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August 11, 2011

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

Re: Contract N62470-10-D-3000
IQC for A/E Services for Multi-Media
Environmental Compliance Engineering Support
Delivery Order (DO) JM01
U.S. Naval Activity Puerto Rico (NAPR)
EPA I.D. No. PR2170027203
Revised Draft Corrective Measures Study Report for SWMU 69

Dear Mr. Everett:

Michael Baker Jr., Inc. (Baker), on behalf of the Navy, is pleased to provide you with one hard copy and one electronic copy provided on CD of the Revised Draft Corrective Measures Study Report for SWMU 69, Naval Activity Puerto Rico for your review and approval. This report is submitted as a revised draft report incorporating the results from the June 21, 2010 Final Sampling Strategy for Disturbed Soil Sampling, SWMU 69 – Aircraft Parking Area.

This report has been revised to address EPA comments dated January 15, 2009. The Navy's responses to these comments are attached for your review. Additional distribution has been made as indicated below.

If you have questions regarding this submittal, please contact Mr. Mark E. Davidson at (843) 743-2124.

Sincerely,
MICHAEL BAKER JR., INC.

Mark E. Kimes, P.E.
Activity Coordinator

MEK
Attachments

cc: Ms. Debra Evans-Ripley, BRAC PMO SE (letter only)
Mr. Mark E. Davidson, BRAC PMO SE (1 hard copy and 1 CD)
Mr. Pedro Ruiz, NAPR (1 CD)
Mr. Tim Gordon, US EPA Region II (1 hard copy and 1 CD)
Mr. Carl Soderberg, US EPA Caribbean Office (1 hard copy and 1 CD)
Mr. Gloria Toro, PR EQB (1 hard copy and 1 CD)
Ms. Wilmarie Rivera, PR EQB (1 CD)
Mr. Felix Lopez, US F&WS (1CD)
Ms. Brenda Smith, TechLaw, Inc. (1 CD)

NAVY RESPONSE TO EPA COMMENTS DATED JANUARY 15, 2009 ON THE DRAFT CORRECTIVE MEASURES STUDY REPORT FOR SWMU 69 DATED SEPTEMBER 12, 2008

The following comments were generated based on review of the *Draft Corrective Measures Study Report SWMU 69* (Draft CMS Report), Naval Activity Puerto Rico (NAPR) Ceiba, Puerto Rico originally submitted to EPA on September 12, 2008. This Draft CMS Report was retracted by Baker in a December 3, 2008 letter to EPA because of soil disturbance and changed site conditions caused by the Puerto Rico Ports Authority. Comments on the Draft CMS Report for SWMU 69 were issued by EPA on January 15, 2009, after the original Draft Report retraction. Since retraction of the report and issuance of EPA and PREQB comments, some additional study and evaluation has been conducted for this SWMU. The new data and evaluations, as well as the applicable responses to these comments will be incorporated into the Revised Draft CMS Report for SWMU 69. Regulator comments are provided in Italics while the Navy's responses are provided in plain text.

EPA COMMENTS

GENERAL COMMENTS

EPA General Comment 1: *The second paragraph of Section 2.2, SWMU 69 Description and History, indicates that the "expanded concrete apron area" was originally a "photo identified" (PI) site due to "the observation of extensive stains on and just off the apron from 1977-1985. Three aboveground storage tanks (ASTs) were also observed in this area ..." The Draft CMS Report goes on to state "most of the area identified as PI Site 21 is now covered by the expanded concrete apron, including the area where the ASTs were located. The expanded concrete apron area is acting as a cap over the potentially contaminated soil areas ..." It is critical to note that there has been no sampling conducted under the pad, and the last sentence of Section 10.1, Description of the Remedy, indicates "There are no long term restrictions, controls or monitoring associated with [the U.S. Navy's proposed] alternative." Therefore, future owners/operators of the site could remove the concrete pad and be exposed to, as well as be required to manage, contaminated soils. To address this critical issue, additional contaminant characterization should be conducted under the expanded concrete apron, or long term restrictions and controls (e.g., land use controls) should be placed on the area to ensure future users will not be adversely impacted by potentially contaminated soils. Revise the Draft CMS Report to address the potentially contaminated media under the expanded concrete apron.*

Navy Response: Additional contaminant characterization under the expanded concrete apron is not being considered at this time. The Jose Aponte De La Torre (JAT) Airport (former NAPR Ofstie Airfield) is now operating as an active regional airport; therefore, it is unlikely that such an undertaking to remove the concrete pad and expose potentially contaminated soil would be initiated by the Puerto Rico Ports Authority. However, given that the pad covers an area where staining was identified; land use controls will be placed on SWMU 69 to ensure future users will not be adversely impacted by potentially contaminated soils.

EPA General Comment 2: *Throughout the Draft CMS Report, the groundwater monitoring wells installed at locations 69SB25, 69SB26 and 69SB27 are referred to as temporary monitoring wells. These wells were installed and developed similarly to the permanent monitoring wells with the exception of steel bollards installed around the concrete pads for additional protection. Therefore, it is not clear why these wells are described as "temporary." Because monitoring wells 69SB25, 69SB26 and 69SB27 were installed and developed similarly to permanent wells, and apparently remain in place, please remove*

"temporary" from the description of these wells or indicate why they are considered to be "temporary".
Navy Response: As indicated by this comment, "temporary" refers to the lack of steel bollards around the monitoring well. The reference to "temporary" will be removed from the description of monitoring wells 62SB25, 62SB26, and 62SB27.

EPA General Comment 3: *Risk and hazard to future residential populations were not evaluated in the human health risk assessment (HHRA). While this is consistent with the Final Corrective Measures Study Work Plan SWMU 69 dated December 6, 2007 (Work Plan), please note that if future land use changes, no evaluation of risk and hazard to residential populations will be available for use in making informed risk management decisions. Because this property is being transferred out of federal control, a residential exposure scenario or the application of land use controls to preclude residential exposures should be considered. Please revise the HHRA to address this issue.*

Navy Response: Future residential land use will conservatively be assumed for SWMU 69, although it is not included in the RCRA §7003 Administrative Order on Consent (USEPA, 2007) as a likely scenario given expected future land use. The site is part of a regional airfield and is not conducive in its current setting to residential use. However, this scenario is included to evaluate unrestricted land use and to provide the most conservatively protective risk estimation. Section 8.0 text and associated tables, figures, and appendices will be revised accordingly.

EPA General Comment 4: *It is unclear from the HHRA whether method detection limits (MDLs) were below applicable screening criteria. Revise the HHRA to include further discussion of data quality relevant to the HHRA and clarify whether MDLs were below applicable screening criteria for all constituents. If MDLs were above screening criteria for any constituent, discuss the implication of these exceedances on the representativeness of the data set discussed in Section 8.3.2.4, Data Analysis.*

Navy Response: The Navy is aware that some of the reporting limits exceed the human health screening levels. A discussion of these exceedances and associated uncertainties will be included in the uncertainties section of the human health risk assessment (specifically, Section 8.3.6.2).

EPA General Comment 5: *The HHRA does not provide or discuss the cumulative risk and hazard values determined in the quantitative assessment. While these values are presented in Appendix K, they should be presented and discussed in the main text of the Draft CMS Report as part of the HHRA discussion and conclusions regarding the corrective action objectives (CAOs). Cumulative risk and hazard results should be used in Section 8, Human Health Risk Assessment and Development of CAOs, and Section 9, Summary of COCs and CAOs, to justify CAO conclusions. Revise the Draft CMS Report to address these issues.*

Navy Response: Sections 8.0 and 9.0 of the Draft CMS Report will be revised as requested in the comment.

EPA General Comment 6: *Tables 4.1 through 4.3 in Appendix K provide exposure factors and equations used in the HHRA to quantify chronic daily intake (CDI) values. While most of the exposure factors have been appropriately obtained from applicable guidance documents, several exposure factors were selected based on professional judgment or were obtained from guidance documents without sufficient justification. Please revise Section 8.3.2.5, Exposure Input Parameters, to provide the complete decision rationale for the use of all exposure factors and model inputs. Examples include, but are not limited to:*

- *An exposure frequency (EF) of 52 days/year was used for adult and adolescent trespasser exposures to surface soil. Please revise the HHRA to further justify the use of this EF.*

Navy Response: The HHRA will be revised to provide justification for the EF.

- *50 mg/day was used for the ingestion rate of soil (IR-S) for future industrial/commercial workers exposed to surface and subsurface soil. However, the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites dated December 2002 (SSL Guidance), indicates that a soil ingestion rate of 100 mg/day should be used for industrial workers. Revise the HHRA to use a soil ingestion rate of 100 mg/day for future industrial/commercial workers in CDI calculations associated with soil exposure.*

Navy Response: The IR-S for the future industrial/commercial worker will be revised to 100 mg/day as per the December 2002 SSL Guidance and as agreed upon in the January 9, 2009 conference call between the Navy, USEPA, and PREQB.

- *An EF of 180 days/year was used for future construction workers. Revise the HHRA to further justify the use of this EF.*

Navy Response: The EF for the future construction worker will be revised to 250 mg/day as per the USEPA 2004 RAGS Part E guidance and as agreed upon in the January 9, 2009 conference call between the Navy, USEPA, and PREQB.

- *For evaluating exposures from fugitive dust, a particle emission factor (PEF) of 1.32E+09 was used. However, the use of this PEF has not been justified in the HHRA. Revise the HHRA to discuss the appropriateness of using a PEF of 1.32E+09 to calculate CDIs for various receptors.*

Navy Response: The HHRA will be revised to use USEPA's current default PEF of 1.36E+09 m^3/kg for residential and generic industrial settings and to calculate a PEF specific for use in evaluating construction worker exposures as per the December 2002 SSL Guidance and as agreed upon in the January 9, 2009 conference call between the Navy, USEPA, and PREQB.

- *0.02 L/day was used for the ingestion rate of groundwater (IR-W) for future construction workers. This value was selected based on professional judgment. Revise the HHRA to further justify the use of this IR-W for future construction workers.*

Navy Response: The IR-W of 0.02 L/day used for evaluation of future construction worker exposure to groundwater was taken from the Virginia Department of Environmental Quality (VDEQ) Voluntary Remediation Program Risk Assessment Guidance. This value was agreed upon in the January 9, 2009 conference call between the Navy, USEPA, and PREQB. The HHRA will be revised to provide the VDEQ reference for this IR-W.

- *An EF and exposure duration (ED) of 18 and 1, respectively, were used for calculating groundwater exposures associated with future construction workers. These values were selected based on professional judgment; however, the use of these values is not fully supported in the HHRA. Revise the HHRA to provide the rationale for the use of these EF and ED values.*

Navy Response: The HHRA will be revised to include an EF of 50 days/year for calculating groundwater exposures associated with future construction workers. This value is based on professional judgment and assumes 20 percent of time spent in a trench. The ED of 1 year is also based on professional judgment and conservatively assumes a construction period of 1 year. These values were

agreed upon in the January 9, 2009 conference call between the Navy, USEPA, and PREQB. The HHRA will be revised to provide the rationale and references to support these exposure parameters.

SPECIFIC COMMENTS

EPA Specific Comment 1: ***Figure 2-3, Site Layout and ECP Sample Location Map, and Figure 2-4, 1961 Aerial Photograph:*** *Figures 2-3 and 2-4 depict a number of color coded polygon features from 1961, 1964, 1977, 1985 and 1995. It is not clear what these polygon features signify. Revise the Draft CMS Report to include an explanation of the polygon features shown on Figures 2-3 and 2-4.*

Navy Response: During the Aerial Photography Analysis, as presented in the Environmental Condition of the Property Report (LANTDIV, 2004) the Navy conducted an analysis of aerial photography, covering the period of 1936 through 1999 from multiple sources (as discussed in the Phase I ECP report). In addition to records review, the Navy used the aerial photographs to identify anomalies (e.g., large spills/stains, ground scars, debris piles, pits, possible disposal areas, etc.) that were not identified in previous investigations. The polygons represent areas of disturbance from the year in which the aerial photograph showed anomalies. Section 2.2 (SWMU 69 Description and History) will be edited to provide a brief summary of how the polygons on Figures 2-3 and 2-4 were derived.

LANTDIV, 2004. Phase I Environmental Condition of Property Report, U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico. Prepared for Commander, Navy Region Southeast (CNRSE), U.S. Navy, by Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. March 31, 2004.

EPA Specific Comment 2: ***Section 4.7.1, Field Duplicates, Page 4-5:*** *The third sentence in this section states "one field duplicate subsurface soil sample 69SB05D was collected…" It is assumed this sentence is referring to sample 69SB08-05D. Revise the Draft CMS Report to correct this apparent typographical error.*

Navy Response: This sentence will be revised to correctly refer to subsurface soil duplicate sample 69SB08-05D.

EPA Specific Comment 3: ***Section 4.7.5, Equipment Rinsates, Page 4-6:*** *Section 4.7.5 lists the equipment rinsate samples as 69ER03, 69ER04, etc. However, Table 4-2, Summary of Sampling and Analytical Program – QA/QC Samples, lists these samples as ER03, ER04, etc. A consistent identification format should be presented for these samples throughout the Draft CMS Report. Revise the Draft CMS Report to address this issue.*

Navy Response: Equipment rinsate samples should be presented as ER03, ER04, and ER05. This section will be revised accordingly, and the report will be checked for consistency.

EPA Specific Comment 4: ***Section 6.1, Surface Soils, Page 6-3:*** *The second sentence in the first full paragraph on Page 6-3 states "Arsenic exceeded the NAPR basewide background screening value in 18 of 25 samples." According to Table 6-1, Summary of Detected Results – Surface Soil, 19 of 25 samples exceeded the basewide background screening value. Revise the Draft CMS Report to address this apparent discrepancy.*

Navy Response: Arsenic exceedances were recounted, and arsenic exceeded the background screening value in 18 of 25 environmental samples. Note that duplicate samples are not included in this count.

EPA Specific Comment 5: ***Table 6-1, Summary of Detected Results – Surface Soil:*** *According to Section 6.1, Surface Soils, Page 6-2, "The detected analytical results for the surface soil data set are provided in Table 6-1." However, Table 6-1 lists detected results for metals only; the detections for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) are not included in this table. Revise Table 6-1 to include all detected analytical results for the surface soils.*

Navy Response: The first four pages of Table 6-1, Summary of Detected Results – Surface Soil include VOC and SVOC detected analytical results.

EPA Specific Comment 6: ***Table 6-2, Summary of Detected Results – Subsurface Soil, Page 2 of 3:*** *In Table 6-2, sample 69SB27-05 shows an acetone detection of 520 R micrograms per liter (µg/kg). In Table 6-4, Summary of Detected Results – QA/QC, sample 69TB02 shows a detection of 2-butanone at 5 R µg/L and toluene at 0.31 R µg/L. The Notes/Qualifiers sections of these tables do not provide a definition for R. The qualifier "R" typically means the analytical result was rejected. If that is the case, the results should be removed from Table 6-2 and Table 6-4. If this is not the case, include a definition for R in Table 6-2 and Table 6-4.*

Navy Response: The "R" qualifier indicates that the result is rejected. Tables 6-2 and 6-4 will be revised to include definitions of the qualifiers.

EPA Specific Comment 7: ***Section 7.1.3, Biota, Page 7-4:*** *This section states that the specific biota occurring at and immediately contiguous to Solid Waste Management Unit (SWMU) 69 has not been documented during previous investigations. As part of the revised CMS Report, clarify whether this constitutes a data gap in the Screening-Level Ecological Risk Assessment (SLERA). If so, discuss how the data gap will be addressed.*

Navy Response: The Navy offers the following points of clarification relative to this comment. As evidenced by Table 7-1, terrestrial birds occurring or having the potential to occur at NAPR are represented by herbivores, omnivores, and carnivores. Terrestrial avian receptors selected for evaluation in the SERA included a representative from each of these feeding guilds (i.e., mourning dove, American robin, and red-tailed hawk). Furthermore, as discussed in Section 7.1.3.1 of the draft CMS report and the Navy response to EPA Specific Comment 14, all native terrestrial mammals have been extirpated from Puerto Rico (with the exception of bats). Therefore, the selection and evaluation of a ground-dwelling mammalian herbivore, omnivore, and/or carnivore is not warranted. Herbivorous bats (i.e., nectivores and frugivores) are considered potential mammalian receptors at a given SWMU if suitable foraging habitat is present. During sampling events associated with the 2010 disturbed soil sampling investigation, vegetation within the small coastal scrub community bordering the drainage ditch system adjacent to SWMU 69 was observed to include a flowering plant (i.e., white lead tree [*Leucaena leucocephala*]). Pollen and nectar from white lead tree is known to be used as a source of food by bats on Puerto Rico (Gannon et al., 2005). Therefore, a nectivorous bat will be added to the list of upper trophic level receptor species evaluated by the ecological risk assessment (ERA) presented within the Revised Draft CMS Report (see Section 7.3.2.1). The species selected to represent nectivorous bats on Puerto Rico was the brown flower bat. This species is common and found throughout Puerto Rico (Gannon et al., 2005). In addition to the brown flower bat, aquatic receptor groups (aquatic invertebrates, plants, and amphibians) will be added to the list of receptors evaluated by the ERA (see section 7.10 of the Revised Draft CMS Report). These receptor groups were added based on observations made during sampling activities associated with the 2010 disturbed soil sampling investigation (see discussion presented in Section 4.4 of the revised draft CMS document). Based on the considerations discussed above, the Navy does not believe that the lack of documentation of the specific biota occurring at and contiguous to SWMU 69 represents a data gap with unacceptable uncertainty.

References cited in the Navy response to EPA Specific Comment 6:

Gannon, M.R., A. Kurta, A. Rodriguez-Durán, and M.R. Willig. 2005. Bats of Puerto Rico: An Island Focus and a Caribbean Perspective. Texas Tech University Press, Lubbock, TX. 239 pp.

EPA Specific Comment 8: ***Section 7.1.3.2, Birds, Page 7-6:*** *According to Section 7.1.3.2, the Los Machos mangrove forest located approximately 1.1 miles southeast of SWMU 69 and the Ensenada Honda located approximately 1.4 miles southeast of SWMU 69 represent foraging habitat for the Caribbean brown pelican (Pelecanus occidentalis), a federally listed bird species. This section also suggests that no transport pathways exist between SWMU 69 and the surface water bodies of the Los Machos mangrove forest or the Ensenada Honda. However, according to Section 7.1.2, Aquatic Habitats, Page 7-4, the groundwater flow direction at SWMU 69 indicates the Los Machos mangrove forest represents the most likely discharge point for SWMU 69 groundwater. Furthermore, this section indicates that surface water run-off within the drainage ditch adjacent to SWMU 69 discharges directly to the wetland system of the Los Machos. Revise the SLERA to resolve this discrepancy. If transport pathways between SWMU 69 and either the Los Machos or Ensenada Honda systems exist, clarify how hazards to species living or foraging in these systems will be addressed. In addition, this transport pathway should be discussed further in Section 7.3.1.2, Transport Pathways.*

Navy Response: The Navy offers the following points of clarification relative to this comment. First of all, the United States Fish and Wildlife Service (USFWS) has published a Final Rule removing the brown pelican from the federal list of endangered and threatened wildlife throughout its range, including Puerto Rico (see Federal Register: Volume 74, Number 220, Page 59444 dated Tuesday November 17, 2009). This final rule indicates that special consideration of the brown pelican is not warranted. Section 7.1.3.2 will be revised to eliminate text identifying the brown pelican as a federally listed bird species. Secondly, Section 7.1.3.2 of the Draft CMS report does not include text suggesting that there are no transport pathways from SWMU 69 to the Los machos mangrove forest as suggested by EPA Specific Comment 8. The text simply stated that there are no transport pathways from SWMU 69 to the unnamed lagoon north of the Los Machos mangrove forest or the Ensenada Honda. These two surface water bodies were identified in this section since they represent the closest open water habitats to SWMU 69 representing likely foraging habitat for brown pelicans. Thirdly, it is noted that the drainage ditch adjacent to SWMU 69 does not discharge to the Los Machos mangrove forest. As stated by the last paragraph in Section 7.1.3.2 of the Draft CMS report, "*A smaller estuarine wetland system (primarily E2SS3 wetland units) is located approximately 4,000 feet southeast of SWMU 69 (see Figure 7-3). Surface water run-off within the drainage ditch adjacent to SWMU 69, as well as surface run-off from much of the airport facility ultimately discharges to this wetland system*". The estuarine wetland identified by this text is not part of the Los machos mangrove forest. As correctly noted in Section 7.3.1.2, transport pathways from SWMU 69 to downgradient surface water bodies are limited to (1) transport with groundwater to Los Machos mangrove forest, and (2) transport with drainage ditch storm water to an estuarine wetland system located southeast of SWMU 69.

To address the groundwater transport pathway from SWMU 69 to the Los machos mangrove forest, the ERA included a comparison of SWMU 69 groundwater analytical data to estuarine/marine surface water screening values (see Table 7-13 of the draft CMS document). As evidenced by the comparison, no detected chemicals were identified as ecological COPCs in Step 2 of the screening level ERA (i.e., all detected concentrations were less than groundwater screening values). Therefore, it can be concluded with high confidence that that aquatic receptor groups within the Los Machos mangrove forest (i.e., aquatic plants, invertebrates, and fish) are not being impacted by chemicals migrating with groundwater.

It is acknowledged that the groundwater screening values used in the comparison are literature-based toxicological thresholds or toxicological values based on lower trophic level aquatic receptor groups (e.g.,

plants, invertebrates and fish). As such, the comparison does not address upper trophic level receptors (i.e., avian invertivores and piscivores) that may forage within the Los Machos mangrove forest. To address this potential transport pathway, groundwater analytical data were examined. The examination of the groundwater analytical data indicates that three organic chemicals identified by the USEPA (2000) as important bioaccumulative compounds were detected in groundwater collected at SWMU 69 during the 2008 CMS field investigation (acenaphthene, fluorene, and phenanthrene). Each organic was detected in one groundwater sample (0.11J µg/L for acenaphthene, 0.083J µg/L for fluorene, and 0.28 µg/L for phenanthrene). Based on the low magnitude of these detections, it is unlikely that these three chemicals are migrating with groundwater to the Los Machos mangrove forest at concentrations that would present unacceptable risk to avian receptors. In addition to these organic chemicals, four bioaccumulative metals (arsenic, cadmium, nickel, and zinc also were detected within the total recoverable fraction of one or more of the SWMU 69 groundwater samples. However, maximum detected concentrations (0.56J µg/L for arsenic, 0.16J µg/L for cadmium, 0.9J µg/L for nickel, and 10J µg/L for zinc) are less than upper limit of the mean (ULM) concentrations for basewide background groundwater contained in the Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds for NAPR (18.9 µg/L for arsenic, 2.21 µg/L for cadmium, 95.7 µg/L for nickel, and 548 µg/L for zinc; Baker, 2010). Therefore, it can be concluded that these four metals are not migrating with groundwater to the Los Machos mangrove forest at concentrations greater than what would be expected under background conditions. The text in Section 7.1.2 will be revised to include the evaluation presented above.

To address the drainage ditch transport pathway, fourteen sediment samples were collected from the drainage ditch adjacent to SWMU 69 during the 2010 disturbed soil sampling investigation. Analytical data for these samples will be evaluated in the revised ERA by examining the spatial distribution of chemical concentrations in drainage ditch sediment in Step 3a of the BERA to determine if chemicals are migrating with storm water to the estuarine wetland system southeast of SWMU 69. As noted in the last paragraph of Section 7.1.2, surface water run-off within the drainage ditch adjacent to SWMU 69, as well as surface water run-off from a significant portion of the airfield ultimately discharges to the estuarine wetland system. Drainage from areas outside of the airfield's boundary also discharges to this wetland. Based on these inputs, it is the Navy's opinion that sediment and surface water quality within the wetland cannot be linked to SWMU 69.

References cited in the Navy Response to EPA Specific Comment No. 8:

Baker Environmental, Inc. (Baker). 2010. Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

USEPA. 2000. Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment: Status and Needs. Bioaccumulation Analysis Workgroup, Washington, D.C.(EPA-823-R-00-001).

EPA Specific Comment 9: ***Section 7.3.1.3, Exposure Pathways and Routes, Page 7-11:*** *The second paragraph on Page 7-11 indicates that the Palustrine Emergent Persistent (PEM1) unit (located approximately 800 feet southwest of SWMU 69) is not hydrologically connected to SWMU 69 and; therefore, ingestion of surface water was not considered in risk calculations for upper trophic level receptors. However, it appears that the surface water drainage ditch adjacent to SWMU 69 may discharge to the PEM1 wetland units. Revise the SLERA to provide further justification for not evaluating hazards from surface water ingestion to upper trophic level receptors.*

Navy Response: Figure 7-3 has been revised to show the drainage ditch system associated with SWMU 69, including storm water flow directions. As evidenced by this figure, freshwater wetland units in the

vicinity of SWMU 69, including the PEM1 wetland unit located approximately 800 feet southwest of SWMU 69, are not hydrologically connected to SWMU 69 via the drainage ditch system. As the Navy believes the revisions to Figure 7-3 adequately address this comment, additional revisions to the document are not deemed necessary.

EPA Specific Comment 10: ***Section 7.3.1.3, Exposure Pathways and Routes, Page 7-11:*** *The third paragraph on Page 7-11 indicates that the dermal exposure pathway was not evaluated in the SLERA. While this appears appropriate for most species that may inhabit the site, this section indicates that burrowing reptiles may inhabit the upland vegetative units at and contiguous to SWMU 69. According to this section, burrowing reptiles would be expected to experience the most significant exposure from dermal absorption. Revise the SLERA to provide further justification for not evaluating dermal exposure to relevant species, or alternatively, revise the SLERA to evaluate dermal exposure quantitatively for burrowing reptiles or an appropriate surrogate species.*

Navy Response: The Navy offers the following points of clarification relative to this comment. Section 7.3.1.3 provides several lines of reasoning for excluding the dermal exposure pathway from evaluation in the SERA. Because these lines of reasoning are consistent with *Attachment 1-3 of Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs): Evaluation of Dermal Contact and Inhalation Exposure Pathways for the Purpose of setting Eco-SSLs* (USEPA, 2003), the Navy does not believe further justification for exclusion of the dermal exposure pathway or an evaluation of the dermal exposure pathway for burrowing reptiles or an appropriate surrogate species is necessary. However, reference to the Draft Ecological Soil Screening Level Guidance (USEPA 2000) in Section 7.3.1.3 has been replaced by the more recent USEPA document identified above. It is noted that site-specific factors were considered when excluding the dermal exposure pathway from evaluation. Specifically, consideration was given to the chemicals detected in SWMU 69 surface and subsurface soil. As stated in section 7.3.1.3, chemicals known or suspected to be of concern via dermal adsorption are not known to be associated with historical site activities (e.g., organochlorine pesticides) or were detected at a low frequency and magnitude of detection (e.g., VOCs).

References cited in the Navy response to EPA Specific Comment No. 10:

USEPA. 2000. Draft Ecological Soil Screening Level Guidance. Office of Emergency and Remedial Response, Washington, D.C. July 2000.

USEPA. 2003. Attachment 1-C of Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs): Evaluation of Dermal Contact and Inhalation Exposure Pathways for the Purpose of Setting Eco-SSLs. Office of Solid Waste and Emergency Response. OSWER Directive 92875.

EPA Specific Comment 11: ***Section 7.3.2.1, Selection of Receptors, Page 7-14:*** *Terrestrial reptiles and amphibians were not selected as receptors in the SLERA. While impacts to these receptors may be difficult to evaluate quantitatively (toxicological data are limited for these species), at a minimum, they should be evaluated qualitatively. Revise the SLERA, to provide a qualitative evaluation of impacts to terrestrial reptiles and amphibians or a quantitative evaluation based on an appropriate surrogate.*

Navy Response: The Navy offers the following points of clarification relative to this comment. As evidenced by Table 7-2, assessment and measurement endpoints were established for terrestrial reptile communities. The measurement endpoint involved a qualitative examination of exposures and risks to ecological receptors occupying similar trophic levels. However, the Navy does acknowledge that beyond the identification of assessment and measurement endpoints, the fate of terrestrial reptiles is not discussed. Therefore, text throughout Section 7.0 will be revised, as necessary, to include a discussion of terrestrial reptiles.

EPA Specific Comment 12: ***Section 7.4.1.2, Groundwater Screening Values, Page 7-18:*** *Chronic-based screening values were extrapolated from acute no-observed-effect-concentrations (NOECs), no-observed-effect-levels (NOELs), low-observed-effect concentrations (LOECs), low-observed-effect-levels (LOELs), concentrations at which 50% of the population would experience lethality (LC_{50}), and concentrations at which 50% of the population would experience an exposure (EC_{50}). The uncertainty factors noted in the Work Plan differ from those used in the SLERA. For example, an uncertainty factor of 30 was used in the SLERA to convert an acute NOEC or NOEL to a chronic-based screening value, versus an uncertainty factor of 10 as outlined in the Work Plan. While an uncertainty factor of 30 is more protective, please provide the rationale for this deviation from the Work Plan in the revised CMS Report.*

Navy Response: The uncertainty factors used in the draft CMS report, including the uncertainty factor used to convert an acute NOEC or NOEL value to a chronic-based screening value, are based on uncertainty factors presented within Wentsel et al. (1996). With the exception of the uncertainty factors used for converting acute-based LC_{50} and EC_{50} values and chronic-based LOEL, and LOEC values to chronic-based NOEC or NOEL values (100 for LC_{50} and EC_{50} values and 10 for LOEL and LOEC values) and 10 [USEPA, 1997]), uncertainty factors were arbitrarily selected (an uncertainty factor of 10 was applied to acute NOEC/NOEL and LOEC/LOEL values). Because Wentsel et al. (1996) provide uncertainty factors for converting a variety of acute toxicity values, including safety factors for converting acute NOEL/NOEC and LOEL/LOEC values to a chronic-based screening value (chronic NOEC/NOEL), these uncertainty factors were used in place of arbitrarily selected values within the draft CMS report.

References cited in the Navy response to EPA Specific Comment No. 12:

USEPA. 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final). Office of Solid Waste and Emergency Response. EPA/540/R-97-006.

Wentsel, R.S, T.W. Pa Point, M. Simini, R.T. Checkai, and D. Ludwig. 1996. Tri-Service Procedural Guidelines for Ecological Risk Assessments. Edgewood Research Development and Engineering Center, Aberdeen Proving Ground, MD. ADA297968.

EPA Specific Comment 13: ***Section 7.6.2, Screening-Level Risk Calculation for Surface Soil, Subsurface Soil, Groundwater and Terrestrial Food Web Exposures, Page 7-26:*** *The top of Page 7-26 states "The sum of maximum LMW [low molecular weight] PAH [polynuclear aromatic hydrocarbon] concentrations (2,652 mg/kg; maximum MDL used for non-detected PAHs) is less than the LMW PAH Eco-SSL value (29,000 µg/kg)." It appears that there is a discrepancy in concentration units. A similar discrepancy was noted in the discussion of high molecular weight (HMW) PAH concentrations. Review this discussion and ensure that Section 7.6.2 presents the correct units for all concentration values.*

Navy Response: The units shown for LMW PAH and HMW PAH should be µg/kg not mg/kg. Section 7.6.2 will be revised to show the correct units.

EPA Specific Comment 14: ***Section 7.7, Uncertainties Associated with the SERA, Page 7-30 through Page 7-31:*** *A terrestrial mammal was not evaluated in the SLERA for reasons noted on Page 7-14. Among the reasons, the text notes "all native terrestrial mammals have been extirpated from Puerto Rico." Revise Section 7.3.2.1, Selection of Receptors, to cite references supporting this assertion. Further, ensure the cited references are listed in Section 7.11, References.*

Navy Response: The statement that "with the exception of bats, all native terrestrial mammals have been extirpated form Puerto Rico" was first included within Section 7.1.3.1 of the draft CMS report with a reference. For clarity, this reference has been added to the discussion in Section 7.3.2.1.

EPA Specific Comment 15: ***Section 7.9.1, Refined Risk Evaluation, Page 7-34:*** *Several metals were dropped as COPCs based on a comparison to background concentrations. According to Section 7.9, Step 3a of the BERA, Page 7-32, this approach was approved by EPA for SWMU 14. However, no information establishing the relationship between SWMU 14 and SWMU 69 is provided in the Draft CMS Report. Revise the Draft CMS Report to include a brief discussion demonstrating that conditions at SWMU 69 are similar to those at SWMU 14 and the comparison of media concentrations to background concentrations proposed for SWMU 14 is applicable to SWMU 69.*

Navy Response: The text referenced on Page 7-32 by EPA Specific Comment 15 above refers to the use of 95 percent upper confidence limit (UCL) of the mean chemical concentrations in Step 3a of the baseline ERA (BERA), not background concentrations. The EPA specified that the ERA at SWMU 14 can use 95 percent UCL of the mean chemical concentrations to refine risk estimates in Step 3a of the BERA if a chemical-specific data sets have a minimum of eight detected values and less than 70 percent non-detected results. This requirement is applied to all ERAs at NAPR. It is noted that the use of 95 percent UCL of mean chemicals concentrations in Step 3a of the BERA is consistent with Navy guidance and policy (Parker et al., 2003).

The use of background concentrations in Step 3a of the BERA is consistent with Navy guidance for conducting ecological risk assessments (available at http://web.ead.anl.gov/ecorisk/process/), as well as Navy Policy on the Use of Background Chemical Levels (available at http://web.ead.anl.gov/ecorisk/policy/pdf/Final_Navy_Background_Policy.pdf). Specifically, If ecological COPCs identified in Step 2 of the screening level ERA (SERA) were detected at or below background levels, as determined by statistical evaluations conducted during the Step 3a evaluation (descriptive and distributional statistics), they exited the ERA process. Background analytical data used in ERAs at NAPR are those specified in the EPA-approved Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds for NAPR (Baker, 2010). As such, the Navy does not believe it is necessary to demonstrate that conditions at SWMU 69 are similar to those at SWMU 14 and the comparison of media concentrations to background concentrations proposed for SWMU 14 is applicable to SWMU 69. It is noted that since submittal of the draft CMS report for SWMU 69, background airfield soil and background airfield drainage ditch sediment data sets have been established and incorporated into the Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds (Baker, 2010) as Addendum B, and C, respectively. As such, the statistical evaluations presented within the Revised Draft CMS Report for SWMU 69 will be based on these airfield background data sets, not the basewide data sets used in the Draft CMS Report.

References cited in the Navy response to EPA Specific Comment No. 15:

Baker Environmental, Inc. (Baker). 2010. Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds, Naval Activity Puerto Rico, Ceiba, Puerto Rico. July 30, 2010.

Parker, N., G. McDermott, and D. Neptune. 2003. U.S. Navy Ecological Screening and COPC Refinement for Sediment, Soil, and Surface Water. 18 pp.

EPA Specific Comment 16: ***Section 8.3.2.1, Potential Human Receptors, Page 8-9:*** *It is unclear from the HHRA why surface water exposures to human receptors were not evaluated. A drainage ditch is located adjacent to SWMU 69 and it appears that site receptors, particularly trespassers, may encounter the ditch. Revise the HHRA to clarify why surface water exposures to human receptors were not evaluated.*

Navy Response: Surface water was not present in the drainage ditch during either the 2004 Phase II ECP

investigation or the 2008 CMS investigation. As such, surface water samples were not collected and that exposure pathway was not evaluated. Surface water was subsequently observed in the drainage ditch during the 2010 Disturbed Soil Sampling Investigation but was not sampled. Rather, sediment samples were collected (in the southern and eastern drainage ditches) as part of the 2010 Disturbed Soil Sampling Investigation to evaluate the potential for surface soil migration into the SWMU 69 drainage ditches resulting from soil disturbance by contractors in 2008 (which occurred after the 2008 CMS field investigation) and surface runoff from the adjacent expanded apron during precipitation events. Therefore, sediment exposure will be evaluated for the trespasser and on-site worker receptor scenarios as part of the 2010 Disturbed Soil Sampling Investigation HHRA.

EPA Specific Comment 17: ***Section 8.3.2.4, Data Analysis, Page 8-11:*** *Section 8.3.2.4 indicates that in the surface soil and subsurface soil data sets, there were instances in which the maximum concentration was used as the exposure point concentration (EPC) in risk calculations due to low frequencies of detection. Please clarify in Section 8.3.2.4 which compounds were evaluated in the quantitative risk assessment based on their maximum detected concentration, rather than a calculated EPC based on the 95% upper confidence limit (UCL) on the mean*

Navy Response: Sections 8.3.2.4 and 8.4.2.2 will be revised to include those compounds that were evaluated in the quantitative risk assessment based on their maximum detected concentration rather than a calculated EPC.

EPA Specific Comment 18: ***Table 9-1, Ecological-Based Corrective Action Objectives for Surface Soil, Page 1 of 1:*** *The surface soil samples with concentrations exceeding corrective action objectives for zinc are listed in Table 9-1 as 69SB05, 69SB09, 69SB15 and 69SB15. It is assumed the first reference to 69SB15 should actually be to surface soil sample 69SB14. Revise the Draft CMS Report to address this apparent typographical error.*

Navy Response: Table 9-1 has been revised to include the data from the 2010 Disturbed Soil Sampling Investigation. References to the 2008 CMS Investigation samples 69SB05, 69SB09, 69SB14 and 69SB15 have been removed from the table since they are no longer representative of site conditions.

EPA Specific Comment 19: ***Section 11.1.1, Required Planning Documents, Page 11-3:*** *Section 11.1.1 indicates that the Site Specific Field Sampling and Analysis Plan (FSAP) (part of a Corrective Action Project Plan) will provide laboratory information, sample handling and analysis requirements, and quality assurance/quality control (QA/QC) requirements. However, this information is also typically documented in a site-specific or project-specific quality assurance project plan (QAPP). Revise the Draft CMS Report to indicate whether a QAPP will be prepared for the proposed corrective measures. If not, explain how the QA/QC requirements for the corrective measures implementation project will be documented.*

Navy Response: In letter to EPA dated April 17, 2008, the Navy addressed the DQOs, SOPs, and QAPP requirements for EPA approval. Specifically, the EPA approved Master Project Plans, which include the Project Management Plan (PMP), Data Collection Quality Assurance Plan (DCQAP), Data Management Plan (DMP), and Health and Safety Plan (HASP) for NAPR. These Master Plans and specifically, the Final Data Collection Quality Assurance Plan (DCQAP) (Baker, September 14, 1995), define acceptable data requirements and error levels associated with the field and analytical portions of this CMI. Additionally, a table was developed which provides a map between the DCQAP sections and the sections required by "EPA Requirements for Quality Assurance Project Plans" (QZ/R-5) (EPA 2001).

PREQB COMMENTS

GENERAL COMMENTS

PREQB General Comment 1: *The CMS has not achieved its stated purpose of characterization of all potential sources of risk at SWMU 69. As noted on Page 2-2, Section 2.2 and in Figure 2-4, three (3) above ground storage tanks (ASTs) were identified in the western part of SWMU 69. Since spills and releases may have occurred underneath and around these tanks, sample results are necessary to verify the absence of impact. Additionally, the CMS report describes that the concrete apron was expanded over potentially contaminated areas. Therefore, the area underneath the apron appears to have potential impact and there are no data to verify absence of risk. Based on the very slow groundwater velocity for the clay (Section 5.2.4), contaminated groundwater may not have exited from underneath the apron and encountered screens of existing monitoring wells. The CMS should identify the area underneath the apron as a data gap and propose measures (i.e., institutional controls and groundwater monitoring) to manage potential risk.*

Navy Response: Five groundwater monitoring wells (downgradient of the former ASTs) were installed as part of the site characterization investigation for underground storage tank (UST) 794 (Blasland, Bouck & Lee, Inc. [BB&L], 1994). In that site characterization report, based on actual analytical groundwater data obtained from wells located west of Building 794 near the former UST, it was concluded that the groundwater was not impacted by the release of fuel compounds.

Blasland, Bouck & Lee, Inc. (BB&L), 1994. Site Characterization Site 794. Roosevelt Roads Naval Station, Ceiba, Puerto Rico. October 1994.

Additional contaminant characterization under the expanded concrete apron is not being considered at this time. The Jose Aponte De La Torre (JAT) Airport (former NAPR Ofstie Airfield) is now operating as an active regional airport; therefore, it is unlikely that such an undertaking to remove the concrete pad and expose potentially contaminated soil would be initiated by the Puerto Rico Ports Authority. However, given that the pad covers an area where staining was identified; land use controls will be placed on SWMU 69 to ensure future users will not be adversely impacted by potentially contaminated soils.

PREQB General Comment 2: *The datasets used in the ecological and human health risk assessments included nondetect data reported down to the method detection limit. This is not consistent with the approved CMS work plan and EPA guidance (Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual (Part A) Interim Final, December 1989) which requires the use of ½ the SQL for chemicals of potential concern (COPCs) that may be present at a site. It should be noted that reporting limits are typically 3-5 times higher than MDLs prior to adjustment for sample-specific solutions, etc. The use of the MDL, unless equivalent to the reporting limit, will therefore likely underestimate potential risks by assuming a lower surrogate concentration for non-detects than a surrogate based on a reporting limit. Please revise the risk assessments accordingly.*

Navy Response: This issue is currently waiting resolution pending the outcome of the Response to Comment Letter for the Draft Phase I RFI for SWMU 60 (Former Landfill at the Marina) dated September 25, 2009. Once this issue is resolved, the final response will be applied to this document. The Navy position is that revisions to the draft document are not necessary.

PREQB General Comment 3: *Please avoid using EPA Region 3 guidance. The appropriate hierarchy of guidance should be EPA Region 2 guidance (if available), EPA Headquarters guidance and Regional Screening Level guidance and information, which has been adopted by EPA Region 2 for screening purposes.*

Navy Response: References to EPA Region 3 guidance will be removed from the HHRA.

PREQB General Comment 4: *A significant data gap in the spatial coverage of the soil sampling program is the drainage ditch and associated forest habitat located south and east of SWMU 69. The nearest existing sample locations are from 50 to 100 feet from the ditch and it is unclear whether they were collected from a slope or a low-lying depositional area. The lack of surface and subsurface soil samples from this habitat was acknowledged and additional sampling of this area was proposed in the report. But it was not clearly stated which media and how many locations would be sampled, nor what analyses performed to fill this habitat/spatial data gap. At a minimum, surface soil should be sampled from several depositional areas within the lowest elevations of the forest and from within each of the ditch channels. Both forks of the ditch and the main channel downstream of their confluence should be sampled for the full suite of organic and inorganic analytes evaluated for prior samples.*

Navy Response: Due to disturbances (i.e., trenching activities) during the conversion of the airfield to a commercial facility by the Puerto Rico Ports Authority during the summer 2008, surface soil (0.0 to 1.0-foot depth interval) and subsurface soil (1.0 to 2.0-foot depth interval and 2.0 to 3.0-foot depth intervals) were re-sampled in accordance with the EPA and PREQB-approved Final Soil Sampling Strategy for Disturbed Soil Sampling dated June 21, 2010. Soil sampling points included locations within the coastal scrub forest community bordering the drainage ditch. As part of this investigation, sediment samples also were collected from the southern and eastern drainage ditches adjacent to the SWMU in accordance with the June 21, 2010 disturbed soil sampling strategy. The analytical data for these soil and sediment samples will be evaluated for human health and ecological risk as part of the Revised Draft CMS Report. It is the Navy's contention that the sampling activities described by the EPA and PREQB-approved June 21, 2010 sampling strategy adequately addresses PREQB General Comment 4.

PREQB General Comment 5: *The avian food chain-mediated exposure assessment and risk calculations for avian receptors should be revised by incorporating new data from the ditch habitat samples. The new soil samples should be collected from low-lying forested areas, both within and along the ditch, that represent depositional areas and potential avian foraging habitat.*

Navy Response: As discussed in the Navy's response to PREQB General Comment 4 above, surface soil (0.0 to 1.0-foot depth interval) and subsurface soil (1.0 to 2.0-foot depth interval and 2.0 to 3.0-foot depth intervals) were re-sampled in accordance with the EPA and PREQB-approved Final Soil Sampling Strategy for Disturbed Soil Sampling dated June 21, 2010. Soil sampling points included locations within the coastal scrub forest community bordering the drainage ditch. Sediment samples also were collected from the southern and eastern drainage ditches adjacent to the SWMU in accordance with the June 21, 2010 disturbed soil sampling strategy. The soil and sediment analytical data will be used in the Revised Draft CMS Report to evaluate potential risks to avian receptors.

PREQB General Comment 6: *The federally-endangered yellow shouldered blackbird was acknowledged as a local inhabitant and a potential receptor within the forested habitat located along these ditches, but was not discussed in terms of the results of the avian exposure assessment for the American robin. After revising the avian exposure assessment and risk calculations to incorporate new data for additional soil samples within/adjacent to the ditch, potential risks to the yellow shouldered blackbird should be discussed. The revised avian risk calculations for the American robin should be discussed with respect to their potential ecological implications and significance for the yellow shouldered blackbird population.*

Navy Response: It is noted that arboreal insectivores, such as the yellow-shouldered blackbird, would not be expected to experience any significant exposures to chemicals in soil. This line of reasoning is consistent with USEPA's approach to ecological soil screening level (Eco-SSL) development. As

discussed in Guidance for Developing Ecological Soil Screening Levels (USEPA, 2005a), aerial and arboreal insectivorous birds were excluded from Eco-SSL development because they are considered inappropriate (i.e., they do not have a clear or indirect exposure pathway link to soil [indirect exposure pathways involve ingestion of prey that have direct contact with soil]). This discussion will be added to the text in Section 7.1.3.2 and 7.3.2.1 of the revised Draft CMS Report.

Although yellow-shouldered blackbirds are not expected to experience any significant exposures to chemicals in soil at SWMU 69, Section 7.3.2.1 of the Draft CMS Report includes an evaluation explaining that the American robin can be protectively used as a surrogate receptor for the yellow-shouldered blackbird. As such, a conclusion of acceptable or unacceptable risk to the American robin also would apply to the yellow-shouldered blackbird. In summary, based on the low potential for arboreal insectivore exposure to chemicals in SWMU 69 soil and the fact that the text in Section 7.3.2.1 demonstrates that the American robin can be protectively used as a surrogate receptor, an evaluation of the implications and significance for yellow-shouldered blackbird populations within the revised avian risk calculations is not deemed necessary.

PREQB General Comment 7: *Surface water samples should be collected from the same ditch segments during a rainfall event and analyzed to evaluate potential transport and offsite migration of surface soil chemicals of potential concern (COPCs) in surface water runoff from source areas. Due to the ephemeral nature of surface water runoff events any related ecological exposures would be brief. Please clarify why marine chronic ambient water quality criteria AWQC and other groundwater screening values were used rather then fresh water AWQC for surface water.*

Navy Response: The Navy offers the following points of clarification relative to this comment. Based on groundwater flow direction, the Los Machos mangrove forest represents the most likely discharge point for SWMU 69 groundwater. As the Los Machos mangrove forest represents an estuarine environment, saltwater-based screening values were preferentially used to screen the groundwater analytical data.

PREQB General Comment 8: *Throughout the report, the term "ingestion-based screening values" has been misapplied to what are actually toxicity reference values (TRVs). TRVs include does-related toxicity thresholds such as No Observed Adverse Effect Levels (NOAELs) and Lowest Observed Adverse Effect Levels (LOAELs). Screening values are chemical concentrations in physical media above which an adverse biological or ecological effect may occur to a specific receptor group (e.g. AWQC or EcoSSLs). While EcoSSLs can be considered as "ingestion-based screening values" because they are based on comparisons of ingested dietary doses of a chemical to a TRV for that chemical, TRVs are not used as screening values. Please revise the report to eliminate use of the term "ingestion-based screening values" by replacing it globally with either TRV, LOAEL, or NOAEL.*

Navy Response: The term "ingestion-based screening value" will be removed from the document and replaced with a more appropriate term (e.g., toxicity reference value).

PREQB General Comment 9: *The soil-plant, soil-invertebrate and soil-small mammal bioaccumulation factors (BAFs) used to calculate food chain mediated exposure doses and risks to birds are often too low and insufficiently conservative for many chemicals. Many BAFs are based on outdated literature that has been superseded by more recent USEPA guidance for ecological risk assessment (ERA), such as Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (USEPA OSWER Directive 9285.7-55, Revised April 2007). This document provides a wealth of empirical data on BAFs for plants, soil invertebrates and small mammals as well as regression equations developed using these data to facilitate calculating BAFs based on soil concentrations. These compiled BAFs and*

regression equations were incorporated into the food chain exposure assessment models were used by USEPA to derive the EcoSSLs for avian herbivores, omnivores and carnivores. When available, these same BAF calculation methods should be used in the ERA to calculate chemical concentrations in the food items of avian receptors.

Navy Response: The soil-to-terrestrial plant and soil-to-terrestrial invertebrate bioaccumulation BAFs listed in Table 7-7 and the soil-to-small mammal BAFs listed in Table 7-8 of the Draft CMS Report, will be revised, as necessary, to reflect the compiled BAFs and chemical-specific/general regression equations presented in Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (USEPA, 2007).

References cites in the Navy response to PREQB General Comment No. 9:

United States Environmental Protection Agency (USEPA). 2007. Attachment 4-1 of Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-55.

PAGE-SPECIFIC COMMENTS

PREQB Page-Specific Comment 1: *Page 2-3. Section 2.3, paragraph 2. Please include the depth to groundwater and reference to a figure with the monitoring well locations for the UST investigation discussed in this paragraph.*

Navy Response: Based on the Site Characterization of UST 794 in 1994 by Blasland, Bouck & Lee, Inc. (BB&L, 1994), the depth to water across the site was approximately 14 feet bgs. Soil boring and monitoring well locations are referenced on Figure 3-1 of that report. The second paragraph of Section 2.3 – Previous Investigations has been revised to include the depth to groundwater and a reference to Figure 3-1 of the BB&L report showing the monitoring well locations.

PREQB Page-Specific Comment 2: *Page 2-3, Section 2.3, paragraph 4. The text referred for analysis of volatile organic compounds (VOCs), semivolatile organics compounds (SVOCs), and metals to Appendix IX. Clarification is needed regarding if the document is making referral to 40 CFR Appendix IX of Part 264, if this is the case, the text should be corrected accordingly.*

Navy Response: Analyses for Appendix IX VOCs, SVOCs, and metals are in accordance with 40 CFR Appendix IX, Part 264. In addition, the proposed VOC, SVOC, and metal constituents were listed in the Final CMS Work Plan for SWMU 69 (Baker, 2007) which was approved by the USEPA on April 10, 2008. The fourth paragraph in Section 2.3 – Previous Investigations has been revised to include reference to Appendix IX to 40 CFR Part 264.

PREQB Page-Specific Comment 3: *Page 2-3, Section 2.3, paragraph 5. Diesel range organics (DRO) concentrations are typically compared to the PREQB Corrective Action concentration of 100 mg/kg. Please include the range of concentrations and whether they exceed this value in this section as well as in Section 6.0.*

Navy Response: The fifth paragraph of Section 2.3 – Previous Investigations has been revised include reference to the PREQB standards for DRO in soil.

PREQB Page-Specific Comment 4: *Page 3-2, Section 3.3.1. Please include the range of depths at which each of the soil formations are found at the site.*

Navy Response: Section 3.3.1 – Soils provides a general description of the soil associations encountered across NAPR. For the Airfield area, and SWMU 69, only the Mabi soil association was encountered**.** According to the United States Department of Agriculture (USDA) Soil Conservation Service's *Web Soil Survey of Humacao Area, Puerto Rico Eastern Part,* this association is typically more than 80 inches deep. The fourth paragraph of Section 3.3.1 – soil has been revised to include this information*:*

> The Mabi-Rio-Arriba-Cayagua Association consists generally of deep, somewhat poorly drained and moderately well drained, nearly level to moderately steep soils found on foot and side slopes, terraces, and alluvial fans. Soils of this association at NAPR are basically clayey and are more than 80 inches thick.

PREQB Page-Specific Comment 5: *Page 3-5, Section 3.3.4. Please provide the thickness of the residuum layer in the text of this section for the inland flats area where the site is located.*

Navy Response: Drilling was terminated prior to encountering competent bedrock, so the full thickness of the residuum layer was not ascertained. Based on the boring log for 69SB25, the residuum extends from approximately 10 feet below ground surface to greater than 18 feet bgs. (or a thickness of more than eight feet). The fifth paragraph of Section 3.3.4 – Regional Hydrogeology will be revised as follows:

> The inland flat land area generally encompasses the airfield and golf course areas. The inland flat land area is typically underlain by relatively thick residuum. The residuum generally consists predominately of clay. Although the total thickness has not been ascertained, more than eight feet of residuum were encountered in soil boring 69SB25, installed during the 2008 CMS Investigation. Fill material overlays the residuum in some areas, particularly the airfield, and generally consists of sand and gravel with lesser amounts of silt and clay.

PREQB Page-Specific Comment 6: *Page 4-2, Section 4.1, Paragraph 1. Based on sample locations depicted in Figure 4-2, please revise the classification of sample 69SB13 as "second line" of samples.*

Navy Response: The fourth sentence of the first paragraph of Section 4.1 – Surface and Subsurface Soil Sampling, 2008 CMS Investigation will be revised to include sample 69SB13:

> The second line of surface soil samples (69SB06, 69SB08, 69SB10, 69SB12, 69SB13, 69SB17, 69SB19, 69SB20 and 69SB22) were collected approximately 50 feet from the edge of the apron area, near the drainage ditch.

PREQB Page-Specific Comment 7: *Page 4-2, Section 4.1, Paragraphs 2 and 4. The text states that soil samples were transferred directly into pre-labeled sample jars. Clarification is required for how the samples for VOCs were collected. It is unclear if these samples were collected in EnCore® samplers or in preserved vials (i.e., sodium bisulfate and methanol) in the field, as required by EPA Region 2. Based on the text of the report as well as field notes and chains-of-custody, this information could not be determined. If soil samples were not collected using proper protocols, data are most likely not usable for the project objectives and should be rejected.*

Navy Response: Surface and subsurface soil samples for VOC analysis were collected using Terra Core kits. The Terra Core kits included one disposal syringe, one dry weight container, two-40 milliliter (ml) VOA vials (with stir bar) including 5 ml of sodium bisulfate solution, and one-40 ml VOA vials (with stir bar) including 5 ml of methanol solution. Section 4.0 has been revised accordingly. Soil samples were

not homogenized prior to collection. The second and fourth paragraphs of Section 4.1 will be revised to include the VOC sample collection procedure followed in the field.

PREQB Page-Specific Comment 8: *Page 4-2, Section 4.1, paragraph 4. It is not clear from what depth the duplicate was taken or if the duplicate was made from the same sampling point, the same number of samples.*

Navy Response: The third sentence of the fourth paragraph of Section 4.1 has been revised as follows:

> Subsurface soil samples were collected from depth intervals of 1 to 3 foot bgs and 9 to 11 foot bgs from five locations (69SB07-01, 69SB07-05, 69SB08-01, 69SB08-05, 69SB11-01, 69SB11-05, 69SB12-01, 69SB12-05 and 69SB27-01, and 69SB27-05), plus a field duplicate from one location (69SB08-05D), for a total of 11 samples.

PREQB Page-Specific Comment 9: *Page 4-4, Section 4.3. The text incorrectly states that the depth to the groundwater surface was measured on July 22, 2007. Please revise to July 22, 2008.*

Navy Response: The text in Section 4.3 will be revised to indicate that the depth to groundwater was measured on July 22, 2008.

PREQB Page-Specific Comment 10: *Page 4-4, Section 4.2, paragraph 6. The text indicated that field parameters were obtained with appropriate instrumentation during sampling. The report should include detailed information on what was the appropriate instrumentation used.*

Navy Response: The sixth paragraph in Section 4.2 – Monitoring Well Installation and Groundwater Sampling will be revised to include the following information:

> The YSI 556 MPS (multi-probe system with flow cell) was used to measure dissolved oxygen, pH, conductivity, temperature, and ORP. The LaMotte 2020 meter was used to measure turbidity.

PREQB Page-Specific Comment 11: *Page 4-5, Section 4.7.1. The text incorrectly states that there were 24 surface soil samples. Please revise to 25 surface soil samples, as per Table 4-1. In addition, the field duplicate subsurface soil sample is incorrectly listed as 69SB05D; Please revise to 69SB08-05D.*

Navy Response: The text in the second paragraph of Section 4.8.1 – Field Duplicates has been revised to indicate that the total number of surface soil samples is 25 and the correct sample designation for the subsurface soil field duplicate is 69SB-8-05D.

PREQB Page-Specific Comment 12: *Page 4-5, Section 4.7.3. The text incorrectly states that there were 24 surface soil samples. Please revise to 25 surface soil samples, as per Table 4-1.*

Navy Response: The text in the first paragraph of Section 4.8.3 – Matrix Spike/Matrix Spike Duplicates has been revised to indicate that the total number of surface soil samples is 25.

PREQB Page-Specific Comment 13: *Page 5-2, Section 5.5.2, third sentence. The sentence lack of sense since apparently there is a typographical error, revise it accordingly.*

Navy Response: Section 5.2.2 Hydrogeology has been revised accordingly.

PREQB Page-Specific Comment 14: *Page 5-3, Section 5.2.3. Please revise the text to clarify why only certain slug test data were used in calculating average hydraulic conductivity values. For example, data from the rising head test are used for wells 69SB07 and 69SB08, and falling head for well 69SB25 were used to determine the hydraulic conductivity for the fractured clay.*

Navy Response: In general, it is better to evaluate unconfined aquifer slug test data using rising head versus falling head (especially when there is a quick response) because the PVC slug does not "smack" the water surface. Therefore, there is less sloshing of the water and masking the groundwater level recovery to equilibrium. In the case of 69SB25, field evaluation of the data indicated a slower recovery and a good data set retrieved and therefore, a rising head test was not performed at this location and the falling head data set was used for evaluation. Section 5.2.3 - Aquifer Characterization Testing will be revised to include this discussion regarding slug test data set collection and use.

PREQB Page-Specific Comment 15: *Page 6-2, Section 6.1, Paragraphs 1 and 3. The text states that the detected analytical results for the surface soil samples are provided in Table 6-1. However, Table 6-1 only provides the detected analytical results for metals and not VOCs and SVOCs. Please update Table 6-1 to include all detected analytical results in surface soils.*

Navy Response: In Table 6-1, Summary of Detected Results – Surface Soil, the first four pages include VOC and SVOC detected analytical results.

PREQB Page-Specific Comment 16: *Page 6-2, Section 6.2, paragraph 2. Surface and subsurface sediment samples (also could be classified as soil samples due to intermittent nature of the surface water body) should be collected along the drainage ditch to confirm the assumption that no contamination reached the drainage ditch. Depending on overland surface water flow rates and type of contaminant, contamination may have reached the ditch without being adsorbed by surface or subsurface soils between the concrete pad and the drainage ditch. Also, drainage ditch sediment/soil may contain have a higher total organic carbon content and could, over time, accumulate contaminants that would not accumulate in less organic soils nearby.*

Navy Response: As a result of soil disturbance by contractors in 2008 (which occurred after the 2008 CMS field investigation), and surface runoff from the adjacent expanded apron during precipitation events; there was potential for surface soil migration into the SWMU 69 drainage ditches. The Navy proposed a disturbed soil sampling strategy that included sampling of sediment in the southern and eastern drainage ditches. The Final Sampling Strategy for Disturbed Soil Sampling, SWMU 69 – Aircraft Parking Area was approved on June 22, 2010. On November 5, 2010, 14 sediment samples (including two duplicate samples – 69SD01D and 69SD02D) were collected and analyzed for Appendix IX metals. Sediment sampling activities are described in Section 4.4.

PREQB Page-Specific Comment 17: *Page 6-4, Section 6.2, Paragraph 4. The text states that, in general, contamination in the subsurface soil is less than in the corresponding surface soil sample. Lead is used as an example at one location (69SB11) to demonstrate this. However, upon review of the data, it was noted that in general, contamination in the subsurface soil was greater than in the corresponding surface soil sample for barium, copper, and vanadium. Please revise the text to explain this increase in concentrations for select metals from surface to subsurface.*

Navy Response: As a result of the conversion of the airfield to a commercial facility by the Puerto Rico Ports Authority (PRPA), significant areas of soil associated with SWMU 69 were disturbed. Surface and shallow subsurface soil (to an approximate depth of 2 feet bgs) collected during the 2008 CMS investigation are not representative of the current site conditions and will not be used to characterize the site.

PREQB Page-Specific Comment 18: *Page 6-5, Section 6.3, paragraph 2. Please identify the monitoring wells where VOCs were detected in the text.*

Navy Response: The following will be added to the second paragraph of Section 6.4 – Groundwater:

Chloromethane was detected in groundwater sample 69GW25 at 1.5 J ug/L, 2-hexanone was detected in groundwater sample 69GW26 at 1.1 J ug/L, and acetone was detected in groundwater sample 67GW27 at 15 J ug/L.

PREQB Page-Specific Comment 19: *Page 6-6, Section 6.3. Please remove the final sentence. No groundwater sample is available from an appropriate location downgradient from 15E-04 to conclude contaminant migration has not occurred. The calculated velocity for the fractured clay is slow enough that groundwater contaminated at 15E-04 may not have had sufficient time to have traveled to 69SB25.*

Navy Response: Section 6.3 – Groundwater in the original draft CMS Report refers to the analytical results for groundwater samples collected and analyzed during the 2008 CMS investigation. The last sentence of this section indicates that there is no evidence that contaminants in the surface soil have migrated to the groundwater. This is based on examination of the surface and subsurface soil data and the observation that elevated metals are primarily confined to the top one foot of the soil column and have not migrated to the deeper soil or groundwater; the statement is not referring to the lateral migration of contaminants. The statement referenced by this comment is not included in the Revised Draft CMS Report because a number of metals were detected in the disturbed shallow subsurface soil sampled during the 2010 Disturbed Soil Sampling investigation.

PREQB Page-Specific Comment 20: *Page 6-7, Section 6.4.2, SVOCs, last paragraph. The text incorrectly states that sample 69B07-01 was reextracted due to compliant surrogate and internal standard recoveries. Please revise to state reextraction was due to "non-compliant surrogate and internal standard recoveries."*

Navy Response: The last paragraph in Section 6.5.2 – Test America SDG SWMU 36289-3, SVOCs was revised to indicate that sample 69SB07-01 was re-extracted due to non-compliant surrogate and internal standard recoveries.

PREQB Page-Specific Comment 21: *Page 6-9, Section 6.4.3, SVOCs, last paragraph. The text states that the samples were reextracted out of holding time due to non-compliant surrogate and internal standard recoveries in the initial analysis. The results of the initial analysis were reported. However, the text of this section does not discuss qualification of the data due to the surrogate and internal standard recoveries. Please revise the text accordingly.*

Navy Response: Detailed discussion of the qualification of the data, including the qualification due to surrogate and internal standard recoveries is provided in Appendix C.

PREQB Page-Specific Comment 22: *Page 6-10, Section 6.4.4, SVOCs, last paragraph. Revise the first sentence since there is apparently a typographical error.*

Navy Response: The referenced typographical error has been corrected.

PREQB Page-Specific Comment 23: *Page 6-13, Section 6.4.6, Metals, last paragraph. Please revise the discussion of cobalt in samples 69GW25 and 69GW12 to cadmium.*

Navy Response: The text in the last paragraph of Section 6.5.6 – Test America SDGWMU36419-2, Metals refers to refers to coblalt, as follows:

> Region II requires a detailed comparison of the results between the total and dissolved sample analysis. This comparison is made only when: the dissolved metals concentration is greater than the total concentration, and the dissolved concentration is greater than or equal to five times the MDL. The analyte cobalt met both of these conditions in samples 69GW25 and 69GW12. Therefore, positive results reported for cobalt were qualified as estimated (J/UJ) in samples 69GW25 and 69GW25F (dissolved). The analyte cobalt exhibited non-comparable results between the total metals and dissolved metals analysis in 69GW12. Based on Region II validation guidelines the reported results for cobalt were qualified as estimated (J) in this sample.

PREQB Page-Specific Comment 24: *Page 6-14, Section 6.4.7, SVOCs. Please revise the text to address the holding time exceedance and low internal standard recovery for sample ER04.*

Navy Response: The text in Section 6.5.7 has been revised to include a discussion on the extraction holding time exceedance for sample ER04:

> All samples were re-extracted out of holding time due to non-compliant LCS recoveries. The re-extracted samples were not used since the holding time was exceeded, except for ER04RE. Sample ER04 was not used due to low surrogate recoveries. The sample was re-extracted and exhibited complaint surrogate recoveries; therefore the initial analysis was not used in favor of the re-extraction.

PREQB Page-Specific Comment 25: *Page 6-14, Section 6.4.6 and 6.4.7, Data Validation Summary for SWMU36419-2 and SWMU36419-4. A discussion on how does data qualification affect the Data Quality Objectives for the project should be added to both paragraphs.*

Navy Response: The following sectence was added to the end of Section 6.5.6 and 6.5.7 to address the impact on the DQOs:

> Overall, the changes in the results due to the application of the data validation objectives are not expected to significantly compromise the data quality objectives for this SDG.

PREQB Page-Specific Comment 26: *Section 7.1.1, Terrestrial habitats, page 7-1. Please correct the spelling of several scientific names of plants to read as Randia aculeat**a**, Acacia far**rn**esiana, and Burs**er**a simaruba. Also, in Section 7.1.2 on page 7-3, the correct spelling of black mangrove is Avice**nn**ia germinans.*

Navy Response: Section 7.1.1 and Section 7.1.2 will be revised to include the correct spelling of scientific names for *Randia aculeata*, *Acacia farnesiana*, *Bursera simaruba*, and *Avicennia germinans*

PREQB Page-Specific Comment 27: *Section 7.3.1.2 Transport Pathways, page 7-10. It is acknowledged that no soil samples were collected from the drainage ditches located south and east of SWMU 69. It also is noted that "The presence of ecological chemicals of concern (COCs) in surface soil samples collected nearest the drainage ditch would indicate that transport to drainage ditch surface soil." Because even the soil samples collected nearest to the ditch were 30 to 100 feet from the ditch and may occur on a slope rather than in a low-lying depositional area, they may not be indicative of COC concentrations in the ditch channel and/or forest immediately soils abutting the ditch. Please add text to acknowledge this and to indicate that supplemental soil samples will be collected from depositional areas within/abutting each fork of the ditch and the main stem below their confluence.*

Navy Response: Please see the Navy response to PREQB General Comment 4.

PREQB Page-Specific Comment 28: *Section 7.3.2 Endpoints and Risk Questions, page 7-13 and Table 7-2. Soil screening values such as EcoSSLs were used both to select COPCs and as measurement endpoints to assess potential risks to plants and soil invertebrates from exposures to surface and subsurface soil. Although EcoSSLs are available for several avian feeding guilds, they were not used as screening values to develop a list of COPCs for birds and to calculate preliminary, screening level HQs. Please compare maximum detected chemical concentrations to the avian omnivore, herbivore, and carnivore EcoSSLs as an additional measurement endpoint.*

Navy Response: The Navy disagrees with this comment. Specifically, the Navy believes that a preliminary screening of maximum chemical concentrations in soil to ecological soil screening levels (Eco-SSLs) for avian herbivores, avian ground insectivores, and avian carnivores would represent an unnecessary step since identification of ecological COPCs for additional evaluation in Step 3a of the baseline ecological risk assessment is based solely on the comparison of maximum ingested doses to toxicity reference values. It is noted that, when available, NOAEL values identified and used by the USEPA in the derivation of avian Eco-SSLs were preferentially used as toxicity reference values.

PREQB Page-Specific Comment 29: *Section 7.3.3 Fate and Transport Mechanisms, page 7-15 and Table 7-3. In the 4th paragraph of this section it is stated that chemicals with a log K_{ow} value of 3.0 or less generally "will not bioconcentrate to a significant degree." However, it appears that this criterion was not used consistently in Table 7-3 to identify "Bioaccumulative Chemicals." However, some chemicals with a "recommended" logK_{ow} lower than 3.0 are listed in Table 7-3 as bioaccumulative (e.g., carbon tetrachloride, chlorobenzene, chloroform, styrene, toluene, and trichloroethene), while others that have a "recommended" logK_{ow} greater than 3.0 were not listed as bioaccumulative (e.g., 1,1-Biphenyl). Please clarify and explain the reasons for this inconsistency.*

Navy Response: As stated in the second footnote within Table 7-3, when a range of log K_{ow} values is reported for a given chemical, the upper value within the range was conservatively used to identify bioaccumulative chemicals. Given that the upper value within the range of log K_{ow} values provided for carbon tetrachloride, chlorobenzene, chloroform, styrene, toluene, and trichloroethane exceed 3.0, these six VOCs were conservatively identified as bioaccumulative chemicals in Table 7-3. With regard to 1,1-biphenyl, Table 7-3 incorrectly identifies this SVOC as a non-bioaccumulative chemical. The table will be revised to show that 1,1-biphenyl is considered a bioaccumulative chemical.

PREQB Page-Specific Comment 30: *Section 7.4 Screening-Level Effects Evaluation, page 7-16. As noted in the General Comments, the term "ingestion-based screening value" has been misapplied as a synonym or TRV and should be globally replaced with more accurate terms. To set the stage for these global changes, please revise the last sentence in Section 7.4 to read as: "Media-specific screening values were developed for soil (surface and subsurface) and groundwater, while toxicity reference values (TRVs) were used to calculate potential risks of terrestrial food web (dietary) exposures to upper trophic level terrestrial receptors (birds) from ingested chemical doses."*

Navy Response: Section 7.4 will be revised to replace the term "ingestion-based screening value" with the term "toxicity reference value". This change also will be made throughout the document.

PREQB Page-Specific Comment 31: Section 7.4.1 Media-Specific Screening Values, page 7-16 and Table 7-4**.** Please rename Table 7-4 as "Soil Screening Values *for Plants and Invertebrates*" for greater accuracy and clarity. Please make the following clarifications/corrections in Table 7-4: The correct description of values for Acrylonitrile, Carbon Tetrachloride, trans-1,4-Dichloro-2-butene, and Hexachlorobenzene, as originally cited by Efroymson et al. (1997a), is "Toxicological threshold for *soil*

microorganisms and microbial processes;" duplicate entries appear for cis-1,**3**-Dichloropropene, attributed to CCME 2007, but that source document only provides values for cis and trans 1,**2**-Dichloropropene; the value for Ethylene Dibromide is attributed to CCME 2007, but could not be found among other soil quality guidelines presented in Table 1 of the source document; the source citation of USEPA 1999 for Pentachlorobenzene does not appear in the reference list of the table.

Navy Response: Section 7.4.1.1 and Table 7-4 will be renamed "Soil Screening Values for Terrestrial Plants and Invertebrates". In addition, comment entries for acrylonitrile, carbon tetrachloride, trans-1,4-dichloro-2-butene, and hexachlorobenzene will be revised to indicate that screening values are toxicological thresholds for soil microorganisms and microbial processes. Finally, the source citation for the pentachlorobenzene screening value (i.e., USEPA, 1999) will be added to the list of references contained within the table.

The Navy offers the following points of clarification relative to cis-1,3-dichloropropene and ethylene dibromide. The VOC cis-1,3-Dichloropropene is a chlorinated aliphatic hydrocarbon. Therefore, the CCME (2007) agricultural interim remediation criterion for chlorinated aliphatic hydrocarbons (100 ug/kg; see Table 2 of source document) was selected as the soil screening value for this VOC. It is noted that the duplicate entry for cis-1,3-dichloropropone will be deleted from Table 7-4. With regard to ethylene dibromide, this VOC is a non-chlorinated aliphatic hydrocarbon. Therefore, the CCME (2007) interim remediation criterion for non-chlorinated aliphatic hydrocarbons (300 µg/kg, see Table 2 of source document) was selected as the soil screening value for this VOC. It is noted that the soil screening value presented in Table 7-4 of the Draft CMS Report for ethylene dibromide (100 µg/kg) is incorrect. The table will be revised to show the correct value listed by CCME (2007) for non-chlorinated aliphatic hydrocarbons (300 µg/kg). The surface and subsurface soil risk calculation for terrestrial plants and invertebrates (presented in Tables 7-13 and 7-14 of the Draft CMS Report, respectively) will be revised to reflect the correct ethylene dibromide surface soil screening value.

References cited in the Navy response to PREQB Page-Specific Comment 31:

Canadian Council of Ministers of the Environment (CCME). 2007. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health: Summary Tables. Updated September 2007. In: Canadian Environmental Quality Guidelines, 1999, CCME, Winnipeg. http://www.ccme.ca/assets/pdf/rev_soil_summary_tbl_7.0_e.pdf.

USEPA. 1999. Screening-Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA/530/D-99/001A.

PREQB Page-Specific Comment 32: *Section 7.4.1.2 Groundwater Screening Values, page 7-18 and Table 7-5. In the bulleted list of dissolved-to-total concentration conversion factors for marine AWQC, please specify that the value for chromium in salt water is for hexavalent chromium. Also, please make the following clarifications/corrections in Table 7-5:* ***(a)*** *the value used for 1,1,**1**,2-Tetrachloroethane should be described as the "Acute LOEL derived from the value for 1,1,**2**,2-Tetrachloroethane, cited by Buchman (1999) using a safety factor of 50;* ***(b)*** *the value for 2-Hexanone should be footnoted as a freshwater value; the Buchman (1999) value for 2,4,5-Trichlorophenol should be cited as "Proposed Marine Criteria Continuous Concentration;"* ***(c)*** *the values for 3,4-Methylphenol, 4,6-Dinitro-2-Methylphenol and 4-Chloro-3-Methylphenol, appear to be incorrectly attributed to USEPA 2003, since the Region 5 ecological screening levels (ESLs) do not include isomers of Methylphenol;* ***(d)*** *the value for 7,12-Dimethylbenz(a)anthracene should be described as a surrogate derived from the value for Dibenz(a,h)anthracene in Buchman (1999);* ***(e)*** *please indicate that the USEPA Region 4 value for Di-n-butyl phthalate is the lowest reported plant value; and* ***(f)*** *note that the value for Naphthalene is the USEPA Region 4* ***marine*** *chronic screening value.*

Navy Response: Section 7.4.1.2 will be revised to indicate that the dissolved-to-total conversion factor shown in the bulleted list for chromium is a conversion factor for hexavalent chromium. Navy responses to Items (a) through (f) are presented below.

(a) The Navy agrees that the value shown in Table 7-5 for 1,1,1-2-tetrachloroethane was derived from the acute LOEL presented in Buchman (1999) for 1,1,2,2-tetrachloroethane. However, use of the 1,1,2,2-tetrachloroethane value as a surrogate value for 1,1,1,2-tetrachloroethane does not follow the approach presented in Section 7.4.1.2 for the selection of groundwater screening values. If this approach is followed, the correct screening value for 1,1,1,2-tetrachloroethane is 200 µg/L. This value represents the minimum acute value listed in the ECOTOX Database System (USEPA, 2007) for 1,1,1,2-tetrachloroethane (96-hour LC_{50} for *Lepomis macrochirus* [bluegill]) with a safety factor of 100). Table 7-5 will be revised to show the correct screening value of 200 µg/L.

(b) The groundwater screening value shown in Table 7-5 for 2-hexanone will be footnoted as a freshwater screening value. With regard to the 2,4,5-trichlorophenol, the Navy does not believe it is necessary to identify the screening value as a "Proposed Marine Criteria Continuous Concentration" since the first footnote in Table 7-5 states that, "*The values shown are marine/estuarine screening values unless otherwise noted*." Because the screening value for 2,4,5-trichlorophenol is not footnoted, it is already inferred that the value is a marine/estuarine screening value. It is noted that groundwater screening values from Buchman (1999) have been updated, as necessary, to reflect values presented in Buchman (2008).

(c) The Navy offers the following points of clarification relative to this comment. USEPA Region 5 (2003) has developed ecological screening levels for 4,6-dinitro-2-methylphenol and 4-chloro-3-methylphenol. The source document lists 4,6-dinitro-2-methylphenol as cresol [4,6-dinitro-o-] and 4-chloro-3-methylphenol as cresol [p-chloro-m-]. The USEPA Region 5 (2003) also lists a ecological screening level for 4-methylphenol (value used as a surrogate for 3,4-methylphenol]. Specifically, the source document lists 4-methylphenol as cresol [p-].

(d) The Navy respectfully disagrees with this comment. All PAH compounds lacking chemical-specific screening values are assigned an acute LOEL of 300 µg/L by Buchman (1999) based on a chemical class. Therefore, the Navy believes that the description of the 7,12-dimethylbenz(a)anthracene screening value included in Table 7-5 (i.e., acute LOEL for chemical class with a safety factor of 50) is appropriate.

(e) The comment entry for di-n-butyl phthalate will be revised to indicate that the screening value is the lowest reported plant value.

(f) The Navy does not believe it is necessary to identify the naphthalene screening value as a "*USEPA Region 4* ***marine*** *chronic screening value*" since the first footnote in Table 7-5 states that, "*The values shown are marine/estuarine screening values unless otherwise noted*." Identical to 2,4,5-trichlorophenol (see Navy response for PREQB Page-Specific Comment No. 32[b] above), because the screening value for naphthalene is not footnoted, it is already inferred that the value is a marine/estuarine screening value.

References cited in the Navy response to PREQB Page-Specific Comment 32:

Buchman, M.F, 2008. NOAA Screening Quick Reference Tables. NOAA OR&R Report 08-1. Office of Response and Restoration, Seattle, WA. 34 pp.

Buchman, M.F. 1999. NOAA Screening Quick Reference Tables. NOAA HAZMAT Report 99-1. Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration, Seattle, WA. 12 pp.

USEPA. 2007a. ECOTOX User Guide: Ecotoxicology Database System. Version 4.0. Available at: http:/www.epa.gov/ecotox/.

PREQB Page-Specific Comment 33: *Section 7.4.2 Ingestion Based Screening Values, page 7-19 and Table 7-6. Please rename this table as "Toxicity Reference Values for Birds" and make the following clarifications/corrections regarding the sources and derivation of LOAELs and NOAELs:* ***(a)*** *Values derived from the data compiled in USEPA EcoSSL documents are often incorrectly cited, wrongly suggesting that USEPA was the original source of LOAELs and/or NOAELs actually published by original authors. USEPA should be cited as the original source only for those geometric mean LOAEL or NOAEL calculated from compiled TRV data and used by USEPA for EcoSSL derivation (e.g., NOAELs of 6.71 for nickel and 66.1 for zinc were calculated by USEPA). When an original TRV was chosen from the summary tables of original published TRVs compiled by USEPA, the reference citation should indicate the original author of the study (e.g., NOAEL of 1.63 mg/kgBW/day for lead should be referenced as "Edens and Garlich (1983) as cited in USEPA 2005d");* ***(b)*** *The European starling growth LOAEL (should be 20) and NOAEL (should be 2) values appear to have been used for 7,12-Dimethylbenz(a)anthracene. Also, since USEPA (2007a) did not specify a TRV for this chemical, but the values used in Table 7-6 were derived from the raw data in Appendix 5.2 of this EcoSSL document, the correct raw data reference is "Trust et al. (1994) as cited in Appendix 5.2 of USEPA (2007a)"* ***(c)*** *It appears that NOAELs (or LOAELs) originally published or calculated as geometric means by USEPA were often used inappropriately to infer LOAELs (or NOAELs) using an extrapolation factor of ten. This was done even when a range of NOAELs or LOAELs from the original studies was available and compiled in the EcoSSL documents (e.g., USEPA tabulated published chicken and duck growth LOAELs for cobalt ranging between 7.8 and 148 mg/kgBW/day, as well as 5 different NOAELs for cobalt, from 9 original studies. While use of USEPA's geometric mean NOAEL of 7.61 mg/kgBW/day is appropriate, an extrapolated LOAEL of 76.1 mg/kgBW/day is not. Either one reported LOAEL should be chosen/justified or a geometric mean calculated from all original LOAELs cited by USEPA for use as a TRV in the risk calculation);* ***(d)*** *the Arsenic NOAEL of 2.24 mg/kgBW/day chosen by USEPA was "the lowest NOAEL value for effects on reproduction, growth or survival" from six different Mortality, Growth and Reproduction NOAELs published in 4 studies, not just Mortality Revise Effect/Endpoint as Mortality/Growth/Reproduction. Also, the arsenic LOAEL for Mortality, Growth and Reproduction should not be assumed equal to 22.4 mg/kgBW/day, since the Growth LOAELs cited in Table 5.1 of USEPA (2005b) from the original studies ranged from 1.49 to 17.3 for chickens and mallard ducks. Choose a LOAEL or calculate a geometric mean LOAEL from the LOAELs cited in Table 5.1 of USEPA (2005b).* ***(e)*** *Please clarify the source of the Reproduction/Growth LOAEL for Cadmium of 11.47 mg/kgBW/day.* ***(f)*** *Body weight (0.155 kg) and study duration (5 weeks) originally reported for quail (Coturnix) were inaccurately transposed from USEPA (2005d) for the chicken reproductive TRVs for lead. The correct values for chicken, as reported originally in Edens and Garlich (1983), were 1.81 kg and a 4 week exposure period.* ***(g)*** *The nickel geometric mean NOAEL of 6.71 mg/kgBW/day derived for Reproduction/Growth by USEPA (2007d) in the EcoSSL document was inappropriately used to extrapolate a Reproduction/Growth LOAEL of 67.1 mg/kgBW/day. Rather, the 9 different published Reproduction/Growth LOAELs compiled by USEPA in Table 5.1 of the EcoSSL should be used to calculate a geometric mean LOAEL, or a single LOAEL from Table 5.1 should be chosen and justified for use.* ***(h)*** *Please correct the Test Material entry for cobalt as "Cobalt, Cobalt chloride, and Cobalt Carbonate" to match information presented in the EcoSSL source document.*

Navy Response: Table 7-6 will be renamed as "Toxicity Reference Values for Birds". Responses to Items (a) through (h) are presented below.

(a) The citations referenced are intended to show the source document used to obtain the avian toxicity reference values. The column title will be changed from "reference" to "source document". In addition, references cited within the table that do not represent primary data sources (as reported by the original authors) will be footnoted and identified as secondary data sources. In the case of ecological soil screening level documents, the USEPA will be identified as a primary data sources only for geometric mean values calculated from compiled TRV data and used by USEPA for avian ecological soil screening level derivation (i.e., cadmium, chromium, cobalt, nickel, and zinc). No additional revisions will be made to the citations.

(b) Table 7-6 will be revised to show the correct NOAEL and LOAEL value for 7,12-dimethylbenz(a)anthracene (2.0 mg/kg-BW/day and 20.0 mg/kg-BW/day, respectively). With regard to the citation, please see the Navy response to Item (a) above.

(c) Table 7-6 will be revised by replacing LOAEL values for cadmium, chromium, cobalt, nickel and zinc with LOAEL values derived by calculating the geometric mean of all growth- and reproduction-based LOAEL values listed within the cited Eco-SSL documents that meet the USEPA's minimum data evaluation score. This approach also will be used for arsenic since a LOAEL value was not available from the study chosen by the USEPA as the source of the NOAEL value selected as the ecological soil screening level.

(d) The Navy partially agrees with this comment. As indicated in the Navy response to Item (c) above, the arsenic LOAEL value shown in Table 7-6 will be revised by calculating the geometric mean of all growth- and reproduction-based LOAEL values listed within the cited Eco-SSL document that meet the USEPA's minimum data evaluation score. However, the Navy respectfully disagrees with the portion of the comment that pertains to the effect/endpoint listed for arsenic. The NOAEL value listed in Table 7-6 for arsenic is based on mortality, not growth or reproduction. Therefore, the Navy does not believe it is appropriate to revise the effect/endpoint column to indicate that the NOAEL value is based on mortality, growth, and reproduction.

(e) The LOAEL value listed in Table 7-6 for cadmium was estimated by applying a safety factor of 10 to the NOAEL value. As indicated in the Navy response to Item (c) above, the LOAEL value for cadmium will be revised by calculating the geometric mean of all growth- and reproduction-based LOAEL values listed within the cited Eco-SSL document that meet the USEPA's minimum data evaluation score.

(f) Table 7-6 will be revised to show the correct body weight and study duration entry for lead (i.e., 0.181 kilograms and 4 weeks, respectively).

(g) As indicated in the Navy response to Item (c) above, the LOAEL value for nickel will be revised by calculating the geometric mean of all growth- and reproduction-based LOAEL values listed within the cited Eco-SSL document that meet the USEPA's minimum data evaluation score.

(h) Table 7-6 will be revised to show the correct test material entry for cobalt (i.e., cobalt, cobalt chloride, and cobalt carbonate).

PREQB Page-Specific Comment 34: *Section 7.5.2.2.1 Exposure Point Concentrations, page 7-21 and Tables 7-7 and 7-8. As noted in the General Comments, many of the soil-plant, soil-invertebrate and soil-small mammal BAFs used to calculate chemical concentrations in the diet of birds are too low and were derived from outdated literature sources. Please revise the BAFs in Table 7-7 (terrestrial plants and invertebrates) and Table 7-8 (small mammal prey) using a combination of regression equations and the*

compiled, median BAFs for these avian food items presented in Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (USEPA, April 2007). A few examples of soil-to-plant BAFs in Table 7-7 that appear too low to estimate plant uptake include: ***(a)*** *BAF of 0.0443 for Pentachlorophenol, for which the EcoSSL guidance reports a median BAF of 5.93;* ***(b)*** *BAF of 0.21 for Acenaphthene versus a median BAF of 2.0 in the EcoSSL guidance;* ***(c)*** *BAF of 0.0908 for Anthracene versus median BAFs ranging from 0.06 to 23 in the EcoSSL guidance;* ***(d)*** *BAF of 0.0114 for Benzo(a)pyrene versus median BAFs ranging from 0.02 to 3.3 in the EcoSSL guidance; (e) Naphthalene BAF of 0.445 versus median BAFs ranging from 5.4 to 12.2 in the EcoSSL guidance; and* ***(f)*** *BAF for Beryllium of 0.01 versus BAFs ranging from 0.033 to 1.625 in Appendix A-2 of the EcoSSL guidance. Because so few actual soil-to-small mammal BAFs were included in Table 7-8, no attempt was made to provide specific comparisons to the more recent BAFs presented in the EcoSSL guidance. Please revise Table 7-8 to include the soil-omnivore BAF median values or regression equations from the EcoSSL guidance to be used to recalculate avian dietary doses derived from invertebrate prey. Please include an explanation of the source and derivation method for each BAF, such as use of a median reported value from published sources, regression equation from the EcoSSL guidance, or "assumed" value.*

Navy Response: As discussed in the Navy response to PREQB General Comment 9, the soil-to-terrestrial plant and soil-to-terrestrial invertebrate BAF values listed in Table 7-7 and the soil-to-small mammal BAFs listed in Table 7-8 of the Draft CMS Report, will be revised, as necessary, to reflect the compiled BAFs and regression equations presented in *Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs* (USEPA, 2007). For example, soil-to-plant BAFs for organic chemicals derived in accordance with the algorithm developed by Travis and Arms (1988) will be replaced by values derived in accordance with the inter-chemical regression equation presented in Figure 5, Panel B of USEPA (2007), the chemical-specific uptake equations present for rinsed plant foliage data presented in Appendix C of USEPA (2007), or maximum BAF values for rinsed plant foliage data presented in Appendix C of USEPA (2007). For conservatism, maximum or 90th percentile soil-to-plant and soil-to-invertebrate BAF values derived from data presented in USEPA (2007) were used in the Step 2 screening-level risk calculation place of the USEPA-recommended median values. It is noted that Tables 7-7 and 7-8 of the Draft CMS Report will become Tables 7-8 and 7-9 within the Revised Draft CMS Report.

Navy responses to Items (a) through (f) are presented below.

(a) The maximum BAF value for the data presented in Appendix F, Table F-1 of USEPA (2007) will be used to estimate the concentration of pentachlorophenol in plant tissue for the Step 2 screening level risk calculation, while the median BAF value contained in Appendix F, Table F-1 of USEPA (2007) will be used to estimate the concentration of pentachlorophenol is plant tissue in the Step 3a risk calculation (maximum BAF = 46.02; median BAF = 5.93).

(b) The chemical-specific bioaccumulation uptake equation derived from measured BAF data and presented in Table 4b of USEPA (2007) will be used to estimate the concentration of acenaphthene in plant tissue for the Step 2 screening level risk calculation and Step 3a risk calculation. The uptake equation is based on the rinsed plant foliage data presented in Appendix C of USEPA (2007).

(c) The chemical-specific bioaccumulation uptake equation derived from measured BAF data and presented in Table 4b of USEPA (2007) will be used to estimate the concentration of anthracene in plant tissue for the Step 2 screening level risk calculation and Step 3a risk calculation. The uptake equation is based on the rinsed plant foliage data presented in Appendix C of USEPA (2007).

(d) The chemical-specific bioaccumulation uptake equation derived from measured BAF data and presented in Table 4b of USEPA (2007) will be used to estimate the concentration of benzo(a)pyrene in plant tissue for the Step 2 screening level risk calculation and Step 3a risk calculation. The uptake equation is based on the rinsed plant foliage data presented in Appendix C of USEPA (2007).

(e) The maximum BAF value for the data presented in Appendix C of USEPA (2007) will be used to estimate the concentration of naphthalene in plant tissue for the Step 2 screening level risk calculation, while the median BAF value contained in Appendix C of USEPA (2007) will be used to estimate the concentration of naphthalene in plant tissue for the Step 3a risk calculation (maximum BAF = 48.0; median BAF = 12.2). The values are based on the rinsed plant foliage data.

(f) The chemical-specific bioaccumulation uptake equation derived be Bechtel Jacobs (1998) from measured BAF data and presented in Table 4b of USEPA (2007) will be used to estimate the concentration of beryllium in plant tissue for the Step 2 screening level risk calculation and Step 3a risk calculation.

References cited in the Navy response to PREQB Page-Specific Comment 9:

Bechtel Jacobs. 1998. Empirical Models for the Uptake of Inorganic Chemicals from Soil by Plants. Prepared for U.S. Department of Energy. BJC/OR-133. September 1998.

Travis, C.C. and A.D. Arms. 1988. Bioconcentration of Organics in Beef, Milk, and Vegetation. Environ. Sci. Technol. 22:271-274.

United States Environmental Protection Agency (USEPA). 2007. Attachment 4-1 of Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9285.7-55.

PREQB Page-Specific Comment 35: *Section 7.6.1 Selection of Ecological Chemicals of Potential Concern, page 7-24. As noted in the General Comments, comparison to screening values of the MDL rather than the reporting limit (RL) for NDs deviates from the COPC selection approach proposed in the approved CMS Work Plan. Since the RL often is higher than the corresponding MDL for a ND, it will yield a higher, more conservative estimate of potential risk than the MDL, when compared to available screening values for non-detected chemicals.*

Navy Response: Please see the Navy response to PREQB General Comment 2.

PREQB Page-Specific Comment 36: *Section 7.6.2 Screening-Level Risk Calculation for Surface Soil, Subsurface Soil, Groundwater, and Terrestrial Food Web Exposures, page 7-25. For additional clarity as to the content of Tables 7-11, 7-12 and 7-13, please insert the following as the second sentence in this paragraph: These calculations of hazard quotients (HQs) apply only to lower trophic level community exposures of plants and soil invertebrates to terrestrial soil, or of aquatic biota to ground water reaching offshore marine habitats.*

Navy Response: Section 7.6.2 will be revised to include text indicating that the calculation of hazard quotient values presented in Tables 7-11 through 7-13 of the Draft CMS Report apply only to lower

trophic level community exposures. It is noted that the above referenced tables will become Tables 7-12 through 7-14 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 37: *Section 7.6.2.1 Surface Soil, page 7-25. Please modify the first sentence of this section as follows, for greater clarity: "Table 7-11 presents the results of the screening-level risk calculation for plants and soil invertebrates exposed to SWMU 69 surface soil."*

Navy Response: The first sentence in Section 7.6.2.1 will be modified to "Table 7-11 presents the results of the screening-level risk calculation for plant and invertebrate exposures to chemicals in SWMU 69 surface soil". As indicated by the Navy response to PREQB Page-Specific Comment No. 36, Table 7-11 of the Draft CMS Report will become Table 7-12 within the Revised Draft CMS Report. As such, the revised sentence will reference Table 7-12.

PREQB Page-Specific Comment 38: *Section 7.6.2, Tables 7-11 and 7-12. Please revise the title of these tables to convey that they pertain only to soil screening values for plants and invertebrates (e.g., rename Table 7-11 as "Frequency and Range of Surface Soil Data (Maximum Concentrations) Compared to Soil Screening Values for Plants and Invertebrates." Also, these tables cross reference a literature reference for USEPA (1999) as found in Table 7-4, but it is missing from Table 7-4.*

Navy Response: The title of Table 7-11 within the Draft CMS Report will be revised to "Frequency and Range of Surface Soil Data (Maximum Concentrations) Compared to Soil Screening Values for Plants and Invertebrates". The title of Table 7-12 within the Draft CMS Report will be revised to "Frequency and Range of Subsurface Soil Data (Maximum Concentrations) Compared to Soil Screening Values for Plants and Invertebrates". As indicated by the Navy response to PREQB Page-Specific Comment No 36, Tables 7-11 and 7-12 will become Tables 7-12 and 7-13 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 39: *Section 7.6.2, Table 7-16. Please expand the footnote for NE (Not Evaluated) to explain that the low and high MW EcoSSLs were used to evaluate two subtotals for PAHs due to a lack of EcoSSLs or other SVs for individual PAHs. Also, for other COPCs annotated as NE, please add a footnote explanation as to why each was not evaluated (e.g., for 1,4-Dioxane, combine "NE" with footnote #1 to explain it was not evaluated because has a logK_{ow} below 3.0 and is not bioaccumulative). As requested in prior comments, please replace the inappropriate acronym "IBSV" with "TRV" in this table. Finally, please add a footnote to this table to indicate which chemicals were included solely due to a lack of screening values, despite never having been detected.*

Navy Response: Table 7-16 of the Draft CMS Report (Summary of the Screening-Level Risk Calculation) will not be included within the Revised Draft CMS Report. Instead, the section presenting the screening level risk calculation for surface soil, subsurface soil, groundwater, and terrestrial food web exposures (i.e., Section 7.6.2) will be referenced within the text of Section 7.8. It is noted that PREQB Page-Specific Comment 39 references Section 7.6.2 as the location within the Draft CMS Report where Table 7-16 is cited. Table 7-16 is actually cited within Section 7.8 of the Draft CMS Report.

PREQB Page-Specific Comment 40: *Section 7.7 Uncertainties Associated with the SERA, page 7-28. Please add a discussion of the spatial gap in analytical data for soil samples from low-lying, depositional reaches of the drainage ditches and adjacent forested habitats located downgradient of SWMU 69, to the south and east. Please acknowledge the significance of this data gap in the evaluations of (a) potential contaminant migration in surface runoff entering the ditch, and (b) potential risks to the yellow shouldered blackbird that may forage within these forested habitats.*

Navy Response: Please see the Navy's response to PREQB General Comment 4.

PREQB Page-Specific Comment 41: *Section 7.7 Uncertainties Associated with the SERA, Food Web Exposure Modeling, page 7-31***.** *Please discuss uncertainties about the assumed diet of the red-tailed hawk at SWMU 69, to acknowledge that hawks are unlikely to prey solely on rats. Hawks also are likely to prey on smaller birds and perhaps reptiles, such as snakes and lizards, for which COPC uptake and food chain exposures of the hawks were not evaluated.*

Navy Response: Section 7.7 of the Draft CMS Report will be revised to include the following discussion of the uncertainties associated with the assumed diet of the red-tailed hawk:

> "In the SERA, it was assumed that the diet of the red-tailed hawk consisted solely of rodents (i.e., Norway rat). However, red-tailed hawks are opportunistic feeders and prey will vary with regional and seasonal availability. In Puerto Rico's El Yunque rainforest, the following food items were delivered to nestlings: rats (black rat and Norway rat), birds (such as the zenaida dove), lizards (*Anolis* spp.), snakes (such as the Puerto Rican racer [*Alsophis portoricensis*]), and coquis (*Eleutherodactylus* spp.) (Global Raptor Information Network, 2010). Santana and Temple (1988) reported the diet of red-tailed hawks in mountain rain and cloud forests of Puerto Rico consisted primarily of birds, reptiles, and amphibians captured from the tree canopy, while the diet of lowland hawks was comprised mostly of mammals. The diet of lowland hawks reported by Santana and Temple (1988) support the diet assumption used in the SERA. However, if red-tailed hawks at NAPR consume a mixed diet of rats, birds, and reptiles, and bioaccumulation of chemicals in birds and reptiles differ from their bioaccumulation in rats, an assumed diet of 100 percent rats may have resulted in an overestimation or underestimation of potential risks."

References cited in the Navy response to PREQB Page-Specific Comment 41:

Global Raptor information network. 2010. Species Account: Red-Tailed Hawk (*Buteo jamaicensis*). Available at: http://www.globalraptors.org.

Santana, E.C. and S.A. Temple. 1988. Breeding Biology and Diet of Red-Tailed Hawks in Puerto Rico. Biotropica. 20:151-160.

PREQB Page-Specific Comment 42: *Section 7.9 Step 3a of the BERA, page 7-33, and Tables 7-17 and 7-18. Revisions and updates of the BAFs in Tables 7-7 and 7-8, used in the SERA, were requested in the General Comments and Specific Comments on these BAFs. Similarly, the purportedly "less conservative" selections of soil-plant, soil-invertebrate and soil-small mammal BAFs proposed in Tables 7-17 and 7-18 should be reassessed and revised to apply the more recent BAFs and BAF derivation methods (e.g. regression equations) presented in the Attachment 4-1 of the EcoSSL guidance on the use of bioaccumulation models for EcoSSL derivation (USEPA, April 2007).*

Navy Response: The plant and invertebrate BAFs listed in Table 7-17 and the small mammal BAFs listed in Table 7-18 of the Draft CMS Report will be revised, as necessary, to reflect the compiled BAFs and regression equations presented in Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (USEPA, 2007). It is noted that Tables 7-17 and 7-18 of the Draft CMS Report will become Tables 7-19 and 7-20 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 43: *Section 7.9.1 Refined Risk Evaluation, Table 7-17***.** *Pentachloroethane is incorrectly listed in this table as a semi-volatile organic chemical, but is correctly listed elsewhere as a VOC. As noted in prior comments, the BAFs and BCFs included in this table also*

should be re-evaluated and revised, as needed, based on comparison to those included in Attachment 4-1 of the EcoSSL guidance (USEPA, April 2007).

Navy Response: Pentachloroethane is mistakenly shown in place of pentachlorobenzene within Table 7-17 of the Draft CMS Report. This table will be revised to remove pentachloroethane and show pentachlorobenze. With regard to the BAFs/BCFs listed within this table, please see the Navy Response to PREQB Page-Specific Comment 42. As indicated in this Navy response, the plant and invertebrate BAFs listed in Table 7-17 of the Draft CMS Report and used in Step 3a of the BERA will be revised, as necessary, to reflect the compiled BAFs and regression equations presented in Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (USEPA, 2007). As was previously discussed, Table 7-17 of the Draft CMS Report will become Table 7-19 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 44: *Section 7.9.1 Refined Risk Evaluation, Table 7-18. Concerns about not having used the best available BAFs and BCFs, voiced in the prior comments, also apply to the content of this table. Please present chemical-specific values used in the food chain exposure models, with a brief explanation of their derivation,*

Navy Response: Please see the Navy response to PREQB Page-Specific Comment 42. As indicated in this response, the soil-to-small mammal BAFs listed in Table 7-18 of the Draft CMS Report and used in Step 3a of the BERA will be revised, as necessary, to reflect the compiled BAFs and regression equations presented in Attachment 4-1 of the Guidance for Developing Ecological Soil Screening Levels (EcoSSLs): Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSLs (USEPA, 2007). Table 7-18 of the Draft CMS Report also will be revised to include the uptake that was used to derive the small mammal tissue concentrations for those chemicals lacking literature-based BAFs values, as well as a footnote explaining the uptake equation. As was previously discussed, Table 7-18 of the Draft CMS Report will become Table 7-20 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 45: *Section 7.9.1 Refined Risk Evaluation, Table 7-20. For greater clarity, please rename this table so that its title ends with "...Compared to Soil Screening Values for Plants and Invertebrates." Also, please correct/clarify what appear to be errors in the entries for Vanadium:* ***(a)*** *using the 95% UCL of the mean concentration and SSV in the table yields a HQ of 13.67, not 68.35;* ***(b)*** *Assuming the correct SSV is 10 mg/kg, it's source is incorrectly referenced here as Efroymson et al. (1997b), whereas this SSV was attributed to USEPA (2005h) in Table 7-4.*

Navy Response: The title for Table 7-20 of the Draft CMS Report will be revised to "Frequency and Range of Surface Soil Data (95 Percent UCL of the Mean Concentrations) Compared to Soil Screening Values for Terrestrial Plants and Invertebrates".

Responses to Items (a) and (b) are presented below.

(a) The soil screening value for vanadium will be updated within the Revised Draft CMS Report to reflect the safety factor recommended by Wentsel et al. (1996) for converting a chronic lowest observed adverse effect concentration (LOAEC) to a chronic no observed adverse effect concentration (NOAEC). The specific safety factor used will be 5. Based on this safety factor, the vanadium soil screening value is 20 mg/kg, which corresponds to a Step 3a risk estimate of 6.84. Table 7-20 of the Draft CMS Report will be revised show the correct HQ value for vanadium (HQ = 6.84).

(b) Table 7-20 will be revised to show the correct source of the vanadium soil screening value (USEPA, 2005h).

It is noted that Table 7-20 of the Draft CMS Report will become Table 7-21 within the Revised Draft CMS Report.

References cited in the Navy response to PREQB Page-Specific Comment 45:

Wentsel, R.S, T.W. Pa Point, M. Simini, R.T. Checkai, and D. Ludwig. 1996. Tri-Service Procedural Guidelines for Ecological Risk Assessments. Edgewood Research Development and Engineering Center, Aberdeen Proving Ground, MD. ADA297968.

PREQB Page-Specific Comment 46: *Section 7.9.1 Refined Risk Evaluation, Tables 7-23 and 7-24. For greater clarity, please rename titles of these tables to indicate they pertain only to birds (e.g., Table 7-23 would end with "...Food Web Exposures of Birds: Surface Soil"). Also, if correct, please add a footnote indicating that the HQs are based on the 95% UCL of the mean concentration. Please replace the term Ingestion-based screening value with TRV in the footnote for NA.*

Navy Response: Table 7-23 of the Draft CMS Report will be renamed "Hazard Quotient Values for Avian Dietary Exposures to Chemicals in Surface Soil: Step 3A Risk Calculation. Table 7-24 of the Draft CMS Report will be renamed "Hazard Quotient Values for Avian Dietary Exposures to Chemicals in Subsurface Soil: Step 3A Risk Calculation". In addition to these revisions, the term ingestion-based screening value in the footnotes of each table will be replaced by "toxicity reference value". Finally, a footnote was added to each table that defines the basis of the hazard quotient values (95 percent upper confidence limit of the mean chemical concentrations for surface soil and maximum chemical concentrations for subsurface soil). It is noted that Tables 7-23 and 7-24 of the Draft CMS Report will become Tables 7-25 and 7-26 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 47: *Section 7.9.1 Refined Risk Evaluation, Table 7-25. Selenium has HQs > 1.0 for birds but was omitted as a COPC in subsurface soil for upper trophic level receptors – please add it to the table.*

Navy Response: Based on the use of updated exposure parameters for each avian receptor, including new soil-to-terrestrial plant BAF values, selenium is not identified as an ecological COPC for avian dietary exposures to chemicals in SWMU 69 subsurface soil. As evidenced by Table 7-16 of the Revised Draft CMS Report, the selenium HQ for American robin dietary exposures is equal to 1.00 (i.e., the dietary intake is equal to the NOAEL-based TRV). As such, revisions to Table 7-25 involving the addition of selenium are not necessary. It is noted that Table 7-25 of the Draft CMS Report will become Table 7-27 within the Revised Draft CMS Report.

PREQB Page-Specific Comment 48: *Section 7.9.1.1 Step 3a Risk Evaluation for Surface Soil, page 7-40, paragraph 1. Here the report states: "The analytical data for these downgradient samples give no indication that zinc has migrated from 69SB05, 69SB09, 15-03, and 15-04 with surface soil via surface run-off to drainage ditch surface soil or estuarine wetland surface water or sediment at concentrations greater than what would be expected under background conditions. However, surface soil samples have not been collected at locations downgradient from 69SB14 and 69SB15." This statement hypothesizes that COPCs from the higher elevation source area within SWMU 69 have not migrated in surface water runoff to downgradient habitats, such as the ditch channel and adjacent forest, despite the potential for such contaminants to have accumulated within depositional reaches of the ditch and adjacent forest. The report recommends "that surface soil samples be collected downgradient from these locations to establish a concentration gradient to determine if zinc has migrated to drainage ditch surface soil and*

estuarine wetland surface water and sediment at concentrations greater than background levels." As noted in prior comments, several additional soil samples should be collected from the ditch channels and adjacent forest, but should be analyzed for all relevant COPCs, not just for zinc, to test the contaminant migration hypothesis and assess potential risk from ecological exposures to soils in the ditch and adjacent forest.

Navy Response: Please see the Navy response to PREQB General Comments 4 and 5.

PREQB Page-Specific Comment 49: *Section 7.9.1.1 Step 3a Risk Evaluation for Surface Soil, page 7-40, paragraph 2. The final sentence of this paragraph prematurely concludes that: "there is no indication that lead has migrated from 15E-SS03, 69SB05, 69SB09, and 69SB05 with surface soil via surface run-off to drainage ditch surface soil or estuarine wetland surface water or sediment at concentrations greater than what would be expected under background conditions." As noted above for zinc, this is a hypothesis that must be tested by analyzing additional soil samples from the ditch channel and adjacent depositional areas within the forest. Sample location 69SB05, located nearly 100 feet upgradient from the drainage ditch, is one of several "hot spots" where inorganic COPC concentrations exceed background. However, since this and other locations may occur on a slope, rather than in lower, depositional areas of the ditch/forest habitat, it is conceivable that comparable or even higher COPC concentrations may have accumulated in these unsampled areas. Please revise the discussion to remove this premature inference and acknowledge this uncertainty related to the spatial data gap for the ditches and adjacent forest.*

Navy Response: Please see the Navy response to PREQB General Comments 4 and 5.

PREQB Page-Specific Comment 50: *Section 7.9.1.1 Step 3a Risk Evaluation for Surface Soil, page 7-41. Please add a new sentence in the last paragraph of this section to state that: "However, since many of these COPCs also exceed the lowest of their avian EcoSSLs, they are evaluated separately for terrestrial food chain exposures of birds, below, in Section 7.9.1.4."*

Navy Response: The recommended revisions to the closing paragraph are not deemed necessary since the section referenced by PREQB Page-Specific Comment No 50 is specific to terrestrial plant and invertebrate exposures to chemicals in SWMU 69 surface soil.

PREQB Page-Specific Comment 51: Section 7.9.2 Uncertainties Associated With Step 3a of the BERA, Identification of Ecological COCs ,page 7-48**.** For greater clarity and precision, please modify the first sentence of the bullet to read as: **"**Non-detected chemicals lacking media-specific *screening values and/or avian TRVs* were not evaluated in the refined risk calculation, nor were they identified as ecological COCs."

Navy Response: The first sentence of the third bullet item will be revised by replacing the term "ingestion-based screening values" with "TRVs".

PREQB Page-Specific Comment 52: *Section 7.9.3.2 Subsurface Soil and Section 7.9.3.3 Groundwater, page 7-49. In both sections, please briefly recap how and why these COPCs were eliminated from further evaluation as COCs. The following revision of the one sentence subsurface soil discussion would serve this need: "Based on the refined risk evaluation presented in Section 7.9.1.2, no detected chemicals were identified as ecological COCs for SWMU 69 subsurface soil, despite several HQs exceeding 1.0 for plants and soil invertebrates, because concentrations of these COPCs were below background levels."*

Navy Response: Sections 7.9.3.2 and 7.9.3.3 will be revised to explain why ecological COPCs identified in Step 2 of the SERA were not identified as ecological COCs in Step 3a of the BERA.

PREQB Page-Specific Comment 53: *Section 7.9.3.5 Terrestrial Food Web Exposures: Subsurface Soil, page 7-49. Please recap how and why these COPCs were eliminated from further evaluation as COCs. For example, reiterate why vanadium was dropped despite having a HQ greater than 1.0 for all three bird species in Table 7-24.*

Navy Response: Section 7.9.3.5 will be revised to briefly explain why ecological COPCs identified in Step 2 of the SERA were not identified as ecological COCs in Step 3a of the BERA.

PREQB Page-Specific Comment 54: *Section 7.10.1 Methodology for CAO Development, page 7-49 and Table 7-26. Avian CAOs should be based on the lowest available NOAELs, rather than LOAELs, but it is not clear from this discussion that NOAELs were chosen from Table 7-6 and used to derive the avian CAOs. Please revise the text discussion and footnote Table 7-26 to document which NOAELs were applied from Table 7-6. Also, in the CAO formula, please replace "SV" (ingestion-based screening value) with the more appropriate term "TRV" (toxicity reference value).*

Navy Response: The CAOs developed for terrestrial avian omnivore dietary exposures to ecological COCs in surface soil are based on NOAELs. It is noted Section 7.10 (Methodology for CAO Development) will be deleted from the Revised Final CMS Report and replaced by an evaluation of ecological risks using analytical data collected in accordance with the Final Soil Sampling Strategy for Disturbed Soil Sampling dated June 21, 2010. CAOs will be developed for those chemicals identified as ecological COCs by this risk evaluation and presented within Section 7.12 of the Revised Draft CMS Report.

PREQB Page-Specific Comment 55: *References, page 7-53. The reference for Parker et al. is missing a date, which was cited in the text as 2003.*

Navy Response: The missing date (i.e., 2003) will be added to the Parker et al. reference.

PREQB Page-Specific Comment 56: *Page 8-2, Section 8.3.1.1. Please clarify why this HHRA is referred to as a revised HHRA in this section. There is no indication in previous sections that this HHRA is an update of a previous investigation.*

Navy Response: The HHRA will be revised as follows. The HHRA will be presented in two parts. In Section 8.3 (Revised Original HHRA), the HHRA methodology is described, and soil and groundwater data collected during the 2008 CMS field investigation are re-evaluated: (a) to incorporate updates to screening and toxicity values, exposure assessment methodologies, and exposure parameters used in the original HHRA and (b) to support the decision to limit the analysis of 2010 data to inorganics (based on the lack of organic COCs identified from the 2008 data). In Section 8.4 (2010 Disturbed Soil Sampling Investigation HHRA), soil and sediment data collected as part of the Disturbed Soil Sampling Investigation are evaluated. In order to address potential risks at the SWMU as a whole, the conclusions drawn from the Revised Original HHRA, as well as those from the 2010 Disturbed Soil Sampling Investigation HHRA are collectively summarized in Section 8.5 (Combined Conclusions for 2008 and 2010 Investigations). Based on these revisions the term "revised HHRA" will be changed to "Revised Original HHRA" in Section 8.3.1.1.

PREQB Page-Specific Comment 57: *Page 8-3, Section 8.3.1.2, paragraph 1. Please clarify why EPA Region 3 guidance is referenced as this site is located in EPA Region 2. Also, please indicate where EAP Region 3 guidance procedures were used in identifying COPCs. There is no reference to this guidance in Sections 8.3.1.2.1 and 8.3.1.2.2.*

Navy Response: References to EPA Region 3 guidance will be removed from Section 8.0.

PREQB Page-Specific Comment 58: *Page 8-4, Section 8.3.1.2.1, Blank Concentrations. Please revise the document to reflect the actual data validation methodology used, consistent with the CMS workplan and Region 2 guidelines. The text states that results were considered as positive results only if they exceed 10x the maximum amount detected in the associated blank for common contaminants and 5x the maximum amount detected for the remaining contaminants. The text also states that this methodology was used during data validation prior to selection of the COPCs. However, it should be noted that the validator did not use this methodology for qualifying data due to blank contamination. As per the CMS Work Plan, Region 2 data validation guidelines were followed. In general, if the sample result was detected at a concentration below that detected in the blank, the result was qualified as nondetect (U) at the reported concentration.*

Navy Response: Section 8.3.1.2.1 will be revised to remove the data validation methodology discussion and state the following:

> In conjunction with concentration comparisons to the USEPA Regional SLs, a comparison to concentrations detected in field and laboratory blanks was conducted by a third-party data validator, to ensure that only site-related contaminants are evaluated in the quantitative estimation of human health effects.

PREQB Page-Specific Comment 59: *Page 8-5, Section 8.3.1.2.2, Surface Soil. Trans-1,4-Dichloro-2-butene is identified as a COPC on Table 8.1. Please clarify why this contaminant is not included as a COPC in the text.*

Navy Response: Trans-1,4-Dichloro-2-butene was inadvertently omitted from the COPC discussion. Section 8.3.1.2.2 will be revised to include this chemical as COPC.

PREQB Page-Specific Comment 60: *Page 8-7, Section 8.3.2, paragraph 2. The final USEPA RAGS Part E guidance (2004) states that it "incorporates and updates principles of the EPA interim report, Dermal Exposure Assessment: Principles and Applications." Therefore, the 1992 Dermal Exposure Assessment guidance should not be used as a reference. Please remove this reference from the text and update the HHRA, if necessary, to ensure consistency with the final RAGS Part E guidance.*

Navy Response: The 1992 Dermal Exposure Assessment guidance will be removed from the HHRA.

PREQB Page-Specific Comment 61: *Page 8-8, Section 8.3.2.1, paragraph 2. Excavation of soils may or may not occur and future industrial worker exposure to combined surface and subsurface soil may not occur. Therefore, for the industrial worker, two datasets should be evaluated, one comprised of surface soil and one comprised of surface and subsurface soil, or only evaluate the dataset (surface or combined surface and subsurface soil) that has the higher contaminant concentrations. The same dataset should also be used to evaluate a future trespasser as a trespasser may be exposed to the same combined surface and subsurface soils as a future commercial/industrial worker. Also, the depth of soils to which construction worker exposure may occur should be based on construction practices, not the maximum depth that soil samples were collected. Please discuss the basis for assuming excavation activities typically reach a depth of 9 to 11 feet bgs in Puerto Rico.*

Navy Response: The soil exposure pathway evaluation in the SWMU 69 HHRA will be revised as follows. COPCs will be selected from both surface soil (0 to 1 foot bgs) and total soil (0 to 11 feet bgs). Note that analytical results from subsurface soil samples collected from the 9 to 11 feet bgs interval will be included in the total soil data set used in the HHRA because 10 feet bgs is included in this interval. EPCs will be calculated for the surface soil and total soil COPCs, and the higher of the two EPCs for each COPC will be used in the risk calculations to produce a conservative risk estimate. For COPCs having

less than four detected concentrations or less than eight samples in the dataset, the maximum detected concentration will be used as the EPC for that data grouping. Section 8.0 text and associated tables, figures, and appendices will be revised accordingly.

The depth of soil to which construction worker exposure may occur is based on construction practices at NAPR rather than the maximum depth soil samples were collected. This will be reflected in Sections 8.2 and 8.3.2.1. It should be noted that the maximum depth of 10 feet bgs to which human exposure is evaluated at NAPR was agreed upon in the January 9, 2002 conference call between the Navy, USEPA, and PREQB.

PREQB Page-Specific Comment 62: *Page 8-8, Section 8.3.2.1, paragraph 3. The use of vapor intrusion screening criteria to evaluate direct inhalation exposure to volatile contaminants in groundwater by construction workers is inappropriate. The vapor intrusion screening criteria were developed to assess vapors volatilizing from groundwater through the vadose zone into a building, not volatilizing directly from water into a trench. The Regional SL calculator can be used to calculate a screening level using only the inhalation component (zeroing out all other exposure parameter inputs for ingestion), adjusting the exposure frequency, exposure duration and exposure time to reflect construction worker exposure scenario values. Using the inhalation during showering component of this calculator more closely models the inhalation of volatiles in a trench than the vapor intrusion screening criteria. Please revise the HHRA accordingly.*

Navy Response: Section 8.3.2.1 will be revised to discuss that the volatile compounds in groundwater were compared to both Regional Screening Levels (RSLs) and vapor intrusion screening criteria to determine if volatiles in groundwater should be evaluated directly and/or indirectly.

PREQB Page-Specific Comment 63: *Page 8-11, Section 8.3.2.5, paragraph 3. Please provide further information on the basis for the inhalation rates selected for the adult and adolescent trespasser, as there are many different inhalation rates presented in the reference.*

Navy Response: The HHRA will be revised to remove the inhalation rates for all receptors because of the application of USEPA's 2009 Supplemental Guidance for Inhalation Risk Assessment (RAGS Part F).

PREQB Page-Specific Comment 64: *Page 8-12, Section 8.3.2.5, paragraph 4. Please obtain dermal factors from the supporting tables for the regional SLs. Please revise the HHRA accordingly. This comment applies elsewhere in the text where Region 3 dermal values are referenced.*

Navy Response: The HHRA will be revised to obtain dermal factors from the RSL tables where available. Additionally, references to Region 3 dermal values will be removed from the HHRA.

PREQB Page-Specific Comment 65: *Page 8-12, Section 8.3.2.5, paragraph 6. Please provide further information on what activity pattern was selected from the reference to represent the respiration rate for this receptor.*

Navy Response: Please refer to response to PREQB Page-Specific Comment 63.

PREQB Page-Specific Comment 66: *Page 8-13, Section 8.3.2.5, paragraph 9. For consistency with other risk assessments conducted in Puerto Rico, please use the ingestion rate of 330 mg/day and an adherence factor of 0.3 mg/cm^2 presented in the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (OSWER 9355.4-24) for the construction worker.*

Navy Response: The ingestion rate and adherence factor for the future construction worker will be revised to 330 mg/day and 0.3 mg/cm^2, respectively, as per the December 2002 SSL Guidance and as agreed upon in the January 9, 2009 conference call between the Navy, USEPA, and PREQB.

PREQB Page-Specific Comment 67: *Page 8-13, Section 8.3.2.5, paragraph 10. This paragraph appears inconsistent with Section 8.3.2.1, paragraph 3, which states that it is not necessary to evaluate direct and indirect inhalation of volatiles from groundwater. This paragraph indicates that inhalation of volatiles will be evaluated. Please clarify this apparent discrepancy.*

Navy Response: Section 8.3.2.5, Future Adult Industrial/Commercial Workers, will be revised to state that inhalation of volatiles was not quantitatively evaluated.

PREQB Page-Specific Comment 68: *Page 8-17, Section 8.3.4.3, paragraph 2. The lead model used to calculate the screening criteria, the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) model, assumes an average lead concentration as an input to the model. Therefore, a discussion of the average (arithmetic and 95% UCL of the mean) lead concentration at the site would be beneficial in this section.*

Navy Response: As future residential land use will conservatively be evaluated for SWMU 69, (refer to Navy Response to EPA General Comment 3), the IEUBK model will be used to evaluate lead concentrations detected in the soil at SWMU 69, and the average lead concentration in soil will be included in Section 8.3.4.3.

PREQB Page-Specific Comment 69: *Pages 8-17 to 8-20, Section 8.3.5. Please revise this section to provide a discussion of the level of uncertainty (low, medium or high) that each source of uncertainty imparts to this risk assessment.*

Navy Response: Note that in the revised HHRA, the uncertainties section will become Section 8.3.6. As such, Section 8.3.6 will be revised as indicated in the comment.

PREQB Page-Specific Comment 70: *Page 9-1, Section 9.1, paragraph 2. According to Figure 9-1 sampling point 69SB11 doe not exceed for cadmium as it is mentioned at the text. Table 9-1 does not include point 69SB14 as having concentrations above the final CAO, instead 69SB15 is repeated. Appropriate corrections should be made at the text, tables and figures were necessary.*

Navy Response: In support of the conversion of the airfield to a commercial facility by the Puerto Rico Ports Authority (PRPA), soil that had been previously characterized as part of SWMU 69 was disturbed by a PRPA contractor thereby resulting in a significant alteration of the physical conditions of the site as well as a potential redistribution of the contaminants of concern (COCs). Section 9.0 (including tables and figures) will be revised to reflect the additional surface and subsurface soil sampling investigation conducted from August 3 to 6, 2010.

PREQB Page-Specific Comment 71: Section 9.1 Surface Soil, page 9-2. *The closing statement in the second paragraph represents a premature and inadequately supported conclusion: "Soil samples collected closer to the drainage ditch did not exhibit exceedances of the CAOs indicating limited contaminant migration south of the site toward the drainage ditch." Because even the samples collected nearest to the ditch are located 50 to 100 feet from the ditch and may be located on a slope rather than in the lowest-lying, depositional areas of the drainage ditch channel and adjacent forest habitat, this hypothetical statement must be verified by sampling and analyzing soils from depositional areas within the ditch and adjacent forest. Please acknowledge this current data gap and rephrase this sentence as a hypothesis to be tested by supplemental sampling and analysis.*

Navy Response: Please refer to PREQB Page-Specific Comment 70. In addition, the additional soil sampling investigation also included sediment samples collected from the southern and eastern drainage ditches associated with SWMU 69.

PREQB Page-Specific Comment 72: *Sections 9.1 Surface Soil and 9.2 Subsurface Soil, pages 9-1 to 9-2 and Figures 9-1 and 9-2. Please estimate, tabulate and discuss the residual surface and subsurface soil concentrations (95% UCL of mean) and residual HQs for plants and invertebrates, and the American robin that would be attained if the spatial extent of soil removal needed to attain the proposed CAOs in the "hot spots" shown in Figures 9-1 and 9-2 were to proceed.*

Navy Response: Vanadium is the sole Chemical of Concern in soils. The proposed remedial action for surface soil (Figure 9-1) and subsurface soil (Figures 9-2 and 9-3) is removal of soil exceeding the CAO (the upper limit of the mean background concentration of 367 mg/kg) for vanadium and would result in residual soil contamination at or below background concentrations. To evaluate post-remediation contamination, the following samples (which were collected from areas to be remediated) were removed from the dataset: Surface soil (0-1 ft bgs) 69SB122-00, 69SB127-00, 69SB128-00, 69SB129-00, 69SB130-00, 69SB132-00, 69SB133-00, 69SB140-00, and 69SB144-00; subsurface soil (1-2 ft bgs) 69SB122-01, 69SB127-01, 69SB128-01, 69SB129-01, 69SB130-01, 69SB132-01, 69SB133-01, 69SB140-01, and 69SB144-01; and subsurface soil (2-3 ft bgs) 69SB122-02, 69SB129-02, 69SB130-02, and 69SB140-02. The 95 percent UCL of vanadium in airfield background soils is 201.4 mg/kg; the post-remediation 95 percent UCL of vanadium in surface and subsurface soil at SWMU 69 would be 135.7 mg/kg and 201.0 mg/kg, respectively. Corresponding post-remediation HQs for terrestrial plants and invertebrates would be 6.79 in surface soil and 10.05 in subsurface soil (compared to 10.07 under background conditions). Post-remediation HQs for the American robin would be 6.34 in surface soil and 9.4 in subsurface soil (compared to 9.42 under background conditions). UCLs and HQs are summarized in the following table.

	Surface Soil Vanadium 95% UCL (mg/kg)	SS HQ for Terrestrial Plants/ Invertebrates	Subsurface Soil Vanadium 95% UCL (mg/kg)	SB HQ for Terrestrial Plants/ Invertebrates	Surface Soil HQ for American Robin	Subsurface Soil HQ for American Robin
Pre-Remediation	171.8	8.59	237	11.85	8.03	11.08
Airfield Background	201.4	10.07	201.4	10.07	9.42	9.42
Post-Remediation	135.7	6.79	201	10.05	6.34	9.4

95% Upper Confidence Limit (UCL) calculated with ProUCL Version 4.00.05 (USEPA, 2010)
HQ = Hazard Quotient
mg/kg = milligrams per kilogram
SB = Subsurface Soil
SS = Surface Soil
Hazard Quotients for the American robin are based on comparisons to No Observed Effects Levels (NOAELs).

PREQB Page-Specific Comment 73: *Page 11-3, Section 11.1.1. Please clarify that contaminant removal verification is synonymous with confirmatory sampling or include confirmatory sampling in the FSAP.*

Navy Response: Contaminant removal verification is synonymous with confirmatory sampling.

PREQB Page-Specific Comment 74: *Page 11-2, Section 11.1, last paragraph. Confirmatory sampling should be intended to verify effectiveness of the corrective measures implementation. Sampling the*

bottom of the excavation area is recommended. It should be included at the Site-Specific Field Sampling and Analysis Plan that will be prepared and submitted for review.

Navy Response: As discussed in Section 10.1- Description of Remedy and Section 11.1 – Conceptual Design, bottom of excavation confirmatory sampling is proposed at the two foot below ground surface for Areas 1, 3 and 5. However, since the excavation depth for all areas is limited to a maximum depth of three feet below ground surface because of a lack of a complete exposure pathway for ecological receptors below this depth, confirmation samples from the three foot bottom of excavation depth are not required.

PREQB Page-Specific Comment 75: *Tables 6-1, 6-2, 6-3, and 6-4. As discussed under General Comments #1 and 2, please revise these tables to reflect the laboratory's reporting limits and not MDLs for nondetect results. It should be noted that the ECP Phase II data presented in Tables 6-5 and 6-6 reported nondetect results down to the reporting limit, not MDL.*

Navy Response: Please refer to the Navy Response to PREQB General Comment #2.

PREQB Page-Specific Comment 76: *Appendix A, Field Log Book Notes. Section 3.2 (page 3-4) of the CMS Work Plan provides criteria for successful well development as follows:*

- *Clarity of water based on visual determination*
- *A maximum time period (typically two hours for shallow wells)*
- *A maximum borehole volume (typically three to five borehole volumes plus the amount of any water added during the drilling or installation process)*
- *Stability of pH, specific conductance, and temperature measurements (typically less than 10% change between three successive measurements)*
- *Clarity based on turbidity measurements (typically less than 20 NTUs)*

Based on these criteria, it is unclear why the following monitoring wells were not developed for a longer period of time.

69GW11: the final turbidity was 60 NTUs after 36 minutes of development.
69GW12: the final 3 conductivity measurements were not within ±10% and the final turbidity was 41 NTUs after 41 minutes of development.
69GW08: the final 3 conductivity measurements were not within ±10% and the final turbidity was 89 NTUs after 56 minutes of development.
69GW07: the final turbidity was 68 NTUs after 35 minutes of development.
69GW25: the final turbidity was 51 NTUs after 27 minutes of development.

Navy Response: The Final CMS Work Plan for SWMU 69 (Baker, 2007) indicates that the wells will be developed until the water runs relatively clear, although the Work Plan points out that not all wells will clear with continued development. Further, the Work Plan indicated that typical limits placed on development may include any one or a combination of the requirements listed in this comment. However, the Work Plan does not require meeting any or all of these requirements to consider a well developed.

Well 69GW11 is considered developed because more than five borehole volumes of water were removed from the well and pH, temperature, dissolved oxygen and oxidation reduction potential were stable. Well 69GW12 is considered developed because more than five borehole volumes of water were removed from the well; dissolved oxygen, pH and temperature also were stabilized for this well. Well 69GW08 is considered developed because more than five volumes of water were removed from the well and four of

the water quality parameters (pH, dissolved oxygen, temperature and oxidation reduction potential) were stabilized. Well 69GW07 is considered developed because more than five well volumes of water were removed from the well and temperature and pH were stabilized. Well 69GW25 is considered developed because more temperature, conductivity, pH and oxidation reduction potential were stable.

Reference

Baker. 2007. Final Corrective Measures Study Work Plan for SWMU 69. Naval Activity Puerto Rico, Ceiba, Puerto Rico. December 6, 2007.

PREQB Page-Specific Comment 77: *Appendix A, Field Log Book Notes. Please explain why sample 69GW25 was collected prior to stabilization of ORP. As per Region 2 low flow sampling procedures which are cited as being followed in Section 4.2 of this report, three consecutive ORP readings must be within ±10 mV.*

Navy Response: Groundwater sample 69GW25 was collected after stabilization of ORP. The relative percent difference between the last three consecutive ORP measurements is 9 mV, which is within the ±10mV criteria.

PREQB Page-Specific Comment 78: *Appendix A, Field Log Book Notes. Section 3.2 of the CMS Work Plan states that the cement/bentonite grout of the monitoring wells will be allowed to cure for a minimum of 24 hours prior to well development. Based on the field notes provided in Appendix A, it appears that well development was performed prior to the minimum 24-hour waiting period. Please clarify why this occurred.*

Navy Response: In a limited number of cases (69SB07 and 69SB08), well development was performed prior to the minimum 24 hour waiting period as stated in the approved Work Plan because of an oversight by the field team. This is not expected to significantly adversely impact the groundwater samples; in fact, water quality parameter measurements for both of these wells stabilized within established criteria indicating good communication with aquifer and representativeness of the groundwater sample.

PREQB Page-Specific Comment 79: *Appendix A, Chain-of-Custody Forms. The chain-of-custody forms associated with groundwater samples 69GW26 and 69GW27 were not provided in this Appendix.*

Navy Response: The chain-of-custody form for groundwater samples 69GW26 and 69GW27 has been added to Appendix A.

PREQB Page-Specific Comment 80: *Appendix B, Laboratory Analytical Results. As discussed under General Comments #1 and 2, please revise these tables to reflect the laboratory's reporting limits and not MDLs for nondetect results. It should be noted that the ECP Phase II data presented in this Appendix reported nondetect results down to the reporting limit, not MDL.*

Navy Response: TestAmerica Savannah's process for performing MDL studies is outlined in laboratory SOP SA-QA-007: *Determination and Verification of Detection and Reporting Limits.* This process is performed in accordance with the 40CFR Part 136 Appendix B procedure and includes determining a statistical MDL value using the standard deviation of results from the analysis of a minimum of 7 replicates spiked near the reporting limit. The laboratory has also adopted an MDL verification procedure such that this statistical MDL value is verified via an MDL verification sample and the long term evaluation of method blanks. This verification procedure ensures the laboratory's MDL values are reasonable, consistently recovered, and at least 3 times the background noise. The laboratory's MDL study, MDL verification data, and SOPs are available for review upon request.

The convention for evaluating non-detect values to the MDL is a common industry-wide laboratory practice. This convention is consistent with that outlined in the Department of Defense Quality Systems Manual (DOD QSM) and several other state requirements, including the Florida Department of Environmental Protection, FLDEP, who issues the laboratory's NELAC certification upon which our Puerto Rico certification is based.

Based on the above, no revisions to the text or tables are proposed. This issue is currently awaiting resolution pending the outcome of the Response to Comment Letter for the Draft Phase I RFI for SWMU 60 (Former Landfill at the Marina) dated September 25, 2009. Once this issue is resolved, the final response will be applied to this document. The Navy position is that no revisions to the text or tables are proposed.