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LETTER DISCUSSING DRAFT PHASE II OF CORRECTIVE MEASURES STUDY
INVESTIGATION AND FINAL REPORT FOR SOLID WASTE MANAGEMENT UNIT 74 AND
DRAFT SAMPLING AND ANALYSIS PLAN FOR SOLID WASTE MANAGEMENT UNIT 77
NAVACT PUERTO RICO
2/28/2012
U S EPA REGION II



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

FEB 28 2012

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Mark E. Davidson
US Navy
BRAC PMO SE
4130 Faber Place Drive
Suite 202
North Charleston, SC 29405

Re: Naval Activity Puerto Rico (NAPR), formerly Naval Station Roosevelt Roads,
EPA I.D. Number PRD2170027203

SWMU 74 Draft Phase II of the CMS Investigation and CMS Final Report – Fuel
Pipelines and Hydrant Pits, JP-5 Hill and DFM Area, dated November 23, 2011,

SWMU 77 (Small Arms and Rifle Ranges) – draft Sampling and Analysis Plan for Full
RFI, dated December 16, 2011

Dear Mr. Davidson:

This letter is addressed to you as the Navy's designated project coordinator pursuant to the January 29, 2007 RCRA Administrative Order on Consent ("the Consent Order") between the United States Environmental Protection Agency (EPA) and the U.S. Navy (the Navy).

SWMU 74 Draft Phase II of the CMS Investigation and CMS Final Report – Fuel Pipelines and Hydrant Pits, JP-5 Hill and DFM Area

EPA has completed its review of the Phase II CMS Investigation and Final Report submitted by Mr. Mark Kimes' (of Michael Baker, Inc.) letter of November 23, 2011, on behalf of the Navy. As part of that review EPA requested that our consultant, TechLaw Inc, also review the Report. TechLaw's comments are given in the enclosed Technical Review, dated February 27, 2012 (Enclosure #1). Based on the reviews, EPA has determined that the draft CMS Report is not fully acceptable.

As discussed in Sections 11.0 and 12.0 of the Phase II CMS Investigation and Final Report, the proposed remedy is for limited excavation of surface and subsurface soils to a depth of six feet below ground surface (bgs) and off-site disposal of soils containing Total Petroleum Hydrocarbon (TPH) concentrations exceeding 100 mg/kg, which is the Puerto Rico Environmental Quality Board's (PREQB's) standard for soil clean-ups of TPH impacted soils.

EPA notes that the potential risk posed by TPH diesel-range organics and TPH gasoline-range organics was not quantified in the human health risk assessment (HHRA) as there are no federally-promulgated toxicity criteria for TPH. However, even though the potential risk posed by TPH was not quantitatively evaluated in the HHRA, TPH was selected as a chemical of concern (COC) and the Corrective Measures Study (CMS) includes an alternative based on a TPH corrective action objective of 100 mg/kg. The CMS recommended remedy is for excavation of soils containing TPH in excess of the CAO down to 6 feet below ground surface (bgs) (based on the rationale that exposures deeper than 6 feet bgs are not anticipated).

Prior to fully approving the CMS proposed remedy, EPA requests that the Navy further evaluate the potential risk posed by TPH in the surface and subsurface soils. Various methodologies have been proposed by numerous state and private entities whereby quantitative point estimates of associated risk/hazard for TPH mixtures may be derived. The more highly regarded of these approaches are predicated on an understanding of the various volatile and extractable hydrocarbon fractions (based on carbon chain length). Analytical assessment of hydrocarbon fractions is not always indicated, based on economic impact and the fact that individual constituents chiefly contributing to hydrocarbon-associated risk and hazard are commonly analyzed and underpin routine risk evaluations. In some instances, semi-quantitative and qualitative risk assessments predicated on gross analytical results, reflecting DRO and GRO, are sufficient to inform effective risk and site management. For example, you may wish to consider the Massachusetts Department of Environmental Protection (MADEP) Volatile Petroleum Hydrocarbons (VPH)/Extractable Petroleum Hydrocarbons (EPH) methods (MADEP 2004).

In addition, Sections 11.0 of the Phase II CMS Investigation and Final Report indicates that land-use controls (LUCs) will be included in any lease or property transfer deed. Since EPA understands that the transfer of the JP-5 Hill and DFM Area occurred in January 2012, please submit a copy of the LUC language included with the transfer deed. Also, EPA understands that the Navy has already, or intends to, plug the fuel pipelines with cement and abandon them in place, please submit a discussion of the implementation of those procedures, and/or a description of the current and expected future operational status of the Fuel Pipelines and Hydrant Pits in the JP-5 Hill and DFM Area.

Within seventy five (75) days of your receipt of this letter, please submit a revised Report, or an Addendum to the Report, which acceptably addresses the above comments and those given in Enclosure #1. In addition, within seventy five (75) days of your receipt of this letter, please also submit a draft Statement of Basis summarizing the proposed remedy for the Fuel Pipelines and Hydrant Pits, in the JP-5 Hill and DFM Area.

Also, please note that by letter dated January 30, 2012 addressed to myself, the Puerto Rico Environmental Quality Board (PREQB) submitted extensive comments on the Phase II CMS report. Within 75 days of your receipt of this letter, please also address PREQB's enclosed comments, which are given in Enclosure #2.

Also as has been indicated previously to the Navy, the revised Final Remedy proposal will need to undergo public notice and review, pursuant to requirements of the Consent Order, before it can be fully approved by EPA.

SWMU 77 – draft Sampling and Analysis Plan for Full RFI

EPA has completed its review of the draft Sampling and Analysis Plan (SAP) for a Full RFI submitted by Ms. Linda Klink's (of Tetra Tech) letter of December 16, 2011, on behalf of the Navy. As part of that review EPA requested that our consultant, TechLaw Inc, also review the Report. TechLaw's comments are given in the enclosed Technical Review, dated February 21, 2012 (Enclosure #3).

Volume I of the SAP describes the work to be performed to investigate potential Munitions Constituents (MC) in soils at SWMU 77, i.e., includes proposed soil sampling and analytical procedures to define MCs (chemicals) in the soil. Volume II describes the work to be performed to investigate the potential presence of Munitions and Explosives of Concern (MEC) at SWMU 77. Each volume includes a SAP based on the format required in the *Uniform Federal Policy on Quality Assurance Project Plans (UFP QAPP)*, dated March 2005.

Several deficiencies were identified in the Volume I of the SAP. These deficiencies included insufficient rationale for proposed sampling analyses and locations, and proposed procedures that do not meet the requirements of the UFP QAPP Manual. These deficiencies are discussed in the general and specific comments on Volume I given in Enclosure #3.

Volume II includes the geophysical survey and reacquisition of anomalies in real time at both the Potential OB/OD and Potential Munitions Trench areas. EPA considers the proposed geophysical survey and reacquisition to be a good approach for this investigation. The plan presented in Volume II of the SAP conforms to standard practices for Munitions and Explosives of Concern (MEC) investigations and is complete, provided that the general and specific comments on discussed in Enclosure #3 are acceptably addressed.

Within sixty (60) days of your receipt of this letter, please submit either a revised SAP for Volume I and II, or an Addendum to each, which acceptably addresses comments given in the enclosed Technical Review.

Also, please note that by letter dated February 17, 2012 addressed to myself, the Puerto Rico Environmental Quality Board (PREQB) submitted extensive comments on the SAP. Within 60 days of your receipt of this letter, please also address PREQB's comments which are given in Enclosure #4.

If you have any questions, please telephone me at (212) 637- 4167.

Sincerely yours,

Timothy R. Gordon
Project Coordinator
Corrective Action and Special Projects Section
RCRA Programs Branch

Enclosures (4)

cc: Ms. Wilmarie Rivera, P.R. Environmental Quality Board, w/encls. #1 & #3.
Ms. Gloria Toro, P.R. Environmental Quality Board, w/encls. #1 & #3.
Mr. Stacin Martin, US Navy, w/encls.
Ms. Linda Klink, Tetra Tech, w/encls. #3 & #4.
Mr. Mark Kimes, Baker Environmental, w/encls.
Ms. Cathy Dare, TechLaw Inc, w/o encl..
Mr. Felix Lopez, USF&WS, w/o encl.

If you have any questions, please telephone me at (212) 637- 4167.

Sincerely yours,



Timothy R. Gordon
Project Coordinator
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Mr. Stacin Martin, US Navy, w/encls.
Ms. Linda Klink, Tetra Tech, w/encls. #3 & #4.
Mr. Mark Kimes, Baker Environmental, w/encls.
Ms. Cathy Dare, TechLaw Inc, w/o encl..
Mr. Felix Lopez, USF&WS, w/o encl.

Enclosure #1

**TECHNICAL REVIEW OF THE DRAFT
PHASE II OF THE CMS INVESTIGATION AND CMS FINAL REPORT
SWMU 74 – FUEL PIPELINES AND HYDRANT PITS
JP-5 HILL AND DFM AREA
DATED NOVEMBER 23, 2011**

**NAVAL ACTIVITY PUERTO RICO
EPA ID No. PR2170027203
CEIBA, PUERTO RICO**

Submitted to:

**U.S. Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866**

Submitted by:

**TechLaw, Inc.
205 West Wacker Drive
Suite 1622
Chicago, Illinois 60606**

EPA Task Order No.	: 002
Contract No.	: EP-W-07-018
TechLaw TOM	: Cathy Dare
Telephone No.	: 315-334-3140
EPA TOPO	: Timothy Gordon
Telephone No.	: 212-637-4167

February 27, 2012

**TECHNICAL REVIEW OF THE DRAFT
PHASE II OF THE CMS INVESTIGATION AND CMS FINAL REPORT
SWMU 74 – FUEL PIPELINES AND HYDRANT PITS
JP-5 HILL AND DFM AREA
DATED NOVEMBER 23, 2011**

**NAVAL ACTIVITY PUERTO RICO
EPA ID No. PR2170027203
CEIBA, PUERTO RICO**

The following comments were generated based on a technical review of the *Draft Phase II of the CMS Investigation and CMS Final Report – SWMU 74 - Fuel Pipelines and Hydrant Pits, JP-5 Hill and DFM Area, Naval Activity Puerto Rico, Ceiba, Puerto Rico*, dated November 23, 2011 (Report).

GENERAL COMMENTS

1. The selected alternative incorporates removal of Total Petroleum Hydrocarbons (TPH)-impacted soil exceeding the corrective action objective (CAO) of 100 mg/kg to a maximum depth of 6 feet below ground surface (bgs). While the TPH CAO of 100 mg/kg is appropriate and consistent with Puerto Rico Environmental Quality Board [PREQB] TPH guidelines as well as the “clean soil” definition established by other state agencies (e.g., *California’s Draft Leaking Underground Fuel Tank Guidance Manual* dated August 2010), further rationale should be presented in the human health risk assessment (HHRA) to support the contention that exposures will not occur below 6 feet bgs. It is acknowledged that basements are not generally constructed in Puerto Rico; however, EPA routinely evaluates soil exposures to a depth of 10 feet bgs, consistent with a standard residential building footing. Further rationale must be presented to support the limitation of excavation of TPH exceedances in soil of greater than 100 mg/kg to a depth of 6 feet bgs, rather than 10 feet bgs.
2. The HHRA employs the Johnson and Ettinger Model (JEM) to model indoor air impacts from vapor intrusion. Revise the HHRA to address the following:
 - a. While the HHRA includes a table that compares volatile compound detections in groundwater to Table 2c groundwater target levels from EPA’s *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*, dated November 2002 (Subsurface Vapor Intrusion Guidance), the HHRA does not clarify if exceedances are located within 100 feet vertically or laterally of an occupied, or potentially occupied, building. Revise the CMS report to include a figure that depicts the vapor intrusion screening criteria exceedances, and discuss any buildings within 100 feet vertically or laterally of an occupied, or potentially occupied, building. If such a building exists within 100 feet vertically or laterally from the exceedance(s), the subject building(s) should be considered for an evaluation of vapor intrusion potential by collecting additional data which could include synoptically-paired sub-slab soil gas and

indoor air samples to determine building-specific chemical-specific attenuation factors. Further, note that if site-related volatile organic compounds (VOCs) extend off-site, an additional vapor intrusion assessment may be required.

- b. Section 8.3.2.1, Potential Human Receptors and Exposure Pathways, states on p. 8-10, "Note that all groundwater COPCs, regardless of exceedances of vapor intrusion criteria, were evaluated for potential exposure via vapor intrusion to maintain a conservative approach." Note that many of the vapor intrusion screening criteria presented in the Subsurface Vapor Intrusion Guidance are predicated on the maximum contaminant level (MCL), not all of which constitute a risk-based screening level, consistent with other EPA health-based screening criteria to advance risk assessment. As a conservative measure, consider evaluating all volatile compounds detected in groundwater in the JEM evaluation to determine cumulative risk and hazard contributing from all volatile compounds present in groundwater. It should be noted that the results of the JEM are indicative only, useful in limited capacity and insufficient for the purposes of defensible risk and site management in the absence of additional empirical lines of evidence.
 - c. While the maximum detected concentration (MDC) of trichloroethylene (TCE) is 0.41 J $\mu\text{g/L}$, which is below the EPA Tap Water Regional Screening Level (RSL) of 0.44 $\mu\text{g/L}$, concentrations of TCE may increase over time as tetrachloroethylene (PCE) degrades. Also, the TCE vapor intrusion screening criteria in the Subsurface Vapor Intrusion Guidance is based on the MCL and is not solely risk-based consistent with EPA health-based screening criteria for the purposes of advancing risk assessment. As a protective approach, include TCE in the JEM evaluation (at a minimum), and ensure that the latest toxicological criteria for TCE is used in the evaluation.
 - d. Section 8.3.3.5, Johnson and Ettinger Model, should be revised to reference the subsections that summarize the JEM results for future hypothetical adult and child residents and future industrial/commercial workers.
 - e. Note that EPA no longer supports use of the JEM to provide reliable decision criteria regarding the negative condition. Specifically, when exceedances of the Table 2c criteria are evident, the JEM, tailored to site-specific conditions, cannot be used to support the conclusion that vapor intrusion potential is insignificant with regard to human health risk or hazard. JEM can be used to bolster the decisions supporting the need for a site-specific vapor intrusion assessment or as a prioritization tool at sites with multiple exposure locations (for further investigation). Revise the document to reflect EPA's position with respect to the utility of JEM as a platform for supporting site and risk management decision-making.
3. The Report states that several metals are not site related based on a qualitative comparison of levels of metals against TPH Diesel-Range Organics (DRO) and TPH Gasoline-Range Organics (GRO). This technique is not presented in the Work Plan (WP). Instead, the WP only discusses statistically correlating the levels of TPH DRO to polycyclic aromatic hydrocarbons (see Revised WP: December 6, 2007; Section 3.2, 2nd ¶, p. 3-4). Comparing metals against TPH organics also assumes that metals could not be present in soil (barring regional background levels), except as a result of past fuel spills, which may or may not be

the case. For example, paint used on the pipes could be high in metals that may have leached/pealed over time, irrespective of local fuel spills. Remove this line of reasoning from Section 7.9.1, Refined Risk Calculation.

4. According to Section 6.2, Subsurface Soil, "the majority of samples with elevated [polynuclear aromatic hydrocarbons (PAHs)] (65%) were not co-located with samples exhibiting elevated TPH concentrations, which suggests that their occurrence likely is not attributed to a release from SWMU 74." Based on this statement, the potential sources of PAH contamination in soil are unclear, and as such, it is not clear whether the extent of PAH contamination has been adequately delineated. Revise the CMS Report to discuss the potential source(s) of the PAH contamination, how the source(s) will be determined, and whether additional sampling is warranted to delineate the extent of contamination and meet the objectives of the SWMU 74 CMS, or an RFI/CMS at another SWMU or AOC.
5. According to Section 6.3, Groundwater, elevated concentrations of bromodichloromethane, carbon tetrachloride, chloroform, dibromochloromethane, and PCE were detected in the samples collected from wells 74VP11a/JP5R, 74VP11b/JP5R, and 74SB697; however, the CMS Report states that these constituents likely are not attributable to a release from SWMU 74. In addition, Section 4.6, Groundwater Level Measurements, states that 0.01 feet of light non-aqueous phase liquid was measured in wells 74SB285R, 74SB671 and 74SB697. Finally, several PAHs were detected at elevated concentrations in samples collected from wells 74VP9a/JP5R and 74SB671. The potential sources of the detected groundwater constituents are unclear and as such, it is not clear whether the extent of contamination has been adequately delineated. Revise the CMS Report to discuss the potential source(s) of the contamination in groundwater, how the source(s) will be determined, and whether additional sampling is warranted to delineate the extent of contamination and meet the objectives of the SWMU 74 CMS, or an RFI/CMS at another SWMU or AOC.
6. It is unclear whether the excavations proposed at some areas will sufficiently address TPH contamination in subsurface soil. For example,
 - a. In several samples collected in the vicinity of excavation Areas 4a and 4b (see Figure 10-1c, Conceptual Removal Action Plan), TPH was not detected at elevated concentrations from 1 to 3 feet, but was detected at elevated concentrations at 7 feet and/or deeper (e.g., 74SB702, 74SB703, 74SB697, 74SB704). No samples were collected between 3 feet and 7 feet.
 - b. In one sample (74SB659) collected in the vicinity of excavation Area 1b (see Figure 10-1a, Conceptual Removal Action Plan), TPH was not detected at elevated concentrations from 1 to 3 feet, but was detected at elevated concentrations at 7 feet and deeper. No samples were collected between 3 feet and 7 feet.

Excavation of soil has not been proposed in these areas and it is unclear whether contamination is present between 3 feet and 6 feet. Revise the CMS Report to clarify whether additional delineation is needed in these areas, and how this uncertainty will be addressed during the implementation of the pre-excavation delineation effort.

7. Soil Vapor Extraction (SVE) is an accepted technology that has been used at Underground Storage Tank (UST) sites since the 1970s. UST sites are similar in nature to the underground pipelines associated with SWMU 74 in that the releases occur in subsurface areas. Soil venting, including air extraction and injection, is the primary method used in the United States to remove VOCs from the unsaturated subsurface. SVE, which always involves air extraction but may include air injection, is considered a presumptive remedy for VOCs in the EPA's Superfund program, allowing for streamlined remedy selection approach. Given that SVE is a presumptive remedy in EPA's Superfund program, it is unclear why a presumptive remedy of excavation and off-site disposal coupled with land use controls (LUCs) was selected as the sole alternative to address TPH-impacted soil. Please either revise the CMS Report to include, at a minimum, SVE as a potential corrective measure, include an air injection/air extraction based remedial alternative, or provide the rationale for why such an alternative is not appropriate at SWMU 74.
8. The CMS Report does not include an evaluation of the selected remedial alternative consistent with EPA's RCRA program. The CMS Report should be revised to evaluate how the selected remedy meets the following standards outlined in the May 1994 RCRA Corrective Action Plan (OSWER Directive 9902.3-2A) (RCRA CAP):
 - a. Protect human health and the environment;
 - b. Attain media cleanup standards set by the implementing agency;
 - c. Control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment;
 - d. Comply with any applicable standards for management of wastes;
 - e. Other factors such as reliability, effectiveness, and cost.

Revise the CMS Report to address these items as they relate to the proposed excavation and disposal of soil. In addition, it is noted that the headings of the sections which discuss the remedial alternative (Section 10.2, etc.) do not match those prescribed in the above-referenced guidance. The headings and associated discussions should match what is specifically outlined in the guidance to ensure the alternative assessment addresses the key considerations in the RCRA program.

Additionally, without assessment of the alternatives against the RCRA CAP criteria, the CMS Report does not address the need to control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment and allow for the restoration of groundwater to beneficial uses or assess whether the sources for potential further release have been removed. With respect to source removal, based on a comparison of the costs in Tables 10-2 and 10-3, for Area 4, Alternative 1 proposes to disturb approximately 0.16 acres, while Alternative 2 proposes to disturb 1.1 acres. Further, comparison of Figures 10-1c and 10-2c indicates that the highest concentration of TPH (all of the TPH contamination between 500 mg/kg and 5000 mg/kg) is below 6 feet. If Alternative 1 is selected, it would appear that the greatest portion of the defined TPH contamination associated with Area 4 would be left in place as a source that could potentially impact human health or the environment or beneficial groundwater use

through continued releases to groundwater. Revise the CMS Report to ensure that the detailed alternative assessment addresses these concerns.

9. The CMS Report provides only a limited discussion of Alternative 2 (Complete Excavation, Off-Site Disposal, and LUCs), and does not provide a detailed explanation of how Alternative 2 differs from Alternative 1. Review of Figures 10-2a and 10-2c and the cost estimate for Alternative 2 presented in Table 10-3 indicates that the extent of excavation for Alternative 2 is greater than that of Alternative 1, but no explanation is provided which justifies why a more expanded excavation footprint will be necessary to attain the CAO. Revise the CMS Report to provide a detailed description of what Alternative 2 includes such that the appropriateness and applicability of each alternative may be adequately evaluated.
10. Section 11.0, Justification and Recommendation of the Corrective Measure, and Section 12.0, Technical Approach to the Corrective Measure Implementation, present the selected remedy. However, concurrence by the regulatory agencies and the public that the selected remedy is appropriate has not been achieved. Prior to selection of the remedy, a Statement of Basis should be generated and the public given an opportunity to comment. Revise the CMS Report and the schedule presented in Figure 12-1 to discuss the appropriate sequence of events and, at a minimum, include issuance of a Statement of Basis on the schedule. Alternatively, explain why this sequence in the RCRA program will not be followed.
11. Section 10.1.1 indicates in the last paragraph that, "LUCs would be implemented to restrict future residential land and groundwater use and prevent uncontrolled exposure to the contaminated media left in place. Because contaminated media would be left in place and the property would not allow for UU/UE, inspections and five year reviews would be required in perpetuity to ensure compliance with the land use and activity restrictions." The budgetary cost estimates presented for each alternative on Tables 10-2 and 10-3 do not include costs for assessment of adherence to LUCs and completion of five-year reviews. As long- term recurring costs can be significant, revise the tables to include an estimate of costs for annual assessment and five year review of the implemented LUCs.
12. The "R" qualifier is defined in the data tables (e.g., Table 6-4) footnotes to indicate that the result has been rejected. To ensure that rejected concentrations are not used, the associated numeric values should be removed from the tables. Revise these tables to remove the numeric values associated with the rejected results.
13. Antimony was rejected in nearly all the samples due to matrix spike measurement performance criteria exceedances. However, the data usability assessment presented in Section 6.4 of the text does not discuss this trend in the data, nor does it discuss whether rejection of antimony results affected the decisions made. Revise Section 6.4 to include a discussion of the trend in the antimony data and whether/how it affected the decisions made. Further, revise the Data Validation/Usability Assessment to discuss all trends and biases observed and how they affected decisions made.

14. The data validation report (DVR) text, summary of qualifications and associated data tables do not always present consistent information. For example, in the DVR for SDG 1104157, The Summary of Data Qualifications, on page 12 indicates that all volatile results for samples 74SB674-01, 74SB674-03, 74SB713-03, 74SB713-05, 74SB714-05, 74SB715-04, and 74SB715-05 should be rejected. However, a discussion of why these samples are rejected is not presented. Further, Table 6-5 does not show the qualified volatile results as rejected, but as estimated and/or not detected. Revise the DVRs and associated tables to present consistent information.
15. The DVRs state that antimony in the post digest spike (PDS) was recovered above 10%. However, the tables in the DVRs showing spike recovery results do not provide an antimony PDS recovery or the PDS recoveries for many of the other metals. Revise the tables to provide the PDS results.

SPECIFIC COMMENTS

1. **Section 7.6.2.4.1 Avian and Mammalian Dietary Exposures: Surface Soil, Page 7-30:** The text states that cobalt is retained as a wildlife contaminant of potential concern because its Hazard Quotients (HQs) exceed 1.0. However, Table 7-15 shows that the cobalt HQs for all wildlife receptors are below 1.0. Remove cobalt from the text of this section.
2. **Section 7.9.1.2 Step 3a Risk Evaluation for Subsurface Soil – Copper, Page 7-57:** The text states that the refined risk estimate ($HQ = 3.18$) for copper in subsurface soil is based on an exposure value of 41.0 mg/kg, which represents the 95% Upper Confidence Limit (UCL) of the mean copper concentration. However, Table 7-23 shows that the 95% UCL for the refined risk estimation for copper equals 222.8 mg/kg. Revise the text in this section to present the correct copper concentration used in the refined risk calculation.
3. **Section 7.9.1.2 Step 3a Risk Evaluation for Subsurface Soil-Zinc, Page 7-62:** The text provides a refined HQ for zinc of 0.17, whereas Table 7-23 provides a refined HQ of 0.50. Revise the text in this section to present the correct zinc HQ.
4. **Section 8.3.1.2.1, Chemical of Potential Concern (COPC) Selection Criteria, Pages 8-4 & 8-5:** June 2011 EPA Regional Screening Levels (RSLs) were used during the data evaluation to identify COPCs for the quantitative assessment. However, EPA RSLs were updated in November 2011. Revise the HHRA to incorporate any newly established or updated screening criteria for any applicable chemicals, or update Section 8.3.6, Sources of Uncertainty, to describe and address any associated impacts to the HHRA regarding RSL and toxicological updates for any applicable chemicals. This is especially important for TCE which has newly promulgated toxicity criteria for carcinogenic and noncarcinogenic endpoints which take into account an early life-stage susceptibility via mutagenic mode of action.

5. **Section 8.3.1.2.1, Chemical of Potential Concern (COPC) Selection Criteria, Pages 8-4 & 8-5:** Polynuclear aromatic hydrocarbons (PAHs) were identified as COPCs and quantitatively evaluated in the HHRA. While the mutagenic mode of action (MOA) was evaluated for PAHs as discussed in Section 8.3.3.4, Mutagenic MOA Chemicals, it is recommended that the HHRA be revised to also present a cumulative PAH Relative Potency Factor (RPF), expressed in benzo(a)pyrene equivalents (BaP_{eqv}) for completeness.
6. **Section 8.3.2, Exposure Assessment, Page 8-9:** Section 8.3.2 references the 1997 Exposure Factor Handbook (EFH). However, note that the EFH was updated in 2011 and is available here: <http://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252>. Any discrepancies in associated exposure parameter values should be updated, consistent with current guidance, or the associated impact on the HHRA addressed within the context of the Uncertainty Analysis.
7. **Section 8.3.2.5, Exposure Input Parameters, Future Adult Exposure Workers, Page 8-18:** According to Section 8.3.2.5 and Table 8-4, Summary of Exposure Parameters, an exposure frequency (EF) of 50 days/year and an exposure time (ET) of 2 hours are used to evaluate groundwater exposures to a future construction worker (trench scenario). Clarify in Section 8.3.2.5 why an ET of 4 hours, as the more commonly cited default estimate, was not selected. Also, a site-specific particulate emission factor (PEF) was calculated for a future construction worker; however, the associated PEF calculation is not provided in Appendix M as referenced in the HHRA. Revise the HHRA to include the associated PEF calculation, consistent with USEPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (2002).
8. **Section 8.3.5, Comparison to Background Levels, Page 8-24:** This section does not sufficiently describe the background evaluation. For example, clarify the soil type at the JP-5 Area and Diesel Fuel Marine (DFM) Area and clarify the background soil type used in the background evaluation. Revise Section 8.3.5 to fully describe the background analysis.
9. **Section 8.4.2, Quantitative CAOs, Page 8-31:** This section indicates that quantitative CAOs for soil and groundwater for the protection of human health assuming continued industrial use were not developed for the JP-5 Hill and DFM Area of SWMU 74. This is somewhat misleading as a CAO of 100 mg/kg is recommended for TPH in Section 9.3, TPH in Soil. Revise Section 8.4.2 to promote clarity.
10. **Table 8-5, HHRA Toxicity Factors:** The HHRA utilizes an inhalation reference concentration (RfC) of 1E-05 mg/m³ for cadmium. However, a RfC of 2E-05 mg/m³ is preferred by California EPA (CalEPA) for cadmium (and is provided as the preferred value in EPA's November 2011 RSL table). Revise the HHRA to utilize this RfC to evaluate cadmium inhalation exposures or revise the uncertainty analysis to address any uncertainties with not re-evaluating cadmium, accordingly.

11. **Figure 8-1, Conceptual Site Model (CSM):** The CSM indicates that the vapor intrusion to indoor air pathway is potentially complete for a future adult resident, but not a future child resident. Revise the CSM to show that the vapor intrusion to indoor air pathway is also potentially complete for a future child resident.

MINOR COMMENTS

1. It was a challenge to verify the HQs for wildlife receptors because the Report does not provide the Estimated Daily Doses (EDDs) used to calculate the HQs. The available food chain model input parameters was used to independently calculate the EDDs and double-check the Step 2 and Step 3a HQs, all of which were accurate. However, including the EDD calculations as separate tables in the Report would provide clarity and transparency. This information will also facilitate reviewing future wildlife exposure calculations. It is recommended that the EDD calculations being included as separate tables in the Report.
2. **Section 8.3.2.4, Data Analysis, Page 8-14:** This section states, "Ambient air EPCs [exposure point concentrations] resulting from vapor intrusion into a building were modeling using the J&E model..." In this context, this statement is referring to modeling *indoor* ambient air concentrations. Revise the text accordingly.





COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board



ENCL. #2

ENVIRONMENTAL EMERGENCIES RESPONSE AREA

January 30, 2012

Mr. Timothy Gordon
U.S. Environmental Protection Agency - Region II
290 Broadway - 22nd Floor
New York, New York 10007-1866

**Re: Review Draft Phase II of the Corrective Measures
Study (CMS) Investigation and CMS Final Report
SWMU 74 - Fuel Pipelines and Hydrants Pits
JP-5 Hill and DFM Area
Naval Activity Puerto Rico, Ceiba
EPA ID No. PR2170027203**

Dear Mr. Gordon:

The Hazardous Wastes Permits Division (HWPD) and the Federal Facility Coordinator has finished the review of the Draft Phase II of the Corrective Measures Study (CMS) Investigation and CMS Final Report for SWMU 74 - Fuel Pipelines and Hydrant Pits JP-5 Hill and DFM Area. It was submitted by Michael Baker, Jr., Inc. on behalf of the Navy. The document was received on November 28, 2011.

Both divisions are sending joint comments in order to avoid duplicity and facilitate Navy responses. Enclosed please find PREQB's comments to the document. If you have any additional comment or question please feel free to contact Gloria M. Toro Agrait at (787) 767-8181 extension 3586 or myself at extension 6129.

Cordially,

Wilmarie Rivra
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**Review Draft Phase II of the Corrective Measures Study (CMS) Investigation and CMS
Final Report for SWMU 74 – Fuel Pipelines and Hydrants Pits JP-5 Hill and DFM Area
Naval Activity Puerto Rico, Ceiba
EPA ID No. PR2170027203
(November 23, 2011)**

GENERAL COMMENTS

1. The 2010 Addendum to the 2004 Reuse Plan indicates that future land use will be commercial in addition to industrial. Please revise the text to include this land use and include a discussion of this current reuse plan where land use is discussed.
2. Please clarify the current status of the pipelines and infrastructure included in this geographic area of SWMU 74.
3. Please discuss the impact of weathering and mobile constituent migration on the correlation between PAHs or metals concentrations and TPH.
4. Data from sample locations investigated as part of SWMU 74 but attributable to releases from SWMU 7 and 8 and soil samples collected below the water table were excluded from the human health risk assessment (HHRA). Please clarify what action will be taken to address contamination at these locations.
5. Puerto Rico's Water Quality Standards Regulation is an applicable, relevant and appropriate requirement (ARAR) for this cleanup. Cleanup of site-related contaminants above WQS is required to meet this ARAR. Please revise this document to address compliance with this ARAR. Comments on specific sections relating to this issue are provided below.

PAGE-SPECIFIC COMMENTS

1. Page 1-1, Section 1.0, paragraph 4: Please provide a reference in the text to Figure 2-4, which shows the geographic areas discussed in this paragraph.
2. Page 2-2, Section 2.2, paragraph 2: For clarity and consistency, please include information on whether the storage areas have been investigated or will be investigated, as is presented for Ensenada Honda.
3. Page 2-3, Section 2.3: Please clarify how the information provided from the 1995 evaluation was used to scope the later investigations. As information concerning leaks observed at this time is included in this CMS, for clarity, please briefly indicate how these leaks were later investigated.

4. Page 4-2, Section 4.1.1, 74VP9b/JP5 Area, Bullet #1:
 - a. The bullet states that boring 74SB655 was moved 70 feet to the west. However, the field logbook notes in Appendix A (Katie Perkins on 4/28/11, page 14) state that this boring was moved to the south. Please clarify.
 - b. The bullet states that boring 74SB656 was moved 60 feet to the west. However, the field logbook notes in Appendix A (Katie Perkins on 4/28/11, page 14) state that this boring was moved to the northeast. Please clarify.
5. Page 4-3, Section 4.1.1, 74VP9b/JP5 Area: The text states that no new monitoring wells were proposed for this area. However, page A-5 of the March 2011 Work Plan states that wells are not proposed because subsurface impacts are shallow and if the PID measurements during this investigation indicate potential contamination at depths greater than those detected during Phase I activities, then the installation of up to two monitoring wells may be necessary. Since elevated PID measurements were observed down to 14 feet, please clarify why no monitoring wells were installed as this is deeper than that which was observed during the Phase I activities (11 feet).
6. Page 4-3, Section 4.1.1, 74SB138 and 74VP10a/JP5 Area, Bullet #1: The bullet states that boring 74SB671 was moved 60 feet to the southwest. However, the field logbook notes in Appendix A (Katie Perkins on 4/28/11, page 14) state that this boring was moved to the east. Please clarify.
7. Page 4-3, Section 4.1.1, 74VP9b/JP5 and 74SB138 and 74VP10a/JP5 Areas:
 - a. Please clarify how replacement of monitoring wells 74VP9a/JP5Ra, 74SB137R, 74SB285R, 74VP11a/JP5R, and 74VP11b/JP5R in deeper water-bearing zone meets the objective of determining if fuel releases to soil have migrated to groundwater. Clarify whether the well screen still intersects the water table. If not, please clarify how data from this well will be used in determining if leaching of contaminants to groundwater has occurred. Please discuss the impact of screen placement for these wells in Section 6.3 as well as on the human health risk assessment.
 - b. Please clarify the basis for selecting the new well location at boring 74SB671.
8. Page 4-4, Section 4.1.1, 74SB150 and 74SB151 Area, Paragraph 3: Please revise the text to state that a slightly elevated PID measurement was present in the 2-3 foot depth interval in boring 74SB691 instead of 74SB679.
9. Page 4-4, Section 4.1.1, Paragraph 4: The report indicates that based on field indications, the area to the east of boring 74SB680 was determined to be delineated. As such, proposed soil boring 74SB681 was not drilled. The report also goes on to state that there were positive PID readings measured in the shallower soils in boring 74SB680. Please expand the text to better reflect the decision not to drill soil boring 74SB681 in light of these positive PID readings.

10. Page 4-5, Section 4.1.2, Paragraph 3: It is assumed that the impacts associated with soil borings 74SB696 and 74SB703 (as determined by field observations) will be further delineated as part of the AOC F work (given their close proximity to the SWMU 74 boundary as shown on Figure 4-4). If this is the case, please re-iterate that in the text of this section. If not, please explain why additional work was not undertaken to define the extent of impacts to the east of these two soil borings.
11. Page 4-5, Section 4.1.2, 74VP10b/DFM Area:
 - a. Elevated PID readings were detected from soil collected below the groundwater interface. Please clarify what evaluation will be conducted to delineate the impact to groundwater in this area.
 - b. Please discuss the PID reading of 23 ppm associated with soil boring 74SB754 in the context of background PID readings for that area.
12. Page 4-6, Section 4.1.2, 74SB 210 Area: The Monitored Natural Attenuation Program for SWMUs 7 and 8 only address groundwater. Please clarify what action will be taken to address the delineation of soil contamination in this area, which was planned as part of the March 2011 Work Plan.
13. Page 4-6, Section 4.2, Surface and Subsurface Soil Sampling, Paragraph 2: The paragraph includes a discussion on select borings where one of the deeper soil samples was not collected from the depth interval exhibiting the highest PID measurement, as per the Work Plan. Please add the following borings to this discussion and provide further explanation as to why additional soil samples were not collected from zones at depth in six borings that exhibited elevated PID readings:
 - a. 74SB705: 4-6 foot depth interval
 - b. 74SB707: 8-10 foot depth interval
 - c. 74SB708: 8-10 and 10-12 foot depth intervals
 - d. 74SB756: 10-12 foot depth interval
14. Page 4-7, Section 4.2: Please provide a reference to the section of the human health risk assessment and development of CAOs sections where the following information is considered (emphasis added): "...In lieu of any detected PID measurements or visual/olfactory evidence of contamination, the deeper subsurface soil samples were collected based on lithologic location and/or professional judgment. *Consideration was also given to these deeper sample intervals to ensure that representative data was collected for use in the human health risk assessment (HHRA) and development of CAOs protective of human receptors.*"

15. Page 6-4, Section 6.2:
 - a. This section documents the lack of soil sample data for subsurface soil sample depths exhibiting the highest PID readings. Please clarify how the lack of analytical data for this depth impacts the soil dataset used in the risk assessments and conclusions drawn.
16. Page 6-5, Section 6.2, Subsurface Soil, DFM Area just West of the SWMU 7/8 Boundary Adjacent to Forrestal Drive, Paragraph 3:
 - a. The list of borings with maximum PAH concentrations should include boring 74SB677 and should not include boring 74SB657.
 - b. The text states that the majority of samples with elevated PAHs were not co-located with elevated total TPH concentrations.
 - i. Please clarify how "elevated PAHs" is defined. Many of the samples listed did not appear to contain elevated PAHs.
 - ii. It may be more helpful to compare TPH to the total PAH concentrations (or total BTEX for GRO) to determine if there is a correlation. In addition, this comparison may not be appropriate for all samples. The LOQ for TPH is 2 mg/kg and the LOQ for PAHs is in the low ug/kg range and therefore it may not be possible to accurately perform this comparison.
17. Page 6-8, Section 6.2, Groundwater, Paragraph 3:
 - a. Please revise the first sentence to state that no VOCs were detected in five wells (not four) and add well 74SB678G to the list.
 - b. The text discusses the presence of elevated concentrations of chloroform in select samples. Please clarify how "elevated concentrations" is defined as the concentrations of chloroform in the listed samples range from 0.2 to 0.85 ug/L.
18. Page 6-9, Section 6.2, Groundwater, Paragraph 1: The text discusses the presence of elevated concentrations of select PAHs in select samples. Please clarify how "elevated concentrations" is defined as the concentrations of these PAHs in the listed samples range from 0.0354 to 0.775 ug/L.
19. Page 6-11, Section 6.4.2, Laboratory Data Validation Summary, CompuChem SDG 1104158: Please revise the last sentence to state that the chromium results were rejected in all samples due to an RPD greater than 120 (not 35).
20. Page 7-29, Section 7.6.2.3: The report states that acrolein, although undetected, was retained as an ecological COC as the MDL/LOD exceeds the surface soil screening value. Please correct the text to state that the acrolein MDL/LOD exceeds the groundwater screening value.

21. Page 7-40, Section 7.9: Adjusted TRVs for the brown flower bat are presented in this section. However, values appear to be presented incorrectly based on data presented in Table 7-7. For example, the selenium adjusted LOAEL TRV is less than the MATC TRV in this table. However, the selenium LOAEL TRV presented in Table 7-7 is greater than the MATC TRV. For benzo(b)fluoranthene and pyrene, the body weight of the test species (house mouse = 0.038 kg) is greater than the body weight of the brown flower bat (0.016 to 0.021 kg). Therefore, the adjusted TRVs for the brown flower bat should increase over values presented for the house mouse in Table 7-7. It appears that the adjusted TRVs were presented incorrectly for these COCs as well as the other COCs in this table. Please verify all values in this table and provide an example calculation for one of the COCs using specific weights of the test species and the brown flower bat.
22. Page 8-2, Section 8.2:
 - a. As retail development is planned for this area, it is unclear that a future trespasser scenario is appropriate, especially since it excludes child receptors. A current trespasser scenario is appropriate; however, future exposure scenarios need to include child, youth and adult visitors who come to the area to shop rather than trespassers. Please revise the human health risk assessment (HHRA) to include future child visitors. This comment also applies to Section 8.3.2.1 where a more detailed discussion is presented of the receptors evaluated in the HHRA.
23. Page 8-2, Section 8.3.1.1:
 - a. Consistent with other DoD projects in Puerto Rico, please provide figures showing sample locations where contaminant concentrations exceed screening criteria for each exposure media (i.e., surface soil, total soil and groundwater). Please include the contaminant identity, concentration and relevant screening criteria (similar to the information presented for TPH). This information is needed to review the proposed datasets for all exposure scenarios. Note that this information is provided for TPH; however, TPH is not evaluated in the HHRA. Based on a review of these TPH figures, petroleum-related impacts attributable to SWMU 74 appear to be present in discrete, localized areas; therefore, it is unclear that the datasets proposed are representative of these discrete areas of impacts in soil.
 - b. Further information is needed to support combining all surface soil and total soil data across the entire investigation area into one dataset for all receptors. A hotspot analysis is needed to determine if hotspots exist that need to be evaluated as separate exposure areas for both soil and groundwater, consistent with other DoD projects in Puerto Rico. This information is needed to ensure that the assessment is protective for the receptors evaluated, regardless of where exposure occurs (i.e., well installed or excavation conducted in a groundwater plume source area or hotspot).
 - c. A data gap was identified for deeper soil at borings where the sample with the highest PID reading was not collected at borings 74SB661, 74SB664, 74SB670, 74SB676,

74SB678a, and 74SB697. Note that Section 4.2 states "...Sufficient laboratory data was obtained from the remaining four borings to conclude that deeper soil was impacted by petroleum constituents..." Since it is assumed that deeper soil within the total soil depth range is contaminated, but soil data is lacking for these sample locations, please discuss how this deviation from the work plan impacts the human health risk assessment as the potential for underestimating contaminant concentrations is high for the areas characterized by these sample locations.

24. Page 8-3, Section 8.3.1.1: The inclusion or exclusion of data from datasets evaluated in the HHRA needs to be based on 1) areas impacted by contamination then 2) areas that represent exposure areas to be evaluated. Please clarify how the inclusion of sample locations where no impacts were observed because those samples are adjacent to areas investigated meets the data quality objectives for the HHRA.
25. Page 8-6, Section 8.3.1.1.2: The discussion concerning conditions under which hexavalent chromium would be present in soils is helpful. As soil pH influences the presence of hexavalent chromium, please add information to this section whether soil pH data were collected and present the results and conclusions that can be drawn as to whether the pH of soils at SWMU 74 are conducive to hexavalent chromium production.
26. Section 8.3.2.1:
 - a. Page 8-10: The current industrial use of an area does not preclude future residential use and, in many cases, former industrial sites are proposed for future residential development at NAPR. Please remove the following statement from the text, noting that it does not diminish the supporting rationale that SWMU 74 is unlikely to be residential in the future, given the current Reuse Plan for the area: "Additionally, the industrial setting of the JP-5 Hill and DFM Area of SWMU 74 precludes its use as a residential site."
 - b. VOCs are present in soil; therefore, the vapor intrusion exposure pathway may be complete for sources in soil. Please address.
 - c. Page 8-11: Please provide a reference to where the input, intercalc and output sheets for the vapor intrusion modeling are provided.
 - d. Page 8-12: Consistent with other DoD projects in Puerto Rico, where volatiles are present in groundwater, inhalation of volatiles while showering (adult) and bathing (child) is quantitatively evaluated using the EPA Region 2 recommended Andelman model, as modified by Schaum (1994), with the following input parameters:
 - time in shower = 2.5E-01 hr (adult) 4.5E-01 hr (child)
 - time in bathroom after shower = 3.3E-01 hr (adult); 5.5E-01 hr (child)
 - fraction volatilized for chemical = 9.0E-01 unitless
 - shower water flow rate = 7.5E+02 L/
 - bathroom volume = 1.6E+01 m³

PREQB requests that this model be used as it is more conservative than the Chrostowski and Foster 1987 model used at this site by the Navy and also that a child bathing scenario be quantified, consistent with other DoD HHRAs conducted in Puerto Rico.

27. Section 8.3.2.5:

- a. Current/Future Adult and Youth Trespassers: As commented on previously for the HHRA conducted at SWMU 74 presented in the August 2011 Phase II CMS Report, please provide the rationale for assuming 25% of total body skin surface area exposure for the youth. A preferred approach is to evaluate what portions of the trespasser's body would be exposed (e.g., feet, lower legs, arms, etc.) and sum the skin surface areas for those body parts. Note that the age group presented is from 6 to 16. Clarify why the surface area for 7 to 17 year olds was calculated.
- b. Current/Future On-Site Worker: Given the climate of the region, the potential exists for a groundskeeper or maintenance worker to wear shorts. Please revise the skin surface area accordingly.
- c. As commented on previously for the HHRA conducted at SWMU 74 presented in the August 2011 Phase II CMS Report, please clarify the difference between the on-site worker and the commercial/industrial worker as it appears they have the same exposure scenario in this HHRA.
- d. Future Adult Construction Worker: Please clarify in the text what model is used to calculate the trench air concentration for volatiles in a trench. Please also add this reference to the calculation sheets in Appendix M.
- e. Please provide tables that show the calculation of the age-specific exposure parameters used in calculating the CDIs, DADs and ECs. Values are presented in Appendix M, but how these values were calculated needs to be presented for clarity and transparency.

28. Page 9-2, Section 9.2: Please revise this section and the proposed remedies to ensure that the corrective action and correct action objectives for groundwater meet Puerto Rico's Water Quality Standards Regulation. As all groundwater are classified for potable use, an incomplete pathway for potable use does not comply with this regulation.

29. Page 10, Section 10: As groundwater is classified for potable use, it is acceptable to apply land use controls until groundwater meets Puerto Rico's Water Quality Standards. The corrective action objectives for groundwater are Puerto Rico's Water Quality Standards and where groundwater exceeds these standards, a remedy needs to be proposed to clean up groundwater to meet these standards. LUCs may be placed on groundwater as an interim measure until groundwater cleanup is achieved.

30. Page 10-1, Section 10.1.1:

- a. The Navy assumes direct contact exposure by humans down to 10 feet at NAPR in the HHRA; therefore, please revise the depth to which the CAO will be applied to reflect this

- depth or please revise the HHRA to only evaluate soils to 6 feet bgs if this is the depth to which humans may be exposed, as stated in this section.
- b. Please clarify whether residual contamination at depth may be a source of contamination of groundwater above acceptable levels. If so, additional soil remediation may be warranted to address soil to ensure protection of groundwater as a potable source of water.
31. Page 10-5, Section 10.2.2 and Page 11-1, Section 11. Paragraph 2:
- a. Please note that Puerto Rico's Water Quality Standards Regulation is an applicable, relevant and appropriate requirement (ARAR) for this cleanup. Therefore, the Navy's cleanup needs to comply with this ARAR.
 - b. A LUC restricting activities from being conducted at depths greater than the planned maximum excavation depth are also needed. As elevated TPH levels were detected at depth and there are no planned bottom post-excavation samples to be collected, soils below this depth must continue to be considered contaminated at unacceptable levels.
 - c. It is PREQB's understanding that the Navy is required to clean up to levels protective of anticipated future land uses. Please discuss the proposed land use presented in the 2010 Addendum to the Reuse Plan for this area and how the remedy achieves cleanup for this anticipated land use.
32. Table 4-4:
- a. Please change the units for TPH-GRO and TPH-DRO in water to mg/L.
 - b. Please change the units for TPH-GRO and TPH-DRO in soil to mg/kg.
33. Table 6-11: This table shows 4 rejected results for PAH analyses. However, there is no discussion of rejected PAH results in Section 6.4.2. Please clarify.
34. Tables 8-1 and 8-2: Please present the rationale for concentration selection for each selected COPC on each table rather than requiring the reader to refer to the other table.
35. Figure 8-1: Please add inhalation of volatiles from indoor air migrating from total soil as a complete exposure pathway for the future commercial/industrial worker residential receptors.

Appendix A

1. April 2011 Field Notes: Please clarify where the field logbook notes are located for the sampling of groundwater monitoring wells 74SB665, 74SB678g, 74SB688, 74SB697, 74SB710, 74SB711, 74VP9a/JP5R, 74VP10a/JP5 and 74VP11b/JP5R. The field notes from April 29, 2011 (Darrin Hupe) indicate that samples were collected at locations 74SB757 and 74SB758. However, there is no mention of these samples in the report.

2. Daily Meter Calibration Records: Please clarify why there was no calibration performed for the oxidation-reduction potential parameter during groundwater sampling.
3. Soil Boring Logs:
 - a. Please correct the soil boring log for 74SB657a to show the correct sample identifications (74SB657A instead of 74SB697A).
 - b. Boring logs were not provided for location 74SB678b (collected on 5/5/11)
 - c. Location 74SB706:
 - i. The boring log shows a date of 5/19/11. However, the field notes and Table 4-2 show a date of 5/5/11.
 - ii. The field logbook notes state that sample 74SB706-03 was also collected at this location. This sample is not included on the boring log or on Table 4-2. Please clarify.

Appendix C, Data Validation Report Summaries

1. SDGs 1104157, 1104172, 1104173, 1104174, 1105004, and 1105008: Please clarify why the results for silver were not rejected due to recoveries <30%, consistent with Region 2 data validation guidelines as well as EPA National Functional guidelines.
2. SDGs 1104174, 1105005, and 1105008: Please revise the units to ug/l. for the VOC contamination in the field blank samples.
3. SDG 1105005: Please include the units of ug/l. for the SVOC contamination in the field blank sample.

Appendix M – Risk Calculation Spreadsheets

Vapor Intrusion Modeling:

1. Clarify why a depth to groundwater of 4.42 meters is used when groundwater is reported at much shallower depths in some areas of the site. The most conservative groundwater deep needs to be used in the vapor intrusion modeling. Alternatively, separate exposure units can be determined based on where groundwater VOC plumes are located and groundwater depths for each exposure unit can be used.
2. A clay soil type was used for the vapor intrusion modeling; however, as stated in EPA's User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, selection of the soil texture class should be biased towards the coarsest soil type of significance. The use of a clay soil type for vapor intrusion modeling is the least conservative soil type. As shown in Figure 5-2, sandy clays are also present at the site. Please revise the vapor intrusion modeling to use this soil type to ensure that the vapor intrusion modeling is sufficiently protective.

3. Please provide the modeling input, intercalc and output sheets generated by the Johnson and Ettlinger model as supporting documentation for the summary tables provided in this appendix.
4. Toxicity criteria have been updated since 2004. Please update toxicity criteria for consistency with current toxicity criteria listed in the November 2011 version of the RSL table and revise the vapor intrusion modeling accordingly.

Appendix N - RAGS Part D Tables

1. Please update the RAGS Tables 5 and 6 to reflect the date the reference was consulted for each toxicity criteria. Please also clarify if the values were taken from the June or November 2011 RSL table, as this is the preferred reference for toxicity criteria meeting EPA's established hierarchy for toxicity criteria references.

References

Schaum et al 1994. Equations and assumptions from Water Consumption and Health: Integration of Exposure Assessment, Toxicology, and Risk Assessment, edited by Rhoda G.M. Wang. Marcel Dekker, Inc., New York. 1994. Exposure to Volatiles in Domestic Water, Schaum et al., Pages 307-320.

Enclosure #3

**TECHNICAL REVIEW OF
THE FULL RCRA FACILITY INVESTIGATION
SAMPLING AND ANALYSIS PLAN, VOLUMES I AND II
SWMU 77 – SMALL ARMS RANGE
DATED DECEMBER 2011**

**NAVAL ACTIVITY PUERTO RICO
EPA ID No. PR2170027203
CEIBA, PUERTO RICO**

Submitted to:

**U.S. Environmental Protection Agency
Region 2
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February 21, 2012

**TECHNICAL REVIEW OF
THE FULL RCRA FACILITY INVESTIGATION
SAMPLING AND ANALYSIS PLAN, VOLUMES I AND II
SWMU 77 – SMALL ARMS RANGE
DATED DECEMBER 2011**

**NAVAL ACTIVITY PUERTO RICO
EPA ID No. PR2170027203
CEIBA, PUERTO RICO**

The following comments were generated based on review of the December 2011 *Full RCRA Facility Investigation Sampling and Analysis Plan, Volumes I and II, SWMU 77 – Small Arms Range, Naval Activity Puerto Rico (SAP)*.

VOLUMES I AND II GENERAL COMMENTS

1. The Explosives Safety Submission (ESS) is mentioned numerous times in this document with the caveat “provided to field personnel under a separate cover.” It is unclear whether the ESS has been approved or is still in submission. The ESS is not attached to this plan, and if changes were made to the ESS before approval, this plan would possibly require changes to comply with an approved ESS. Revise the SAP to discuss the current status of the ESS.

VOLUME I:

VOLUME I GENERAL COMMENTS

1. Throughout the SAP there are references to the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (Phase I RFI), but relevant excerpts from this document (i.e., previous sampling results and conclusions) are not included in the SAP to support the rationale for the proposed sampling. In addition, according to the *Uniform Federal Policy of Quality Assurance Project Plans Manual*, dated March 2005 (UFP QAPP), each reference to a previous document should be a full reference that cites the year, location of the referenced document (appendix/attachment), page number of the reference, etc. Revise all references in the SAP to the previous Phase I RFI to include this information and consider providing data and conclusions to support the sampling rationale.
2. The text in Worksheet #10 states that a Phase I RFI was completed in 2010 and based on the results, a Full Resource Conservation and Recovery Act Facility Investigation (Full Phase I RFI) was recommended to determine the vertical and lateral extent of metals in soil within SWMU 77. However, the SAP does not provide Phase I RFI results to demonstrate where exceedences of metals constituents occurred at SWMU 77. The Phase I RFI identified several areas within the site where munitions constituent (MC) surface and subsurface soil sampling was conducted, but there are no references or data tables in the SAP to identify which samples (numbers and locations) contained elevated levels of MC that would justify the sampling locations proposed in the SAP. Figures 17-1 through 17-7 in the SAP identify previous sampling locations; however, without knowing the Phase I RFI sampling locations where exceedances occurred, it is not possible to determine whether sufficient samples are

proposed in Worksheets #17 and #18 to establish the vertical and lateral extent of contamination. Update the text in the SAP to include data tables and summaries from the previous Phase I RFI and revise Figures 17-1 through 17-7 to indicate which sample numbers from the previous Phase I RFI contained elevated levels of MCs.

3. Worksheet #11 of the SAP states that if evidence that a landfill is present at the Potential Open Burn/Open Detonation (OB/OD) Subarea or Potential Munitions Trench Subarea, potential contaminants may also include non-MC-related contaminants including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, herbicides, polychlorinated biphenyls (PCBs), all metals, and nitroglycerin. However, none of the tasks appear to include delineating the extent of potential landfill debris. For example, a detailed methodology for this task has not been provided in Worksheet #14, Summary of Project Tasks, Worksheet #17, Sampling Design and Rationale, or in a Standard Operating Procedure (SOP). Revise the SAP to include an SOP or a methodology for delineating the extent of landfill debris, including how any potential landfill debris encountered during the course of the Full Phase I RFI will be described.
4. X-Ray Fluorescence (XRF) was used for some of the Phase I RFI sampling (Figures 17-1, 17-2, 17-4, and 17-5), but it is not clear in the SAP which metals were included in the XRF sampling (i.e., whether metals other than lead were included). Update Worksheets #10 and #11 to specify the metals that were analyzed using the XRF during the Phase I RFI.
5. Worksheets #10 and #11 do not answer the questions posed on pages 14 and 15 of the UFP-QAPP Workbook (Vol 2A of the UFP-QAPP Manual). For example, Worksheet #10 is missing the project decision conditions (if..then... statements). For Worksheet #10, the following should be included:

The problem to be addressed by the project:

- The environmental questions being asked:
- Observations from any site reconnaissance reports:
- A synopsis of secondary data or information from site reports:
- Project decision conditions ("If..., then..." statements):

For Worksheet #11, the following should be included:

- Who will use the data?
- What will the data be used for?
- What type of data is needed? (Target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques):
- How "good" do the data need to be in order to support the environmental decision?
- How much data are needed? (Number of samples for each analytical group, matrix, and concentration):
- Where, when, and how should the data be collected/generated?
- Who will collect and generate the data?
- How will the data be reported?
- How will the data be archived?

6. Neither Worksheets #17 nor #18 include a sampling rationale for each sample location. It is not sufficient to include only a general rationale for each sampling area; according to pages 21 and 22 of the UFP-QAPP Workbook (Vol 2A of the UFP-QAPP Manual), the text of the SAP should provide a detailed rationale for all sampling locations. Revise Worksheets #17 and #18 to include a detailed rationale for each sampling location.
7. It is unclear who will perform the data validation activities for this investigation and if the validator is an independent third party. Section 11.5 of Worksheet #11 (page 62) states that a Puerto Rico certified chemist provided by the laboratory will validate all analytical packages for each laboratory. However, Worksheets #33 through #36 identify a TetraTech Data Validator who will perform full data validation. Revise the SAP to clarify who will perform data validation for each analytical data package and if the validator is an independent third party.
8. The data management, reduction and reporting discussion is insufficiently detailed. For example, it is unclear where hardcopy project documents will be stored and where the project database will be maintained. It is also unclear how long these documents and the database will be stored before archival/disposal. Lastly, it is unclear how analytical data will be entered into the database, if the entry will be reviewed, and how data qualifiers will be added to the final reports. Revise the SAP to provide greater detail regarding the data management, reduction and reporting tasks as per Section 3.5, Data Management Tasks, of the UFP QAPP Manual.
9. The SAP does not include data validation checklists. Since the SAP references multiple sources for data validation procedures in Worksheet #36, a checklist describing the criteria that will be used to evaluate the quality control (QC) measures, how samples will be qualified (e.g., the qualifiers that will be used, when samples will be qualified estimated/rejected, and if individual or all samples in a batch will be qualified) should be provided. Revise the SAP to provide data validation checklists.
10. The SAP indicates in Section 11.4 and Worksheet #15 that nondetect-reported results for analytes where the limit of detection (LOD) is greater than the PAL will not be considered contaminants of potential concern (COPC). This approach is not advised because analytes may be present above action levels but were unable to be detected by the analytical method. This potential risk should be considered in the risk assessment. If reanalysis with appropriately sensitive quantitation limits is not possible, an assessment of the associated uncertainty and impact to the overall estimates of risk and hazard and projected impact to site and risk management decision-making should be provided. Such assessment should address the historic land use and the pragmatic assessment of the potential for the constituent at issue to be present. This will allow EPA to review this datagap assessment and make recommendations for risk management that may include resampling in the face of significant uncertainty.

11. The SAP indicates that investigation derived waste (IDW) will be composited. However, the SAP does not provide the specifics on the methods that will be used to composite and analyze IDW. Revise the SAP to include information on the methods to be used and what laboratory will perform the analysis of IDW for waste characterization. Additionally, revise the SAP to include the criteria used to characterize IDW.

VOLUME I SPECIFIC COMMENTS

1. **Worksheet #6, Communication Pathways, Pages 26 to 29:** This worksheet does not include EPA in any of the communication pathways. Revise the table to specify that the EPA will be notified when significant corrective actions or changes occur and include the form of communication and timeframe for this notification.
2. **Worksheet #7, Personnel Responsibilities and Qualifications Table, Pages 30 to 31:** This worksheet does not include the responsibilities for several personnel identified in Worksheet #3, Distribution List. For example, the responsibilities have not been provided for the NAVFAC Chemist/Quality Assurance Officer, the NAPR facility contact Pedro Ruiz, or the personnel from both analytical laboratories that will be used. Revise this worksheet to include the responsibilities for these personnel.
3. **Worksheet #10 - Conceptual Site Model; Section 10.4: Previous Environmental Investigations; Page 45:** The first paragraph discusses various geophysical and MEC surveys that were completed at four of six sites; and based on the analog detector-aided surveys, a digital geophysical mapping (DGM) survey was performed at two subareas where subsurface operations/disposal was a concern, but the text in Worksheet #10 does not specify the sites where the surveys were done. For example, it is not clear if a geophysical survey was conducted at the Potential Munitions Trench Subarea to locate the burial trenches or if these trenches were sampled during the Phase I RFI (this information is presented on a Worksheet #17 figure, but it needs to be included in Worksheet #10). Also, if samples were not collected from and beneath the trenches, the Phase I results may not be representative of site contamination. Revise Worksheet #10 to specify the sites where geophysical and MEC surveys were done, include a full discussion of sub areas within the site where DGM was performed, and summarize the results of each survey. Additionally, verify whether sampling occurred within or beneath trenches with debris in the Potential Munitions Trench Subarea during the Phase I RFI.
4. **Worksheet #10, Conceptual Site Model, Page 46:** The Detonation Area Near Concrete Pad Subarea subsection of Section 10.4, Previous Investigations, makes no mention of prior sampling for explosives. Also, in the recommendation for conduct of a full Resource Conservation and Recovery Act Facility Investigation (RFI) for munition constituents (MC), no mention is made of investigating potential explosives contamination, nor is a statement provided as to why this is not necessary. Revise the cited subsection to include this information.

5. **Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements, Page 57:** The Detonation Area Near Concrete Pad Subarea subsection of Section 11.1, Problem Statement, makes no mention of investigating potential explosives contamination, nor is a statement provided as to why this is not necessary. Revise the cited subsection to include this information.

Also, the Potential OB/OD Subarea and Potential Munitions Trench Subarea subsection states that these areas "...may be contaminated with MC in the form of select metals and explosives." This potential explosives contamination is not recommended for investigation in the related Potential OB/OD Subarea subsection of Worksheet 10. In addition, the Potential OB/OD Subarea and Potential Munitions Trench Subarea subsection lists NG (nitroglycerine) as a "non-MC-related contaminant," which is incorrect. Correct these inconsistencies/errors.

6. **Worksheet #11 Project Quality Objectives/Systematic Planning Process Statement, Page 57: Former Pistol Range Subarea:** This section states that surface soil in the northwestern portion of the site may be contaminated with MC in the form of select metals, but it is not clear why surface soil in the northwestern portion of the former pistol range subarea would be contaminated with MC. It is also unclear why other areas of the former pistol range subarea are not considered for sampling in the SAP. Explain why sample locations are concentrated in the northwestern portion of the former pistol range subarea and other areas are not considered in the SAP.
7. **Figure 11-1A:** The SAP does not clearly demonstrate how anomaly locations will be selected for MC sampling. It is likely that more anomalies will be investigated than the proposed number of samples, so criteria for prioritization are needed. For example, it is unclear if sampling will be biased toward breached items, subsurface explosive remnants, items with high explosives still present, or items that are rusting. Provide clear criteria that will be utilized to determine how anomalies will be selected for sampling.
8. **Worksheet #11: Project Quality Objectives/Systematic Planning Process Statement, Page 5:** Item 2 requires sampling when "evidence of chemical contamination from landfilling is encountered," but it is unclear how this will be determined, since metal contamination may not be visible and cannot be found using typical field equipment. Revise the SAP to specify the evidence that will be used to evaluate whether chemical contamination from landfilling is present.
9. **Worksheet #11 - Project Quality Objectives/Systematic Planning Process Statement, Page 58: Worksheet #11, Page 59:** Item four calls for analyses for explosives, but these are not included in the Worksheet #18 tables. Revise the tables in Worksheet #18 to be consistent with Worksheet #11.
10. **Worksheet #11 - Project Quality Objectives/Systematic Planning Process Statement, page 60, Section 11.3:** For the Potential OB/OD and Potential Munitions Trench Subarea, there are no rationale for the depths of subsurface soils to be investigated. Typically backhoes are used to excavate trenches, so most disposal trenches extend to more than 4 feet

below ground surface (ft bgs). Revise the SAP to explain why four ft bgs is a sufficient depth in the OB/OD and Potential Munitions Trench subareas.

11. **Worksheet #12, Measurement Performance Criteria Table – Field Quality Control Samples, Page 63:** The footnotes for this table indicate that duplicate sample analyses for metal analytes should be within four times the limit of quantitation (LOQ) if results are less than five times the LOQ. It is also stated that duplicate samples for non-metal analytes should be within two times the LOQ if results are less than five times the LOQ. It is unclear why the low-level criteria for metal and non-metal analytes is different. Revise the SAP to discuss the difference in duplicate sample acceptance criteria for low concentrations.
12. **Worksheet #14 - Summary of Project Tasks, Page 67:** The section on global position system (GPS) locating does not include the required accuracy for the GPS survey. Revise Worksheet #14 to include this information.
13. **Worksheet #14 - Summary of Project Tasks, Page 67: GPS Locating:** An SOP for alternative positioning (last sentence) is needed, since SOP-09 does not include this activity. Revise Worksheet #14 to include this information.
14. **Worksheet #17 - Data Collection Plan for SWMU 77, Section 17.3.1, Pistol Range Subarea Page 95:** The sampling locations within the text are not shown in the figures as presented in the RFI. The text states that 22 discrete samples will be collected within the Pistol Range Subarea, six samples will be collected from above the natural embankment (locations 77PRSB037 through 77PRSB042), six samples will be collected from the toe of the natural embankment (locations 77PRSB043 through 77PRSB048), and up to ten samples will be collected from locations scattered throughout the range and firing lines (locations 77PRSB049 through 77PRSB058). However, these sampling locations are not shown on Figure 17-1 within the Pistol Range Subarea. Further, Worksheet #18.1 includes six samples to be collected from above the natural embankment (locations 77PRSB037 through 77PRSB042), six samples to be collected from toe of the natural embankment (locations 77PRSB043 through 77PRSB048), and up to ten samples to be collected from locations scattered throughout the range and firing lines (locations 77PRSB049 through 77PRSB058); 12 additional Natural Embankment samples, and up to 16 discretionary samples. Review Worksheets #17 and 18 and Figure 17-1 and revise them to be consistent.
15. **Worksheet #17 - Data Collection Plan for SWMU 77, Section 17.3.5, Page 98 through 99:** This section of the SAP discusses sampling within the potential OB/OD subarea. However, if MEC and/or landfill debris are not encountered, it is unclear how the sample locations will be selected or how the suite of analytes will be determined. Revise the section to provide this information.
16. **Worksheet #18, Sampling Locations and Methods/SOP Requirements Table, Pages 101 to 121:** This table indicates that the sample identification for field duplicates will contain "FD". However, it is recommended that field duplicates be submitted to the laboratory blind. Revise this table to utilize a different identification system for field duplicates.

17. **Worksheet #18.6 and Figure 17-7:** None of the sampling locations proposed in Worksheet 18.6 are shown on Figure 17-7. It is understood that sampling locations may depend on MEC geophysical surveys, but the potential sampling locations should be depicted on Figure 17-7, or the text should state that a revised figure with proposed locations will be submitted to the Regulatory Agencies for review before any sampling is performed. Revise the SAP to address this issue.
18. **Worksheet #18.5 and #18.6, Pages 98 through 99 and pages 119 through 121:** Worksheets 18.5 and 18.6 only include metals and explosives, but potential analytes include VOCs, SVOCs, pesticides, herbicides, and PCBs. Revise these worksheets to include all potential analytes.
19. **Worksheet #19, Analytical SOP Requirements Table, Pages 123 to 125:** The analytical SOP that will be used for the analysis of herbicides is not included in this table. Revise this table to identify the analytical SOP that will be used to analyze the herbicides and include the sample preservation information.
20. **Worksheet #20, Field Quality Control Sample Summary Table, Page 126:** The numbers of samples in this table do not appear to be consistent with the number of samples for each method discussed in Worksheet #17 and listed in Worksheet #18. For example, Worksheet #18 identifies 41 samples to be collected if landfill material is encountered (samples 77OBSB007 through 77OBSB026, and 77MTSB004 through 77MTSB024), but this worksheet identifies 38 samples to be analyzed for VOCs, SVOCs, pesticides, herbicides, PCBs, and metals if landfill material is found. The collection of 41 samples would result in an increase in the number of QC samples required. Revise this table to identify the number of samples to be analyzed by each method as discussed in Worksheets #17 and #18, and to update the amount of QC samples required accordingly.
21. **Worksheet #21, Project Sampling SOP References Table, Pages 127 to 128:** This worksheet notes that several SOPs will be modified for project work, but it is unclear how these SOPs will be altered. Revise this worksheet to identify how the SOPs will be altered for the current investigation.
22. **Worksheet #28, Laboratory QC Samples Table, Pages 150 to 166:** This worksheet contains several references to Appendix G of the Department of Defense Quality Systems Manual Version 4.2; however, this appendix does not contain some of the referenced information. For example, acceptance criteria for the recovery of cyanide in laboratory control samples (LCS) and matrix spikes (MS) (Method 9010B, 9012A) are not included. Additionally, acceptance criteria for the recovery of surrogates for explosives (Method 8330B) and herbicide analyses (Method 8151A) are not included. Revise this worksheet to provide the acceptance criteria for these methods, or provide a specific reference to where this information can be found.
23. **Worksheet #28, Laboratory QC Samples Table, Page 163:** This table indicates that a post digest spike (PDS) will be performed when a serial dilution fails or all analyte concentrations are less than 50 times the LOD, and the acceptance criteria for the PDS recovery is 75 to 125

percent (%); however, it does not indicate that the PDS will be performed when a MS does not meet acceptance criteria. Method 6010C indicates that a PDS should be performed when MS/MSD recoveries are unacceptable, and the acceptance criteria for the PDS should be 80 to 120%. Revise this table to indicate that a PDS will also be analyzed whenever MS/MSDs do not meet acceptance limits, and to identify the %R acceptance limits for the PDS as 80 to 120%.

24. **Worksheet # 31, Planned Project Assessments, Page 170:** Field audits have not been identified in this worksheet. It is unclear if field audits will be conducted for the current investigation. Revise this worksheet to discuss whether field audits will be performed.
25. **Worksheet #37 – Data Usability Assessment, Page 182:** The first section in this worksheet states that there may be reason to use rejected data in a weight of evidence argument, especially when the rejected data supplements data that has not been rejected. However, rejected data should never be used for decision making. Revise the SAP to remove this statement.
26. **Figure 17-7:** The aerial photograph inset suggests the width of the burial trenches, but the red lines representing the potential trenched areas do not. Trenches should not be represented as thin lines on this figure. According to the scale on the aerial photograph inset on Figure 17-7; one inch represents approximately 200 feet, so it appears the trenches were approximately 20 to 25 feet wide. This information should be transferred to Figure 17-7 to clarify the relationship between the trenches and the survey lines. For example, the eastern two survey lines may represent the same trench. Additionally, it is unclear whether all 5 of the apparent trenches in the eastern part of this site are accounted for. It appears a short trench is located in the southeast, according to the aerial photo inset. In addition, it is not clear why the survey lines did not parallel the road, to get an indication of the location and width of each trench. Finally, for these burial trenches, the sampling data should be summarized in the text, including whether any debris was encountered and the depths where samples were collected. Revise Figure 17-7 and the text of the SAP to address these issues.
27. **Appendix C, MC Field Standard Operating Procedures (SOPs):** Although this appendix is supposed to present procedures for sampling for MC, it appears to be a somewhat generic series of sampling SOPs. It does not contain or reference the procedures for ensuring the safety of the operation in an area potentially contaminated with munitions and/or explosives in concentrations or particle sizes that present an explosive hazard. Include this information in the appendix, or provide a reference therein as to where it may be found elsewhere in the plan.
28. **Appendix D, Analytical Laboratory Accreditation and Certification Information, Pages 389 to 418 of pdf:** The pages presenting the acceptance limits in this appendix do not include the analyte name. Revise this appendix to clearly present the laboratory acceptance limits for each analyte.

VOLUME I MINOR COMMENTS

1. **Worksheet #17, Page 97, second and third paragraphs:** The text should cite Figure 17-5, not Figure 17-4 for locations in the embankment and wooded berm area. Revise the SAP to address this issue.
2. **Worksheet #17, Page 98:** Figure 17-4 should be cited for the Firing lines, instead of Figure 17-5. Revise Worksheet #17.

VOLUME II: VOLUME II GENERAL COMMENTS

1. The data management discussion does not discuss where hardcopy project documents and the project database will be stored or maintained and for how long these documents will be stored before archival/disposal. Revise the data management discussion to identify the time period and location where project files will be stored in accordance with Section 3.5, Data Management Tasks, of the UFP QAPP Manual.

VOLUME II SPECIFIC COMMENTS

1. **Acronyms, Page 4:** The acronyms "ATFE" and "BATFE" are not the ones currently used by the Bureau of Alcohol, Tobacco, Firearms and Explosives in their documents. They currently use the acronym "ATF" in their documents and on their website. Unless it is the intent of this document to establish acronyms that are site or document-specific, use the official ATF acronym. Also, the acronym "ESQD" should be defined as "Explosives Safety Quantity-Distance," and the acronym "MFD" should be defined as "Maximum Fragment Distance." Revise the SAP to make these corrections.
2. **Worksheet #6, Communication Pathways, Pages 25 to 28:** This worksheet does not include EPA in any of the communication pathways. Revise the table to specify that the EPA will be notified when significant corrective actions or changes occur and include the form of communication and timeframe for this notification.
3. **Worksheet #7, Personnel Responsibilities and Qualifications Table, Pages 29 to 33:** This worksheet does not include the responsibilities for several personnel identified in Worksheet #3, Distribution List. For example, the responsibilities of the NAVFAC MRP Senior Technical Advisor Mike Green and the NAPR facility contact Pedro Ruiz have not been included. Revise this worksheet to include the responsibilities for these personnel.
4. **Worksheet #11, Project Quality Objectives/Systematic Process Statements for SWMU 77 Full RFI, Page 60:** This worksheet states that Figure 11-1 provides the decision tree for each subarea, but this figure has not been included. Revise the SAP to include this figure.
5. **Worksheet #14, Summary of Project Tasks, Manual Anomaly Intrusive Investigation (Hand Digs), Page 71:** This table states "Locate, flag, and record random number of each subsurface hand-dig locations in accordance with Worksheet #17." However, Worksheet

#17, Section 17.8.1, Scope, Page 84, states that, "All anomalies will be intrusively investigated in real time using manual techniques (hand digs)." Correct one of the cited statements to make them consistent.

6. **Worksheet #17, Section 17.2.2, Site Accessibility and Traffic Control, Page 77:** The first paragraph of this section states that, "If non-site personnel or non-essential non-UXO personnel enter the EZ, all MEC operations will cease until the EZ is re-established." This statement is confusing and conflicts with Section 17.2.3, Site Security. As this currently reads, it appears to allow non-essential personnel that are "UXO personnel" unrestricted access to the site at all times. In addition, the term "UXO personnel" includes UXO-Sweep Personnel that may not be UXO Technicians. Review the cited statement and revise it as necessary.

Also, the second paragraph of the section states that, "The EZ is based on the blast over pressure distance (K328) for a M651 40mm CS grenade, the primary Munition with the Greatest Fragmentation Distance (MGFD). No explanation as to what "K328" is (other than the "blast over pressure distance") is provided, and "K328" is not identifiable as a specific distance in feet or meters. Expand this paragraph to better explain what the term "K328" is and how it is used, or reference where this information is provided elsewhere in the document.

The second paragraph also notes that, "If an item with a larger EZ than the M651 CS grenade is found, then the hazardous fragmentation distance (HFD) for the M383 40mm grenade as the contingency MGFD will be observed." This is somewhat confusing and does not explain what action is required if the newly discovered munition has a greater EZ requirement than the M383 40mm grenade. As the correct process is explained in the third paragraph of this section, delete the cited sentence from the second paragraph.

7. **Worksheet #17, Section 17.13, Manual Anomaly Intrusive Investigation – Hand Digs, Page 95:** The first paragraph on this page refers to MEC collection points and thermal treatment. Expand on "thermal treatment," i.e., is the intention to ship a thermal treatment oven to the site for small arms, or is it to use an explosive detonation treatment.
8. **Worksheet #17, Section 17.14.4, Methods and Procedures, Page 96:** Approximately one cubic yard of soil at a time is a significant amount of soil to be swept for 20mm projectiles. Provide the details of the process the Quality Control personnel will employ to inspect the soil.
9. **Worksheet #17, MEC Management – Treatment, Page 101:** The second paragraph describes the use of collection points for MEC that is safe to move but also makes the statement that "no consolidated shots will be allowed." This appears to be inconsistent. Provide the reasoning for not allowing consolidated demolition shots when the MEC items are to be consolidated at collection points.

10. **Worksheet #21, Project SOP References Table, Page 113:** This worksheet notes that several SOPs will be modified for project work, but it is unclear how these SOPs will be altered. Revise this worksheet to identify how the SOPs will be altered for the current investigation.
11. **Worksheet #33, QA Management Reports Table, Pages 143 to 144:** This table does not include the final report for the MEC investigation as recommended in the UFP QAPP Manual. Revise this worksheet to include the final report.
12. **Worksheet #35, Validation (Steps IIa and IIb) Process Table, Pages 152:** The top row on this page does not identify the definable feature of work. Revise Worksheet #35 to identify this missing definable feature of work.
13. **Worksheet #36, Analytical Data Validation (Steps IIa and IIb) Summary Table, Page 154:** This table indicates that validation Step IIb is not applicable for this MEC investigation; however, measurement performance criteria are established in Worksheet #12 of this SAP. This table should identify who will perform validation of the measurement performance criteria and reference where the criteria can be found in the SAP. Revise Worksheet #36 to provide this information.

VOLUME II MINOR COMMENTS

1. **Acronyms, Pages 5 and 6:** The following acronyms are incorrectly defined. The correct definitions may be found in DoDM 6055.09-M-V8 (Department of Defense Ammunition and Explosives Safety Standards, Volume 8, Glossary):
 - The acronym “DDESB” should be defined as “Department of Defense Explosives Safety Board.”
 - The acronym “ESQD” should be defined as “Explosives Safety Quantity-Distance.”
 - The acronym “ESS” should be defined as “Explosives Safety Submission.”

Make these corrections here and at all occurrences in Volumes I and II.

2. **Worksheet #9, Project Scoping Session Participants Sheet:** The attendee listed as “Tom Paul” should read “Tom Hall.” Revise the SAP to make this correction.

ENEL # 4



COMMONWEALTH OF PUERTO RICO
Office of the Governor
Environmental Quality Board



ENVIRONMENTAL EMERGENCIES RESPONSE AREA

February 17, 2012

Mr. Timothy Gordon
U.S. Environmental Protection Agency – Region II
290 Broadway – 22nd Floor
New York, New York 10007-1866

RE: TECHNICAL REVIEW DRAFT FULL RCRA
FACILITY INVESTIGATION
SAMPLING AND ANALYSIS PLAN
SWMU 77 – SMALL ARMS RANGE
NAVAL ACTIVITY PUERTO RICO (NAPR)
CEIBA, PUERTO RICO

Dear Mr. Gordon:

The Hazardous Wastes Permits Division (HWPD) and the Federal Facility Coordinator has finished the review of the above-mentioned document.

Enclosed please find PREQB's comments issued as part of the technical review. If you have any additional comment or question please feel free to contact Gloria M. Toro Agrait at (787) 767-8181 extension 3586 or myself at extension 6129.

Cordially,

Wilmarie Rivera
Federal Facilities Coordinator
Environmental Emergencies Response Area

cc: Gloria M. Toro Agrait, EQB Hazardous Waste Permits Division

Technical Review of the Draft Full RCRA Facility Investigation Sampling and
Analysis Plan for SWMU 77, Naval Activity Puerto Rico, Ceiba, Puerto Rico,
dated December 2011

VOLUME I MUNITIONS CONSTITUENT SAP

General Comments

1. Subsurface soil samples were not collected during the Phase I RFI and mobile MC were detected during the Phase I RFI (such as nitroglycerine [NG]). Therefore, please conduct a subsurface investigation in those areas where MC COPCs exceed EPA's Soil Screening Levels (SSLs). These areas include the Pistol Range firing lines, the Detonation area near the concrete pad, and Rifle Range (all firing lines). Note that where site conditions are similar, a reduced number of samples may be proposed, where the results apply across similar sites with similar NG and other detected explosives (RDX) concentrations. This additional data is needed to evaluate whether mobile MC has migrated to the subsurface sufficient to impact groundwater. Specific areas where these constituents exceed soil screening levels (SSLs) for the migration to groundwater transport pathway are discussed in the Worksheet-specific comments below.
2. Similar to concerns associated with mobile explosives and propellant constituents, metals may become mobile under certain conditions (corrosion of lead bullets mobilizes lead, for example). Therefore, subsurface sampling is requested in areas where metals contamination exceeds EPA's SSLs to document whether metals migration to the subsurface is occurring, to provide information needed to determine if groundwater sampling is warranted, and to determine the vertical extent of contamination.
3. During the Phase I RFI, the laboratory failed to analyze samples marked on the chain-of-custody for MS/MSD analyses of metals. As stated in PREQB's comments on the Phase I RFI Report, this was considered a significant deficiency in the QA program and impaired the ability of performing a proper data usability assessment since metals analyses have no means of monitoring matrix effects in the individual samples. Therefore, please ensure MS/MSDs are analyzed at the proper frequency during the full RFI.
4. The Navy's response Tetra Tech's Response to PREQB's General Comment #1 on the Phase I RFI states that the bucket evaluation to determine the percent weight of bullets would be performed in the full RFI. It was not clear from the SAP submitted if this task will be performed. Please clarify.

Page/Worksheet Specific Comments

1. Page 11, Executive Summary, Paragraph 4: The text states that sample concentrations were less than human health and ecological screening criteria in

the Detonation Area Near Concrete Pad Subarea. However, Worksheet #10 (page 46) states that lead was detected above the ecological screening criterion in this subarea. Please clarify.

2. Table ES-1: In the note included for the rifle range, please specify that the investigation for NG will be at the 200-yard firing line, as stated in the earlier text.
3. Page 20, Worksheet #3:
 - a. Please replace Karen Vetrano with Katarina Rutkowski.
 - b. Please correct Wilmarie Rivera's extension in this report and all future documents to X 6129. This comment applies to Worksheets 5 and 9 in both SAPs also.
4. Worksheet 9:
 - a. Comments/Discussion: Under Puerto Rico's Water Quality Standards Regulation, which is an applicable, relevant and appropriate requirement (ARAR) for this site, all groundwater is considered potable and no criteria are established under this ARAR to evaluate nonpotability. Also, groundwater discharging to a surface water body is required to meet the lower of the applicable surface water quality standard or the SG standards. Please revise the discussion here as well as in Item 6 under Consensus Decisions to clarify this.
 - b. Consensus Decisions: Please clarify that background is not used for screening to identify chemicals of potential concern evaluated in the risk assessments.
5. Worksheet 10, Section 10.2.3: The 2010 Addendum to the 2004 Reuse Plan for Roosevelt Roads was available for review at the time this document was prepared; therefore, please revise this section to remove text stating that future development plans are unknown. This comment applies to the conceptual site model summary as well.
6. Worksheet 11:
 - a. Section 11.1:
 - i. Please note in the text that another objective is to obtain data sufficient to evaluate whether groundwater has been impacted above regulatory standards.
 - ii. Pistol Range Area:
 - i. Nitroglycerin was detected in surface composite samples collected at the firing range at levels that exceeded the screening levels during the Phase I RFI investigation. NG is mobile in soil environments (USACE 2006), and NG was detected in surface soil indicating that natural processes have not eliminated NG as of yet nor have degradation rates been determined for this site. Therefore, further

investigation to determine the extent of NG is warranted. As only surface soil was collected, please conduct subsurface soil sampling at the presumed firing lines for nitroglycerin analysis. This comment also applies to the Detonation Area near the concrete pad and Rifle Range.

2. Note that the risk evaluation presented in the Phase I RFI report excluded other COPCs that were automatically carried forward to the full RFI, so cumulative risks were not evaluated. This is a datagap that needs to be addressed in the Full RFI.
 - iii. The worksheet states that surface soil will be collected in the Former Pistol Range Subarea. However, Worksheet #10 (page 46) states that the vertical extent of metals also needs to be determined in this subarea during the full RFI. Please clarify why subsurface samples are not proposed in this subarea.
- b. Section 11.2:
- i. Please use the most current version (November 2011) of the USEPA Regional Screening Levels.
 - ii. Item 5: Please clarify the following parenthetical statement "(note that all analytes detected during the Phase I RFI were carried forward for evaluation in the Full RFI)..." as it appears that detected COPCs were eliminated from further consideration at the conclusion of the Phase I RFI for various areas and Section 11.1 excludes munitions-related chemicals that were detected (such as NG at firing lines) in surface soil. This comment also applies to Section 11.4, where this statement is also made.
 - iii. Item 6, last paragraph: Please conduct further evaluation before determining chemicals with elevated detection limits are not COPCs for risk assessment. Consider whether the chemical is likely to be present, whether it is detected in other media, if it is part of a class of more toxic compounds (such as PAHs), etc. before excluding chemicals with elevated detection limits from the risk assessments. Please revise this section and the footnote to Worksheet 15 accordingly.
- c. Section 11.3:
- i. This section refers to a PREQB definition of surface soil. Please note that a PREQB does not have a specific definition of surface soil; rather, agreement was reached on surface soil sample depth during the August 2009 Planning meeting. Please revise the text accordingly.
 - ii. Please clarify why subsurface soil is established at 4 feet bgs when the deepest subsurface soil sample collected from this area (due to the presence of shallow bedrock) was 1.5 feet.
 - iii. Please provide the rationale for selecting 2 feet bgs as the maximum depth of subsurface soil samples for areas other than the Potential OB/OD area.

d. Section 11.4:

- i. Data that are rejected are defined as not usable for project objectives. Please remove the text on rejected data or include a note that rejected data will not be used for the achievement of project objectives.
- ii. Please clarify why the Navy is preparing two complete risk assessments in order to address background when the Navy conducts one risk assessment on chemicals that exceed risk-based screening criteria (including metals) at other former Navy sites, then during risk characterization presents cumulative site risks for all COPCs for each receptor, then subtracts out the site risk attributable to background for each receptor. This approach is consistent with EPA's *Role of Background in the CERCLA Cleanup Program*. PREQB prefers this approach as it results in one set of recommendations and conclusions pertinent to site risks and is consistent with EPA guidance.
- iii. Section 11.5: Please revise the text to state that the data should be validated. Also it should be certified by a Puerto Rico-licensed chemist.

7. Worksheet 12, Page 63:

- a. Please include the goals for field and laboratory completeness, as required in Section 2.6.2.6 of the UFP QAPP Manual.

8. Worksheet 13, Page 64: Currently, the worksheet states that there are no limitations on the data use from the Phase I RFI. Please revise the worksheet to refer the reader to Appendix H of the Phase I RFI Report for a summary of rejected data in the Phase I RFI.

9. Worksheet 14, Page 66, Quality Control Tasks: The text refers the reader to Worksheet #12 for the required frequency of MS/MSDs and laboratory duplicates. However, these quality control samples are included on Worksheet #28 (not Worksheet #12). Please revise the text accordingly.

10. Worksheet 15:

- a. Please provide supporting rationale/calculations for the use of a dilution attenuation factor of 20 for this SWMU. Please discuss the depth to groundwater, shallow depth of bedrock and other factors influencing dilution/attenuation processes.
- b. Please provide the inputs to the RSL table used to calculate the lead RBSSL.
- c. Ecological PALs were presented in this worksheet for volatile, semi-volatile, low-level scan semi-volatile, polychlorinated biphenyls, metals, pesticides and explosives for the soil medium. The ecological PALs were based on screening criteria presented in the USEPA eco-SSL documents (first preference) and the lower of USEPA Region 5 soil ecological

screening levels (August 2003) or Los Alamos National Laboratory (LANL) ecological screening levels from the Ecorisk Database (Release 2.4, December 2009). This preference hierarchy for selection of ecological screening levels for soil is acceptable. However, Please use the more recent LANL EcoRisk Database (Release 3.0, October 2011) as this database presents additional screening values and revised screening values for many SWMU 77 contaminants.

- d. Based on the recent LANL database, ecological screening values are now available for additional explosives including HMX, RDX, 2,4,6-trinitrotoluene, 2,4- and 2,6-dinitrotoluene, 2-, 3-, and 4-nitrotoluene, and nitroglycerin. In addition, lower ecological screening values need to be presented for the 1,3-dinitrobenzene (0.073 mg/kg), 1,2,4-trichlorobenzene (0.27 mg/kg), 1,2-dichlorobenzene (0.92 mg/kg), 1,3-dichlorobenzene (0.73 mg/kg), methyl iodide (0.038 mg/kg), tetrachloroethene (0.18 mg/kg), vinyl chloride (0.12 mg/kg), total xylenes (1.4 mg/kg), 2-methylphenol (0.67 mg/kg), 2-nitroaniline (5.4 mg/kg), di-n-octylphthalate (0.91 mg/kg), thallium (0.032 mg/kg), 4,4-DDD (0.0063 mg/kg), 4,4-DDT (0.044 mg/kg), and dieldrin (0.0045 mg/kg). Please incorporate these values into Worksheet #15 and re-evaluate PALs and laboratory LOQs and LODs.

11. Worksheet 17:

- a. Page 96, Section 17.3.4, Rifle Range Subarea: Please provide the rationale for the investigation proposed behind the target berm and at the short yardage target stand areas. It is unclear why a subsurface investigation is occurring here but not at other areas where mobile MC may be present.
- b. Subsurface samples are requested for the step out area outside the study area (not shown on figure, but discussed in text) to document whether metals migration to the subsurface is occurring.
- c. Target Area Earthen Berm and Wooded Embankment: The text refers to Figure 17-4; however, this figure presents the samples proposed for the 200-foot firing line. Please revise as appropriate.
- d. Figure 17-1:
 - i. It appears from this figure that surface and subsurface soil samples will be collected from different locations. Please provide the rationale for this sample design, along with more detail on the rationale for the various sample locations selected:
 - 1. For example, additional surface and subsurface soil samples appear to be warranted to the northeast and southeast of samples SB-001, SB-008, SB-15 and SB-031A to determine the extent of contamination.
 - 2. It is unclear why samples are located behind and immediately in front of the viewing area.

3. A storage building is located within the sample design area, but is not proposed for sampling. Sampling at this building may be warranted, depending on what was stored.
 4. NG was detected in surface soil samples; therefore, please add two subsurface soil samples at the locations of highest NG detections to document whether NG is migrating to subsurface soil.
- e. Figure 17-2:
- i. It appears that additional sampling is warranted to the west of the Phase I RFI sample locations to determine the extent of contamination above background and risk-based criteria.
 - ii. Please provide the rationale for only collecting surface soil samples from this range, as it appears that the lack of subsurface soil sample data may be a datagap and Worksheet #10 (page 46) states that the vertical extent of metals also needs to be determined in this subarea during the full RFI. Please discuss soil type at the target area and bullet penetration depths. It has been reported that bullets can penetrate a foot or more in sandier soils (ITRC 2003) and trenching into berms is recommended in order to sample subsurface soils and to aid in the inspection for bullet fragments as an aid in ascertaining the appropriate sample depth.
- f. Figure 17-3:
- i. Please clarify whether the kick-out zone surrounding the depression can be determined, based on what is known about the open detonation that occurred.
 - ii. NG was detected above SSLs in surface soil; therefore, this investigation needs to determine if NG has migrated to the subsurface.
 - iii. Please remove the reference to "Phase I RFI" from the legend for the proposed surface soil sample location. This comment applies to Figure 17-4 also.
- g. Figure 17-4:
- i. NG was detected at the firing lines during the Phase I RFI above RSLs and SSLs; therefore, please include a subsurface investigation to determine the extent of NG impacts in subsurface soil at each firing line.
 - ii. RDX was detected above the SSL in all three samples from the Phase I RFI; therefore, please include RDX in the analysis of subsurface soil samples to evaluate the potential for impacts to groundwater.
- h. Figure 17-5: It appears that the samples proposed in Worksheet 17 were inadvertently left off this figure. Please revise the figure to include the proposed samples at the wooden embankment and elsewhere, as appropriate. Note that although the worksheet references sample IDs, proposed samples on figures are not labeled.

- i. Figure 17-7: Please include the proposed sampling locations on the figure (even if they are subject to change based on the MEC survey) or alternatively, please include a note on the figure indicating that the sampling locations will be chosen in the field.
12. Worksheet 18: Please revise the subsurface soil depth to 0.5 to 2 feet interval to eliminate the datagap from 0.5 to 1.0 feet (currently, subsurface soil samples are proposed from 1-2 feet).
13. Worksheet 19:
 - a. Soil/VOCs: Please remove the requirement to freeze methanol-preserved samples. The methanol-preserved samples must be cooled to $<6^{\circ}\text{C}$, not frozen.
 - b. Aqueous QC Samples/SVOCs, Pesticides: Please add the extraction SOP SA-EX-030 to the SOP references.
 - c. Soil/SVOCs, Pesticides: Please add the extraction SOP SA-EX-040 to the SOP references.
 - d. Please add rows for herbicides in soil and aqueous QC samples, as this analysis may be performed in the Potential OB/OD Subarea and the Potential Munitions Trench Subarea, as per Worksheet #11.
 - e. Please clarify with the laboratory that SW-846 method 6010C will be used for the metals analyses, as shown on this worksheet. The LOQs provided on Worksheet #15 (page 85) for metals are low and may be associated with SW-846 method 6020A (ICP/mass spectrometry) instead.
14. Worksheet 37: Data that are rejected are defined as not usable for project objectives. Please remove the text on rejected data or include a note that rejected data will not be used for the achievement of project objectives.

Appendix C: MC Field Standard Operating Procedures

1. SOP-07: Please expand the SOP to include a more robust 8-step decontamination procedure to be used in the event that gross contamination is encountered (in particular, in the areas where former landfilling may have occurred). At the least, as elevated levels of metals have been encountered during previous sampling efforts, please use a 10% nitric acid solution as part of the decontamination effort to minimize the potential of cross-contamination.
2. SOP-08: In the event that grossly-contaminated soils are encountered (in particular, in the areas where former landfilling may have occurred), please add a provision into the SOP for drumming these soils.

References

ITRC 2003. Characterization and Remediation of Closed Small Arms Firing Ranges. <http://www.itreweb.org/Documents/SMART-1.pdf>

USACE 2006. Environmental Transport and Fate Process Descriptors for Propellant Compounds. Environmental Quality and Technology Program. ERDC/EL TR-06-7. June 2006

VOLUME 2 MUNITIONS AND EXPLOSIVES OF CONCERN SAP

Worksheet Specific Comments

1. Worksheet 6: Please include PREQB on this worksheet (for both SAPs) to ensure that PREQB is notified of changes to schedule, scope of work changes, or any other modifications that change the approved field work.
2. Worksheet 11: Please ensure that Worksheet 11 defines the amount of trenching that is needed to characterize the potential MEC contamination in the trenches and describe why this recommended amount of trenching will provide adequate data quantity and quality to characterize the contents of the trenches. Please add some technical justification and support for the recommended amount of test trenching excavation at this site.
3. Worksheet 12:
 - a. Please verify the measurement performance criteria for the IVS. It says that the daily IVS requires 100% detection of the ISOs. This is correct for the detector-aided survey; however, for DGM, the actual criteria should be to detect the ISO and the detection signal intensities should be required to be within some percentage of the calculated signal intensity to ensure that the DGM sensor is functioning properly. Please revise accordingly.
 - b. Please verify the measurement performance criteria for "manual anomaly intrusive investigation." Determining the type, condition and fuzing state of MEC and identifying non-MEC is a task, not a measurement performance criteria. And it appears that this measurement performance criteria is applied to "blind seed items" which don't have a type, condition or fuzing as they are likely to be pieces of pipe.
 - c. The measurement performance criteria for "along line accuracy of geophysical anomalies" of 2-meters does not appear to be appropriate for "anomaly reacquisition." If anomalies reacquisition is only required to be accurate to within 2-meters, please clarify how the excavation process will work when the search radius around anomalies is a maximum radius of 2-ft (see worksheet 14 for "manual anomaly intrusive investigation"). A two-meter accuracy requirement combined with a 2-ft. search radius is not adequate (note that Section 17.7 and worksheet 12 would require "sub-meter accuracy" from the GPS unit). Please clarify how will these different navigation accuracy requirements (2-meters, 2-ft., and sub-meter) be implemented.
 - d. This worksheet also requires emplacing BSI along trench lines for mechanized anomaly investigation of test pits (this requirement is also described in Section 17.9.3 and worksheet 20 on Page 112). Please clarify the purpose of this requirement. Placing a piece of pipe painted blue on a suspected burial pit location that is going to be excavated and investigated

seems to be not relevant to the activity taking place: excavation, removal and identification of the contents of the trench.

- c. Please review this worksheet to ensure that the measurement performance criteria are more relevant to the activities being performed.

4. Worksheet 17:

- a. Section 17.10.1 says that "Gaps in the geophysical data due to unusable data or data that could not be positioned will be evaluated to determine whether they are sufficiently large enough to warrant data recollection in those areas." Please develop a DQO to define what is considered data sufficiency that answers the following question: "How will it be determined that there is adequate data quantity to support decision-making?"
- b. The text in worksheet 17 adds a DFW that is not included on worksheet 14 and the table in Section 17.1 of worksheet 17. This new DFW in the text is Section 17.5: Archeological Discovery. Please either incorporate this task into another DFW or add it to worksheet 17 and the table in Section 17.1 to make the identification and description of DFW consistent throughout the document.
- c. Section 17.2.2 requires, "If non-site personnel or non-essential non-UXO personnel enter the EZ, all MEC operations will cease until the EZ is re-established". Please note that this doesn't account for the presence in the EZ of "authorized visitors" as described in Section 17.13: "Authorized visitors will be allowed to enter the EZ during intrusive operations in accordance with requirements in NOSSA guidance, OP-5, and the DDEWB-approved ESS." Please revise Section 17.2.2 accordingly.
- d. Sections 17.2.2 and 17.13 require all excavations to be backfilled prior to leaving so no open excavations remain after duty hours. Due to the remote nature of the trenching sites, please consider using caution tape and snow fencing to surround open trenches overnight as backfilling each night may result in the need to re-excavate test pits and may also result in QC issues because QC activities are required to be performed prior to backfilling.
- e. Sections 17.2.5 and 17.15.1 and the "references" section: Please reference the Puerto Rico explosives law as a requirement and include compliance with this law to the work plan. A copy of the Puerto Rico explosives law is attached to these comments as Attachment 1.
- f. Section 17.4 prohibits cutting of trees greater than 2-in. in diameter between March 15 and August 30. As the fieldwork is planned to be conducted during this time period cutting of trees greater than 2-in. will not be possible. Please explain if this will allow the planned DGM work at the western portion of the Potential Munitions Burial Trench subarea to be implemented.
- g. The document refers to accessibility in numerous places (see 17.10.1 (first paragraph), 17.10.1 (third paragraph), worksheet 18) but doesn't define "accessibility". Please define what is considered to be accessible and

inaccessible for the various investigation methods that will be implemented at the three full RFI sites. Consider including this information on a map to show how much of the three areas are expected to be inaccessible. The question that needs to be answered is whether or not accessibility will prevent the project goal of characterizing the MEC contamination from being achieved. Note that on worksheet 18 there are no "exclusion areas" noted yet it is implied that there are inaccessible areas that will be excluded from sampling. Please clarify this apparent discrepancy.

- h. Section 17.8.3 says that blind seeds in the "site IVS are identified in the ESS (provided to field personnel under separate cover)." This information is also provided in this document, for example in Sections 17.6 and 17.9.3. Please consider removing the reference to the ESS as it is provided in this document in numerous places.
- i. Section 19.9.3 says that large ISOs will be used as blind seeds for the DGM survey. However, Section 17.6 says that only small and medium ISOs will be used in the IVS. To comply with the recommendations of the GSV document please emplace some large ISOs in the IVS or change the BSI ISOs from large to medium and small.
- j. Section 17.10.1 says that the geophysical survey will address depth requirements in worksheet 11. However, review of worksheet 11 shows that the only depth requirements specified are the excavation limits of 2-ft. (OB/OD area) and 4-ft. (trench area). These are not detection requirements as implied in 17.10.1. In order to establish depth requirements the document should calculate the GSV depth of detection for various MEC and determine if the penetration or burial is potentially greater than the ability of the sensors to detect it. As these two investigation sites are potentially OB/OD and mass burial sites, it is unlikely that detection capability will be a problem. However, this section implies that detection requirements are provided in worksheet 11. Please ensure consistency between the two worksheets.
- k. Section 17.10.2 says that the EM61 MK2 "will be used in areas where the potential MEC may be at deeper depths". Please clarify how these areas will be determined. Is it possible to identify these areas now during the planning process? Also, earlier in the document it was stated that the survey would be done with both the HH and MK2 versions of the EM61. This section appears to be in conflict with that as this implies that the MK2 version will not be used unless the site is suspected to contain MEC at deeper depths. Please explain this and define the approximate limit of the "deeper depths" for this application.
- l. The first bullet and the next-to last bullet in Section 17.10.2 on Page 91, the "geophysical surveying" section on Page 92 and worksheet 18 say either a meandering path or 2-ft. transect spacing will be used. Please explain which method will be used in which situation. These are very different search methods and it is unclear which will be used and where.

- m. Section 17.10.2, first bullet on Page 92 says geophysical surveys will be performed in the previously unsurveyed western portion of the Potential Munitions Trench. It is unclear if this is a real-time or DGM survey. Please explain.
 - n. It is unclear where Section 17.11 on geophysical data processing will be implemented. Will DGM be used only in the western portion of the Potential Munitions Trench which hasn't been geophysically surveyed to date? If so, how will anomalies be identified as potential ordnance items if the contamination is expected to be present in trenches and it will not be possible to identify individual MEC in the trenches. Is there another criterion, other than suspected individual MEC, that should be used?
 - o. Section 17.13 on Page 95 contains the sentence, "These points will be under the control of the SUXOS until the item has been thermally treated." Please explain this statement. What are the "points" in this reference and what thermal treatment is taking place?
 - p. Section 17.15.2 describes acquiring explosives from a local supplier in an "on demand" basis. It is possible that this may take some time and that MEC found at the end of the day will have to remain overnight. Sections 17.15.4 and 17.16 (Page 102) require the SUXOS to maintain security of the MEC but doesn't provide guidance for how to accomplish this. Will the MEC need to be guarded overnight? Please provide guidance on MEC security.
 - q. Section 17.17 requires implementation of procedures in Section 17.8.4 in the event that HTRW is found. However, Section 17.8.4 contains the procedures for CWM, not HTRW, and these procedures are likely to be excessive for routine HTRW. The contractor may want to reconsider this requirement.
5. Worksheet 20:
- a. Worksheet 20 for the soil matrix (detector-aided surface survey) says that if a blind seed is missed that the entire lot of work will be rejected and reworked. Please consider conducting a root cause analysis prior to establishing required rework.
 - b. In worksheet 20 the "N/A" for "sample" under the soil matrix (anomaly intrusive investigation) is confusing. There should be some type of sample specified. If all of the data is supposed to be inspected the sample would be 100%. If none of the data is inspected the sample would be 0%. Please clarify.
6. Worksheet 22: Please provide a reference for the UFP-QAPP Manual referenced here and in Worksheet 29, and clarify whether this document is required to be on-site during the project.
7. Worksheet 25: Please correct the definition of the acronym CVAA to cold vapor atomic absorption.

8. Worksheet 29, Page 128: This worksheet references "FMTR Forms" (according to the list of acronyms this is "field task modification request"). However, the field forms at the end of the document, after the SOPs, do not include an FMTR form. It has an FCR (field change request). Are these the same? If so, please ensure that they are consistently labeled.
9. Worksheet 31: The only assessments required by worksheet 31 on Page 133 for "manual anomaly intrusive investigation" and "mechanized anomaly intrusive investigation" is blind seeding. However, earlier in the QAPP it was stated that it is required for the QCS to inspect all of the excavation holes to ensure complete removal of all anomalies. If this assessment of cleared holes is required, please add to this table.

Attachment 2: MEC Standard Operating Procedures and Field Forms

1. SOP 1:
 - a. This SOP only covers performing detector-aided surface surveys. The Rifle Range will be surveyed by performing detector-aided subsurface surveys but the procedures for that (for example, how anomalies will be marked, whether they excavation will take place immediately upon finding an anomaly or later after the hand-held geophysical survey is completed) are not included in this or other SOPs. Please consider modifying SOP 1 to include a section on performing subsurface surveys using hand-held analog sensors.
 - b. This SOP contains QC requirements that appear to be different than those in the main QAPP. For example, there are requirements to recheck 25% of the first four units of work (a new term not used in the QAPP) and then step up or down the amount of QC based on the results. Please check to see that this is compliant with the requirements of the QAPP and, if not, identify which set of QC requirements will be implemented.
2. SOP 3: Section 5.0 says that EP 75-1-2 contains instrument checks, tests and their required frequencies and acceptance criteria. However, this reference covers MEC support during construction or HTRW operations and doesn't go into detail on the performance and operation of geophysical sensors. Please correct this reference.
3. SOP 8:
 - a. Section 3.0 of SOP 8 indicates that field forms are available on a Tetra Tech web site. Please include the forms in the work plan as EQB does not have access to this web site.
 - b. Section 4.3 in SOP 8 says the Daily Equipment Checklist is MRP FF.4. However, review of the forms at the end of the document shows that MRP FF.4 is the visitor's log. Please correct this reference.
4. The field forms at the end of the document are just placed there without a cover

introducing them or a list of the forms that are included. Please consider adding a cover and an index of the forms.

5. Some of the field forms appear to be included numerous times. For example, the IVS Installation Checklist appears three times and the Daily IVS Report appears twice. Please consider reviewing the forms to make sure the latest versions are included once.