TETRA TECH

PITT-03-10-037

March 22, 2010

Project Number 112G02226

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

ATTN: Mr. Adolph Everett, P.E.
Chief, RCRA Programs Branch

Reference: Contract N62470-08-D-1001
Contract Task Order (CTO) JM04

Subject: U.S. Naval Activity Puerto Rico (NAPR)
EPA I.D. No. PR2170032703
Final Phase 1 RFI Sampling and Analysis Plan for SMWU 77 [Small Arms Range]
And Comment Response Letter

Dear Mr. Everett:

Tetra Tech NUS, Inc., on behalf of the Navy, is pleased to provide you with one hard copy and one electronic copy provided on CD of the Final Phase 1 RFI Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Naval Activity Puerto Rico (NAPR) SWMU 77 [Small Arms Range]. Additional distribution has been made as indicated below. The associated comment response letter addressing comments on the draft version of the document is attached.

If you have questions regarding this submittal, please contact Mr. Art Sanford, BRAC PMO SE, Remedial Project Manager (RPM), at 843-743-2135.

Sincerely,

Linda Klink

Linda Klink P.E.
Project Manager

LEK/clm
Attachments

cc: Ms. Debra Evans-Ripley, NAVFAC SE (letter only)
Mr. David Criswell, BRAC PMO SE (letter only)
Mr. Art Sanford, BRAC PMO SE (1 hard copy and 1 CD)
Mr. Mark Davidson, BRAC PMO SE (1 hard copy and 1 CD)
Mr. Stacin Martin, NAVFAC LANT (1 hard copy and 1 CD)
Mr. Pedro Ruiz, NAVFAC LANT (1 hard copy and 1 CD)
Mr. Tim Gordon, US EPA Region II (1 hard copy and 1 CD)
Mr. Carl Soderberg, US EPA Caribbean office (1 CD only)
Ms. Wilmarie Rivera, PR EQB (1 hard copy and 1 CD)
Ms. Gloria Toro-Agrait, PR EQB (1 hard copy and 1 CD)
Mr. Felix Lopez, US F&WS (1 CD)

Tetra Tech NUS, Inc.
661 Andersen Drive, Pittsburgh, PA 15220-2745
Tel 412.921.7090 Fax 412.921.4040 www.ttnus.com

TETRA TECH



Mr. Jonathan Flewelling, TechLaw, Inc (1 CD)
Mr. James Pastorick, UXO Pro (1CD only)
Ms. Karen Vetrano, TRC Environmental (1 CD only)
Mr. Mark Kimes, Baker Environmental (1 CD only)
Ms. Bonnie Capito (Librarian), NAVFAC LANT (1 hard copy and 1 CD for Admin Record)
File N62470-08-D-1001, CTO JM04 112G02226 (1 hard copy and 1 CD)

**RESPONSE TO USEPA PROVIDED COMMENTS DATED JANUARY 22, 2010**
**ENCLOSURE 3 (TechLaw, Inc. Comments Dated December 18, 2009)**
**DRAFT SAMPLING AND ANALYSIS PLAN DATED NOVEMBER 2009**
**SWMU 77 – SMALL ARMS RANGE**
**NAVAL ACTIVITY PUERTO RICO (NAPR), CEIBA, PUERTO RICO**

## GENERAL COMMENTS

1. **Comment:** The *Draft Sampling and Analysis Plan for SWMU 77 – Small Arms Range, Volumes 1 and 2*, dated November 2009 (SAP) describes an efficient and logical approach to addressing possible Munitions and Explosives of Concern (MEC) and Material Potentially Presenting an Explosive Hazard (MPPEH) in four addressed Munitions Response Areas (MRAs) where MEC/MPPEH is suspected. The equipment and techniques described within the subject document are consistent with current industry standards.

   According to the SAP, of the six MRAs, the Pistol Range and Former Pistol Range have been ruled out for MEC/MPPEH investigation. However, the SAP indicates that they will be inspected for munitions constituents. The logic presented for this is consistent with other MMRP site investigations on small arms ranges.

   **Response:** The comment is acknowledged and no response is necessary.

2. **Comment:** The SAP does not provide all of the required laboratory-specific information. For example, Worksheet #12 lists "within laboratory statistically derived percent recovery (%R) [Percent Recovery] limits" for the matrix spike (MS) measurement performance criteria; however, the laboratory-specific %R limits have not been provided for all analyses. Further, the laboratory quality assurance (QA) manual has not been provided. The QA manual is necessary to document how the laboratory performs QA procedures (e.g., corrective actions, etc.). Revise the SAP to provide this information.

   **Response:** Appendix D will be expanded to include all relevant laboratory QC limits and the requested laboratory QA manual will also be added.

3. **Comment:** The SAP indicates that munitions constituents (MC) could contaminate soil at all SWMU 77 subareas, except for firing points (e.g., see page 49 of 121). Additionally, it appears that propellant (i.e., nitroglycerin) is the only analysis proposed at firing points. However, it is unclear why the potential for metals contamination has not been considered at the firing points since it is possible that bullets may have misfired or been dropped on the ground in the vicinity of firing points. Revise the SAP to clarify why analysis for metals has not been proposed at the firing points and/or firing lines.

   **Response:** The Phase 1 RFI focuses investigations on biased areas known to be or most likely to be contaminated and would, therefore, be areas of maximum concentrations, to make decisions regarding moving forward to a Full RFI. Propellant is the MC of concern at firing points. While it is agreed that bullets may have been fired or dropped on the ground in the vicinity of firing points, the numbers and resulting metals contamination would be expected to be minimal compared with the berm area. The following sentence will be added to Section 10.5.1, end of 3rd paragraph: *"Any misfired bullets in the vicinity of the firing points/firing lines would be nominal, especially when compared to bullets associated with the berm areas."*

4. **Comment:** The SAP indicates that all proposed soil samples will be collected via hand auger, with some subsurface soil samples to be collected from one to three feet below ground surface (bgs). It is unclear if the proposed baggies will be large enough to hold and homogenize an entire subsurface sample from one to three feet bgs or if some other method for homogenizing these samples will be used. For composite samples, it is unclear how the entire sampling interval for all of the proposed aliquots (i.e., in many cases ten aliquots per composite sample) will be homogenized, or if representative portions of the sampling interval will be selected for homogenization. Revise the SAP to provide additional detail regarding collection procedures for soil samples. If representative portions of a sampling interval will be used instead of the entire interval, ensure the SAP describes how these portions will be selected.

   **Response:** As described in the SAP, all **subsurface soil samples** will be collected as grab samples within an interval of 1- to 3-feet bgs. Large baggies, one to two gallon capacity, will be used during the collection of subsurface soil samples to ensure that the entire volume can fit in the baggie for homogenization.

   Only **surface soil samples** will be composited; 10-point composite surface soil samples will be collected at several subareas. Each composite sample will consist of 10 surface soil aliquots, surface soil aliquots will be collected from 0- to 6-inches bgs. Similar to subsurface soil sample collection, large baggies will be used during sample homogenizing to composite surface soil samples.

   Section 17.2, 4th paragraph, next to last sentence will be clarified as follows: "At all sample locations, the sample material will be placed in a zip-top plastic baggie *(one to two gallon capacity depending on the sample volume)*, which will be marked with....."

5. **Comment:** The SAP references Method 8330A. However, Method 8330B was issued in October 2006. This method should be used for applicable explosives analyses. Revise the SAP to indicate that Method 8330B will be used.

   **Response:** As provided in the SAP, Method 8330A will be used as that is the method that the selected laboratory is currently certified for under the DoD Environmental Laboratory Approval Program (ELAP). As discussed during the planning meeting, Method 8330B sampling (incremental) and preparation (grinding) is not proposed for this project. Method 8330A precision and accuracy meet the data quality objective goals for this project.

   Also, please note that the Navy's laboratory certification process has changed since the draft SAP was prepared and so references to Naval Facilities Engineering Services Center (NFESC) certification will be revised to indicate that the analytical laboratory is now certified under the DoD ELAP and the new accreditation will replace the NFESCE certification in Appendix D-1.

6. **Comment:** The SAP indicates that metals will be analyzed by Method 6010B. However, there is a newer method available for this analysis. It is recommended that the SAP be revised to indicate that Method 6010C will be used, in place of Method 6010B. Alternatively, if Method 6010B will be used, ensure that a post digest spike (PDS) will be analyzed whenever a MS does not meet acceptance limits (i.e., except when sample concentration is greater than four times the MS concentration). In addition, ensure that the acceptance criteria for laboratory control samples, MS, and laboratory duplicates presented in Method

6010C will be utilized.

**Response:** As provided in the SAP, Method 6010B will be the method utilized for metals analysis. As suggested, PDS will be analyzed whenever an MS does not meet acceptance criteria and acceptance criteria for laboratory control samples, MS, and laboratory duplicates as presented in Method 6010C will be utilized during this project. A line item for PDS was added to Worksheet 28 and on the line item for MS in the acceptance limits column the text *"except when sample concentration is greater than four times the MS concentration"* was added.

7. **Comment:** The SAP indicates that the data validators are employed by Tetra Tech NUS, Inc. (Tetra Tech). From the information presented in the SAP, it is unclear if the data validators will be independent of the data generation and interpretation process. Revise the SAP to clarify if the data validators are independent of the data generation and interpretation process.

   **Response:** The data validators will be personnel independent of the data generation and interpretation process. A footnote will be added to both Worksheets #34 and #35 for clarification to make this point.

8. **Comment:** The SAP does not provide all of the required forms. For example, generic audit information is provided in the SAP. However, examples of audit checklists are not provided. Revise the SAP to include copies of audit checklists, data validation checklists, corrective action forms, and data reporting forms or example laboratory reports. Ensure that the checklists identify the specific items to be evaluated.

   **Response:** Data provided by the laboratory will be presented as standard CLP and CLP-like forms. Additionally, data will be validated following USEPA Region 2 Quality Assurance Guidance and Standard Operating Procedures. Forms will be obtained from the website http://www.epa.gov/Region2/qa/documents.htm.

9. **Comment:** The SAP briefly discusses completeness in Worksheet #37. However, field and laboratory completeness goals have not been defined. Further, the SAP should indicate how completeness is calculated for the laboratory and field (e.g., per analyte or per sample). If the completeness will be measured on a per sample basis, ensure that the SAP indicates when a sample will be considered as rejected (e.g., if one compound is rejected, if five results are rejected, etc.). Revise the SAP to clarify how completeness will be calculated for the laboratory and field.

   **Response:** The following will be added to the end of the Completeness discussion in Worksheet #37:

   *"Completeness will be calculated in two ways, on a per sample basis and a per analyte basis in order to determine how many samples were actually collected and how many total results were received from the laboratory per analyte based on validation (rejected or blank contamination) results, respectively. Completeness will be determined using the following equation:*

   $$\%C = (V/T) \times 100$$

*where* *%C = percent completeness*
*V = number of samples taken or results determined to be valid*
*T = total number of planned samples or results*

*The project completeness goal for samples collected and valid, usable analytical results (i.e., not rejected) is 95%."*

10. **Comment:** The SAP briefly discusses document control procedures but does not provide sufficient detail to satisfy the requirements of Section 3.5.5 of the *Uniform Federal Policy for Quality Assurance Project Plans Manual*, dated March 2005 (UFP QAPP Manual). The SAP should indicate where the project files will be stored and who will manage them (including address and contact information). The SAP should also identify the minimum amount of time that the project files must be kept. Additionally, the SAP should indicate that records will be offered to EPA prior to disposal. Revise the SAP to provide this information.

    **Response:** As discussed in Worksheet #14, Data Storage, Archiving, and Retrieval, the project data and records are stored for the life of the Navy CLEAN Tetra Tech contract prior to archiving in secure project files audited for accuracy and completeness, and eventually handed over to the Navy for long-term storage. (Also of note, an Administrative Record is maintained for NAPR). The following sentence will be added to the paragraph as follows: "*The secure project files will be stored by Tetra Tech [at Business Records Management (BRM)] as per Worksheet #29.*"

    A footnote will be added to Worksheet #29 Project Documents and Records Tables stating that "*Tetra Tech storage of archived project documents and records will be secured at third-party professional document storage firm in the BRM repository located at 651 Mansfield Ave., Pittsburgh, PA 15220.*"

11. **Comment:** The SAP proposes to analyze the following metals: antimony, arsenic, copper, lead, and zinc. However, the SAP does not clearly state why these particular metals were chosen. According to the *Munitions Constituent Sampling* technical update, issued by the Military Munitions Center of Expertise in March 2005, if the specific list of ordnance is not known, then the technical update recommendation is to analyze for the 23 Total Analyte List (TAL) metals or state-specific list. Zirconium, titanium, and strontium may also be potential metals of concern. Further, tungsten is an emerging metal of concern associated with tungsten bullets used as an alternative to lead. Revise the SAP to explain the selection of metals for this project or consider expanding the list of metals.

    **Response:** The Interstate Technical regulatory Council (ITRC) has published a guidance document titled "Characterization and Remediation of Soils at Close Small Arms Firing Ranges." The metals which have been identified for potential consideration include lead, antimony, arsenic, tin, copper, zinc and iron. Antimony and arsenic are present in lead. Copper and zinc are components of jacket alloys. Tin would be present in copper bullet core alloys. Iron would be present from iron tips in penetrator rounds. Lead, arsenic, antimony, copper, and zinc were chosen as the constituents most likely to be present in significant concentrations and potential risk/hazard. Tin was not chosen for analysis because it would be present only in copper bullet cores in small concentrations and has a high USEPA Residential Soil Screening Value (R-RSL) (5,500 mg/kg for residential uses). Iron was not chosen because penetrator rounds were not suspected to have been used and the high R-RSL (640 mg/ kg).

Therefore, antimony, arsenic, copper, lead, and zinc have been chosen for analysis during this Phase 1 RFI and the sampling plan focuses the investigation on biased areas known to be or most likely to be contaminated in order to make decisions regarding moving forward to a full RFI.

The purpose of the Phase 1 RFI is to generate field data efficiently to determine if further response action or remedial investigation is appropriate. Also, stringent screening criteria are being used for decision-making purposes for this Phase I RFI. These primary metals of concern are the current list that is known to be associated with the site. For MEC subareas, if these primary metals of concern exceed criteria (or anomalies indicating potential MEC are encountered), the decision will be to proceed to a Full RFI potentially expanding the analyte list. A planning meeting including the regulatory agencies would be arranged to support SAP development for a Full RFI.

Based on the available range records for NAPR from 2003 through 2009, included as Appendix B-1.2 of the SAP, no items are tungsten related (i.e., 5.56mm Ball M855 Lead Free and 5.56mm Armor Piercing (AP) M995 types). Range records before 2003 are not available so this info does not completely answer the tungsten question. However, a Tungsten Issues Paper dated October 2008 by the Association of State and Territorial Solid Waste Management Officials, Federal Facilities Research Center (refer to the website link http://astswmo.org/publications_federalfacilities_policytechnology_tungstenmunitions.html for the paper) discusses the use of tungsten munitions and associated issues. Based on the paper, tungsten bullets were not used at NAPR (see the far right column listing of facilities where tungsten bullets were used). Furthermore, the range operator, Elba Zaleski, has indicated that tungsten bullets potentially used by the Army were never used at the NAPR Small Arms Range.

**SPECIFIC COMMENTS**

1. **Comment: SAP Worksheet #10, Site History and Background, Page 43 of 121:** The last paragraph on this page describes munitions items observed at the Rifle Range Subarea during the site visit and refers to Appendix B-3 [Volume 1], Photograph 12. The photographs in Appendix B-3 [Volume 1], page 7 of 19 are missing photo "D." In addition, the photo descriptions included in Appendix B-3 are. Correct this photo page by adding photo "D" along with correcting the identifications listed below the photos. Photos "A & E" should be labeled M781 vs. M78.

   **Response:** A photo is not missing. Photo 12E will be relabeled as Photo 12D and Photo 12F will be relabeled as Photo 12E. The photo descriptions are correct. The typographical error "M78" in Photo 12A and 12E descriptions will be revised to "M781."

2. **Comment: SAP Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements, Page 51 of 121:** This worksheet states, "[p]otential contaminants include select metals, explosives, and propellants specifically, Nitroglycerin (NG)." Section 17.2.2 also states "NG was used as the propellant for the fired bullets." Single base nitrocellulose and double-base (a mixture of nitrocellulose and nitroglycerin) were the most common small arms propellants used in the 1940-1950 era. Ensure that laboratory tests of soil samples are appropriate for these chemicals.

   **Response**: Neither an R-RSL nor ecological screening value are available for nitrocellulose,

which is used as a propellant or low-order explosive; it is also known as guncotton. Nitrocellulose is of low toxicity because it consists mainly of cotton (or wood pulp) with minor amounts of acid. There is no evidence to suggest that nitrocellulose has any detrimental effect on the environment. Nitrocellulose is not included as an analyte because of its lack of toxicity. In addition, available analytical methods are prone toward false positives results. Therefore, nitrocellulose analysis will not be added to the SAP.

3. **Comment: SAP Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements, Page 54 of 121:** Section 11.3 states, "The subsurface soil interval of interest at this subarea is from 6 inches to 4 feet bgs; a 1 to 3 feet bgs soil sample will sufficiently address the interval of interest." However, it is unclear why the subsurface sampling interval has been adjusted to one to three feet bgs, given that the subsurface soil interval of interest is six inches to four feet bgs. Revise the SAP to provide a justification for selecting a sampling interval of one to three feet bgs, instead of addressing the entire subsurface interval of six inches to four feet bgs.

   **Response**: It is correct that 6-inch to 4-foot bgs is the overall interval of interest; however, sample collection will be biased toward the 1- to 3-foot bgs interval. A 2-foot interval is a standard sample collection interval. Moreover, this is a Phase 1 RFI and the SAP focuses the investigation on biased areas known to be or most likely to be contaminated. Concentration of contaminants is expected to decrease with depth and the 1- to 3-foot depth is more likely to contain contamination; therefore, collection of additional sample volume from the 3- to 4-foot interval would tend to dilute the sample concentration if subsurface contamination is present and, moreover, surface soil samples from the 0- to 6-inch interval will also be collected and are anticipated to have the maximum concentrations of contaminants, if any.

   The subject sentence in Section 11.3, 2nd paragraph, will be clarified as follows: "The subsurface soil interval of interest at this subarea is from 6 inches bgs to 4 feet bgs; a 1 to 3 feet bgs soil sample *is a standard two foot sampling interval and* will sufficiently address the interval of interest *biased to the interval most likely contaminated in the subsurface. If contamination is present at the Potential OB/OD Subarea during the Phase 1 RFI, additional depth intervals for sampling will be considered during a Full RFI to further refine contamination zones by depth."*

4. **Comment: SAP Worksheet #14, Summary of Project Tasks, Page 62 of 121:** Under the data management section on this page, the SAP indicates that the project documentation and records will include laboratory data package deliverables as described in the analytical specifications. However, the SAP should provide a list of all required items that must be included in the data packages per Section 3.5.2.1 of the UFP QAPP Manual. Revise the SAP to include this information.

   **Response:** A list of the items included in the final laboratory data package is provided in Worksheet #29. An asterisk will be placed next to all of the elements that will be included in the final laboratory data package and will include: sample receipt/log-in forms, sample storage records, sample preparation logs, standard traceability logs, equipment calibration logs, sample analysis run logs, reported field sample results, reported results for standards, quality control checks, and quality control samples, extraction/clean-up records, and raw data.

5. **Comment: SAP Worksheet #15, Reference Limits and Evaluation Table, Pages 65 and 66 of 121:** This worksheet indicates that the EPA Residential Soil Screening Values (RSLs) were utilized as the project action limits (PALs) for many of the compounds associated with this project. However, it appears that several of the PALs listed in Worksheet #15 are incorrect and in many cases it seems that the values may not have been accurately converted from scientific notation to numerical values (e.g., the PAL listed for 1,3,5-trinitrobenzene is 220 mg/kg, but the EPA RSL is 2200 mg/kg). Revise the SAP to ensure the PALs are consistent with the cited references.

   **Response:** As indicated in Footnote 1 of Appendix B-5, which presents all of the screening criteria evaluated, USEPA R-RSL screening criteria based on noncarcinogenic effects were divided by 10 to account for cumulative effects on target organs/systems. This footnote will be added to Worksheet #15 for all applicable analytes where the R-RSL value was divided by 10. Also, note that R-RSLs were updated in 12/2009 and these revised values are incorporated in Worksheet 15 and Appendix B-5.

6. **Comment: SAP Worksheet #17, Sampling Design and Rationale, Page 75 of 121:** The text indicates that X-Ray Fluorescence (XRF) data may be used in evaluations of potential human health risk from exposure to contaminants in soil at the subareas, provided that a satisfactory correlation between the fixed-base data and field XRF data is obtained. However, it is unclear if the use of XRF data will be suitable for risk evaluations. Further, the text states, "[i]f a correlation coefficient (commonly denoted as "r") of 0.65 or greater is obtained for a region, the fit will be considered adequate to translate field XRF results to the equivalent laboratory lead concentrations with confidence." The SAP does not indicate why a correlation coefficient of 0.65 or greater is sufficient to demonstrate that the field XRF results are equivalent to laboratory lead concentrations. Additionally, the SAP should discuss why the proposed correlation coefficient of 0.65 is appropriate given that the XRF data may potentially be used in risk evaluations. Revise the SAP to clarify this information.

   **Response:** The following explanatory paragraph will be added to Worksheet #17, the end of Section 17.2.1, Correlation of XRF Data with Fixed-Base Laboratory Samples for Lead:

   "*The magnitude of r, the correlation coefficient describes the strength of a linear relationship. If all pairs of data ($x_i$, $y_i$) were to lie exactly on a straight line then the correlation coefficient would be 1. A value of r close to zero implies that a linear association is weak. Therefore, a correlation coefficient greater than 0.65 would indicate a linear relationship exists between the two variables. With a linear relationship established the XRF data could be used to determine the laboratory concentrations with the use of a regression analysis.*"

7. **Comment: SAP Worksheet #17, Sampling Design and Rationale, Page 77 of 121:** The first paragraph states, "[t]he locations of surface/subsurface soil samples will be determined based on the results of the MEC investigation and the CSMs. If there are no anomalies or if no surface MEC are found in these subareas, the samples will be collected in areas suspected to be contaminated...This biased selection of sample locations will ensure that any potential contamination is not overlooked." It is unclear how biased selection of sample locations will ensure that contamination will not be overlooked. Revise this section to provide further justification for the proposed sampling approach or consider multi-increment sampling. Additionally, since the exact sampling locations have not yet been determined, it is recommended that the justification for selecting each sample location be thoroughly documented in the field log books, as well as the project report. Revise the SAP to indicate

that justification for selection of each sample location will be thoroughly documented in the project report.

**Response:** As presented in Worksheet #11, surface/subsurface soil samples will be collected from areas known to be or most likely to be contaminated. The selected locations and numbers of samples, along with the use of stringent screening criteria for decision-making purposes, support the attainment of the stated project objectives. Biasing the sampling toward the study areas that are most likely to have been contaminated is an important part of the investigative strategy because the goal of the Phase 1 RFI is to determine if contamination is present in surface/subsurface soil at concentrations exceeding the PALs. This strategy minimizes overlooking the presence of any significant contamination. The results of the investigation will be evaluated to determine whether the data collected are sufficient to support the attainment of project objectives. This will involve a review and evaluation of contaminant concentrations and concentration patterns for both field screening data and fixed-based analytical results to ensure that contaminants are likely to have been detected if present. Stakeholders will be included in decision-making. Furthermore, if there are no anomalies and no surface MEC found in suspect MEC subareas, then the default locations for sampling [selected based largely on aerial photography interpretation (see Appendix B-2) and visual site inspection by the field team during RFI investigation] will be employed. This approach biases the sampling in the most likely locations where contamination is expected to be biased high.

Worksheet #17, Section 17.2.4, end of paragraph, will be rewritten to read: "This biased selection of sample locations *in areas identified as potentially contaminated, based on historical information and field observations,* will ~~contamination is not overlooked~~be used to determine if a past contaminant releases(s) has occurred or sources(s) of contamination is present that warrants further investigation and characterization. *Justification of the selection of each sample location will be thoroughly documented in field log books as well as the project report."*

8. **Comment: SAP Worksheet #20, Field Quality Control Sample Summary Table, Page 90 of 121:** Only one field duplicate is listed for explosives. However, 21 field samples are proposed and the frequency of field duplicates, MS, and MS duplicate (MSD) is listed as one per 20 samples. Therefore, two samples each for field duplicates, MS, and MSD should be required. Revise the SAP to address this discrepancy.

   **Response:** The SAP will be revised to indicate that two each field duplicates, MS, and MSD samples will be collected for explosives analysis as a maximum total of 21 samples are proposed for collection. However, a footnote will be added to Worksheet #20 (and Worksheet #18 on the Potential Munitions Trench Subarea table) stating that.... "*Surface soil samples will be collected at the Potential Munitions Trench Subarea only if subsurface anomalies are detected.*" If the Potential Munitions Trench Subarea samples are not collected, a total of 18 samples for explosive analysis will be collected and then only one field duplicate, MS, and MSD will be collected. Additionally, the number of rinsate blanks will be revised in Worksheet #20 to reflect that these QC samples will also be collected at a frequency of 1 per 20 samples per matrix per analyte.

9. **Comment: SAP Worksheet #28, Laboratory QC Samples Table, Pages 104 and 105 of 121:** These pages list the quality control (QC) samples required for metals. However, MS, PDS and serial dilution have not been included. Revise Worksheet #28 to include MS, PDS

and serial dilutions.

**Response:** Agree. Worksheet #28 will be revised to include the MS, PDS, and ICP serial dilution.

10. **Comment: SAP Worksheet #28, Laboratory QC Samples Table, Pages 105 and 106 of 121:** This worksheet often references "DoD QSM QC acceptance criteria" for acceptance limits and/or measurement performance criteria. The SAP should specify this information or provide a specific reference (i.e., document name, section name, page number) to where this information can be located. Revise the SAP to provide this information.

    **Response:** Agree. The SAP will be expanded to include the QC acceptance criteria in Appendix D and a footnote will be added to Worksheet 28.

11. **Comment: SAP Worksheet #37, Usability Assessment, Page 120 of 121:** The last paragraph on this page states, "[s]tatistical outliers will be conducted using standard statistical techniques appropriate for this task." However, given that the sampling locations are non-random, typical statistical techniques may not be applicable to this project. Revise the SAP to clarify what type of statistical techniques will be used for this non-random sample set.

    **Response:** Although the Navy agrees that judgmental, non-random sampling is inappropriate to use for statistical analyses used to determine if a site is "clean" or "dirty" (e.g., MARSSIM Sign Test), it is not the intent of the statistical analyses to be performed for this SAP. The simple summary statistical analyses described will be evaluated to assist in making the determination of whether sufficient laboratory data of acceptable quality are available for decision making not whether or not the site is "clean" based on statistical analyses of populations. The statistical evaluations will include simple summary statistics for target analytes, such as, maximum concentration, minimum concentration, number of samples exhibiting non-detected results, number of samples exhibiting positive results, and the proportion of samples with detected and non-detected results. Therefore, no changes to the text are necessary.

12. **Comment: SAP Worksheet #37, Usability Assessment, Page 121 of 121:** The text states, "[f]or statistical comparisons and mathematical manipulations, non-detected values will be represented by a concentration equal to one-half the sample-specific reporting limit [RL]." However, it is unclear why non-detected values will be represented by a concentration equal to one-half the RL since the lowest value that the laboratory has demonstrated that they can reliably achieve is the RL. Revise the SAP to provide justification for using one-half the RL to represent non-detected values.

    **Response:** Concentration values can only be quantified to reporting limits. The following text will be added to Worksheet #37, end of section of table entitled Describe the evaluative procedures used to assess overall measurement error associated with the project section (top of page 121) to provide justification for representing non-detected valued at one-half of the reporting limits.

    "*The true concentration of a non-detected result lies somewhere between zero and the sample-specific reporting limit. One-half of the concentration of the sample-specific reporting limit will be used for statistical and mathematical manipulations so that the*

*probability of biasing the concentration high or low is equal (i.e., fifty percent)."*

13. **Comment: SAP Worksheet #37, Usability Assessment, Page 121 of 121:** The text states, "[d]uplicate results (original and duplicate) will not be averaged for the purpose of representing the range of concentrations; however, the average of the original and duplicate samples will be used to represent the concentration at a particular sampled location." Since this effort is focused on determining if contamination is present, it is recommended that a conservative approach be taken by considering the highest value from duplicates, instead of averaging. Revise the SAP to indicate that the higher value among duplicates will be used to represent the concentration at a particular sampled location.

    **Response:** Original and duplicate sample results will be evaluated individually. All results, original, duplicate, and average, will be presented in the report. If the original and duplicate sample concentrations meet duplicate precision criteria, then the average concentration will be utilized, as described in the SAP, as this would be a more representative concentration for the sample location. If duplicate precision criteria are not met, then the original and duplicate sample results will be evaluated and the project team will decide which sample concentration to utilize for decision making purposes. It is very unlikely that decision making would be affected (i.e., all samples in a given data set would have to be less than the PAL except for one sample/duplicate pair with one value less than the PAL and one value greater than the PAL).

14. **Comment: Figure 10-5, Former Pistol Range Subarea:** The note on this figure indicates that the most probable firing direction was to the north. However, the arrow on the figure, and the text of the SAP, indicates that the most probable firing direction was to the east at this subarea. Revise the SAP to correct this discrepancy.

    **Response:** The figure and text are correct and the note on Figure 10-5 will be revised to reflect that the probable firing direction is to the east.

15. **Comment: Appendix A, Section 11.2:** Paragraph 2 explains the MRA geophysical search depths below ground surface. These depths, along with their reasoning, are correct for the MRA histories; and the equipment used is appropriate for the depths to be achieved. Geophysical mapping of the open burn/open detonation (OB/OD) subarea and Potential Munitions Trench subarea will present buried anomalies only to the depth of the largest item; and any smaller anomalies below will be shadowed by the larger anomalies above. The Geonics EM-31 & EM-61 systems are appropriate for this geophysical survey. With the small search areas of these two MRAs, the use of ground penetrating radar would be an available option if continuing geophysical survey were required beyond the EM 31/61 surveys. Ensure that these issues are appropriately addressed.

    **Response:** Ground penetrating radar (GPR) can detect some metallic and non-metallic objects, in practical use, GPR (like EM) cannot identify a subsurface object. In limited cases GPR data can be used to suggest the possible presence of certain large objects, and those items might include torpedoes, mines, bombs, pipes, underground storage tanks (USTs) or drums since they possess characteristic shapes and are large in size. Many of the expected potential munitions at these sites, however, would not fall into this category, and using GPR would not support an interpretation of their suggested potential presence [debris items, cobbles (rocks), or tree roots could resemble potential small to medium sized munition item GPR reflections]. Additionally, objects buried underneath other objects may not be

detectable with the GPR method (depending on the circumstances, e.g., size, composition, and positions of objects involved).

The EM methods proposed are UXO industry standard methods used to search for possible munitions and landfilled materials (efficient geophysical methods). The objective is to identify if anomalies are present that could be reflective of MEC and not to identify specific items and "shadowing" of anomalies at different depths. Future investigation phases at these sites (e.g., Full RFI) might involve intrusive operations to determine what is present at the location of an EM anomaly. A separate SAP would be prepared for a Full RFI with the Phase 1 RFI results as the basis. It is premature at this time to identify geophysical methods for a Full RFI.

16. **Comment: Appendix C, SOP 08, Field Portable X-Ray Fluorescence Analysis of Soil Using the INNOV-X Alpha Series Instrument, Page 8 of 11:** The text indicates that the dried samples will be re-homogenized. However, it is unclear if the soil will be passed through a sieve after drying and homogenizing and prior to analysis. Also, it is unclear if the soil samples sent to the fixed-base laboratory will be processed (i.e., dried and homogenized) in the field, or if the fixed-base laboratory will process the samples prior to analysis. Revise this SOP to clarify if the homogenized soil will be sieved prior to analysis in the field and if so, what size sieve will be used. Also, revise the SAP to clarify if the samples sent to the fixed-base laboratory will be dried and homogenized in the field or at the fixed-base laboratory and if they will also be sieved.

**Response:** Section 17.2.1, XRF Lead Sampling and Analysis Methodology, will be expanded as follows:

1st paragraph, 1st sentence: "For samples undergoing field XRF analysis, any bullets or bullet fragments *greater than the size of a pea* observed in a sample will be removed, *by hand* prior to *homogenization and* analysis, because they do not reflect contamination that has migrated to soil."

2nd paragraph: "Samples from each of the following subareas having target areas, including the Rifle Range Subarea (earthen berm and wooded embankment), Pistol Range Subarea, and Former Pistol Range Subarea will be homogenized in the baggies *or other containers as appropriate*, processed *(particles greater than the size of a pea separated from the sample and sample dried as necessary)*, and undergo XRF screening in accordance with SOP 08. Based on the distribution of the XRF screening results surface soil samples will be chosen for submittal to the fixed-base laboratory,~~collected~~ the sample placed in the appropriate sample container and placed on ice prior to transportation to the fixed-base laboratory. *The same sample that was screened via XRF will be submitted to the fixed-base laboratory for analysis.* Unused portions of a collected sample not used for analysis will be returned to the sample location from which it was collected."

**MINOR COMMENTS**

1. **Comment: Appendix B, Project Support Information, Sections B-2.2 through B-2.4:** These three sections present the aerial photographs and site development for three of the subareas. However, the title page for each section does not match the caption of the photographs. Revise these sections to resolve these discrepancies.

**Response:** The captions on the aerial photographs in Sections B-2.2 through B-2.4 are correct; the title pages will be revised to indicate the correct subarea.

2. **Comment:** **Appendix B, Project Support Information, Section B-3, Photographs:** Photograph 12 presents various MEC/MPPEH items and fragments found in the Rifle Range Subarea. However, photograph F is not described in the caption. Revise the text to describe the MEC/MPPEH pictured in photograph 12-F.

   **Response:** Agree. Refer to the Navy's response to Specific Comment #1.

**RESPONSE TO USEPA COMMENTS DATED JANUARY 22, 2010**
**ENCLOSURE 4 (Commonwealth of Puerto Rico Environmental Quality Board, Hazardous Wastes Permits Division (HWPD) of the Land Pollution Control Area and Federal Facility Coordinator (FFC) Joint Comments dated January 19, 2010)**
**DRAFT SAMPLING AND ANALYSIS PLAN DATED NOVEMBER 2009**
**SWMU 77 – SMALL ARMS RANGE**
**NAVAL ACTIVITY PUERTO RICO (NAPR), CEIBA, PUERTO RICO**

## I. GENERAL COMMENTS

1. **Comment**: Along with each soil sample, a volume of soil should be collected to determine the percent by weight analysis of any bullets (slugs or casings). This information is needed to quantify all lead impacts, evaluate potential exposures and to aid in considering appropriate future actions at these sites. Approximately five (5) pounds of soil, after each sample is collected, should be placed into a clean container (e.g., single-use bucket) for this evaluation. The total weight of the soil should be determined, then the entire sample screened using a O.25-inch wire screen and then the residual items (i.e., bullets) should be weighed. Thus, the relative percent by weight of bullets vs soil may be determined. Furthermore, these soil aliquots may be used for additional analyses including: grain-size distribution, organic content (humates), clay content/ plasticity, mineralogy, and soil pH.

   **Response:** As noted in Section 17.2.1, sample locations will be adjusted to locations where lead shot or bullets/bullet fragments are visible. Documentation of bullets/bullet fragments associated with a given sample will be recorded.

   The purpose of the Phase 1 RFI is to generate field data efficiently to determine if further response action or remedial investigation is appropriate. For the Phase 1 RFI, as little disturbance of site conditions is preferred. The proposed bucket evaluation is more appropriate for a Full RFI and the Navy agrees to implement the task at that time. A planning meeting including the regulatory agencies would be arranged to support SAP development for a Full RFI. Note that as per the decision tree of Figure 11-1, regardless of whether or not contaminant concentrations exceed criteria, the next step would be to proceed with investigation to support removing and disposing of bullets in high density areas, such as the berm.

   Soil lithology will be documented in the field by a geologist using standard classifications. The Navy agrees to add soil pH to the analytical list as it will provide information concerning leachability of metals.

2. **Comment:** Please include a discussion of the potential for the berms to have been reworked during their active use or constructed using soil previously contaminated or containing bullets. If berms may have been reworked, then additional sampling along the top and across the rear of the berm may be appropriate for characterizing contamination.

   **Response:** The berms do not appear to have been reworked. Regardless, the purpose of the Phase 1 RFI is to generate field data efficiently to determine if further response action or remedial investigation is appropriate and the SAP will be able to meet this objective. Determining the depth/extent of the bullets will be addressed during a future

response action or the Full RFI. However, the suggestion to examine the top and rear of the berm is a good one and a visual inspection will be added to the Phase 1 RFI SAP.

The following sentence will be added to Section 17.2.1, Selection of XRF Samples for Lead Analysis, end of 2nd paragraph: *"In order to better characterize the berm and determine if it has been reworked, the site walkover will include a visual survey of the top and rear of the berm for bullets/bullet fragments."*

3. **Comment:** The field activities should be expanded to include measurement of the length, breadth, and height of all target berms so that volumetric estimates can be calculated.

   **Response:** Measurements were made during the initial site visit and are shown on the figures; additional measurements will be made during site reconnaissance and this field investigation and the results will be presented in the Phase I RFI Report.

## II. PAGE-SPECIFIC COMMENTS

1. **Comment:** Table ES-1. Please also analyze soil samples for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), as accelerants and other materials may have been used or disposed of at the Potential OB/OD area.

   **Response:** The proposed analyte list for the Potential OB/OD subarea includes analysis of select metals, nitroglycerin, and select explosives. These are the primary contaminants that would be expected to be present. If anomalies are detected at this site, and/or if concentrations of these analytes exceed conservative screening values, then results will be evaluated and an expanded analyte list may be recommended during future investigation at this area. Furthermore, groundwater investigation is not included as part of the Phase 1 RFI. However, the Navy has agreed to conduct groundwater investigation during the Full RFI and additional analytes for groundwater may be included.

2. **Comment:** Table 10-2. Please add grenades to the Munition Type for the Rifle Range Area, based on the description on page 47, paragraph 1. If it is possible that grenade launchers were used, then please add perchlorate to the analyte list. Please also add cadmium to the metals analytes due to its frequent detection at firing ranges. Please clarify why nitrocellulose (NC) and nitroguanidine (NQ) were not included in the analyte list of propellants.

   **Response:** Footnotes 2 and 3 of Table 10-2 identify several items observed as being present at the Rifle Range Subarea and include: intact M781 practice grenade and fragments; an unidentified fin; silver rifle grenade fragments; smoke grenades; and, flare or smoke grenades; these items are present only at the end of the range (target berm area and woods behind target berm area) as already indicated on the table.

   This is a Phase I RFI and is not intended to be a full-scale study of the nature and extent of contamination. Rather, the purpose of the Phase 1 RFI is to generate field data efficiently to determine if further response action or remedial investigation is appropriate.

   Perchlorate typically rapidly migrates through soils to groundwater and so is not typically an issue in soils except in scenarios such as manufacturing facilities or rocket fuel

disposal operations. Groundwater investigation is not included as part of the Phase 1 RFI. However, the Navy has agreed to conduct groundwater investigation during the Full RFI and perchlorate will be included in the analysis.

The proposed analyte list for the Rifle Range subarea includes analysis of select metals, nitroglycerin, and select explosives. These are the primary contaminants that would be expected to be present in this area. If concentrations of these analytes exceed conservative screening values, then the decision will be to proceed to a Full RFI and, likely, the analyte list will be re-evaluated and an expanded analyte list may be recommended. The list of metals was base on the Interstate Technical regulatory Council (ITRC) published guidance document titled "Characterization and Remediation of Soils at Close Small Arms Firing Ranges." The metals which have been identified for potential consideration include lead, antimony, arsenic, tin, copper, zinc and iron. Antimony and arsenic are present in lead. Copper and zinc are components of jacket alloys. Tin would be present in copper bullet core alloys. Iron would be present from iron tips in penetrator rounds. Lead, arsenic, antimony, copper, and zinc were chosen as the constituents most likely to be present in significant concentrations and potential risk/hazard. Tin was not chosen for analysis because it would be present only in copper bullet cores in small concentrations and has a high USEPA Residential Soil Screening Value (R-RSL) (5,500 mg/kg for residential uses). Iron was not chosen because penetrator rounds were not suspected to have been used and the high R-RSL (640 mg/kg). Therefore, antimony, arsenic, copper, lead, and zinc have been chosen for analysis during this Phase 1 RFI and the sampling plan focuses the investigation on biased areas known to be or most likely to be contaminated in order to make decisions regarding moving forward to a full RFI.

Neither an R-RSL nor ecological screening value are available for nitrocellulose, which is used as a propellant or low-order explosive, it is also known as guncotton. Nitrocellulose is of low toxicity because it consists mainly of cotton (or wood pulp) with minor amounts of acid. There is no evidence to suggest that nitrocellulose has any detrimental effect on the environment. Nitrocellulose is not included as an analyte because of its lack of toxicity. In addition, available analytical methods are prone toward false positives results. Therefore, nitrocellulose analysis will not be added to the SAP.

Nitroguanidine is used as an explosive propellant, notably in triple-base smokeless powder. The nitroguanidine reduces the propellant's flash and flame temperature without sacrificing chamber pressure. These are typically used in large bore guns where barrel erosion and flash are particularly important. Based on the range records for NAPR from 2003 through 2009, included as Appendix B-1.2 of the SAP, and the prevailing use of SWMU 77 as a small arms range, it is not expected that triple-base propellants were used. At present, triple-base propellants are used in tank rounds and are being tested for new long-range artillery rounds. Additionally, little toxicity information is available for this compound, because of the lack of toxicity data, nitroguanidine has not been classified with regard to its carcinogenicity. Therefore, nitroguandine analysis will not be added to the SAP.

**Worksheet 5**

1. **Comment:** Page 25, Worksheet 5, Project Organization Chart. Please correct the phone number for Wilmarie Rivera to read 787.767.8181.

**Response:** The text will be revised per the comment.

## Worksheet 9

1. **Comment:** Page 38, Worksheet 9, and Page 53, Worksheet 11, Section 11.2. These worksheets both state that if good correlation is obtained between XRF and offsite laboratory data, these data can be used in the delineation of site contamination. Please clarify how the XRF data would be used in delineation if the correlation data would not be available until 21 days after samples are received by the laboratory, as shown in Worksheet #30.

   **Response:** Analysis of the XRF data and determination of correlation between XRF data and fixed base laboratory data will be determined once the analytical results are received from the laboratory and during preparation and report writing for the Phase I RFI report.

## Worksheet 10

1. **Comment:** Page 42, Conceptual Site Model and Wildlife Receptors. The description of the major mammal population in and near NAPR mentions only introduced species. However, as discussed for other sites and agreed upon between the Navy, USEPA and EQB, the conceptual site model for each site also should consider and discuss the possible occurrence of local populations of bat species that are native to Puerto Rico. Please add this discussion of native bats.

   **Response:** The following discussion will be added to the Conceptual Site Model, Section 10.3.6 at the end of the Wildlife section:

   *"Thirteen species of bats are known to occur on Puerto Rico. None of the bats found on Puerto Rico are exclusive to the island, nor are they listed under provisions of the Endangered Species Act of 1973. The specific bat species known to occur on Puerto Rico are listed below:*

   *Fruit-eating bats: Jamaican fruit bat (Artibeus jamaicensis), Antillean fruit bat (Brachyphylla cavernarum), and red fig-eating bat (Stenoderma rufum)*

   *Nectivorous bats: brown flower bat (Erophylla sezekoni bombifrons) and greater Antillean long-tounged bat (Monophyllus redmani)*

   *Insectivorous bats: Antillean ghost-faced bat (Mormoops blainvillii), Parnell's mustached bat (Pteronotus parnellii), sooty mustached bat (Pteronotus quadridens), big brown bat (Eptesicus fuscus), red bat (Lasiurus borealis), velvety free-tailed bat (Molossus molossus), and Brazilian free-tailed bat (Tadarida brasiliensis)*

   *Piscivorous bats: Mexican bulldog bat (Noctilio leporinus)"*

2. **Comment:** Page, Section 10.5. Please include wire diagrams showing complete or potentially complete and incomplete exposure pathways for both current and future human receptors and ecological receptors.

**Response:** Agree. Conceptual Site Model wire diagrams depicting complete, potentially complete, and incomplete exposure pathways will be added to the SAP as new Figure 10-9 for the MC SAP and new Figure 10-10 for the MEC SAP (Appendix A) as requested.

3. **Comment:** Page 49, Section 10.5.2. This section states "Potentially complete exposure pathways are present that could result in unacceptable human health and environmental exposures (i.e., exposure pathways are present creating potential imminent and substantial endangerment) ... " There is no regulatory basis for the need to show imminent or substantial endangerment to have unacceptable human health or environmental exposures. Therefore, please remove the parenthetical phrase from this section. Also, please discuss the potentially complete exposure pathways similar to the detail provided in the discussion of exposure pathways for ecological receptors (ingestion of soil/groundwater, inhalation, dermal exposure, etc). These exposure pathways need to be presented in a diagram, as commented on in the previous comment.

   **Response:** The phrase "exposure pathways are present creating potential imminent and substantial endangerment" will be deleted from Section 10.5.2 of the MC SAP (Volume 1) but will be retained for Section 10.5.2 of the MEC SAP (Volume 2). Section 10.5.2, last paragraph, first sentence will be clarified to read: "Potentially complete exposure pathways are also present that could result in unacceptable adverse environmental impacts to *ecological receptors (*biota and/or to critical habitat*)*...."

4. **Comment:** Page 50, Section 10.5.2. It is premature to eliminate inhalation of volatiles as a potential future exposure pathway, as accelerants and unknown wastes may have been used or disposed of in these areas. Please revise this section to indicate that additional information is needed to determine whether this is a potentially complete future exposure pathway. Information regarding groundwater condition and potential future uses should be discussed.

   **Response:** The subject paragraph will be revised to read: "Impacts to indoor air from groundwater is an unlikely future exposure pathway should any buildings be constructed, considering that munitions constituents do not include volatile organic compounds (VOCs), which are typically the chemicals associated with this exposure pathway. *Groundwater investigation is not included as part of the Phase 1 RFI; however, groundwater investigation will be conducted during the Full RFI and further evaluation of this pathway will be considered during the Full RFI planning phase."*

**Worksheet 11**

1. **Comment:** Page 52 of 121, Section 11.1, first bullet. Please add another subpart that indicates that these subareas "may contain buried munitions."

   **Response:** Section 11.1 of the MC SAP, first bullet describes the Problem Statements for only the MC investigation. Section 10.6 of the MEC SAP (Volume II) describes the Problem Statements for only the MEC investigation and includes discussion of the MEC/MPPEH which may be present.

2. **Comment:** Page 53 of 121, Section 11.2, No.4, first bullet. Please use the latest update to the RSL table, which is the December 2009 version.

**Response:** Worksheets #11 and #15 will be updated to include and reference December 2009 RSL values rather than the May 2009 RSL values in place at the time of draft SAP preparation.

3. **Comment:** Page 53 of 121, Section 11.2, No.4, 3rd bullet. Please clarify in the text that the 200 mg/kg screening value is for lead. If XRF instrument allows, it may be helpful to field screen for additional metal analytes (i.e., antimony), as well.

   **Response:** Section 11.2, No. 4, 3rd bullet will be revised: "A value of 200 milligrams per kilogram (mg/kg) will be used in the field as a screening value *for lead* to trigger step-out sample collection where specified."

   For small arms ammunition, the primary MC of concern is lead from bullets and to a lesser extent antimony and arsenic which are associated with lead and copper and zinc which are associated with bullet jackets. Lead accounts for more than 85 percent of the weight of the projectile. Antimony is added to bullets as a hardening agent in quantities ranging from 0.1 to 2 percent. Arsenic is naturally present in lead at trace levels (0.001 to 0.05 percent). Antimony and arsenic, if present, would be spatially correlated with the lead because they are associated with the lead in the bullets. The USEPA screening value commonly used to indicate the presence of potentially unacceptable levels of antimony in soil and sediment is 31 mg/kg; the screening value for arsenic is 0.39 mg/kg with typical soil and sediment background concentration at this facility ranging up to about 2.5 mg/kg. Using the relative concentrations of these metals in projectiles, lead would have to be present in soil or sediment at a concentration greater than 600 mg/kg for arsenic, antimony, copper, or zinc from bullets to be present at potentially unacceptable levels. A similar argument can be made for copper and zinc. Lead is a useful indicator of potentially unacceptable concentrations of other metals, including antimony, associated with small arms. Therefore, lead will be screened in the field using the XRF; however, confirmatory samples sent to the fixed base laboratory during the Phase I RFI will be analyzed not only for lead but for antimony, arsenic, copper, and zinc.

4. **Comment:** Page 53 of 121, Section 11.2, No.4, fourth bullet. Please include a reference to the background values that will be used for this SWMU.

   **Response:** The reference, "*Baker and CH2MHill, 2006*" will be added to Section 11.2, No. 4, fourth bullet.

5. **Comment:** Page 54, Section 11.3. The text states that subsurface soil at the Potential OB/OD Subarea will be investigated either during the Phase 1 RFI or later during the full RFI. However, Worksheet #17 (Section 17.3.4) indicates that these subsurface soil samples are being collected during the Phase 1 RFI. Please clarify.

   **Response:** Subsurface soil samples will be collected at the Potential OB/OD Subarea during this investigation. Exact locations for sample collected may be adjusted based on the outcome of the MEC investigation, Section 11.3 will be revised:

   "Additionally, the subsurface soil will be investigated at the Potential OB/OD Subarea.~~, either during the Phase 1 RFI or later during the Full RFI, as necessary~~."

6. **Comment:** Page 54, Section 11.3. Please clarify in this section what actions will be taken at the Potential Munitions Trench Subarea if non-MC are potentially present in this area. This is unclear until one reads Section 17.3.5.

**Response:** A paragraph will be added to the end of section 11.3 that states: "*Even if there are no anomalies or if no surface MEC is found in the Potential Munitions Trench Subarea, further investigation is still warranted during the Full RFI because it is possible that the trenches could have been used for disposal of materials not associated with the SWMU 77 historic use as a small arms range (e.g., sludge). In this event, an addendum to the SAP will be prepared to address a more extensive list of constituents that will definitely include non-MC analytes.*"

7. **Comment:** Page 54 of 121, Second Paragraph. Please revise this section to be consistent with page 60 of 121, which states that subsurface soil samples will be collected from 6 inches to 4 feet.

**Response:** It is correct that 6-inch to 4-foot bgs is the interval of interest; however, sample collection will be biased toward the 1- to 3-foot bgs interval. A 2-foot interval is a standard sample collection interval. Moreover, this is a Phase 1 RFI and the sampling plan focuses the investigation on biased areas (and depths) known to be or most likely to be contaminated. Concentration of contaminants is expected to decrease with depth and the 1- to 3-foot depth is more likely to contain subsurface contamination while additional sample volume from the 3- to 4-foot interval would tend to dilute the sample concentration if contamination is present.

The subject sentence in Section 11.3, 2nd paragraph, will be clarified as follows:

"The subsurface soil interval of interest at this subarea is from 6 inches bgs to 4 feet bgs; a 1 to 3 feet bgs soil sample *is a standard two foot sampling interval and* will sufficiently address the interval of interest *biased to the interval most likely contaminated in the subsurface. If contamination is present at the Potential OB/OD Subarea during the Phase 1 RFI, additional depth intervals for sampling will be considered during a Full RFI to further refine contamination zones by depth."*

## Worksheet 12

1. **Comments:** Page 57. As per Section 2.6.2 of the UFP QAPP guidelines, please complete one Worksheet #12 for each matrix and each parameter for a total of two worksheets, one for metals in soil and one for explosives/propellant in soil. If this is performed, some of the issues listed below will most likely be eliminated: Please change the frequency of the equipment blank to one per analysis per type of equipment (not per lab).

**Response:** The comment is noted. The Navy has developed their own template which is based on the UFP QAPP Manual but differs slightly and Worksheet #12 is quite different. Please see the following comment responses for changes that will be made to the text.

a. **Comment:** The measurement performance criteria for the equipment blank refers to common contaminants. However, for this investigation, there are no common contaminants. Please revise the worksheet accordingly.

**Response:** Worksheet #12 will be revised as requested and the reference to common contaminants will be removed.

b. **Comment:** Please provide the measurement performance criteria for matrix spikes and matrix spike duplicates for each method. It should be noted that these were listed in the laboratory SOPs provided in Appendix D and need to be included on this worksheet.

**Response:** This information is provided in Worksheet #28 Laboratory QC Samples Table. Worksheet #12 will not be revised.

c. **Comment:** In general, matrix spike duplicates are not associated with all analytical groups. For this investigation, matrix spike duplicates will be performed with the explosives/propellant analysis. Please revise the worksheet accordingly.

**Response:** References to MS and MSD will be deleted from this worksheet. The measurement performance objectives for MS/MDSs are described in detail on Worksheet #28 Laboratory QC Samples Table.

d. **Comment:** In general, laboratory duplicates are not associated with all analytical groups. For this investigation, laboratory duplicates will be performed with the metals analysis. It should be noted that the laboratory's SOP in Appendix D for explosives does not include laboratory duplicate analyses. Please revise the worksheet accordingly.

**Response:** The worksheet will be revised accordingly.

e. **Comment:** The measurement performance criteria for the laboratory duplicates does not agree with the laboratory SOPs provided in Appendix D. For metals analysis, the criteria listed in the SOP is RPD $\leq$20 if results are >5x the quantitation limit (QL) or ± the QL if results are $\leq$5x the QL. Revise the worksheet accordingly.

**Response:** This is an instance where the laboratory measurement performance criteria correctly differ from the measurement performance criteria that is applied for data usability. The worksheet will not be revised and the project specific measurement performance criteria list in Worksheet #12 will not be revised.

f. **Comment:** Please add completeness goals to Worksheet #12 for each analytical parameter, as per Section 2.6.2 of the UFP QAPP guidelines.

**Response:** Similar to response to Worksheet #12, comment 1, the Navy has developed their own template which is based on the UFP QAPP Manual but differs slightly; completeness is addressed in Worksheet #37.

g. **Comment:** Per Section 2.6.2 of the UFP QAPP guidelines, please include measurement performance criteria for laboratory QC analyses including surrogates, LCS, serial dilutions, interference checks, method blanks, etc. Please include a note on Worksheet #12 to refer to Worksheet #28 for the measurement performance criteria of these laboratory QC analyses.

**Response:** Agree. A footnote will be added to Worksheet #12 to refer the reader to Worksheet #28 for this information.

h. **Comment:** Please provide a Worksheet #12 for the measurement performance criteria associated with the field XRF analyses. This worksheet needs to include field duplicates, laboratory duplicates, method blanks, and instrument blanks.

**Response:** The original Worksheet #12 will be renumbered as Worksheet #12.1 and labeled All Fractions. An additional worksheet, *Worksheet #12.2 – Measurement Performance Criteria Table – Soil/Sediment Field Analysis – Lead via Field-Portable X-Ray Fluorescence*, will be added to the SAP. Information in this table will include: energy calibration checks; instrument blank; method blank; duplicate analysis; field duplicate; data completeness check; and, comparability and sensitivity check. Field duplicates will be included at a frequency of 1/20 samples and laboratory duplicates will be included at a frequency of 1/20 samples or 1/day, whichever is more frequent.

**Worksheet 15**

1. **Comment:** The QLs provided in this worksheet for metals and explosives are exactly 3-5x the listed MDLs. Please provide the actual QLs for each metal and explosive analyte based on the lowest concentration standard used in the initial calibration for explosives and based on the concentrations of each metal in the QL check standard.

**Response:** All QLs are supported by the low concentration standard for explosives or by the metals RL standard. The reported detection limits are set 3-5x below the QL and supported by the calculated MDLs. Due to the statistical fluctuations, the calculated MDLs are not generally used on reports but are verified with MDL checks or MDL studies as required by the QSM.

2. **Comment:** The MDL of each explosive analyte is 0.1 mg/kg. Typically, MDLs vary between compounds and are almost never exactly the same for each analyte in a group. Please clarify if these are actual laboratory MDLs.

**Response:** As indicated above, statistical MDLs are not generally reported. They are used to validate the reported detection limits provided on the forms.

3. **Comment:** The QLs provided for antimony (0.75 mg/kg) and arsenic (0.5 mg/kg) are much lower than QLs typically observed using SW-846 method 6010B. The QLs which were provided are more likely if SW-846 method 6020A (ICP-MS) was used. In addition, typical SW -846 method 6010B QLs for these two metals will exceed the listed background values and therefore may not be able to achieve the project objectives. Please clarify the actual QLs for these two metals based on the concentrations of these metals in the QL check standard and if the actual QLs exceed the background values, consider the use of SW-846 method 6020A for analysis in order to achieve the project objectives.

**Response:** The QL provided for arsenic is based on an alternate digestion using 2g sample and brought to a final volume of 100ml. The QL provided for antimony is 3.00 mg/kg for SW-846 method 6010B.

4. **Comment:** Worksheet No. 15 and Appendix B-5. Please clarify why perchlorate was not included as an analyte for which soil screening levels and quantitation levels are prescribed in these tables of the SAP.

   **Response:** Perchlorate is not proposed for analysis in this SAP and is not listed on Worksheet #15 or in Appendix B-5. As discussed in the Navy's Page-Specific Comment 2, perchlorate typically rapidly migrates through soils to groundwater and so is not typically an issue in soils; perchlorate will be included during groundwater analysis during the Full RFI.

5. **Comment:** Pages 65 to 67. In the soil table for metals on page 65, the PAL for lead is correctly based on the lowest available ecological soil screening level (EcoSSL) of 11 mg/kg for birds. However, in the soil table for XRF screening of lead on page 67, a much higher PAL of 200 is proposed, which will not provide for an adequately low MDL for evaluating potential risk to birds or other ecological receptors. Please clarify and justify this proposed deviation from using the avian EcoSSL, and if technologically feasible, revise the PAL accordingly to attain an MDL compatible with this avian EcoSSL for lead.

   **Response:** The field PAL of 200 mg/kg is the screening level that will be used during XRF field screening to determine whether or not to collect step-out samples, this value will only be used during field screening. All data that is evaluated for risk screening purposes (fixed-base laboratory analytical results and field screening results if an acceptable correlation is achieved) will be screened against the PAL of 11 mg/kg for decision making purposes.

6. **Comment:** Page 67, footnote 1. Please add text to this footnote similar to footnotes 1 and 3 in Appendix B-5 that indicates that the RSL for noncarcinogenic compounds has been reduced by a factor of 10 to account for the presence of multiple noncarcinogenic compounds. Also indicate that if the noncancer RSL is less than 10 times the cancer RSL, then the noncancer RSL reduced by a factor of 10 is used.

   **Response:** Footnotes will be added, as appropriate, to Worksheet #15 stating that "R-RSL *screening criteria based on noncarcinogenic affects were divided by 10 to account for cumulative effects on target organs/systems.*"

**Worksheet 17**

1. **Comment:** Page 72, Section 17.2. The last paragraph states that samples will be thoroughly mixed within the baggie. However, per the SOP 05 provided in Appendix C, samples should be mixed in place for surface soil samples and within a stainless steel bowl for subsurface soil samples. Please clarify.

   **Response:** Soil samples will be homogenized in baggies or other container as appropriate, clarification will be added to Section 17.2 and the SOP.

2. **Comment:** Page 73, Section 17.2. Please correct the depth of subsurface soil sampling to 4 feet bgs as stated on page 60 of 121.

   **Response:** Refer to response to comment Worksheet #11 comment 7.

3. Page 74, Section 17.2.1.

a. **Comment:** It is unclear why the step-out sample collection will be stopped at two (2) samples. Step-out samples for field screening should be continued if XRF readings above criteria are observed. Please clarify.

**Response:** This is a Phase I RFI and is not intended to be a full-scale study of the nature and extent of contamination. Rather, the purpose of the Phase 1 RFI is to generate field data efficiently to determine if further response action or remedial investigation is appropriate. Therefore, if step-out samples are collected during field screening, most likely some type of further response action or remedial investigation will be recommended and nature and extent of contamination will be addressed during these future investigations.

b. **Comment:** Please clarify if "processed" refers to the drying and sieving of the samples. Update this section accordingly to clarify.

**Response:** Section 17.2.1, XRF Lead Sampling and Analysis Methodology, will be expanded as follows:

First paragraph, "For samples undergoing field XRF analysis, any bullets or bullet fragments *greater than the size of a pea* observed in a sample will be removed, *by hand* prior to *homogenization and* analysis because they do not reflect contamination that has migrated to soil....."

Second paragraph, "Samples from each of the following subareas..... will be homogenized in the baggies *or other containers as appropriate*, processed *(particles greater than the size of a pea separated from the sample and sample dried as necessary)*, and undergo XRF screening in accordance with SOP 08. Based on the distribution of the XRF screening results surface soil samples will be *chosen for submittal to the fixed-base laboratory*, ~~collected~~ *the sample placed* in the appropriate sample container and placed on ice prior to transportation to the fixed-base laboratory. *The same sample that was screened via XRF will be submitted to the fixed-base laboratory for analysis.* Unused portions of a collected sample....."

c. **Comment:** Please clarify if the homogenized, processed sample will be what goes into the sample container for off-site laboratory confirmation analysis, as per Section 5.8 of SOP 08, provided in Appendix C. Update the section accordingly.

**Response:** Refer to response to Worksheet #17, comment 3b.

4. **Comment:** Page 74, Section 17.2.1. The text should be expanded to describe how bullets will be removed and the procedure to be used for documenting the presence and amount of lead fragments. As discussed in General Comment 1, a standardized screening procedure should use a 0.25-inch wire screen. Additionally, the percent by weight of bullets per soil aliquot should be determined to quantify the presence of lead fragments.

**Response:** Refer to response to Worksheet #17, comment 3b, and response to General Comment 1.

5. Page 75 of 121, Section 17.2.1.

a. **Comment:** This section states that if the correlation coefficient between XRF and fixed based laboratory data are $\geq$ 0.65, this will be considered adequate to translate XRF results to their equivalent laboratory lead concentrations with confidence. However, per SW-846 method 6200, the correlation coefficient for the results should be $\geq$ 0.7 for the XRF data to be considered screening level data and if the correlation coefficient is $\geq$ 0.9 and inferential statistics indicate the XRF data and the confirmatory data are statistically equivalent at a 99 percent confidence level, the data could potentially meet definitive level data criteria. Based upon these method requirements, please clarify why a correlation coefficient objective of $\geq$ 0.65 is being used for this program.

**Response:** Under the UFP-SAP, the project team is afforded the latitude to select quality measures considered to be satisfactory to the team. A correlation coefficient of 0.65 has been used with success on multiple past projects and was adopted for this project. It is generally held that obtaining several inexpensive and less precise measurements is preferred to a few highly precise measurements because the additional spatial coverage obtained with the less precise measurements provides a better site characterization than just a few measurements, regardless of the precision or accuracy of those few measurements; therefore the EPA guidance on XRF data and relaxed the 0.7 correlation coefficient for this reason.

The following text will be added to the end of the Correlation of XRF Data with Fixed-Base Laboratory Samples for Lead section: "*The magnitude of r, the correlation coefficient describes the strength of a linear relationship. If all pairs of data ($x_i$, $y_i$) were to lie exactly on a straight line then the correlation coefficient would be 1. A value of r close to zero implies that a linear association is weak. Therefore, a correlation coefficient greater than 0.65 would indicate a linear relationship exists between the two variables. With a linear relationship established the XRF data could be used to determine the laboratory concentrations with the use of a regression analysis.*"

b. **Comment:** This section states that the XRF data may be used in evaluations of potential human health risk from exposure to contaminants in soil. However, based on the SW-846 method correlation issues noted above, the XRF data with a correlation coefficient of $\geq$ 0.65 is most likely not of adequate accuracy to be used for human health risk purposes. If data are to be used for human health risk purposes, much tighter QC criteria will need to be used, including a much higher correlation coefficient ($\geq$ 0.9) and it is highly recommended that site specific calibration standards be used for each area where XRF analyses are being performed.

**Response:** Refer to response to Worksheet #17 Comment 5a, above and Worksheet #15, Comment 5.

6. **Comment:** Page 76, Section 17.2.2. Please clarify the rationale for using composite sampling for propellant analysis instead of grab sampling.

**Response:** It is anticipated that nitroglycerin from unburned propellant, which may result when a fire arm is discharged, may be found distributed along firing lines. Sample aliquiots will be collected along the firing lines, approximately equidistant apart and approximately 3 feet in front of firing point(s), to account for potential aerial deposition of

the propellant onto the soil surface. Collection of a composite sample rather than individual grab samples will allow for greater spatial coverage of the firing line to provide confidence that the sample is representative of the potentially contaminated soil.

7. **Comment:** Page 78 of 121, Section 17.3.1. It is recommended that a UXO Technician thoroughly clear all areas prior to access by any sampling crews.

   **Response:** Section 17.3.1 describes the field investigation proposed for the Rifle Range Subarea. A UXO Technician will be present during sampling activities at Target Area Earthen Berm and Wooded Embankment at the end of the range. A UXO Technician will not be required during sampling at the firing lines in this subarea because this area was active until recently and MEC is not known or suspected to be present in these areas and has been visually inspected during a previous site walk.

8. **Comment:** Page 78 of 121, Section 17.3.1; Page 80 of 121, Section 17.3.2; and Page 81 of 121, Section 17.3.3. In order to obtain data for vertically profiling contamination and bullets, samples should be collected at each proposed location from three (3) depths: 0 to 6-inches, 6 to 12-inches, and 1 to 4 feet.

   **Response:** This is a Phase I RFI and is not intended to be a full-scale study of the nature and extent of contamination. Rather, the purpose of the Phase 1 RFI is to generate field data efficiently to determine if further response action or a Full RFI is appropriate. If further investigation or a Full RFI is recommended for these subarea, nature and extent of contamination will be determined at that time.

9. **Comment:** Page 79, Section 17.3.1. The last paragraph of this section states that the lower transect will be in the clear strip between the concrete wall and the toe of the wooden embankment. However, page 76 states that the lower transect will be between the earthen berm and the wooden embankment. Please clarify if the concrete wall and the earthen berm are referring to the same location.

   **Response:** This is the same location, the text will be revised to state that the lowest transect will be collected in the clear strip between the earthen berm/concrete wall and the toe of the wooden embankment.

   Page 76:
   "..and one 10-point composite will be collected in the clear strip between the earthen berm/*concrete wall* and *the toe of* the wooded embankment."

   Page 79:
   "The lowest transect will be in the clear strip between the *earthen berm/*concrete wall and the toe of the wooded embankment."

**Worksheet 18**

1. **Comment:** Page 83, Rifle Range Subarea: Please update Sample Location and Sample ID column as follows: Wooden Embankment, 2nd row: Change to 77RRSB063 through 77RRSB066; Firing Points: change to 77RRSB067 through 77RRSB073.

   **Response:** The text will be revised per the comment ("*through*" added as per first change, "079" fixed to "07*3*" as per second change.

2. Page 85, Former Pistol Range Subarea:

a. **Comment:** Update Sample Location and Sample ID column for Step-out Samples as follows: Change to 77FPSB033 through 77FPSB042.

**Response:** The text will be revised per the comment ("043 changed to 042").

b. **Comment:** It is unclear how the selection of XRF samples for confirmatory analysis will be made at this location. Based on page 75, the selection of samples for the fixed-base laboratory will be dependent upon the concentrations detected and will generally represent low, mid-range, and elevated concentrations of lead. However, for this site, it is unclear how this rationale will be used when there are 4 planned fixed-base laboratory analyses at the eastern berm area and 2 each at the southern, western, and northern berm areas. Please clarify.

**Response:** Prior to XRF sample collection and screening, the FOL will inspect the study area to determine which areas are most likely to be contaminated based on visual observation and may adjust the proposed sample locations accordingly. The rationale behind sample selection for fixed-base laboratory analysis of samples that will generally represent low, mid-range, and elevated concentrations of lead is that the spread of concentrations will allow for correlation of the XRF measured concentrations to the analytical results from the laboratory while also obtaining maximum concentration samples for decision-making purposes. At the Former Pistol Range Subarea, the most likely location for the berm is the natural embankment east of the subarea. Discrete surface soil samples will be distributed around the four boundaries of the subarea (locations of potential and probable berm), but a greater number of samples will be collected from the transect that is centered over the area expected to contain the greatest concentrations of spent bullets (eastern embankment), as compared to the other three transects (northern, southern, and western embankments). Therefore, the distribution of samples to be sent to the fixed-base laboratory will allow for coverage of all four embankments in the expected relative distribution of bullets in these areas since the exact location of the berm is unknown.

Section 17.3.3, Target Area Berm, 2nd paragraph text will be clarified as follows:
"Ten confirmation samples (33 percent of the XRF discrete samples), *which will be spatially distributed similar to the collection of the XRF screening samples (4 from the Eastern berm, 2 from the Southern berm, 2 from the Western berm, and 2 from the Northern berm)* will be submitted to the fixed-base laboratory....."

**Worksheet 19**

1. **Comment:** Page 89: The holding time for metals analysis is listed as 180 days to analysis. However, as per Section XIII B of the laboratory SOP-IOO in Appendix D, soil samples for antimony analysis need to be analyzed within 48 hours of digestion. Please clarify why there is a need for a shorter holding time for antimony and update Worksheet 19 accordingly.

**Response:** The holding time per SW-846 and data validation guidance is 180 days from sample collection to analysis; there is no holding time requirement for digestion to analysis. The selected laboratory, Empirical Laboratories, employs a more stringent

holding time for antimony in soils based on their own observations. Worksheet #19 will not be revised as there is no regulatory requirement for the shorter holding time.

**Worksheet 20**

1. Page 90.

a. **Comment:** Please change the number of field duplicates, MS/MSDs, and equipment blanks for explosives analysis to two in order to cover the different sampling procedures used for surface and subsurface soil samples. The frequency should cover one per 20 samples per matrix and the subsurface soil samples may also have different matrix characteristics than the surface soil samples.

**Response:** Soil is considered to be one matrix and field duplicates and MS/MSDs are collected at a frequency of 1 per 20 samples per medium/matrix per analyte. The Potential OB/OD Subarea is the only Subarea where both surface and subsurface soil samples are to be collected. A footnote will be added to Worksheet #20 (and Worksheet #18 on the Potential OB/OD Subarea) stating that..."*For the Potential OB/OD Subarea, if the surface soil matrix is different than the subsurface soil matrix, one duplicate for each matrix (surface soil and subsurface soil) will be collected.*"

The SAP will be revised to indicate that two each field duplicates, MS, and MSD samples will be collected for explosives analysis as a maximum total of 21 samples are proposed for collection. However, a footnote will be added to Worksheet #20 (and Worksheet #18 on the Potential Munitions Trench Subarea table) stating that.... "*Surface soil samples will be collected at the Potential Munitions Trench Subarea only if subsurface anomalies are detected.*" If the Potential Munitions Trench Subarea samples are not collected, a total of 18 samples for explosive analysis will be collected and then only one field duplicate, MS, and MSD will be collected. Additionally, the number of rinsate blanks will be revised in Worksheet #20 to reflect that these QC samples will also be collected at a frequency of 1 per 20 samples per matrix per analyte.

b. **Comment:** Revise the Worksheet to include laboratory duplicates to cover metals analysis as MSD analyses will most likely not be performed with the metals analyses.

**Response:** As shown on Worksheet #12, laboratory duplicate samples will be analyzed for all analytical groups, including metals, in order to evaluate precision. Additionally, MS and MDS samples will be collected in the field and analyzed for all analytical groups as a measure of accuracy, bias, and precision.

c. **Comment:** Footnote #2 states that rinsate blanks will be collected at a frequency of one per sampling event. Please clarify what a sampling event is and update the frequency to also be one per different sampling equipment used.

**Response:** Refer to response to Worksheet #20 comment 1a, last sentence.

d. **Comment:** Please add the QC samples required with the field XRF analyses. This should include field duplicates at a frequency of 1/20 samples and laboratory duplicates at a frequency of 1/20 samples or 1/day, whichever is more frequent.

**Response:** Types of QC samples and frequencies of QC sample collection for XRF screening will be included in a new Worksheet #12.2, per response to Worksheet #12 comment 1h. Worksheet #20 lists the field samples and field QC samples that will be sent to the laboratory. XRF samples that will be sent to the laboratory are included in the totals currently listed on Worksheet #20.

**Worksheet 22**

1. Pages 93 and 94, XRF.

a. **Comment:** Per the SOP 08 provided in Appendix C, please change the frequency of using the standardization clip to also include every four hours of operation and when instrument drift is suspected.

**Response:** The text will be revised per the comment.

b. **Comment:** Per the SOP 08 provided in Appendix C, please change the frequency of the instrument blank to also include at the end of each day, after every 20th sample, and when potential instrument contamination is suspected.

**Response:** The text will be revised per the comment.

c. **Comment:** Per the SOP 08 provided in Appendix C, the frequency of the calibration verification needs to be changed to also include at the end of each day and after every 20th sample.

**Response:** The text will be revised per the comment.

d. **Comment:** Per the SOP 08 provided in Appendix C, the corrective action for the instrument blank needs to also state to check the probe window and other instrument components for contamination. The instrument needs to be zeroed if detections are not caused by contamination.

**Response:** The text will be revised per the comment.

e. **Comment:** Per the SOP 08 provided in Appendix C, the corrective action for the calibration verification needs to also include a note to recalibrate or restandardize and to reanalyze the batch of samples analyzed before the unacceptable calibration verification.

**Response:** The text will be revised per the comment.

f. **Comment:** Per the SOP 08 provided in Appendix C, clarify that the acceptance criteria for the calibration verification is 20 % difference or less and not 20% recovery.

**Response:** The acceptance criteria for the calibration verification will be 20% difference or less; this will be revised and clarified in SOP 08. The reference to Percent Recovery will be formatted with a strikethrough and Percent Difference will be added in italics to SOP 08.

**Worksheet 28**

1. Pages 103-105, Metals.

a. **Comment:** Method blank: Please eliminate the reference to common lab contaminants as there are none in the metals analysis.

**Response:** The reference to common laboratory contaminants will be removed.

b. **Comment:** Please add requirements for matrix spike, laboratory duplicate, and serial dilution analyses.

**Response:** These items will be added.

c. **Comment:** LCS: In order to effectively monitor the recovery of target metals, a standard reference material (SRM) should be used for the LCS. This option is provided in Section 2 of SOP-I00 (SW-846 3050) in Appendix D. Please clarify this requirement in this worksheet as Section VII B.2 of the SOP provides for an option of the SRM or spiked Teflon chips.

**Response:** LCS will be prepared, performed, and monitored as per the DoD QSM version 4.1 April 2009 and this reference will be added to Worksheet 28 and the LCS control limits have been included as Appendix D-3.

2. Pages 106-107, Explosives and nitroglycerine.

a. **Comment:** Please change the surrogate compound to 1,2-dinitrobenzene.

**Response:** The typo will be corrected.

b. **Comment:** LCS: Please include specific acceptance criteria (60-120% per the SOP in Appendix D) and change "redigest" to "reprepare" in the corrective action column.

**Response:** DoD QSM will be followed per the SOP and QC limits provided in Appendix B-3. The acceptance criteria are 50-140% with the exception of tetryl and TNT.

c. **Comment:** MS: Please include specific acceptance criteria (50-140% per the SOP in Appendix D) and provide accurate corrective action procedure (post-digestion spikes are not applicable to the explosives analysis).

**Response:** The requested changes will be made.

d. **Comment:** Please add requirements for MSD analyses. Clarify what compounds are considered poor performers since the SOP in Appendix D allows higher RPDs for poor performers.

**Response:** The requested changes will be made.

e. **Comment:** Please add requirements for dual column confirmation analyses.

**Response:** The requested change will be made.

**Worksheet 29**

1. **Comment:** Page 107: Add XRF results under Sample Collection Document and Records.

   **Response:** The text will be revised per the comment.

**Worksheet 36**

1. **Comment:** Page 118: The incorrect version of the Region II explosives data validation guidelines were cited. Please update the worksheet to include the correct version: Nitroaromatics and Nitroamines by HPLC, SOP HW-16 Rev. 2 (September 2006).

   **Response:** The requested change will be made.

**Appendix A**

1. **Comment:** Page 32, Worksheet 10. Please revise this section, although this is just a formatting issue, it is confusing to the reviewer regarding the areas and subareas.

   **Response:** Worksheet #10, Page 37, Section 10.4, 1st paragraph will be reformatted to provide a bulleted listing of the Subareas. Also, the next to the last sentence in the paragraph will identify the short-yardage range as part of the Rifle Range.

2. **Comment:** Page 39, first bullet. The first and last sentences of this bullet claim that "no visible evidence exists of any MEC operations within this subarea" and "no evidence of OB/OD operations has been observed". These statements ignore evidence that the OB/OD subarea was used for MEC disposal including the last sentence in the large paragraph on Page 41 which states, "one or more berms were evident on a historical aerial photograph". The photo of these berms is evidence of OB/OD operations and this, and other evidence, is the reason that the area is being investigated. Removal of these two sentences is recommended.

   **Response:** The historical use of the berms is unknown and was not necessarily related to potential OB/OD or other disposal operations or even munitions related, which is why the area is under investigation. Therefore, these sentences will be revised as follows:

   Page 39
   "No visible evidence exists of any MEC ~~operations~~ within this subarea."

   Page 41
   "...one or more berms were evident on a historical aerial photograph (Appendix B-2 [Volume 1]) *of this area which may be an indication of* OB/OD operations;...."

3. **Comment:** Page 40, last line. The word "expanded" is incorrect and is probably a typo. However, if this word should be "expended" the sentence is still not correct because even "expended" grenades may still be present at the site. Evaluation of this sentence is recommended.

**Response:** Page 40, last line, will be revised as follows: "However, their inclusion on the list suggests potential use prior to 2003; although items may have been retrieved upon use and ~~if in fact expanded,~~ may no longer be present."

4. **Comment:** There is confusion throughout the document on the terms GSV and IVS. For example, Worksheet 12 uses GSV as the DFW. However, Worksheets 14 and 34 use IVS. The first paragraph on page 69 uses both IVS and GSV. Review of the use of these terms throughout the document is recommended and it is recommended that GSV be used to describe the process and IVS be used to describe the line of buried standardized targets.

   **Response:** The SAP will be revised per the comment, GSV is used throughout the SAP to describe the process and IVS is used to describe the line of buried objects.

5. **Comment:** Page 58, Section 17.1.2. Site Accessibility and Traffic Control requires operations to cease when non-site personnel or non-essential non-UXO personnel enter an exclusion zone. This is not in accordance with Navy policy (see NAVSEA OP 5, Section 14-7-5) which allows "authorized visitors" to enter the EZ when specific requirements are met. Please revise this section to describe the procedures to be followed for the Regulatory Agencies to enter the EZ as authorized visitors while the MEC investigation is being performed.

   **Response:** The following text will be added to Section 17.1.2, after the 1st paragraph:

   "*Once established, the EZ will be controlled by barricades at each access point. Each barricade will be marked with the name and number of the person who can be contacted to request access. Access to the EZ is limited to personnel essential to the operation being conducted. However, under specific conditions and on a case-by-case basis, authorized visitors may be granted access to the EZ when operations are being conducted. Before access is granted the following requirements will be met:*
   *a. Access to an EZ while munitions response operations are occurring is limited to essential personnel and authorized visitors.*
   *b. The Tetra Tech UXOSO is responsible for conducting an operational risk management assessment in accordance with OPNAVINST 3500.39 (series) prior to initiating response actions involving MEC. In addition, the UXOSO must determine the maximum number of persons (essential personnel and authorized visitors) that can be in the EZ at one time. The ratio of UXO-qualified escorts to visitors will be determined by the UXOSO based on this site-specific operational risk analysis.*
   *c. Based on the risk posed by the munitions response operation underway, the UXOSO may determine that access to the EZ is unsafe for visitors. However, every effort should be made to accommodate the authorized visitor's needs.*
   *d. With concurrence of the Navy RPM and Tetra Tech PM, the UXOSO will grant EZ access to authorized visitors. Access to the site will be based upon the operational risk analysis of the scheduled MEC operations and availability of escorts, as well as a demonstrated visitor need and subsequent completion of visitor safety briefings.*
   *e. Persons requiring access to the EZ must demonstrate a legitimate need for access and obtain written authorization from the Navy RPM, Tetra Tech PM, and UXOSO. At a minimum, the request for authorization will include: names of the individual requesting access, the identification of emergency contacts for these individuals, purpose of visit; task(s) to be performed; and rationale to support EZ access. Persons requesting access must submit their request to the Navy RPM and Tetra Tech UXOSO 5 days prior to the*

*proposed date of the site visit. This advance notice will allow time for the UXOSO to support the visit request by assigning a qualified escort, conducting an operational risk analysis on the operations planned for the date of the site visit, and preparing a visitor site-specific safety briefing for the planned operations.*
*f. Prior to entry, all authorized visitors must receive a site-specific safety briefing describing the specific hazards and safety procedures to be followed within the EZ for operations underway that work day. Each authorized visitor must acknowledge receipt of this briefing in writing.*
*g. Authorized visitors to the EZ must be escorted at all times by a UXO-qualified person.*
*h. Any authorized visitor that violates the established safety procedures will be immediately escorted out of the EZ and/or site for their own protection and to protect essential personnel working at the site."*

6. **Comment:** Page 62, Section 17.4.1, second paragraph. Please revise the first sentence of the second paragraph ("The UXO Technicians to aid will remove non-munitions related debris in follow-on digital geophysical surveying efforts ... ").

   **Response:** The sentence will be modified to read: "The UXO Technicians ~~to aid~~ will remove non-munitions related debris *to aid* in follow-on digital geophysical surveying efforts if allowed by the ESS Determination."

7. **Comment:** Section 17.4.1, third paragraph. This section describes collecting "a qualitative assessment of the amount of shallow buried metal" and the first paragraph on page 67 describes one of the purposes of the surface survey to "identify high density areas to aid MC sampling efforts". EQB agrees that this data is valuable and should be collected. However, there is no guidance provided in the QAPP or SOP on how this qualitative assessment will be performed, recorded, and reported and there is also no guidance on how the field personnel will determine an area to be a "high-density anomaly area". Please add this guidance to SOP 1 and include a reference to it in the QAPP.

   **Response:** The SOP will not be revised because it provides standard procedures for all operating sites. However, the following will be added to the end of the first paragraph of Section 17.4.1 to provide clarification: "*The UXO survey instruments used at this site will not record data or provide visual data measurements related to the energy field produced by suspect high-density anomaly areas. The instruments only provide audio signals to indentify suspect areas; hence, the identification of these high-density anomaly areas will rely on the qualitative judgment of an experienced UXO operator (the stronger and more numerous the signals in an area, the larger the item, the closer it is to the surface, or multiple items in an area). The location of suspect high-density anomaly areas will be recorded in field log books and the GPS unit.*" Figure 17-7 shows the planned survey areas. NOTE: Further investigation of these high anomaly areas would occur during the Full RFI using digital geophysical survey equipment which will record data about the area, if a Full RFI is determined to be required. The Stakeholders would be involved in the Full RFI planning process.

8. **Comment:** Page 71, Section 17.6.4. The table on the page shows the 5X depth of the 2-in. ISO as 13-in. This should be 10-in.

   **Response:** The text will be revised per the comment.

9. **Comment:** Worksheet 18. The Matrix for the Rifle Range and Detonation Area Subareas should be both "surface" and "qualitative subsurface" to account for the requirement to collect information on high-density anomaly areas during the surface survey (see comment 7).

**Response:** Worksheet #18 will be updated to address both surface and qualitative subsurface.

10. **Comment:** Worksheet 20. Some QC processes should be added to the "surface" matrix to account for the requirement to collect information on high-density anomaly areas during the surface survey (see comment 7).

**Response:** The QC survey requirements will not change, the same process of checking 25% of first four grids and then 10% of remaining grids after four grids in a row pass QC will be followed. However, the table has been revised to measure the ability to capture a qualitative subsurface high density anomaly. Revisions are: The sample column for the surface matrix will state: "Detect all metallic objects 20mm or larger on surface *and identify suspect high density anomaly areas*; non-detection of metallic objects would result in failure of QC". The matrix column will state: "Surface; *Qualitative Subsurface".*

11. **Comment:** Worksheet 22, page 85. Adding a specific percentage of allowable variation to the acceptance criteria for EM61 MK2 HH IVS detections is recommended.

**Response:** An acceptable criteria of 20% variation from the standard type curve will be added to the Worksheet #22 table; this may be modified (up or down) at the discretion of the Project Geophysicist based on the ability to identify the surrogate items in the IVS. Regardless of the standard item test response, the goal is to be able to discern likely UXO.

12. **Comment:** Worksheet 22, page 86. The "acceptance criteria" for the magnetic locator is "operating properly". This should be replaced with a reference to the required "blanket test". And, the acceptance criteria should be the same for the all-metal detector which does reference passing a detection test (although there is a typo in the use of "segregate"). Changing both acceptance criteria for the Schonstedt and Whites to "successfully detect targets in the blanket test", or some similar reference to the required test, is recommended.

**Response:** The acceptance criteria for the magnetic locator in Worksheet #22 will be revised to read: "Operating properly-*detect surrogate items during blanket test"*

13. **Comment:** Worksheet 22, Section 22.1. There are some differences between the text in this section and the preceding table. Should each test described here be listed on the preceding table? If so, then the IVS should be added to the table and the tests for the Schonstedt and Whites should be added to this text.

**Response:** No change is necessary to the Worksheet 22 table. The IVS for the EM61 is included in the table of Worksheet #22. A daily IVS will not be performed for the EM31 because this instrument is not well suited to identify individual objects and no standard curves are available for such items. The text in Section 22.1 is used to expand upon and clarify select items addressed in the table. However, the text does not need to

include all items addressed in the preceding table; therefore, the Schonstedt and Whites will not be added to the text.

14. **Comment:** Worksheet 22, Section 22.1, page 87, Record Sensor Positions. How does this requirement for + or -6-in. compare with GPS positioning requirement in the table on Page 86 that requires accuracy of "sub-meter HDOP <3"? Since the sensor positioning is going to be done via GPS, how can a much more stringent standard be imposed on the sensor positioning when compared to the overall GPS accuracy requirement?

    **Response:** The sensor positioning is measured with ruler or tape (not with the GPS). As needed, the position of the GPS sensor in comparison to the geophysical instrument can be compensated for during data interpretation. This measurement is needed when the GPS is backpack mounted rather than instrument mounted. Coil sensor measurements are also recorded to document compliance with the manufacturer's specification.

15. **Comment:** Worksheet 22, Section 22.1, page 87, Calibrations. The preceding table lists calibration as a requirement for the EM31, not the EM61 or either of the handheld instruments or the GPS. However, there is no definitive list of the equipment that requires calibration. Listing the equipment that requires calibration in this section is recommended.

    **Response:** Clarification will be added to Section 22.1 Calibrations as follows: "*Surface Survey Equipment: The Whites all-metal detector requires calibration while the Schonstedt does not. Geophysical Survey Equipment: The EM31-MK2 and EM-61HH require field calibration. GPS Equipment: The Omnistar GPS unit will be used during this project and does not require calibration.*" For the table, a row will be added for the EM-61HH concerning calibration requirements.

16. **Comment:** Worksheet 22, Section 22.1, page 88. The fourth line says "and ppt nT;" while the table says "1 ppt". Please review and correct.

    **Response:** The referenced text in Worksheet #22 will be revised to read 1 ppt to match the table.

17. **Comment:** Worksheet #22 Section 22.1, page 88 Baseline Test. The text says this test is required at the beginning, middle and end of each day. The table also requires this test before and after extended breaks. The table and the text should agree on the frequency of the required tests (or, eliminate this potential error by only listing the frequency once, in the table, or delete this text, keep the table and refer to the SOPs which contain this same information).

    **Response:** Worksheet #22 will be revised to be consistent and state that testing is required at the beginning, middle, and end of each day.

18. **Comment:** Worksheet 22 Section 22.1, page 88. The last paragraph discusses a test for "latency". This test isn't included on the preceding table and should be added if it is a required test.

    **Response:** A sentence will be added to the end of this paragraph to state: "*This test is not likely to be needed because the standard equipment uses an integrated GPS.*"

19. **Comment:** Worksheet 31. The "frequency" of inspections for geophysical field notes is "once during start of fieldwork and after survey completion" and the frequency for inspecting conformance with the SOPs is "monthly during survey performance". This isn't an effective inspection schedule since errors will not be detected until after the geophysical work is completed (since the geophysics work will be completed in less than one month). Revising these inspection frequencies to make them more frequent and effective is recommended.

**Response:** Agree. Worksheet #31 will be revised to read weekly inspection of geophysical field notes and geophysical survey SOP conformance will be conducted during survey performance to allow for adjustment during the field event.

20. **Comment:** Worksheet 35. This worksheet only requires an oral IVS assessment. However, SOP 3, page 8, requires the results of the IVS to be summarized in a geophysical report with specific reporting requirements. Revising Worksheet 35 to require this report is recommended.

**Response:** Worksheet #35 will be revised to state that a written IVS summary report will be provided. In order to proceed with field work in a timely fashion, the report will consist of data presentation and a sign-off sheet. One of the purposes of the IVS versus a full geophysical prove-out is to improve the efficiency of the field effort and reduce mobilization time. This streamlined approach is the best to meet this objective.

21. **Comment:** Worksheet 37. The assessment described in this text differs from the requirements listed on the data usability checklist table on page 120. The table and the text should agree.

**Response:**
The Worksheet #37 table will be revised as follows:

| **Usability Checklist Table** | | | |
|---|---|---|---|
| **Phase of Work** | **Item to be checked/verified** | **Verified (Yes or No)** | **Comments or Deviations** |
| Pre-Survey | *Identify personnel responsible for performing assessment* | | |
| | Qualification of Survey Team evaluated | | |
| | Personnel reviewed and signed-off on relevant UFP-SAP section(s) | | |
| Survey | *Certify proper operation of detection and positioning systems* - QC evaluation of survey equipment (tests and checklists satisfactorily completed) | | |
| | IVS met requirements specified in UFP-SAP | | |
| | *Areas to be investigated* - Conformance to UFP-SAP | | |

| Usability Checklist Table | | | |
|---|---|---|---|
| **Phase of Work** | **Item to be checked/verified** | **Verified (Yes or No)** | **Comments or Deviations** |
| | requirements and procedures for all survey work and rework (including documentation requirements), and all deficiencies documented | | |
| | Coverage of Areas to be Investigated fulfilled and located within accuracy levels required for the Phase 1 RFI | | |
| | Interpretation and Summary of Geophysical Data satisfies UFP-SAP requirements and conformance with Data Processing Flowchart (Worksheet #17) | | |
| *Post-Survey* | *Document, review, and present usability assessment results* | | |

22. **Comment:** Worksheet 37, Page 119 The last paragraph says that written documentation will be used to support non-compliance or rejected data results. However, the first two assessments listed on the preceding page require written documentation even for adequate and accepted results. The last paragraph on page 119 should be changed to agree with the requirements on the previous page.

    **Response:**
    The last paragraph on Page 120 will be revised: "Written documentation will support *both accepted results and* the non-compliance estimated or rejected data results. The project report will identify and describe the data usability limitations and suggest re-surveying or other corrective actions, if necessary."

**Figures (Appendix A)**

1. **Comment:** Figure 11-5. There should be a "yes" option coming out of the top of "Is MEC expected in subsurface"?

   **Response:** The missing "*Yes*" will be added as per the comment.

2. **Comment:** Figure 17-8. This figure should be revised to show that the OB/OD subarea will receive DGM investigation.

   **Response:** The light pink area on the figure will be filled in.

**SOPs (Appendix A)**

1. **Comment:** SOP 3, section 5.0. There is very little additional information in this SOP on the instrument checks. For example, performing the pull-away test is not described. Adding detailed procedures for these tests in this SOP is recommended.

**Response:** Additional details for the test will be added to the SOP as requested.

**Note no Comment 2 provided**

3. **Comment:** SOP 3, section 6.0. There is very little information in this section on QC. If detailed information on QC is not going to be included in the SOP, then referencing the relevant QAPP worksheets that describe the required geophysics QC is recommended.

   **Response:** QA is project specific and is detailed in the QAPP worksheets.

4. **Comment:** SOP 3, Table 1. The QC tests on this table are different than the tests required in Worksheet 22. For example, the GPS positioning test is required twice daily in WS 22 and is only required on the first day on-site in SOP 3 Table 1. Either revise the tables to make them agree or correct these discrepancies by including only one comprehensive table documenting the required geophysics QC tests (probably in the SOP and reference this one comprehensive table in the QAPP worksheets).

   **Response:** The sections of SOP 3 will be revised to be consistent with Worksheet #22.

5. **Comment:** Appendix A, Attachment 2, ESS Determination Note that the NOSSA point of contact identified in the last paragraph is retiring and will not be available to serve as the POC during the project.

   **Response:** Comment acknowledged. The ESS Determination request is approved by NOSSA and cannot be changed by a contractor. The important aspect of the POC information is the office which will be contacted in the event we have questions concerning the document.

**Appendix B**

1. **Comment:** Appendix B-5, Ecological Screening Levels for Soil. Ecological screening levels (ESLs) are needed for nitroglycerin and 14 other explosives in soil. Except for nitrobenzene, ESLs are available for all of these analytes from ESL compilations by USEPA Region V and/or the Los Alamos National Labs (LANL). Please resolve these data gaps using the lowest available soil ESLs for explosives from Version 2.3 of the LANL Ecorisk Database. These soil ESLs are designed to be protective of plants, soil invertebrates, and diverse feeding guilds of birds and mammals. LANL ESLs also were recently proposed by the Army and accepted by EQB for use at sites in Puerto Rico and are being considered by the Navy for incorporation into the Vieques Master SOP for Ecological Risk Assessment.

   **Response:** Additional ecological screening levels will be evaluated as recommended and incorporated into Worksheet 15 PALs and supporting reference tables of Appendix B-5.

2. **Comment:** Appendix B-5, Ecological Screening Levels for Soil. After adding the missing ESLs, please add a column to this table to identify the source (e.g. USEPA Region V or LANL) and ecological receptor group or species (e.g., vole for Region V ESLs) for which each soil ESL was developed and is protective.

**Response:** A column will be added to Appendix B-5 to indicate the source of the final ecological screening level, the lower of the ecological receptor group or species screening criteria was used (e.g., avian, herbivorous mammals, etc.).

**Appendix C**

**SOP 08 - XRF**

1. **Comment:** General Comment. In comments to the text of the SAP, it was recommended that XRF screening be conducted for copper and antimony, in addition to lead. These compounds are in the analyte list of the fixed-laboratory analysis. Addition of these compounds is not anticipated to add any additional steps in the XRF screening process as the instrument automatically selects compounds during the screening.

   **Response:** Per response to Worksheet #11 comment #3, additional analytes will not be screened using the XRF.

2. **Comment:** Page 7 of 11, Section 5.8, paragraph 1. The critical concentration of 400 mg/kg is not consistent with the level presented in Worksheet #17. Page 74 of 121 indicates that the XRF-measured concentration of 200 mg/kg will be used as the critical level for step-out sampling. Please clarify.

   **Response:** Agree. Worksheet #15 (and #17) correctly identifies 200 mg/kg as the field PAL that will be used for lead during XRF screening to determine if step-out samples will be collected during screening. For the SOP, the reference to 400 mg/kg will be formatted with a strikethrough and 200 mg/kg will be inserted in italics.

3. **Comment:** Page 7 of II, Section 5.8.2. The text should be expanded to detail how particles greater then the size of a pea will be removed from the sample. Will a sieve/screen be used? The SOP should describe the sample preparation procedure and required equipment.

   **Response:** The particles will be removed by hand; therefore, equipment will not be required. Refer to response to Worksheet #17, comment 3b.

**Appendix D**

1. **Comment:** SOP-I00: Section IX D.2 of this SOP describes the procedure to be used when following SW-846 3050B. Please explain if the special procedure provided in Section 7.5 of SW-846 method 3050B used to improve recoveries of antimony and lead should be used for this program since these metals are both contaminants of concern for this program.

   **Response:** The standard procedures as specified in SOP-100 will be used for this project. This is a Phase I RFI and the recoveries specified in the standard procedures will be sufficient to meet project objectives.

**Figures**

1. **Comment:** Figures 11-1 to 11-4. The criteria for "high density" of bullets and/or surface MEC should be clarified.

**Response:** The typographical error in the above referenced phrase for Figure 11-1 decision rule flow chart will be revised to read "Are bullets and/or surface MEC present in high density *areas*?" Figures 11-2 through 11-4 are correct as is. For small arms ranges, high density areas are expected to be areas where the bullet stop/natural embankment/berm is located. These are the areas behind the targets and are designed to receive and contain the bullets, i.e., absorb the bullet impact after hitting and passing through the target, and, therefore, are expected to contain the greatest concentrations of spent bullets.

**RESPONSE TO USEPA PROVIDED COMMENTS DATED JANUARY 22, 2010**
**ENCLOSURE 5 (United States Department of the Interior Fish and Wildlife Service Dated November 30, 2009)**
**DRAFT SAMPLING AND ANALYSIS PLAN DATED NOVEMBER 2009**
**SWMU 77 – SMALL ARMS RANGE**
**NAVAL ACTIVITY PUERTO RICO (NAPR), CEIBA, PUERTO RICO**

**Letter Comment:**

This is in reply to the November 6,2009, letter from Tetra Tech regarding the Draft Sampling and Analysis Plan for SWMU 77. Our comments are provided as technical assistance in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act (16 U.S.c. 1531 et seq. as amended).

The Service is concerned with this area because of its prior use as a small arms range and the possible migration of metals, and other contaminants into sensitive environments. This area directly abuts the Los Machos Mangrove area and is surrounded by seagrass beds.

The document mentions the federally listed plant species, the cóbana negra (Stahlia monosperma), this tree species is usually associated with the upper part of mangrove areas. The area is also designated critical habitat for the endangered yellow-shouldered blackbird *(Agelaius xanthomus).* The sand beach on the north shore of the peninsula is a known hawksbill *(Eretmochelys imbricata)* sea turtle nesting beach. Endangered acroporid corals may be found just off shore the northern tip of the peninsula.

Sampling seems to be concentrated very tightly in the known areas of the range. We recommend that the sampling plan be extended cover mangroves and adjacent seagrass. including sampling mangrove and seagrass leaves. Both mangrove and seagrass have been shown to accumulate certain metals.

Since the intention of the Phase 1 RFI is to determine if further response or investigation is appropriate, we have the following recommendations in addition to sampling mangrove and seagrass leaves.

1) Sediment samples from the near shore seagrass beds should be collected to determine if contaminants have migrated off site.
2) Sediment samples should be taken from the mangrove areas since there are depositional areas and represent the low point in the topography.

With regards to vegetation clearance, all vegetation 3 inches or greater in diameter must be left standing unless absolutely necessary. Mangroves can be trimmed but not cut; justification for cutting of vegetation over 3 inches in diameter should be recorded in the daily logs.

We highly recommend a vegetation survey of SWMU 77 prior to any cutting of vegetation to assure that no federally listed plant species could be impacted. The maps of the site should indicate sensitive areas: the conceptual site model map should show mangrove vegetation, salt flats, beaches, seagrass and other sensitive environments. The aerial photography analysis blocks out the near shore areas as if they don't exist, we recommend that all photos show the near shore sensitive areas.

As mentioned above, the site is within the range of several federally listed species under our jurisdiction. Under CERCLA, the Endangered Species Act would be considered an ARAR and compliance with said ARAR is required. The Navy should evaluate the possible impacts to listed species by the proposed work and if anticipated, propose measures to minimize such impacts.

**Letter Response:** A conference call was held among the Navy (Art Sanford and Stacin Martin), Felix Lopez (Fish and Wildlife), and Tetra Tech (Linda Klink) on January 11, 2010 to resolve the concerns stated in the letter. The following items were resolved:

***Vegetation Management:*** Felix Lopez reiterated the letter requirement that, while grass cutting is acceptable, the Navy must not cut any woody vegetation 3 inches or greater. Linda Klink responded that no vegetation greater than 2 inches was planned. She noted that vegetation management is detailed in Appendix A (Volume 2 of the SAP) because vegetation management is largely part of the site preparation for the munitions and explosives of concern (MEC) investigation; Volume 1 of the SAP addresses munitions constituents (MC) sampling and does not detail vegetation management. After discussion, Felix Lopez determined that a vegetation clearance permit would NOT be required for the Phase 1 RFI project.

***Ecological Concerns Beyond the Phase 1 RFI Subarea Boundaries:*** Felix Lopez reiterated US Fish and Wildlife Service (USFWS) concerns that sensitive environments outside of the area of investigation may be impacted and so mangroves and seagrass should be sampled. The Navy responded that the planned work is a Phase 1 RFI, which serves as a first step investigation that focuses on areas most likely to be impacted. Phase 1 RFI results will show if and where contamination is a concern and will aid in planning the scope of a subsequent Full RFI; stakeholders would be involved in the planning effort.

***Mapping of Sensitive Areas:*** Felix Lopez reiterated the USFWS direction that mapping of sensitive areas should be included in the SAP. Linda Klink referred to Appendix B-1.1 of the SAP for these maps, which were extracted from the Phase I/II Environmental Condition of Property Report of July 2005 and noted that most all of SWMU 77, including the Subareas of investigation for the Phase 1 RFI, are outside of the wetlands area (including mangroves).

***Federally Listed Species:*** Felix Lopez stated that the site is within the range of several federally listed species under USFWS jurisdiction and impacts should be evaluated and minimized. The Navy recognizes the sensitive ecological environment and, for the Phase 1 RFI, has designed the field program to minimize site disturbance. Linda Klink noted that the Phase 1 RFI is outside of sensitive ecological designated areas and that several field program design elements included in the SAP to minimize impacts: For example, hand-held geophysics instrumentation has been selected that is small in terms of footprint, hand augering will be used rather than a drill rig for soil sampling, monitoring well drilling has been deferred to the future Full RFI, and only nominal vegetation removal will be conducted.