of energized materials. Physical hazards are also likely to be present due to exposed metals (e.g., cuts, scrapes).
e. Clarify why an adult would not be exposed to surface water/sediment at this site, while a resident child would be exposed to these environmental media.
f. Clarify why contamination may only be present in subsurface soil as a result of leaching. The report documents that munitions were encountered in subsurface soil and therefore may be a source of subsurface contamination.
g. Clarify why construction workers will not be exposed to groundwater, which is present at 7 feet bgs in some portions of this site.

36. Page 4-1, Section 4 – The site investigation should include data collection for hydraulic conductivity and grain size, which will contribute to the evaluation of the fate and transport of contamination at the site.

37. Page 4-1, Paragraph 3 – See comment regarding Page 2-8, Paragraph 5 for clarification if the 1,792 MEC items includes both buried and un-buried items. Page 4-1, Paragraph 3 indicates that 1,300 buried MEC items were detected during the geophysical survey.

38. Page 4-4, Section 4.3.1.3 - Clarify that surface and subsurface soil sampling will be conducted in areas where BIP methods are used to eliminate munitions.

39. Page 4-5, First Bullet – Clarify the distance between the two monitoring wells discussed in the bullet and OB/OD Pits 14, 15, and 16.

40. Page 4-5, Second Bullet – Provide the basis for installing monitoring well NDW04MW15 200 feet from the area targeted for monitoring. A location closer to the source area may be warranted.

41. Page 4-5, Third Bullet – According to EPA guidance (EPA, 1989), "...background samples are collected at or near the site in areas not influenced by site contamination, but in areas that do have the same basic characteristics as the medium of concern..." Provide documentation that the areas selected for groundwater background sampling satisfy this and other applicable guidance.

42. Pages 4-5 and 4-6, Section 4.3.3 –
    a. Add VPH and EPH analyses to the suite of analysis for this site due to the history of past disposal/destruction of fuels.
    b. Clarify if low stress (low flow) sampling will be conducted consistent with Region II guidance (GW Sampling SOP Final, March 16, 1998). Provide details of procedures that will be followed and equipment used (e.g., bladder pumps, flow-through cell, etc.)
    c. For consistency, the list of analyses discussed in the text should be the same as that presented in Table 4-2.

43. Page 4-6, Table 4-2 –
    - The laboratories must use the most current Contract Laboratory Program (CLP) Statements of Work (SOWs) for semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and metals as is being done for the volatile organic compound (VOC) method. Therefore, OLC02.1 must be changed to OLC03.2 for SVOCs and pesticides/PCBs and ILM04.0 must be changed to ILM05.3 for metals. It should be noted that the SVOC list in OLC03.2 contains additional compounds in comparison to OLC02.1.
    - It is unclear why the ion chromatograph anions and alkalinity analyses are proposed for groundwater. These are being used for surface water samples to determine hardness to support ecological screening. The Conceptual Site Model presented in Figure 3-2 does not indicate ecological exposures associated with groundwater.

44. Page 4-6, Paragraph 1 – Clarify that temperature, pH, dissolved oxygen and conductivity readings will be collected using a sonde within a flow through cell.

45. Page 4-6, Section 4.3.4, Paragraph 1 - Collect deeper surface soil samples in those areas where the expanded PA/SI samples indicated potential contamination at 0 to 6 inches, unless historical data indicates that contamination is restricted to the 0 to 6 inch bgs interval.

46. Pages 4-6 and 4-7, Section 4.3.4 - Provide the rationale for the selection of the location of the samples to be collected at the northwest of the site. For example, it would be helpful to know if the samples will be collected in areas where signs of surface runoff are visible or if such features have been observed at the site.

47. Section 4.3.4 - Clarify which figure shows the location of the soil boring to be completed in the drainage feature to the southwest of OB/OD Pit 12.

48. Page 4-6, Section 4.3.4, 1st bullet – The text states that the full TCL/TAL analyte list will be performed for soil samples. However, Table 4-3 does not include cyanide which is part of this list. Clarification is needed whether cyanide analysis is needed in soil samples, or other matrices as well, for this investigation.

49. Page 4-6, First Bullet –
    a. Collect additional soil from the 0.5 to 2 foot interval to fully characterize the surface soil interval.
    b. Clarify if soil samples will be screened for the presence of VOCs using a jar headspace procedure.

50. Page 4-7, First Bullet –
    a. Provide the rationale for sampling subsurface soil at the 4 to 6 foot depth interval. According to the Conceptual Site Model (Section 3.2), groundwater occurs at depths ranging from 7 to 28 feet bgs. Subsurface soil samples may need to be collected from depths other than 4 to 6 feet bgs (i.e., the capillary fringe, highest field screening measurement, visual staining, etc.).

b. Clarify if a field screening procedure will be used to select samples with observable contamination. Select samples would then be submitted for laboratory analysis.
c. Add VPH/EPH analyses due to the history of past disposal/destruction of fuels.

51. Page 4-7, Third Bullet –
a. Clarify why only one sample will be collected from the drainage feature.
b. Describe the rationale/procedure for selecting the sample location in the drainage feature.
c. Identify from what depth the drainage feature soil sample will be collected.

52. Page 4-7, Table 4-3 –
a. As previously discussed, add VPH/EPH analyses due to the history of past disposal/destruction of fuels.
b. Include analysis of TOC. This information will be useful in evaluating the fate and transport of contaminants (e.g., retardation, attenuation) at the site and the degree to which contaminants could leach to groundwater.
c. Distinguish the number of surface soil samples and subsurface soil samples separately.
d. Include pH and total organic carbon content (by Lloyd Kahn method) for surface and subsurface soil samples.

53. Page 4-7, Section 4.3.4, Table 4-3 – The laboratories must use the most current CLP SOWs for VOCs, SVOCs, pesticides/PCBs, and metals. Therefore, OLM04.2 must be changed to OLM04.3 for VOCs, SVOCs, and pesticides/PCBs and ILM04.0 must be changed to ILM05.3 for metals.

54. Page 4-8, Section 4.3.5 – The rationale for each surface water sample location should be presented.

55. Page 4-8, Section 4.3.5, Paragraph 3 - According to EPA guidance (EPA, 1989), "...background samples are collected at or near the site in areas not influenced by site contamination, but in areas that do have the same basic characteristics as the medium of concern..." Provide supporting information that the areas selected for surface water background sampling satisfy this and other applicable guidance.

56. Page 4-9, Table 4-4 - The laboratories must use the most current CLP SOWs for SVOCs and metals as is being done for the VOC and pesticide/PCB methods. In addition, the method currently cited for SVOCs is a low-medium concentration method. As is done for the other parameters, the low-level CLP SOW (OLC03.2) must be used and not OLM04.2. This method would also yield quantitation limits consistent with those cited in Appendix F for SVOCs.

57. Page 4-9, Section 4.3.6, Table 4-5 - The laboratories must use the most current CLP SOWs for VOCs, SVOCs, pesticides/PCBs, and metals. Therefore, OLM04.2 must be changed to

OLM04.3 for VOCs, SVOCs, and pesticides/PCBs and ILM04.0 must be changed to ILM05.3 for metals.

58. Table 4-5 - Please include total organic carbon content for sediment samples, as this information may be needed to establish applicable ecological sediment screening criteria.

59. Tables 4-4 and 4-5 – Analyses for petroleum carbon ranges (e.g., VPH and EPH) should be included given the sites history of fuel destruction.

60. Page 4-10, Section 4.5.1 – The text implies that laboratory method detection limits (MDLs) will be compared to the screening criteria. It should be noted that the quantitation limits should be compared to the screening criteria and not the MDLs. The MDL is a statistically derived number and is not an accurate measurement of the lowest concentration the laboratory can reliably detect.

61. Figure 4-1 –
    a. Label the proposed well locations with the proposed well identifiers.
    b. Clearly label/identify the drainage feature and mangrove swamp.

62. Figure 4-2 – Clearly label/identify the drainage feature and mangrove swamp.

63. Figure 4-2 – Clarify the relationship between the proposed soil sample locations and the ground scar identified in Figure 2-2 as PI-01. Also, aerial photograph (Figure 2-2) depicts a road extending due north from the center of SWMU 4. This road does not appear on the figures in this work plan. The Work Plan should discuss the history of this road and summarize activities that may have occurred on it. The Work Plan should also clarify whether this road provided access to OB/OD areas within SWMU-04. The Work Plan should clarify what activities have been conducted to investigate potential OB/OD along this road. If no such activities have been conducted, the Work Plan should propose activities to investigate potential OB/OD.

64. Figure 4-3 - Please clarify why sediment sampling is not proposed for the western shore area. Although the topographic figure is difficult to read, it appears that the topography slopes down toward the west. Sampling in this area would be useful for determining if surface runoff has occurred in areas of the beach unaffected by tidal action.

65. Page 5-1, Section 5.2, Paragraph 1 - Clarify how the RAGS Volume II, Environmental Evaluation Manual, will be used in the human health risk assessment (HHRA).

66. Page 5-2, Section 5.2, Paragraph 2 - Please note in the text that a preliminary conceptual site model has been developed for this site and is presented in Figure 3-2. Please revise this paragraph to discuss the preliminary CSM and the current understanding of the site.

67. Page 5-2, Section 5.2.1, Paragraph 1 - The first sentence states that "Existing analytical data from SWMU 4 will be evaluated for a quantitative risk assessment..." Other

sections of the report indicate that the data collected from the remedial investigation will be included in the risk assessment. Please clarify this here as well.

68. Page 5-2, Section 5.2.2, Paragraph 1 - Please discuss available land use data and sampling data from the PA/SI in conjunction with the preliminary conceptual site model provided in Figure 3-2 in this section. Please identify data gaps that will be addressed in the RI. If additional land use data or information on receptors will be obtained during the RI, please discuss in this section.

69. Page 5-3, Section 5.2.2, Paragraph 2 - Please clarify the third sentence of this paragraph.

70. Page 5-3, Section 5.2.2, Paragraph 3 - Please clarify whether the various recreational scenarios will be evaluated separately in the risk assessment or will be evaluated to develop exposure parameters for a general recreational exposure scenario scenario.

71. Page 5-3, Section 5.2.2, Paragraph 5 - Please clarify what is meant by "appropriate representative exposure pathways." Typically, complete exposure pathways are evaluated for each scenario in the risk assessment. Also, EPA RAGS Part D guidance requires that all exposure pathways considered but excluded from evaluation be identified and an explanation given as to why the pathway will not be evaluated in the risk assessment. Please ensure that the conceptual site model submitted in accordance with this EPA guidance includes this information.

72. Page 5-3, Section 5.2.2, Paragraph 6 - Please provide a reference for the EPA guidance that will be used in developing values representing the 95% upper confidence limit of the mean for each contaminant.

73. Page 5-3 ,Section 5.2.2, Paragraph 7 - PREQB does not support the evaluation of a 0.5-acre portion of the site for risk assessment purposes. PREQB requests that each area impacted by contamination is adequately defined and characterized and exposure point concentrations representing the 95% upper confidence limit of the mean or the maximum for each area impacted by contamination (whichever is lower) are used to evaluate exposure to each receptor. Please note that "relevant data" should only include that data for each area impacted by contamination.

74. Page 5-4, Section 5.2.2, Paragraph 3 - Please clarify why only soils within the uppermost 6 feet will be evaluated for direct exposure during excavation. Please define the depths associated with surface and subsurface soil.

75. Page 5-4, Section 5.2.2, Paragraph 4 - The initial understanding of the fate and transport of all contaminants identified based on previous investigations at this should be provided here. If the data from the PA/SI is insufficient to determine preliminary fate and transport mechanisms and pathways for this site, please identify this data gap and discuss what data will be collected during the RI to address this data gap. This comment applies to Section 5.3.1.1 also. Please do not dismiss exposure pathways from quantitative consideration in the risk assessment until the RI data is collected and evaluated. For

example, the inhalation of volatiles in ambient air volatilizing from soil exposure pathway should not be excluded from quantitative evaluation based solely on data collected during the PA/SI. The lack of volatiles in surface soil is based only on samples collected from 0 to 6 inches below ground surface (bgs). Deeper samples may indicate the presence of volatiles associated with historic releases or confirm the lack thereof. Please note that volatilization from soil occurs in subsurface as well as surface soil. Therefore, subsurface soil should be evaluated as a source for volatiles to ambient air for all receptors in accordance with EPA guidance (EPA, 1996 and 2001a).

76. Page 5-4, Section 5.2.3 - Please update this section to reflect current EPA guidance on the hierarchy for toxicity values to be used for the human health risk assessment (EPA, 2003b).

77. Page 5-5 to Page 5-6, Section 5.3.1.1 - A summary of previous habitat surveys or site walks for the purpose of evaluating habitat or wildlife should be provided here. Section 2.3.1 references a wildlife survey that was conducted at this site. Please use information from that survey to identify a preliminary list of species and habitats and data gaps for the ecological risk screening/assessment that should be addressed during the field investigation for the RI. EPA soil screening values for ecological receptors should be used for screening purposes prior to using EPA Region 4 guidance values. EQB requests the use of freshwater sediment screening criteria provided in MacDonald et al, 2000 as the tier 1 reference and Jones, D.S., et al, 1997 as a tier 2 reference.

78. Page 5-7 to Page 5-8, Section 5.3.3.1 - Ecotoxicity criteria represent acute exposure should be converted to LOAELs for comparison to NOAEL-based hazard quotients. Also, considering this site is in Region 2, please use guidance appropriate for this region.

79. Page 5-8, Section 5.3.4 - If this site requires a baseline ecological risk assessment, a supplement to this work plan should be submitted for agency review and approval that provides information on the proposed studies and approaches that will be used. The information provided in this section currently only provides a brief outline of steps involved in conducting a baseline ecological risk assessment.

80. Page 5-9, Section 5.3.6 - Please include a statement that proposed field study work plans and sampling plans will be provided for agency review and approval prior to implementation.

81. Page 5-9, Section 5.4 - The text should clarify the basis for selecting 10E-04 as the cancer risk level above which cleanup is required.

82. Page 5-9, Section 5.4.2 – The text should be revised to indicate that the development of RGOs will comply with Region 2 guidance.

83. Table 5-1 - Please note that limited information is available in the risk assessment work plan to allow a full review of the proposed exposure parameter values presented in Tables 5-1, 5-2 and 5-3. Additional comments and requested changes may be provided once the exposure scenarios are described.
   - The ingestion rate for a utility worker should be 330 mg/day to be consistent with current EPA guidance (2001a). The ingestion rate for a maintenance worker (outside worker) should be 100 mg/day to be consistent with current EPA guidance (2001a).
   - The use of a faction ingested (FI) less than 1 for a maintenance worker or utility worker is not consistent with current EPA guidance. The daily ingestion rate considers ingestion from all sources and should be used without modification to represent the contact rate for these receptors.
   - Based on the exposure factors presented, it appears that child and adult exposure will be combined to evaluate 30 years of exposure to a resident for carcinogens, but risks will be presented separately for a child and an adult for noncarcinogens. The use of age-adjusted exposure factors (not rates – please modify parameter names to age-adjusted inhalation and ingestion factors) is acceptable, but the risks associated with exposure to noncarcinogens should also be presented as a combined child/adult Hazard Index (HI). The exposure duration for an adult should be reduced to 24 years and the overall HI to a residential receptor representing 30 years of exposure should be presented for noncarcinogens. If the Navy wishes to evaluate a child receptor separately from an adult receptor, then this approach should be used for carcinogens as well as noncarcinogens, and an age-adjusted exposure factor would not be used and the adult exposure duration for noncarcinogens would remain 30 years. This comment applies to Tables 5-2 and 5-3 also.
   - The PEF for a utility worker should be developed using current EPA guidance (EPA 2001a). Also, the default PEF assumes that the area impacted by contamination is 0.5 acres. Prior to using this value to evaluate the inhalation of particulates exposure pathway, please confirm that the size of the area impacted by contamination at the site is consistent with this default value. If not, a site-specific value should be calculated in accordance with the EPA guidance.
   - Notes h through j indicate that the soil loading calculations used to calculate adherence factors are provided in Appendix G, which was not included in the hardcopy or electronic version of the work plan provided to PREQB. However, please use adherence factors from current EPA guidance (EPA, 2001b) unless additional supporting documentation is provided on the equations used, and which demonstrates the selection of a central tendency AF for a high-end activity or a high-end AF for a central tendency (i.e., typical) activity, as EPA describes in their guidance. Absent this site-specific information, please use the following recommended AFs provided in Section 3.2.2.3 of the EPA guidance: a commercial/industrial worker - 0.2; adult resident - 0.07; child resident – 0.20. Since the commercial/industrial worker uses the median AF for a utility worker, this value should be used for the utility worker as well.
   - Please provide supporting documentation for the development of the site-specific skin surface area values. Please note that the moderate temperatures and climate should be considered in evaluating exposed skin surface area. It should be assumed that receptors wear shorts and shirts and, therefore, where the arms are exposed. Legs and

arm surface areas should be used rather than lower legs and forearms. Also, calculations should include EPA's dermal guidance also provides recommended skin surface area values for a reasonable maximum exposure (RME) exposure scenario. Unless supporting documentation is provided justifying the use of the values proposed, please use the following EPA-recommended values: Adult Maintenance, Utility and Industrial Worker – 3,300 cm^2; Residential Adult – 5,700 cm^2; and Resident Child – 2,800 cm^2. Note that for recreational receptors, it should be assumed that the receptors only wear shorts and no shirt. Therefore, please develop site-specific values assuming exposure to face, hands, arms, legs and feet (residents only).

- The exposure factors for a Recreational Adult should be presented in this table, since this exposure scenario is being evaluated for future land use.
- Please clarify why the table indicates that there is no exposure time for residential receptors, yet the not says that 4 hours is assumed for residential dermal contact.
- It does not seem reasonable to combine 4 hours of exposure per day with only 50 days a year exposure for recreational receptors. Exposure to a monolayer of soil on the skin does not stop at the point a receptor is no longer on-site. Rather, exposure stops when the skin is washed. Therefore, to ensure that the exposure scenario represents a reasonable maximum exposure, please assume that the event duration is 8 hours for all receptors.
- The exposure frequency for a recreational youth) should be 50 days per year to be consistent with a recreational child.
- Please use current guidance in developing exposure parameter values. Note a indicates that a 1991 exposure factors reference is being used in developing values; however, the 1997 reference is listed in Section 5.2. This comment applies to Table 5-2 also.
- Please correct the presentation of the equations in Notes o, p and q.

84. Table 5-2 - Please revise the incidental ingestion rate for a child recreational receptor to be consistent with EPA guidance (1989) for a swimming scenario (i.e., 50 ml/hour). Please revise the skin surface area values to take into account that clothing is not a barrier to water exposure. Therefore, for the recreational receptors, it should be assumed that the entire body is exposed to surface water unless site conditions preclude swimming. The skin surface area values for the remaining receptors should include the face, arms, hands, legs and feet (for residents).
    a. If a swimming scenario is appropriate, the event duration should be 4 hours for exposure to surface water to be consistent with EPA guidance (1989).
    b. The exposure frequency for sediment and soil should be consistent with Table 5-1 (i.e., 50 days per year). Please clarify why the number of days a receptor would be on-site varies from 45 to 50 days for recreational receptors.
    c. Please use adherence factors appropriate for each receptor and activity. A construction worker AF is not appropriate for a recreational user, especially a child, as shown in EPA's current guidance for evaluation dermal exposure (2001b). The AF for a child playing in wet soil is 3.327. Several higher values are also available for children playing in mud – 20.601 (geometric mean) and 230.663 (95th percentile). The use of 3.327 is appropriate as it represents the 95th

percentile value for a central tendency activity. The same approach should be used for developing appropriate AFs for recreational users for wet soil/sediment, based on likely activities.

85. Table 5-3 - Please verify the units for the Exposure time provided in the table and in note e. The table states 0.007 hours/day, which translates to 0.4 minutes per day or 25 seconds. Note e indicates this value is in events/day. If the units are in events/day, then the units for the exposure frequency should be events/year.

86. Appendix A, Table 2 - Please use Residential PRGs to screen subsurface soil for the future residential exposure scenario. As shown in this table, the industrial screening criteria for noncarcinogenic compounds are generally over ten times higher than the residential screening criteria, especially for metals. The use of industrial PRGs results in screening individual noncarcinogenic compounds at a hazard quotient greater than 1 for soils greater than 2 feet below grade.

87. Appendix F – The following issues were noted with the tables presented in Appendix F which compare laboratory reporting limits to screening criteria.
    - MDLs were presented in this table in addition to the quantitation limits but cannot be used to compare to screening criteria, as discussed in comment #6 above.
    - Section 3.1 of the document states that Region IX Residential Soil PRGs will be used as screening criteria for soil samples in addition to Region IX Industrial Soil PRGs. However, Appendix F only presents the Industrial PRGs which are generally higher than the Residential PRGs. Therefore, it is unclear whether the laboratory reporting limits will be able to meet the Residential PRGs, when required. The table should be revised to present both sets of screening criteria.
    - Section 3.3 of the document states that MCLs will be used as groundwater ARARs for the site. Section 3.1 states that the Region IX Tap Water PRGs will be used as screening criteria for groundwater. The table only summarized Region IX Tap Water PRGs for groundwater screening criteria. In general, this is acceptable since most Region IX PRGs are lower than MCLs. However, there are a few MCLs which are lower than the Region IX PRGs and should therefore be presented or one case where there is an MCL but no Region IX PRG and should therefore be presented. These are as follows: 1,1,1-trichloroethane, 1,1-dichloroethene, styrene, and beryllium (MCLs lower than Region IX PRGs) and total chromium (MCL exists but Region IX PRG does not exist).
    - Screening criteria were not presented for groundwater for cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and gamma-BHC although there are Region IX Tap Water PRGs and MCLs for these compounds.
    - The parameter headers should list the low-level methods for (OLC03.2) for surface water and groundwater for VOCs and pesticides/PCBs.
    - The surface water criteria listed on the table are from 2002. However, according to the website listed in Section 3.3 of the document for locating surface water ARARs, these were updated in 2003. The most recent screening criteria must be used.

- The screening criterion for 1,2-dibromoethane in groundwater must be changed to 0.000764 ug/L (not 0.00).
- The screening criterion for aldrin in groundwater must be changed to 0.004 ug/L (not 0.00).
- The screening criterion for dieldrin in groundwater must be changed to 0.0042 ug/L (not 0.00).
- It is unclear why the screening criterion for total PCBs in soil is different than the screening criterion for the individual PCB Aroclors in soil. According to the Region IX PRGs, these numbers should be equivalent.
- The units for the metals quantitation limits in soil must be changed to mg/kg (not ug/kg).
- It is unclear where the screening criterion for mercury in soils (0.00051 mg/kg) comes from. The Region IX Industrial PRG is 31 mg/kg and the Region IX Residential PRG is 2.3 mg/kg.
- Several of the metals quantitation limits could be lowered and subsequently able to achieve screening criteria if the ICP/MS option of the CLP SOW ILM05.3 was utilized. This should be considered in order to meet the stated screening criteria.
- There are many screening criteria for each matrix which will not be met based on a review of Appendix F (quantitation limits versus the screening criteria). If this will adversely impact the risk assessment, this needs to be readdressed and use of other methods may be required to achieve the screening criteria for critical contaminants of concern. Other methods could include SW-846 methods modified to utilize selective ion monitoring for VOCs and SVOCs and lower concentration standards and reduced final extract volumes for pesticides and PCBs.

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