Baker

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June 2, 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
Final Phase I RCRA Facility Investigation Report for SWMU 67

Dear Mr. Everett:

Michael Baker Jr., Inc. (Baker), on behalf of the Navy, is pleased to provide you with one hard copy of the replacement pages for the Draft Phase I RCRA Facility Investigation for SWMU 67, Naval Activity Puerto Rico for your review and approval. These replacement pages make up the Final Phase I RCRA Facility Investigation for SWMU 67. Directions for inserting the replacement pages into the Draft Phase I RCRA Facility Investigation for SWMU 67 are provided for your use. Also included with the copy of the replacement pages is one electronic copy provided on CD of the Final Phase I RCRA Facility Investigation for SWMU 67.

This report is being submitted in accordance with EPA comments dated February 24, 2011. 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. David Criswell at (843) 743-2130.

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. David Criswell, 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)
Ms. Bonnie Capito, NAVFAC Atlantic – Code EV42 (1 hard copy)
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 RESPONSES TO EPA COMMENTS DATED FEBRUARY 24, 2011
ON THE
DRAFT PHASE I RCRA FACILITY INVESTIGATION REPORT
SWMU 67 – FORMER GAS STATION
DATED OCTOBER 29, 2010

EPA COMMENTS

GENERAL COMMENTS

EPA General Comment 1: *EPA does not fully concur with the conclusions in Section 7.1 of the report that state that the results of the Phase I RFI investigations indicate that only surface soils and estuarine wetland sediments may have been impacted by releases. Furthermore, EPA does not fully concur with the conclusion (in Section 7.1 of the report), nor has the Navy demonstrated, that the exceedences of organic and inorganic constituents in the subsurface soils and groundwater "… are not characteristic of a release from a gas station and likely represent natural variation of soil and groundwater." EPA's basis for this is discussed below.*

In Section 6.4 of the report it is indicated that concentrations measured in the groundwater samples exceeded one or more screening criteria for the organic constituent naphthalene and for 4 inorganic constituents (copper, mercury, selenium, and vanadium). EPA notes that in fact, the report states in Section 6.4 that "Based on organic and inorganic exceedences, contamination in the groundwater has not been delineated." Therefore, the proposed Full RFI work plan should include investigations to fully characterize that groundwater contamination.

Navy Response to EPA General Comment 1: The Navy concurs with this comment. Section 7.1 – Conclusions and Section 7.2 Recommendations will be revised to read as follows:

7.1 Conclusions

The results of the Phase I RFI investigation for SWMU 67 indicate the presence of contaminants in surface soil, subsurface soil, groundwater and estuarine sediment. However, the extent of the identified contamination in these media has not been delineated. The following summarizes the findings of the Phase I RFI investigation by media:

- **Surface Soil** - VOCs, SVOCs (with LLPAHs) and TPH GRO were not detected at concentrations that exceeded screening criteria. TPH DRO exceeded screening criteria at one location approximately 125 feet southeast of the former gas station foundation. Arsenic, copper, lead, mercury, selenium and vanadium were detected in the surface soil at various locations at concentrations above both the applicable screening criteria and background.

- **Subsurface Soil** - VOCs, SVOCs (with LLPAHs), TPH GRO and TPH DRO were not detected at concentrations that exceeded screening criteria. Arsenic, cobalt, copper, lead, mercury, nickel, vanadium and zinc were detected in the subsurface soil at various locations at concentrations above both the applicable screening criteria and background.

- **Groundwater** – VOCs, TPH GRO and TPH DRO were not detected at concentrations

that exceeded the established screening criteria. One SVOC, naphthalene was detected in well 67SB07 at a concentration in excess of the regional tap water screening value; however, this sample was located side-gradient and approximately 200 feet south of the former gas station foundation. Dissolved copper, dissolved vanadium, total mercury and total selenium were detected at various locations at concentrations in excess of applicable screening criteria and background.

- **Fresh Surface Water** – VOCs, TPH GRO and TPH DRO were not detected in the fresh surface water sample. SVOCs were not detected at concentrations that exceeded the applied estuarine wetland surface water screening criteria. Dissolved barium, copper and vanadium, and total arsenic, copper and vanadium exceeded at least one of the estuarine wetland surface water screening criteria. No NAPR basewide fresh surface water background has been established.

- **Estuarine Sediment** – Detected concentrations of acetone and carbon disulfide exceeded the established screening criteria for estuarine sediment; no other VOCs exceeded the screening criteria. Benzo(a)pyrene and dibenz(a,h)anthracene exceeded the established screening criteria for estuarine sediment; no other SOVCs exceeded the screening criteria. TPH GRO and TPH DRO were not detected at concentrations exceeding the established screening criteria. Barium, cobalt, copper, lead, selenium, vanadium and zinc were detected at various locations at concentrations in excess of applicable screening criteria and background.

- **Freshwater Sediment** – Acetone was the only VOC detected in excess of established screening values. SVOCs were not detected at concentrations in excess of the established screening value. TPH GRO and TPH DRO were not detected at concentrations exceeding the established screening criteria. Metals were not detected above established screening criteria and background.

7.2 Recommendations

The results of the Phase I RFI investigation indicate the presence of contaminants at concentrations in excess of screening criteria and background in surface soil, subsurface soil, groundwater and estuarine sediment. A Full RFI Investigation is recommended to characterize the nature and extent of contamination in these media. Recommended analyses for these media include VOCs, SVOCs, TPH GRO, TPH DRO and metals. Additionally, characterization of the surface and shallow subsurface soil of the former parking/lay down area currently underlying the tennis courts should be considered.

EPA General Comment 2: *Furthermore, in Section 6.3 (Subsurface soils) of the report it is indicated that arsenic, cobalt, lead, mercury, nickel, vanadium, and zinc were detected at concentrations exceeding screening criteria, and that "…contamination may have occurred in the subsurface soil, although the source has not been determined." In addition, it is indicated in Section 6.3 that eight volatile organic constituents (VOCs) and 16 semi- volatile organic constituents (SVOCs) were also detected at low concentrations in the subsurface soils. Though the VOCs and SVOCs were all detected below screening criteria, their occurrence in the subsurface soils indicates past releases of these constituents have likely occurred from the former gas station operations or other Navy activities. Therefore, as part of the Full RFI required for this SWMU, the nature and extent of the indicated subsurface soil contamination must be fully characterized as regards both the 7 inorganic constituents detected above screening criteria and*

the 8 VOCs and 16 SVOCs detected in the subsurface soils, but at concentrations below applicable screening criteria.

Navy Response to EPA General Comment 2: The Navy only partially concurs with this comment. The screening criteria (including background) is the agreed upon decision criteria that is used in the Phase I RFI to determine the presence or absence of potential site contamination at environmentally significant concentrations. Typically, only exceedances of the screening criteria warrant further characterization. However, since subsurface soil requires further characterization with respect to the potential extent of metals contamination, VOCs, SVOCs, TPH GRO and TPH DRO will also be included in the list of analytes recommended for subsurface soil. Please refer to Navy Response to EPA General Comment 1.

EPA General Comment 3*: In addition, the discussion of estuarine wetland sediments in Section 7.1 of the report needs to be revised to indicate that the constituent lead was detected at sample 67SD01 at an estimated concentration of 134 mg/kg, exceeding both the ecological screening value and the base-wide background concentration.*

Navy Response to EPA General Comment 3: Section 7.1 – Conclusions has been revised to indicate that VOCs, LLPAHs and metals were detected at concentrations exceeding screening values and require further investigation. Please refer to Navy Response to EPA General Comment 1.

EPA General Comment 4: *Also, the discussion in Section 6.1.3 (Background Screening Values) needs to be expanded to discuss the applicability of the freshwater drainage ditch sediment background data set given in the July 2010 "Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds" to the estuarine wetland sediments at SWMU 67.*

Navy Response to EPA General Comment 4: The text has been revised to clarify that sediment samples 67SD01, 67SD02, 67SD04 and 67SD05 were screened against the estuarine wetland background sediment screening values, and 67SD03 was compared to the NAPR basewide background non-airfield freshwater drainage ditch sediment screening values. As such, Section 6.1.3 has been revised as follows:

> Note that the freshwater sediment sample (67SD03) was compared to the NAPR basewide background non-airfield freshwater drainage ditch sediment screening values. The other sediment samples (67SD01, 67SD02, 67SD04 and 67SD05) were compared to the estuarine wetland background sediment screening values.

The reference in Table 6-6 (page 3 of 4) has been revised to indicate the use of the NAPR basewide background estuarine sediment screening values. Table 6-7 has been revised to use the background screening values for freshwater non-airfield drainage ditch sediment. Since Table 6-7 has been revised, barium and cobalt are no longer detected at concentrations above basewide background for freshwater sediment. Therefore, Figure 6-9 was deleted from the report and the first paragraph as well as the second and third bullet relating to metals exceedances in Section 6.7 was revised as listed below:

> One freshwater sediment sample (67SD03) was collected from near a storm water outfall upgradient of the forested estuarine wetland boundary and analyzed for VOCs, SVOCs (with LLPAHs), TPH DRO/GRO, total metals, and TOC as outlined on Table 4-1. The detected results for the sediment sample data set are provided in Table 6-6 as compared to non-airfield background freshwater drainage ditch sediment (see Section 6.1.3), while the complete data set is provided in Appendix C. Figure 6-8 presents the location of detected organic compounds above the human health and/or ecological screening values.

EPA General Comment 5: *At that same time, please also submit a Draft Work Plan for implementing a Full RFI which will: a) fully characterize the nature and extent of the indicated releases to the surface soils and estuarine wetland sediments (as indicated in Section 7.2 of the report); b) fully characterize the nature and extent of the indicated releases to groundwater (as described in Section 6.4 of the report); c) fully characterize the nature and extent of subsurface soil contamination as regards both the 7 inorganic constituents detected above screening criteria and the 8 VOCs and 16 SVOCs detected in the subsurface soils at concentrations below screening criteria (as described in Section 6.3 of the report); and d) determine whether releases have impacted the former parking/lay down area currently underlying the tennis courts, located adjacent to the south side of SWMU 67, as discussed in Section 7.2 of the report.*

Navy Response to EPA General Comment 5: The Navy agrees with this comment and will submit a Draft Full RFI Work Plan that encompasses the activities discussed in the comment. However, as a result of the Full RFI work recently being awarded to a different contractor, the Navy has requested a schedule extension for the submittal of the Full RFI Work Plan (letter dated May 26, 2011from the Navy to EPA). The revised submittal date of the Draft Full RFI Work Plan for SWMU 67 is October 31, 2011.

PAGE-SPECIFIC COMMENTS

PREQB Comment 1: *Page 4-1, Section 4.0:* *Please revise the bullet discussing sediment samples to show four samples were collected from the adjacent estuarine wetland community and one sample was collected from the adjacent freshwater wetland community, as shown in Section 1.2 and summarized on Table 4-1.*

Navy Response to PREQB Comment 1: The bullet in Section 4.0, Page 4-1 discussing sediment samples has been revised as follows:

- Five sediment samples were collected. Four sediment samples were collected from the adjacent estuarine wetland, and one sediment sample was collected from the adjacent freshwater wetland.

PREQB Comment 2: *Page 4-2, Section 4.2, Paragraph 4:*

a. *Please add the depth interval 7 to 9 in the list of second interval samples collected. This depth interval was collected at 67SB03-04.*

Navy Response to PREQB Comment 2a: The text has been revised to add the interval of 7 to 9 to the list of the second interval samples collected. The third sentence of the fourth paragraph of Section 4.2 has been revised as follows:

> Since impacts were not evident based on the PID, olfactory or visual screening, one sample was collected in the shallow subsurface from the 1 to 3 foot interval bgs and the second sample was collected above the anticipated water table interface from either the 3 to 5, 5 to 7, 7 to 9, or 9 to 11 foot interval bgs.

b. *Please clarify if each depth interval was preserved for VOCs and GRO immediately after cutting the liner and screening the sample or if samples were preserved when the desired depth interval for analysis was selected.*

Navy Response to PREQB Comment 2b: The fourth sentence of the fourth paragraph of Section 4.2 has been revised as follows:

The samples were transferred directly into pre-labeled, laboratory provided sample jars (using a Terra Core transfer tool to the VOA vial), immediately after cutting the liner and screening the sample.

PREQB Comment 3: *Page 4-5, Section 4.5: The report states that the reclassification of the samples collected from the drainage ditch from an upland area to an estuarine wetland community type necessitated redesignating the drainage ditch samples from surface soil samples to sediment samples. It should be noted that this redesignation may not be warranted simply because a sample was collected from a wetland. Wetlands may also contain soils (with hydric characteristics) as well as sediment. The important feature that should be considered is whether the sampling locations may support organisms (e.g., aquatic macrobenthic invertebrates) typically associated with an aquatic community rather than a terrestrial community. The report subsequently states that the sample collected at the culvert outfall location does not represent an aquatic habitat that would support macrobenthic invertebrates. Therefore, for this sample (and perhaps the remaining samples depending on their characteristics), surface soil screening benchmarks should be used to evaluate potential effects on terrestrial organisms and/or estuarine sediment guidelines used if evaluating potential impacts from transport of sediment from this area into downgradient estuarine wetlands providing aquatic habitat.*

Navy Response to PREQB Comment 3: The Navy concurs with this comment; the SWMU 67 sediment samples have been designated appropriately. With regard to sediment samples 67SD01, 67SD02, 67SD03, 67SD04, and 67SD05, the fifth paragraph of Section 4.5 has been revised as follows:

> Reclassification of upland habitat to the E2F03 wetland community type necessitates redesignating the proposed drainage ditch surface soil samples (67SS01, 67SS02, 67SS03, 67SS04, and 67SS05) as sediment samples (67SD01, 67SD02, 67SD03, 67SD04, and 67SD05) as the areas where these samples were collected have the ability to support lower trophic level receptors, such as benthic macroinvertebrates, fish, or amphibians.

The report stated that the sample collected at the culvert outfall location (67SW03 and 67SD03) does not represent an aquatic habitat that would support benthic macroinvertebrates. The text has been revised to state that these sample locations represent an aquatic habitat that has the potential to support benthic macroinvertebrates. Also, this section discusses, as indicated below that the source where the pool of water is located is a freshwater source, not an estuarine wetland source. The second paragraph of Section 4.6 has been revised as indicated below.

> There were no other areas within SWMU 67 or the E2FO3 wetland with standing water that warranted the collection of additional surface water samples. The small pool represents an intermittent aquatic habitat that has the potential to support lower trophic level receptors such as benthic macroinvertebrates, fish, or amphibians. However, it is important to note the location where surface water sample 67SW03 and sediment sample 67SD03 was collected originates from a culvert that is draining from upgradient sources (predominately precipitation and related runoff) into a depression forming the pool of water, therefore is classified as a freshwater source.

PREQB Comment 4: *Page 5-2, Section 5.2.2: Please add a discussion of the depth to groundwater across the site.*

Navy Response to PREQB Comment 4: The text in Section 5.2.2 has been revised to add a discussion of the depth to groundwater across the site, as follows:

> The depth to groundwater ranges between approximately 13 feet bgs (well 67SB08) in the

western portion of SMWU 67 to approximately seven feet bgs in the north central portion (67SB02). Groundwater is anticipated to be shallower in the northeast portion of SWMU 67 as the ground surface slopes toward the estuarine wetland.

PREQB Comment 5: *Page 6-1, Section 6.1.1 and 6.1.1.2: Please include PREQB's Water Quality Standards Regulation (March 2010) as applicable criteria for groundwater.*

Navy Response to PREQB Comment 5: Section 6.1 has been revised as follows to incorporate reference to the PREQB Water Quality Standards:

> Applicable human health criteria for soils include USEPA Regional Industrial Screening Levels (SLs) and USEPA Regional Residential SLs (USEPA, 2010), while applicable human health criteria for groundwater are USEPA Regional Tap Water SLs, Federal Drinking Water Maximum Contaminant Levels (MCLs) (USEPA, 2010a), and the Puerto Rico Water Quality Standards (PRWQS) (PREQB, 2010). TPH GRO/DRO results will be screened using the PREQB guideline standard of 100 mg/kg for soil and 50 µg/L for groundwater.

In addition, a new section (Section 6.1.1.3 - Puerto Rico Water Quality Standards) has been added to discuss use of the PRWQS as human health screening criteria for groundwater:

> Section 6.1.1.3 Puerto Rico Water Quality Standards (PRWQS)
>
> PRWQS are regulations designed to enhance maintain and preserve the quality of the waters of Puerto Rico. Rule 1303 establishes water quality standards and use classifications promulgated for the protection of the uses assigned to the classifications of the coastal, surface, estuarine, wetlands, and ground waters of the Commonwealth. In Rules 1303.1 (I) (1) through 1303.1 (I) (5) specific substances are identified for which numeric water quality standards have been established (PREQB, 2010).
>
> Puerto Rico Water Quality Standards for Class SG (groundwater intended for use as a source of drinking water supply and agricultural uses including irrigation) listed in the PRWQS regulation amended March 31, 2010 are also included as groundwater screening values. PRWQS values will be used in place of the Federal Drinking Water Quality Standards, when more stringent.

In addition, the acronym PRWQS was added to the List of Acronyms and Abbreviations and the following reference was added to Section 8.0:

> PREQB, 2010, Puerto Rico Water Quality Standards Regulation. Puerto Rico Environmental Quality Board. http://www.gobierno.pr/NR/rdonlyres/B1978466-1AA0-4E48-899A-48D50311D7DF/0/Water_Quality_Standards_Reg_2010.pdf.

PREQB Comment 6: *Page 6-3, Section 6.1.2.2: Surface water screening values are proposed for evaluating constituents detected in surface water samples at the site. Please include the SB aquatic life criteria presented in the Puerto Rico Water Quality Standards (March 2010) as the preferential screening benchmark source. This would include the following metals (expressed as total recoverable concentrations): cadmium, copper, lead, nickel, selenium, silver and zinc. Please revise Table 6-3 accordingly citing this source and revising the screening values where appropriate.*

Navy Response to PREQB Comment 6: Section 6.1.2.2 has been revised to indicate that Puerto Rico Water Quality Standards for Class SB coastal and estuarine waters were preferentially used as

groundwater screening values for ecological receptors. Specifically, Section 6.1.2.2 has been revised as follows:

6.1.2.2 Groundwater Screening Values

As discussed in Section 5.2.2, the groundwater flow direction at SWMU 67 is east toward an estuarine wetland system comprised of E2FO3 and E2SS3 wetland units. Because this estuarine wetland system represents a potential discharge point for SWMU 67 groundwater, the available groundwater data, collected during the March 2010 field investigation, were screened against saltwater toxicological thresholds. PRWQS for Class SB coastal and estuarine waters listed in the Puerto Rico Water Quality Standards Regulation (PRWQSR) dated March 31, 2010 (PREQB, 2010) were preferentially used as ground water screening values for ecological receptors. PRWQS for Class SB coastal and estuarine waters were selected based on the classifications contained within Rule 1302.1 of the PRWQSR. For those chemicals lacking PRWQS for Class SB coastal and estuarine waters, groundwater screening values were identified from the following information listed in their order of decreasing preference:

- Chronic saltwater National Ambient Water Quality Criteria (NAWQC) (USEPA, 2009a)
- Final Chronic Values (FCVs) for saltwater contained in ECO Update Volume 3, Number 2 (USEPA, 1996)
- USEPA Region 4 chronic screening values for saltwater contained in Ecological Risk Assessment Bulletins – Supplement to Risk Assessment Guidance for Superfund (RAGS) (USEPA 2001)
- Minimum chronic toxicity test endpoints (No Observed Effect Concentration [NOEC], No Observed Effect Level [NOEL], and Maximum Acceptable Toxicant Concentration [MATC] values) for marine species reported in the ECOTOX Database System (USEPA, 2007a)
- Chronic Lowest Observable Effect Levels (LOELs) for saltwater contained in National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRTs) (Buchman, 2008) with a safety factor of 10 (Wentsel et al., 1996)

The order of preference was selected based on their level of protection. For example NAWQC and FCVs would be expected to offer a greater degree of protection than a single species NOEC, MATC, or LOEL since their derivation considers a larger toxicological database. In the absence of the above-mentioned NAWQC, FCVs, USEPA Region 4 chronic screening values, chronic test endpoints (NOECs, NOELs, and MATCs), and chronic LOELs, screening values were derived from the literature-based acute saltwater values listed below:

- Acute LOELs for saltwater contained in NOAA SQUIRTs (Buchman, 2008)
- Acute toxicity test endpoints (NOEC, NOEL, LOEL, Lowest Observed Effect Concentration [LOEC], median lethal concentration [LC_{50}], and median effective concentration [EC_{50}] values) for marine species contained in the ECOTOX Database System (USEPA, 2007a)

- LC_{50} values for marine species contained in Superfund Chemical Matrix (USEPA, 2004)

Chronic-based screening values were extrapolated from acute NOEC, NOEL, LOEC, LOEL, LC_{50}, and EC_{50} values as follows:

- A safety factor of 30 was used to convert an acute NOEC or NOEL a chronic-based screening value (Wentsel et al., 1996)

- A safety factor of 50 was used to convert an Acute LOEC or LOEL to a chronic-based screening value (Wentsel et al., 1996)

- A safety factor of 100 was used to convert an EC_{50} or LC_{50} to a chronic-based screening value (Wentsel et al., 1996)

When acute toxicity data were used to extrapolate a chronic screening value, NOECs/NOELs were given preference over LOECs/LOELs, LOECs/LOELs were given preference over LC_{50} and EC_{50} values, and EC_{50} values were given preference over LC_{50} values. When more than one value was available from the literature for a given test endpoint (e.g., NOEC), the minimum value was conservatively used to extrapolate a chronic screening value.

The screening values selected for arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc are PRWQS for Class SB coastal and estuarine waters, while the screening value selected for mercury is a USEPA saltwater NAWQC (i.e., continuous criteria concentrations [CCC]). Although PRWQS for all metals are expressed only as total recoverable concentrations, USEPA saltwater CCC values for many metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc, can be expressed as total recoverable or dissolved concentrations (USEPA, 2009a).

Because the SWMU 67 groundwater samples were analyzed for total recoverable and dissolved metals, USEPA saltwater NAWQC for arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc, expressed as dissolved concentrations, were used as dissolved groundwater screening values for these nine metals.

Total recoverable screening values were conservatively used to screen the dissolved analytical data for those metals lacking screening values expressed as dissolved concentrations (i.e., antimony, barium, beryllium, cobalt, silver, thallium, tin, and vanadium).

For those chemicals lacking saltwater toxicological thresholds and literature values, groundwater screening values were identified or developed from freshwater values using the sources and procedures discussed in Section 6.1.2.3.

In addition to text changes in Section 6.1.2.2, Table 6-3 has been revised to reflect the use of PRWQS for Class SB coastal and estuarine waters as groundwater screening values.

PREQB Comment 7: *<u>Page 6-5, Section 6.1.2.3:</u> Surface water screening values are proposed for evaluating constituents detected in surface water samples at the site. Please include the aquatic life*

criteria presented in the Puerto Rico Water Quality Standards (March 2010) as the preferential screening benchmark source.

Navy Response to PREQB Comment 7: Section 6.1.2.3 has been revised to indicate that Puerto Rico Water Quality Standards for Class SD surface waters were preferentially uses as surface water screening values. Specifically, Section 6.1.2.3 has been revised as follows:

> PRWQS for Class SD surface waters listed in the PRWQS dated March 31, 2010 (PREQB, 2010) were preferentially selected as surface water screening values. PRWQS for Class SD surface waters were selected based on the classifications contained within Rule 1302.2 of the PRWQSR. For those chemicals lacking a freshwater PRWQS for Class SD surface waters, screening values were identified from the following information listed in their order of decreasing preference:
>
> - Chronic freshwater NAWQC (USEPA, 2009a)
> - Final Chronic Values (FCVs) for freshwater contained in ECO Update Volume 3, Number 2 (USEPA, 1996).
> - USEPA Region 4 chronic screening values for freshwater contained in Ecological Risk Assessment Bulletins – Supplement to RAGS (USEPA, 2001) and USEPA Region 5 ecological screening levels (ESLs) (http://www.epa.gov/reg5rcra/ca/ESL.pdf) (USEPA, 2003).
> - Minimum chronic toxicity test endpoints (NOEC, NOEL, and MATC values based on reproduction, growth, or survival) for freshwater species reported in the ECOTOX Database System (USEPA, 2007a).
> - Great Lakes basin Tier II SCVs listed in the Great Lakes Initiative Toxicity Data Clearinghouse (http://www.epa.gov/gliclearinghouse/) (USEPA, 2010b).
> - Chronic LOELs for freshwater species contained in NOAA SQUIRTs (Buchman, 2008) with a safety factor of 10 (Wentsel et al., 1996).
>
> The order of preference was selected based on their level of protection. For example NAWQC and FCVs would be expected to offer a greater degree of protection than a single species NOEC, NOEL, MATC, or LOEL value since their derivation considers a larger toxicological database. It is noted that USEPA Region 4 and Region 5 screening values were given equal preference. When a value was available from both sources, the minimum value was selected as the surface water screening value. In the absence of the above-mentioned freshwater FCVs, freshwater USEPA Region 4 and Region 5 screening values, freshwater chronic test endpoints (NOECs, NOELs, and MATCs), and freshwater chronic LOELs screening values were derived from the acute literature-based freshwater values listed below:
>
> - Acute LOELs for freshwater contained in NOAA SQUIRTs (Buchman, 2008).
> - Acute toxicity test endpoints (NOEC, NOEL, LOEL, LOEC, LC_{50}, and EC_{50}) values for freshwater species contained in the ECOTOX Database System (USEPA, 2007a).

- LC_{50} values for freshwater species contained in Superfund Chemical Matrix (USEPA, 2004).

Chronic-based screening values were extrapolated from acute NOEC, NOEL, LOEC, LOEL, LC_{50}, and EC_{50} values using the following safety factors:

- A safety factor of 30 was used to convert an acute NOEC or NOEL to a chronic-based screening value (Wentsel et al., 1996).

- A safety factor of 50 was used to convert an acute LOEC or LOEL to a chronic-based screening value (Wentsel et al., 1996).

- A safety factor of 100 was used to convert an EC_{50} or LC_{50} to a chronic-based screening value (Wentsel et al., 1996).

When acute toxicity data were used to extrapolate a chronic screening value, NOECs/NOELs were given preference over LOECs/LOELs, LOECs/LOELs were given preference over LC_{50} and EC_{50} values, and EC_{50} values were given preference over LC_{50} values. When more than one value was available from the literature for a given test endpoint (e.g., NOEC), the minimum value was conservatively used to extrapolate a chronic screening value.

The total recoverable screening values selected for cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc are PRWQS for Class SD surface waters. In addition the screening value selected for beryllium is a Great Lakes Basin Tier II chronic criterion (i.e., SCV) developed by the Ohio Environmental Protection Agency (OEPA). The screening values for these eight metals are expressed as total recoverable concentrations. PRWQS for cadmium, chromium, copper, lead, nickel, silver, and zinc, as well as the OEPA SCV for beryllium are further expressed as a function of water hardness (PREQB, 2010 and USEPA, 2009b). A hardness-dependent, total recoverable SCV for beryllium and hardness-dependent, total recoverable PRWQS for cadmium, chromium, copper, lead, nickel, silver, and zinc were derived for use as surface water screening values using the following regression equations (PREQB, 2010 and USEPA 2009b):

- Beryllium: exp[2.528(*ln* hardness)-10.77]
- Cadmium: exp[0.7409(*ln* hardness)-4.719]
- Chromium: exp[0.8191(*ln* hardness)+0.6848]
- Copper: exp[0.8545(*ln* hardness)-1.702]
- Lead: exp[1.273(*ln* hardness)-4.705]
- Nickel: exp[0.8460(*ln* hardness)+0.0584]
- Silver: exp[1.72(*ln* hardness)-6.59]
- Zinc: exp[0.8473(*ln* hardness)+0.884]

In these equations, hardness concentrations are expressed in units of mg/L as calcium carbonate ($CaCO_3$). The Water Resources Division of the United States Geological Survey (USGS), in cooperation with local and Federal agencies, obtains data pertaining to the water resources of Puerto Rico each year. Data are available in the National Water Information System water quality database available at http://waterdata.usgs.gov/nwis. A USGS monitoring station (i.e., 50071000) has been identified within a stream located approximately 4 miles northwest of NAPR. From February 21, 1961 to August 10, 2004, a total of 231 hardness measurements were

taken at this station. Hardness concentrations ranged from 4 mg/L to 61 mg/L as $CaCO_3$, with an arithmetic mean concentration of 32.2 mg/L as $CaCO_3$, a 95 percent lower confidence limit (LCL) of the mean concentration of 31.35 mg/L as $CaCO_3$ (derived using Scout Version 1.00.1 software [USEPA, 2008]), and a 95 percent upper confidence limit (UCL) of the mean concentration of 32.86 mg/L $CaCO_3$ (derived using USEPA ProUCL Version 4.00.02 software [USEPA, 2007b]). Because NAPR and USGS monitoring station 50071000 are located within the same hydrologic unit (21010005), hardness data for the USGS monitoring station will represent reasonable estimates of surface water hardness within the drainage ditch. Therefore, the 95 percent LCL concentration (i.e., 31.35 mg/L as $CaCO_3$) will be used to derive the surface water screening values for beryllium, cadmium, chromium, copper, lead, nickel, silver, and zinc.

The screening values selected for arsenic and mercury are USEPA freshwater NAWQC (i.e. criteria continuous concentrations [CCC]). The CCC values for these two metals are expressed as dissolved concentrations (USEPA, 2009a). Total recoverable CCC values for arsenic and mercury were derived for use as surface water screening values by dividing the dissolved CCC values (150 µg/L and 0.77 µg/L, respectively) by the following freshwater conversation factors (USEPA, 2009):

- Arsenic: 1.000
- Mercury: 0.850

Because surface water samples collected as SWMU 67 were analyzed for total recoverable and dissolved metals, dissolved screening values also were identified from the literature. PRWQS expressed in terms of the dissolved metal in the water column are not available from the PRWQSR. The PRWQSR has adopted USEPA total recoverable NAWQC as PRWQS for cadmium, chromium, copper, lead, nickel, silver, selenium, and zinc (the PRWQSR hardness-dependent regression equations for these eight metals are identical to the hardness-dependent regression equations contained in National Recommended Water Quality Criteria [USEPA 2009a]). Therefore, dissolved screening values for these eight metals were derived by multiplying the total recoverable PRWQS (based on a water hardness of 31.35 mg/L as $CaCO_3$) by the USEPA freshwater conversion factors listed below (USEPA, 2009a):

- Cadmium: 1.101672 – [(*ln* hardness)(0.0418380)]
- Chromium: 0.860 (conversion factor for trivalent chromium)
- Copper: 0.960
- Lead: 1.46203 – [(*ln* hardness)(0.145712)]
- Nickel: 0.998
- Selenium: 0.922
- Silver: 0.850
- Zinc: 0.986

It is noted that total recoverable screening values were conservatively used to screen dissolved analytical data for those metals lacking screening values expressed as dissolved concentrations (i.e., antimony, barium, beryllium, cobalt, silver, thallium, tin, and vanadium).

For those chemicals lacking freshwater toxicological thresholds and literature values from the sources listed and described above, surface water screening values were identified or developed from saltwater values using the sources and procedures discussed in Section 6.1.2.2."

In addition to the text changes in Section 6.1.2.3, Table 6-4 has been revised to reflect the use of PRWQS for Class SD surface waters.

PREQB Comment 8: *Page 6-16, Section 6.5: The text incorrectly refers to "groundwater" samples several times in this section. Please correct to "surface water" samples.*

Navy Response to PREQB Comment 8: The fifth and sixth paragraphs of Section 6.5 have been revised as follows:

> Ten dissolved metals were detected in the surface water samples. Three exceeded one of the criteria including:
>
> - Barium (exceeded background screening criteria)
> - Copper (exceeded ecological surface water screening criteria)
> - Vanadium (exceeded regional tap water screening levels)
>
> Eleven total metals were detected in the surface water samples. Three exceeded one of the criteria including:
>
> - Arsenic (exceeded regional tap water screening levels)
> - Copper (exceeded ecological surface water screening criteria)
> - Vanadium (exceeded regional tap water screening levels)

PREQB Comment 9: *Page 6-12, Section 6.2:*

a. *Paragraph 2: The text states that VOCs were detected at low, estimated concentrations. However, this is not accurate for some of the acetone and 2-butanone concentrations which were not low or estimated. Please revise the text accordingly.*

Navy Response to PREQB Comment 9a: Although not estimated concentrations (i.e., flagged with a "J" qualifier), the reported concentrations of 2-butanone (ranging between 12 and 19 µg/kg) and acetone (ranging between 63 and 240 µg/kg) are low compared to their Residential and Industrial Regional Screening Levels of 2,800,000 and 20,000,000 µg/kg and 6,100,000 and 63,000,000 µg/kg, respectively. However, the second paragraph of Section 6.2 has been revised as follows:

> Nine VOCs (2-butanone [MEK], acetone, benzene, carbon disulfide, chloroform, chloromethane, methyl iodide, methylene chloride, and m&p-xylene) were detected in the surface soil at low concentrations. Note that 2-butanone [MEK] and acetone are known laboratory contaminants.

b. *Paragraph 3: Please revise the text to state that seventeen (not 19) SVOCs were detected in the surface soil,*

Navy Response to PREQB Comment 9b: The first sentence of the third paragraph of Section 6.2 has been revised as follows:

> Seventeen SVOCs (with LLPAHs) were detected in the surface soil at SWMU 67; none exceeded the screening criteria.

c. *Paragraph 6: Please clarify that the cobalt concentrations were exceedances of residential RSLs.*

Navy Response to PREQB Comment 9c: The text has been revised to clarify cobalt concentration exceedances of residential RSLs. The fifth sentence of the sixth paragraph of Section 6.2 has been revised as follows:

> Cobalt exceeded the residential SL at all locations; the industrial SL at only one location; and the selected ecological soil screening value at seven of eight surface soil sample locations (excluding 67SB08-00).

PREQB Comment 10: *Page 6-13, Section 6.3, Paragraph 2: The text states that VOCs were detected at low, estimated concentrations. However, this is not accurate for some of the acetone and carbon disulfide concentrations which were not low or estimated. Please revise the text accordingly.*

Navy Response to PREQB Comment 10: Although not estimated concentrations (i.e., flagged with a "J" qualifier), the reported concentrations of acetone (ranging between 29 and 150 µg/kg) and carbon disulfide (one reported concentration of 5 µg/kg) are low when compared to the Residential and Industrial Regional Screening Levels of 6,100,000 and 63,000,000 µg/kg and 82,000 and 370,000 µg/kg, respectively. However, the second paragraph of Section 6.3 has been revised as follows:

> Eight VOCs (2-butanone[MEK], 2-hexanone[MBK], acetone, benzene, carbon disulfide, chloromethane, methyl iodide, and m&p-xylene) were detected in the subsurface soil at low, concentrations, well below the listed criteria. Note that acetone and carbon disulfide are known laboratory contaminants.

PREQB Comment 11: *Page 6-16, Section 6.4:*

a. *Please revise the text to state the ecological groundwater screening criteria were exceeded for vanadium in five (not six) groundwater samples.*

Navy Response to PREQB Comment 11a: As shown on Table 6-3, total vanadium exceeded the ecological groundwater screening criteria in six of the eight groundwater samples (67GW01, 67GW03, 67GW04, 67GW06, 67GW07 and 67GW08) plus the duplicate sample (67GW08D). The last sentence of the eighth paragraph of Section 6.4 has been revised as indicated by this comment:

> The ecological groundwater screening value for total vanadium was exceeded in six groundwater samples (plus the duplicate sample 67GW08D); the regional tap water SL for total vanadium was exceeded in all eight groundwater samples.

b. *Please revise the text to state that vanadium exceeded the regional tap water SLs in three (not two) samples: 67GW0l, 67GW02 and 67GW05.*

Navy Response to PREQB Comment 11b: See Navy response to PREQB Comment 11a (above).

PREQB Comment 12: *Page 6-18, Section 6.7:*

a. *Paragraph 2: Please revise the text to state that five (not four) VOCs were detected and include m&p-xylenes in the list of detected VOCs.*

Navy Response to PREQB Comment 12a: The first sentence of the second paragraph of Section 6.7 has been revised as indicated by this comment:

> Analysis resulted in the detection of five volatiles (2-butanone, acetone, carbon disulfide, methyl iodide, and m&p-xylene).

b. Bullet #5: Revise the bullet to state that vanadium exceeded the regional screening levels for both residential and industrial soil in addition to the ecological criteria.

Navy Response to PREQB Comment 12b: The fifth bullet of Section 6.7 has been revised as indicated by this comment:

- Vanadium exceeded the selected ecological sediment screening value and regional screening levels for residential and industrial soil

PREQB Comment 13: *Page 7-1, Section 7.1:*

a. In the second bullet, please clarify that lead exceeded its screening criterion at 67SD01.

Navy Response to PREQB Comment 13a: The text has been revised as indicated in the Navy response to EPA General Comment 1 to state that lead as well as barium, cobalt, copper, selenium vanadium and zinc were detected at concentrations above screening criteria.

b. Please clarify if metals exceeding background and screening criteria will be included as chemicals of potential concern for the Full RFI investigation. This section seems to indicate that metals other than lead are not site-related and attributable to background, yet concentrations exceeded background. Please include those metals that exceeded both background and screening criteria as COPCs for the Full RFI investigation or provide further supporting documentation/discussion to support eliminating them from further investigation.

Navy Response to PREQB Comment 13b: Metals analysis recommended for the Full RFI will include the Full Appendix IX list of metals.

PREQB Comment 14: *Table 4-1:*

a. Please include the units for the sample depth in the table.

Navy Response to PREQB Comment 14a: Table 4-1 has been revised to include the units for the sample depths.

b. The second subsurface soil sample collected at 67SB03 is listed on the table as 67SB03-04. However, the boring log provided in Appendix B shows this should be 67SB03-03. Please clarify.

Navy Response to PREQB Comment 14b: The correct designation for the second subsurface soil sample collected at location 67SB03 is 67SB03-04 as listed in Tables 4-1 and 6-2 and on page 92 of Robert Roselius' log book provided in Appendix B. The boring log for location 67SB03 has been revised accordingly.

c. Revise the sample date for subsurface soil samples collected at 67SB08 to 3/22/10.

Navy Response to PREQB Comment 14c: Table 4-1 has been revised to reflect the correct date of sample collection.

d. The sample depths for the estuarine sediments are listed as 0-0.25 ft bgs.
However, according to the field log book notes by Adam Gailey in Appendix B, the depth interval is 0-0.5 ft bgs. Please clarify.

Navy Response to PREQB Comment 14d: The sample depth interval for estuarine sediment was 0-0.5

feet bgs as stated in Adam Gailey's log book. Table 4-1 has been revised to reflect the correct sample depth interval.

PREQB Comment 15: *Table 4-2:*

a. Please revise the sample date for equipment rinsate blank 67ER03 to 3/24/10.

Navy Response to PREQB Comment 15a: Table 4-2 has been revised to reflect the current date of sample collection.

b. According to Section 4.9 and Appendix C, the solid IDW samples were analyzed for TCLP VOCs and TCLP metals, not Appendix IX VOCs and Appendix IX metals, as indicated on this table. Please revise.

Navy Response to PREQB Comment 15b: Table 4-2 has been revised to indicate that the solid IDW samples were analyzed for TCLP VOCs and TCLP metals, not Appendix IX VOCs and Appendix IX metals.

PREQB Comment 16: *Table 4-3:*

a. *Please revise the units for the soil quantitation limits for metals from ug/L to mg/kg.*

Navy Response to PREQB Comment 16a: Table 4-3 has been revised to change the soil quantitation limits for metals form ug/L to mg/kg.

b. *Please revise the method description for all metals except mercury and tin to ICP/MS.*

Navy Response to PREQB Comment 16b: Table 4-3 has been revised to edit the method description for all metals except mercury and tin to 6020A ICP/MS.

c. *Please revise the method number for tin to 6010B, as per the data validation reports in Appendix D.*

Navy Response to PREQB Comment 16c: Table 4-3 has been revised to edit the method number for tin to 6010B.

d. *Please revise the method numbers for all TCLP VOCs to 1311/8260B.*

Navy Response to PREQB Comment 16d: Table 4-3 has been revised to edit the method numbers for all TCLP VOCs to 1311/8260B.

e. *Please revise the preparation method number for TCLP VOCs in soil to 1311/5030B.*

Navy Response to PREQB Comment 16e: Table 4-3 has been revised to edit the method number for TCLP VOCs in soil to be 1311/5030B.

f. *Please revise the method description for TCLP VOCs to GC/MS.*

Navy Response to PREQB Comment 16f: Table 4-3 has been revised to edit the method description for TCLP VOCs to be GC/MS.

Appendix B, Field Log Book Notes

PREQB Field Log Comment 1: *Adam Gailey notes, 3/28/10, Page 80: The locations of 67SD01 and 67SD02 on the figure drawn in the field logbook are reversed on Figure 4-1 and Figures 6-1 through 6-9. Please clarify and revise as needed.*

Navy Response to PREQB Field Log Comment 1: The locations of 67SD01 and 67SD02 on the figure in Adam Gailey's logbook on page 80 were inadvertently mislabeled. The correct locations of 67SD01 and 67SD02 are as shown on Figure 4-12 and Figures 6-1 through 6-9 (as verified by the GPS files).

PREQB Field Log Comment 2: *Robert Roselius notes, 3/21/10, page 75: The collection of sample 67SB08 is detailed on this page of the field notes. However, in four different locations on this page, the sample is referred to as 57SB08. Please revise.*

Navy Response to PREQB Field Log Comment 2: Page 75 of the logbook has been revised to edit entry error of 57SB08 to the correct entry of 67SB08 in four locations on this page.

Appendix B, Chain-of-Custody Forms

PREQB Chain-of-Custody Comment 1: *According to the chains-of-custody, soil samples for GRO analysis were collected in one jar with no preservative. According to the analytical method (SW-846 5035/8015B) and Chapter 4 of SW-846, these samples should be collected in preservative similar to VOC soil samples since GRO is a volatile parameter. Without the preservation, sample results are not reliable and should not be used for decision making purposes. Please explain why these samples were not preserved and revise all tables and validation reports to qualify these data as rejected due to the lack of preservation, as per EPA Region 2 VOC validation guidelines.*

Navy Response to PREQB Chain-of-Custody Comment 1: The laboratory provided 2 oz and 4 oz jars for collection of samples for GRO determination consistent with SW846 Method 5035, Section 6.2.3 and the approved quantitation limit of 250 mg/kg for "high concentration" samples. Based on an internal evaluation after receipt of the samples, the laboratory determined that the samples were not "high concentration." Consequently, SW846 Method 5030B (Section 6.2.1) was used for sample preparation to achieve lower quantitation limits.

Application of the criteria for 5030B, as stated in section 6.2 indicates that samples have a 14 day holding time from sampling to analysis. All samples analyzed by the laboratory for this project met the 14 day holding time indicated in the method. Consequently, the sample collection and preservation for GRO is appropriate and acceptable according to the referenced method and the resulting data, as qualified by the validator, acceptably meets the project objectives.

Reference:
Method 5035 - Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/5035.pdf. USEPA. December 1996.

Appendix C, Laboratory Analytical Results

PREQB Lab Analytical Comment 1: *Please explain why the quantitation limits for SVOCs are much higher than those provided in Table 4-3. Table 4-3 indicates that a low-level SVOC method will he performed but these quantitation limits are much higher.*

Navy Response to PREQB Lab Analytical Comment 1: The quantitation limits reported for this project (specifically surface soil and subsurface soil SVOCs) are higher than the quantitation limits provided in Table 4-3 because the samples were diluted due internal standard issues with the laboratory equipment and/or appearance of the sample extract, thus raising the quantitation reporting limits.