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

NOV 24 1998

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Mr. Paul A. Rakowski, P.E., DEE  
Head  
Environmental Program Branch  
Environmental Division  
Atlantic Division (LANTDIV), Code 182  
Naval Facilities Engineering Command  
1510 Gilbert Street  
Norfolk, VA 23511-2699

Re: Naval Station Roosevelt Roads - EPA ID # PR2170027203

EPA Comments on Draft RCRA Facility Investigation Report for Operable Units 3 (SWMUs 1 & 2) and 5 (SWMU 11/45), and Request for Corrective Measures Studies at SWMUs 1, 2, and 45.

Dear Mr. Rakowski:

The United States Environmental Protection Agency (EPA) Region 2 has completed its review of the Draft RCRA Facility Investigation Report for Operable Units ("OUs") 3 & 5 ("the Draft Report"), dated March 20, 1998, submitted on the Navy's behalf by your contractor, Baker Environmental, Inc.. EPA considers the final decision on both of the OU 3 SWMUs (#1 and #2) as being particularly significant for the following reasons:

- \* both are large unlined landfills which are either directly adjacent to human habitation (the "Navy Lodge"), or in close proximity to that human habitation and other intensive human activity (the Base Commissary and Exchange Buildings, which include stores and restaurants visited daily by large numbers of people, including both adults and to a lesser extent children);
- \* both are directly adjacent to or even partially within sensitive environmental areas (the mangroves and surface waters of Ensenada Honda);
- \* neither SWMU has undergone RCRA or any other "closure"; and
- \* the precise areal extents and types of wastes involved at both SWMUs are poorly defined.

Likewise, because of its size, complexity, and documentation of significant environmental releases (though some have already been remediated through Interim Remedial Measures), EPA views the final decision on the OU 5 SWMUs (#11/45) as also most significant.

As you are probably aware, as part of its review process for the Draft Report, EPA has previously transmitted to Mr. Chris Penny of your staff preliminary draft comments on the Draft Report prepared by our contractor TechLaw, Inc. (reference June 1, 1998 Evaluation of Draft RCRA Facility Investigation Report) and the May 28, 1998 comments prepared by the Puerto Rico Environmental Quality Board (PREQB). Likewise, as part of the review process, Mr. Penny has provided preliminary draft responses to those TechLaw and EQB comments. After evaluating Mr. Penny's preliminary draft responses, EPA has concluded that it is not prepared to fully approve the Draft Report as completing the RFI requirements for the subject solid waste management units (SWMUs). While EPA is not prepared to give final approval for the Draft Report, EPA anticipates that such approval can be given for the SWMU #1, #2, and #45 portions following the Navy satisfactorily addressing what the Agency sees as the major salient deficiencies in the Draft Report, which are summarized below (and expanded on in the enclosed TechLaw June 1, 1998 evaluation):

#### SWMUs #1 & #2 (Operable Unit #3)

##### 1. Lack of Source Characterization/Definition

It is difficult to evaluate the adequacy of the Draft Report without a portrayal of the horizontal and vertical extent of the wastes deposited. Section 2.2.1 of the Draft Report indicates that an estimated 100,000 tons of waste were disposed of at SWMU #1 (Army Cremator Disposal site) from the early 1940s until the early 1960s. Appendix A of the Draft Report contains the results of the 1993 geophysical investigations (Electromagnetic Terrain Conductivity and Magnetic profiling) conducted at SWMU #1; however, the interpreted "limits of disposal" are not portrayed on the figures contained in Appendix A or Figure 2-3 of the Draft Report itself, and there is no indication of the vertical extent of the wastes in Appendix A or the Draft Report itself.

Apparently no geophysical surveys were conducted for SWMU #2 (Langley Drive Disposal Site), and the horizontal and vertical extent of the wastes at that SWMU have not been defined [as implicitly required under Task IV (refer to IV.B) of the "Scope of Work for a RCRA Facility Investigation (RFI)" given in Appendix A of Module III ("Appendix A") of the 1994 RCRA Operating Permit]. Nevertheless, as will be discussed in comment 5 below, better portrayal of the areal extent of the observed contaminant distribution, may be acceptable in place of this lack of definition of the horizontal and vertical extent of the wastes.

## 2. Lack of key items to complete Site Characterization

Among basic site characterization items which have not been submitted for SWMU #1 or #2, and are required by the "Scope of Work for a RCRA Facility Investigation (RFI)" given in Appendix A, are:

- a) Water-level contour and/or potentiometric maps [Condition VI.A.(1).(e) of Appendix A].
- b) A description of the biota in surface water bodies on, adjacent to, or affected by the SWMUs/facility; and a description of any endangered or threatened species near the SWMUs/facility. [Conditions VI.D.(4) and (7) of Appendix A].

The Draft Report should be revised to include these items for SWMUs #1 and #2.

## 3. Lack of Integration of Pre-RFI Analytical Results:

EPA's approval of the September 1995 RFI work plans was predicated on the fact that extensive investigations had already been conducted at SWMUs #1 and #2 under the Navy's "Installation Restoration Program" (IRP), including two rounds of verification sampling (total 10 each of sediment, soil, and groundwater environmental samples) conducted as part of the 1988 "Confirmation Study" (CS), and the 1993 "Supplemental Investigation" (21 soil samples, and 1 groundwater sample). Although the Draft Report states that data obtained during the CS is of questionable [data validation] quality, there is no such indication regarding the 1993 "Supplemental Investigation" data. Therefore, EPA requests that the analytical results from the "Supplemental Investigation" be incorporated into the RFI. If they have a material bearing on existing risk evaluation conclusions, "Supplemental Investigation" data should be incorporated into all risk evaluations given in the Draft Report. However, because of their questionable validity/quality, CS data should not be utilized in the risk evaluations, unless the data quality/validity justifies such usage. In addition, both the "Supplemental Investigation" data and the 1988 CS data should be incorporated into the Contaminant Distribution Portrayals discussed in 5 below (use the CS data only where it is not duplicated by subsequent "Supplemental Investigation" or RFI data).

## 4. Lack of Determination/Demonstration of Statistical Representativeness

Because the precise areal extents and types of wastes involved at both SWMUs are poorly defined, the RFI report should include an evaluation/discussion (by SWMU) of whether the existing data sets (including the IRP "CS", IRP "Supplemental Investigation", RFI "Phase 1", and RFI "Phase 2" data) are statistically representative of the areas potentially impacted by each SWMU. Guidance as to what constitutes a statistically representative data set can be found in Chapter Nine of Test Methods for Evaluating Solid Waste (EPA

Publication SW-846, Third Edition, November 1986, as amended by Updates I (July 1992), II (September 1994), IIA (August 1993), and IIB (January 1995), and any subsequent updates, and "Methods for Evaluating Cleanup Standards" (EPA 230/02-89-042, February 1989). If the existing data sets are not statistically representative, then the Navy should identify data gaps that are present, and recommend actions to resolve those data gaps.

#### 5. Lack of Adequate Contaminant Distribution Portrayals

To better define the aerial distribution of contaminant occurrence at the two SWMU sites (especially since the areal extent of the wastes at both SWMUs is poorly defined), and to assist in identifying data gaps, EPA requests that for each SWMU, isopleth (equal concentration) maps be submitted on a media and constituent specific basis, for all constituents which were detected in a given media (i.e. surface soil, subsurface soil, groundwater, sediments) at 3 or more sampling points (irregardless of whether the data is from the IRP "CS", IRP "Supplemental Investigation", RFI "Phase 1", or RFI "Phase 2" investigation) at concentrations equaling or exceeding appropriate Action/Screening levels, such as the Region III Residential Risk Based Concentration Levels for soils (via ingestion), or Maximum Contaminant Levels (MCLs) in groundwater, or the Region III Draft BTAG "effects range-low" (ERL) screening levels for sediments.

#### 6. Incomplete or Unacceptable Conclusions/Recommendations

Since unacceptable potential human health risks are indicated for current on-site workers at SWMU #1, and future on-site residents for both SWMUs #1 and #2, based on RFI Phase 1 and 2 data alone, corrective measures studies (CMSs) are required for those SWMUs. The CMS(s) for the OU 3 SWMUs (#1 and #2) may be streamlined and include evaluation of limited alternatives, such as institutional controls on current and future site and groundwater usage. However, if either institutional controls alone, or no further action, are recommended as the final remedy for SWMUs #1 and #2, the CMSs for those two SWMUs must also be supported by an evaluation of actual and/or potential impacts to the environment, that demonstrates no unacceptable risks.

EPA requests the Navy to either submit a workplan for the "streamlined" CMS(s) for SWMU #1 and #2 within 60 days of your receipt of this letter, or if the Navy believes a workplan is not necessary, then please so indicate in writing within 60 days of your receipt of this letter, and then submit the draft Final CMS report for the two SWMUs within 120 days of your receipt of this letter.

SWMUs #11/45 (OU #5)

Since characterization of the interior of the former power plant (SWMU #11) has not been completed, the RFI for the entire OU #5 cannot be considered complete, as OU #5 encompasses both SWMU #11 (the "interior" of the power plant building) and SWMU #45 (soils and other areas/units outside the power plant). However, since the two SWMUs involve substantially different environmental media and impacts, as well as likely substantially different the final remedies, their RFI status/approvals should be separated. Therefore, in the following comments, EPA will discuss each SWMU separately.

7) As noted above, investigations at SWMU #11 have not been completed. The Navy has submitted (separate from the Draft Report) a draft report on previous sampling at SWMU #11 and a proposal for additional sampling (refer to the March 31, 1998 "SWMU #11-Building 38, Old Power Plant, Sampling Results and Recharacterization Workplan submitted by Baker Environmental on behalf of the Navy). Pending EPA's approval of the workplan and implementation of the "recharacterization" sampling, the RFI for SWMU #11 cannot be considered complete. In addition, since its' investigation results were not included in the Draft Report, and for reasons discussed above, a separate Final RFI report on SWMU #11 should be submitted following implementation of the "recharacterization" sampling for that SWMU.

8) While EPA is not prepared to give final approval for the SWMU #45 portion of the Draft Report, EPA anticipates that such approval can be given following the Navy satisfactorily addressing the enclosed TechLaw comments (modified as discussed below) regarding SWMU #45. Nevertheless, EPA concurs with the recommendation given in Section 7.3.3 of the Draft Report, that a CMS is required for SWMU #45. Therefore, EPA requests the Navy to either submit a workplan for this CMS within 60 days of your receipt of this letter, or if the Navy believes a workplan is not necessary, then please so indicate in writing within 60 days of your receipt of this letter, and then submit the draft Final CMS report for SWMU #45 within 120 days of your receipt of this letter.

9) Since Section 7.3.3 of the Draft Report states that natural attenuation is one of the alternatives being considered for SWMU #45, and that removal of PCB contaminated sediments outside of the Puerca Bay cooling water tunnel is likely to be more damaging than leaving the sediments in place, the CMS for SWMU #45 should include, among other things:

- \* specific clean-up objectives/concentrations, protective of human health and the environment, which are to be achieved;

- \* a follow-up monitoring/sampling plan to confirm the efficacy of natural attenuation/bio-remediation, and achievement of the clean-up

objectives/concentrations.

\* an ecological risk evaluation if a no further action recommendation is made;

\* likewise, if sediment removal is deemed not feasible because of potential ecological harm, that must be demonstrated/documentated ;

#### TechLaw's June 1, 1998 Evaluation

After evaluating Mr. Penny's preliminary draft responses, EPA has determined that certain of the comments in the TechLaw June 1, 1998 evaluation either do not have to be addressed, or can be handled as follows:

10) TechLaw comment 1 in section 3.0 (General Comments), regarding data quality and validation does not have to be addressed. The OU 3 and 5 RFI data quality and validation have been reviewed by EPA's Division of Environmental Science and Assessment (DESA), and found to be acceptable. Please refer to the enclosed copy of Mr. Leon Lazarus' memo of November 9, 1998 to Mr. Tim Gordon of my staff. [Comments 2, 3, and 4 of the memo do not require a response from the Navy].

11) In regards to the second "bullet" of TechLaw's comment 3 in section 3.0 (General Comments), while on-going and post-closure groundwater monitoring of "non-regulated" solid waste management units (SWMUs) [i.e., SWMUs that ceased receiving wastes prior to November 1980] is it not explicitly required by 40 CFR Part 264 or 265 regulations, follow-up monitoring may be (and frequently is) required as part of the final remedy for a SWMU undergoing corrective action pursuant to 40 CFR ¶ 264.101, as is the case for SWMUs at Roosevelt Roads. Therefore, as part of the final remedy evaluation for SWMUs #1 and #2, the corrective measures studies (CMSs) for those two SWMUs should evaluate the necessity of a limited term (such as 5 or 10 years) recurring program (such as annually) of follow-up groundwater monitoring to confirm that no adverse impacts are occurring.

12. In regards to TechLaw's comment 4 in section 3.0 (General Comments), since unacceptable potential human health risks are indicated for future on-site residents for SWMUs #1 and #2 (OU #3), CMSs are required for those SWMUs. As was discussed previously in EPA's comment #6 above, the CMSs for SWMUs #1 and #2 may be streamlined, and include evaluation of limited alternatives, such as institutional controls on future site and groundwater usage. However, if institutional controls, or no further action, are recommended as the final remedy for SWMUs #1 and #2, the CMSs for those two SWMUs must also be supported by an evaluation that indicates unacceptable risks of impacts to the environment are not posed by the two SWMUs.

13. In regards to TechLaw's comments in section 4.0 (page-specific comments), the Navy does not need to address the first two comments (page 3-8, paragraph 2; and page 5-1, paragraph 1), as many of those requirements should be covered in the Navy's responses to EPA's above

comments, or were fulfilled in other documents previously submitted by the Navy. However, where prior submittals fulfilled requirements discussed anywhere in the TechLaw evaluation, they should be so identified in a revised section 8 Reference List. For example a note should follow the entry for the Closeout Report for Interim Action of PCB Contaminated Soils, Sites 15 and 16., making clear that the report includes SWMU 45 (OU 5).

14. In regards to TechLaw's recommendations in section 6.0, the issue of data gaps can be addressed in the Navy's response to EPA's comment #4 above.

15. In regards to TechLaw comments regarding background data [such as Section 4.0 (page-specific comments) re: page 7-1, Section 7.2.1], while the background data set may be of questionable applicability due to the presence of non-naturally occurring compound (as will be discussed below), detections at concentrations above the background data set cannot be ascribed to natural occurring "leaching of volcanically derived soils", without further factual documentation.

#### Applicability of existing "Background" data set

16) As to the applicability of the existing Boxer Drive "background" data set, which is discussed in the enclosed PREQB May 28, 1998 letter, while EPA generally agrees with PREQB's comment that there appears to be some anthropogenic impact to the Boxer Drive "background" data set, usage of that "background" data set should only be problematic when hazardous constituents are detected at average concentrations indicating a potential threat to human health, yet those concentrations are below "background" (taken at the Roosevelt Roads facility to be the average concentration in the background data set [by media] plus two standard deviations [refer to "Revised Draft RCRA Facility Investigation Report for Operable Unit 2 (SWMUs 7/8)" dated June 16, 1997]). Therefore, for any constituents detected at OU 3 or 5 SWMUs, where the average detected concentrations (by media) exceeds generally recognized action/screening levels (such as Region III Risk Based concentration levels for soil ingestion [either residential usage or industrial usage] or MCLs for groundwater] EPA requests that a risk evaluation be performed, if not previously included in the Draft Report. If potential unacceptable human health risks are calculated, yet the average detected concentration (by media) does not exceed "background", EPA reserves its right to require, or on a case-by case basis further action based solely on a determination of unacceptable potential risk to human health. This will be our policy for all SWMUs and AOCs at Roosevelt Roads where the RFI has not been completed.

Additionally, while it is generally EPA policy to not require clean-up to concentration levels below the naturally occurring background [For example due to the typical background concentrations for naturally occurring arsenic, EPA generally does not apply the Region III Risk Based arsenic concentration levels (carcinogenic effects) of 3.8 mg/kg (industrial usage) and 0.43 mg/kg (residential usage) when setting site-specific clean-up levels at Puerto Rico sites, but rather calculates the human health risks for arsenic based on non-carcinogenic effects], that policy does not necessarily apply when the "background" has been impacted by anthropogenic

activities, and is not truly reflective of naturally occurring conditions. Therefore, for the interim, for Roosevelt Roads' SWMUs and AOCs, while EPA will not require establishment of a new "background" data set; it reserves its right to so require, and to require corrective measures based solely on unacceptable potential risk, as discussed above.

### Conclusion

Within 60 days of your receipt of this letter, EPA requests that the Navy submit a supplement to the Draft Report addressing EPA's above comments, and those given in the enclosed TechLaw evaluation (modified as discussed in comments 10 -16 above). This may be in the form of either a supplement modifying the Draft Report as requested in the above comments and enclosed TechLaw evaluation (without preparing an item by item discussion/response), or the Navy must provide written justification where no modification is made (the preliminary draft responses provided by Mr. Chris Penny may be incorporated into such justification).

In addition, CMS workplans for SWMUs # 1, #2, and #45 should be submitted within 60 days of your receipt of this letter. If the Navy believes that CMS workplans (and EPA's review and approval of them) are not necessary for any or all three of these SWMUs (because of their "streamlined", straight-forward nature), please so indicate in writing within 60 days of your receipt of this letter, and then submit the draft Final CMS report for those SWMUs (i.e., for those where no CMS workplan is submitted) within 120 days of your receipt of this letter.

Furthermore, before any measures recommended by the CMS as the final remedy can be implemented, a corrective measures implementation (CMI) plan must be submitted. If the CMS recommended final remedy for SWMUs #1 and #2 involves institutional controls on current and future site and groundwater usage, the CMI must document the instruments of institutional control, and the CMI must then undergo public notice and public comment, before the final remedy for the SWMUs can be considered fully approved. Likewise the CMI for SWMU #45 must document the steps to implement the final remedy recommended in the CMS, and undergo public notice and public comment before the final remedy for that SWMU can be considered fully approved.

Please telephone Mr. Tim Gordon of my staff at (212) 637- 4167 if you have any questions regarding any of the above.

Sincerely yours,



Nicoletta DiForte, Chief  
Caribbean Section  
RCRA Programs Branch

Enclosures (3):

TechLaw Evaluation dated June 1, 1998  
PREQB comments dated May 28, 1998  
Leon Lazarus Memo dated November 9, 1998

cc: Mr. Israel Torres, PREQB, w/o encl.  
Ms. Madeline Rivera, NAVSTA Roosevelt Roads, with encl.  
Mr. Christopher Penny, LANTDIV, with encl.  
Mr. Tom Fuller, Baker Environmental, with encl.  
Ms. Luz Muriel-Diaz, PREQB, with encl.  
Mr. William Goold (for Adam Balough), TechLaw Inc., w/o encl.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION II

DATE: NOV 09 1998

SUBJECT: Review of Roosevelt Roads Draft RFI Report for Operable Units 3 and 5

FROM: Leon Lazarus, Environmental Scientist *LL*  
Hazardous Waste Support Section (2DESA-HWSB)

TO: Tim Gordon, Environmental Engineer  
Caribbean Section (2DEPP-RPB)

I have reviewed the March 20, 1998 draft RFI Report for Roosevelt Roads Operable Units 3 and 5 located in Ceiba, Puerto Rico. The document was prepared by Baker Environmental. Our ESAT contractor reviewed the analytical deliverables and data validation reports. My comments are as follows:

1. The analytical deliverables, analytical results, and data validation reports are acceptable.
2. The Office of Solid Waste recently modified the 1994 Revised Interim Soil Lead Guidance for CERCLA sites and RCRA Corrective Action Facilities (EPA-540-F-98-030, August 1998). We recommend that you ascertain if the lead regulatory action levels in the RFI report are appropriate.
3. Contaminant concentrations in SWMUs 1 and 2 that exceed regulatory action levels are considered inconsequential in the RFI Report. For example, Table 5-21 for SWMU 2 shows 4 out of 8 arsenic soil samples exceed the industrial RBC, and 7 out of 8 arsenic soil samples exceed the residential RBC. However, the RFI Report recommends land use restrictions instead of remediation for SWMUs 1 and 2. Clarification should be provided as to why remediation for contaminated areas within SWMUs 1 and 2 is not recommended.
4. We agree with the recommendation to perform a Corrective Measures Study on SWMU 45.

If you have any questions, or require further information, please contact me at 732-321-6778.

cc: Robert Runyon, 2DESA-HWSB  
Ray Basso, 2DEPP-RPB  
Nicki Diforte, 2DEPP-RPB

EVALUATION OF  
Draft  
RCRA FACILITY INVESTIGATION REPORT  
Operable Unit 3/5  
RCRA FACILITY INVESTIGATION  
NAVAL STATION ROOSEVELT ROADS  
CEIBA, PUERTO RICO

Submitted to:

Ms. Elizabeth Van Rabenswaay  
Regional Project Officer  
U. S. Environmental Protection Agency  
Region 2  
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New York, New York 10007

Submitted by:

TechLaw, Inc.  
122 East 42nd Street  
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New York, New York 10168

June 1, 1998

EVALUATION OF  
Draft  
RCRA FACILITY INVESTIGATION REPORT  
Operable Unit 3/5  
RCRA FACILITY INVESTIGATION  
NAVAL STATION ROOSEVELT ROADS  
CEIBA, PUERTO RICO

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## 1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has requested support for technical review of documents associated with the RCRA Facility Investigation (RFI) of the U.S. Naval Station Roosevelt Roads (NSRR) located in Ceiba, Puerto Rico. TechLaw has assigned this project to TRC, a TechLaw Team member under the REPA Contract under Work Assignment No. R02020.

The NSRR is located on the east coast of Puerto Rico in the municipality of Ceiba, approximately 33 miles southeast of San Juan. The primary mission of NSRR is to provide full support for the Atlantic Fleet weapons training and development activities. NSRR is currently operating under a Draft RCRA Corrective Action Permit that includes varying degrees of work at 28 Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs).

EPA requested the TechLaw Team to review the *Draft RCRA Facility Investigation Report for Operable Unit 3/5, Volumes 1 and 2*, dated March 20, 1998.

The TechLaw Team's report presents evaluations of the Draft RFI Report for Operable Unit 3/5. The method and objective of this evaluation are presented in Section 2.0. General comments are presented in Section 3.0. Page-specific comments are detailed in Section 4.0. Editorial comments are detailed in Section 5.0; and, recommendations are presented in Section 6.0.

## 2.0 METHODOLOGY

Pursuant to the EPA Work Assignment Manager's (WAM's) Technical Directive dated March 25, 1998, the TechLaw Team reviewed the Draft RFI Report, in particular Sections 3.0, 4.0, 5.0, 6.0, and 7.0 with respect to the adequacy and acceptability of investigation activities and conclusions and analytical results. The following documents were considered during the review:

- Final RCRA Facility Investigation, NSRR, P.R. prepared by Baker Environmental, Inc., dated September 1995;
- Interim Final RCRA Facility Investigation Guidance, OSWER Directive 9502.00-60, EPA 530/SW-89-031, May 1989;
- *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, OSWER Directive 9355-3-01, October 1988;
- *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, EPA/540/P-91/001, February 1991;

2. It is unclear whether or not rejected data has been used in the statistical analysis of the sample results. This fact must be clarified and if rejected data has been used, the statistical analysis must be revised. The report should discuss the rejected data and determine the significance of these lost data points with regard to the completeness objectives of the RFI.
3. The Navy estimates that all three sites pose unacceptable increased risk for future residential users. While residential use of the three SWMUs appears unlikely, the Navy needs to provide documentation on the following:
  - Data (salinity and aquifer yield) demonstrating that the aquifer is not a potable water source;
  - Long term groundwater monitoring plan to verify that concentrations do not increase, as increased levels may result in risks via other pathways such as migration through soil into indoor air or ecological risks; and,
  - Deed restrictions on the site which will effectively prevent any development of the site for uses other than its current use, without further evaluation of risk to human health.
4. It is unclear why an Environmental Risk Assessment was not conducted at SWMUs #1 and #2 due to the presence of elevated concentrations of metals within sediments. The Environmental Risk Assessment provided in the Facility Investigation for Operable Units 1, 6, and 7 (Phase I) specifically identified SWMU 2 (Langley Drive Disposal Area) as of particular ecological concern due to the elevated metals. This report also recommended additional sediment characterization in conjunction with sampling of surface and subsurface soils and groundwater to determine the source of the contamination. The additional characterization should have included sediment samples from the harbor side of the mangroves as well as additional shoreline areas located south of 2SD03 to determine the extent of contamination. An Environmental Risk Assessment must be conducted.

In order to demonstrate that no unacceptable risk to the environment exists, the assessment should determine whether ecological receptors may be exposed to site-related contaminants by describing conditions at the site, potential receptors, and potential exposure pathways. If exposure pathways are present, then the risk to ecological receptors must be characterized in accordance with the following guidance:

- Framework for Ecological Risk Assessment. 1992. Risk Assessment Forum, U.S. Environmental Protection Agency. EPA/630/R-92/001.

area of the PCB detection at 1SD02 to further delineate a potential source, and from surface water hydrogeologically down gradient locations of the disposal site perimeter.

- Due to contaminant levels above ERM screening values from the preliminary sediment sampling results, toxicological sampling must be completed on-site, and an ecological risk evaluation must be completed.

### SWMU 2

- The fill material must be characterized from various depths, throughout the site. Note that this landfill was in operation from 1939-1959. Characterization must be completed to delineate any potential cells and/or hot spots. Contaminant concentrations directly on-site must be documented.
- The extent of dioxin contamination in soils, identified in soil samples 2SB05 and 2SB04, must be delineated.
- The extent of elevated arsenic levels in soils in the area of 2MW03 must be delineated.
- The physical characteristics and chemical composition of cover material on-site must be documented.
- The vertical and lateral extent of the disposal site must be delineated and documented. This information must be surveyed and presented in site plans. The current disposal site boundary is not supported by the site data provided. Additionally, analysis of soil samples at the perimeter of the site indicates the additional soil data is necessary to delineate the site boundary.
- Storm water runoff swales and on-site drainage channels must be delineated and presented on the site plan.
- Potential off-site migration pathways via all media must be documented. Confirmatory media sampling must be completed at all potential migration pathways.
- The source and extent of the trichloroethene detections in ground water must be delineated.
- Ground water located hydrogeologically downgradient of the disposal site boundary must be characterized further to demonstrate no off-site migration of contaminants.
- Additional on-site sediment sampling must be completed. Additional sediment samples must be collected from the areas associated with 2SD02 & 2SD03 to determine the extent of sediment contamination.
- Due to contaminant levels above ERM screening values from the preliminary sediment sampling results, toxicological sampling must be completed on-site, and an ecological risk assessment must be completed.

### SWMU 11/45 - Building 38

- The extent of soil and ground water contamination outside Building 38 must be determined. The site boundary must be delineated by analytical data and presented on a site plan. Ground water elevations and flow directions onto and off the site must be

Page 6-17, Section 6.1.2.3, Paragraphs 3 & 4

Dissolved mercury concentrations are reported at higher numerical values than total mercury. This apparent discrepancy must be clarified

Page 6-28, Section 6.2.3, Paragraph 1; Page 6-46, Section 6.4.3.2, Paragraph 2; Page 6-47, Paragraph 2; and Page 6-48, Paragraph 2

The following is stated within the report “. . . groundwater at NSRR is not being utilized as potable water due to poor quality and low yields . . . .” Data or reference documentation must be provided which demonstrates the poor quality and low yields of the aquifer.

Page 6-35

The EPA's Human Health Evaluation Manual, Development of Risk-Based Preliminary Remediation Goals (Part B), dated December 1991, presents a particulate emission factor (PEF) based on standard default assumptions of  $4.63 \times 10^9$  m<sup>3</sup>/kg. This value differs from the PEF of  $1.32 \times 10^9$  m<sup>3</sup>/kg utilized with this report. The derivation of PEF utilized here must be presented.

Page 6-36, Paragraph 2, and Appendix M

The dermally absorbed dose for organic compounds must be estimated using the nonsteady-state approach presented in the EPA document entitled Dermal Exposure Assessment: Principles and Applications (EPA 600/8-91/001B, dated January 1992). In addition, the text on page 6-36 and Appendix M must be revised to reflect this guidance.

Page 6-46, Paragraphs 1 & 2

The findings must state that lead was detected in site ground water (total concentrations) and sediments at concentrations above applicable screening levels; and, that a possible additional source of risk to current and future receptors is evident.

Page 6-47, Paragraphs 1 & 2

The risk characterization discussion needs to state that lead concentrations in surface soils, sediments, and groundwater exceed applicable screening levels and may present additional risk to current and future receptors. The discussion must also state that detected levels of isodrin could not be evaluated because toxicity criteria do not exist, and therefore the risk posed by isodrin is uncertain.

primarily to detected levels of benzo(a)pyrene in ground water and that the individual ICLRs for benzo(a)pyrene also exceeded the upperbound of the risk range of  $1 \times 10^{-4}$ .

Page 7-7, Sections 7.3.1 & 7.3.2

In order to justify the “no further action recommendation” for SWMUs 1 and 2, the following information must be provided: 1) Data (salinity and aquifer yield) demonstrating that the aquifer is not a potable water source, 2) A long term monitoring plan for site ground water to ensure levels do not increase (increased levels may result in risks via other pathways such as migration through soil into indoor air spaces or ecological risks), and 3) Presentation of deed restrictions on the site which will effectively prevent any development or use of the sites other than their current use, without further evaluation of risk to human health.

In addition, risks to current on-site workers at SWMU 1 must be addressed further since the nature and extent of site contamination, especially dioxin contamination, is uncertain.

Page 7-7, Section 7.3.1, Paragraph 1

The recommendation for no further action at SWMU 1 is not acceptable at this time. Additional activities must be completed to characterize the nature and extent of contamination at the site were detailed in comments to Section 5.0. Discussions of risk and land use restrictions are premature prior to fully delineating and characterizing the disposal site.

Page 7-7, Section 7.3.2, Paragraph 4

The recommendation for SWMU 2 is not acceptable. Additional activities must be completed to characterize the nature and extent of contamination at the site were in comments to Section 5.0. Prior to fully delineating and characterizing the disposal site, land use restrictions to maintain certain levels of risk cannot be evaluated.

Page 7-8, Section 7.3.3, Paragraph 4

The recommendation for no further action for SWMU 45 is not supported by data gathered and analyzed to date. Additional activities warranted to complete the characterization of the nature and extent of contamination were presented in comments to Section 5.0.

Page 7-8, Section 7.3.3, Paragraph 5

Based on TPH exceedances of Residential and Industrial RBCs in subsurface soil along the cooling water tunnel, additional information is necessary to support the recommendation for natural attenuation of TPH.

## Appendix F

Inorganics (Dissolved) Detections that are presented in Section 5 cannot be cross-checked in Appendix F due to the absence of analytical results. For example, no analytical results for organics are presented in Appendix F for samples 1GW05 and 5GW02 (Table 5-19). This information must be provided.

## Appendix H, SWMU 1

Sample 1SS06 has a reported result of 0.13JS for Total HxCDF. The data qualifier "S" should be identified.

## Appendix H, SWMU 11/45

The table summarizes the number of samples which have results above RBC limits. Page 7 of 8 indicates that 0/17 samples for copper and 0/17 for zinc exceed the limits. Review of the previous pages indicates 14 of the 25 zinc samples presented have results which have been rejected (flagged R) which would result in only 11 valid samples to summarize. Copper also has eight samples rejected. The report must not use any sample results flagged with an R in any statistical analysis. The report must also state that rejected data is not used. The report should provide an assessment of the impact of rejected data on the site characterization. The report should also present any corrective actions which would be required if the assessment identifies an adverse impact to site characterization.

## **5.0 EDITORIAL COMMENTS**

### Tables 5-1 through 5-6

Table 5-1 through 5-6 summarizes the inorganic and organic positive detections in background surface soils. The analytical results for the samples do not contain analytical data sheets in Appendix H. Therefore, background analytical results presented in Table 5-1 through 5-6 cannot be verified. The analytical data sheets must be submitted as an addendum to support review of the data.

### Tables 5-7 through 5-35

Analytical results in Tables 5-7 through 5-35 should be reviewed for consistency with results in Appendix F. Examples of inconsistencies identified include:

- Table 5-7

The data presented for Samples 1SS06 and 1SS07 are not consistent with data presented in Appendix F. Data should be reviewed and revised as appropriate.

- Figure 5-13

Sample 11SB01-02 must include analytical results for arsenic and aroclor 1260. According to Table 5-36, arsenic was detected at 2,700J and aroclor 1260 was detected at 320J.

- Figure 5-14

Sample 11SD09 must include analytical results for phenanthrene. According to Table 5-38, phenanthrene was detected at a concentration of 470J.

- Page 7-4, Paragraph 2

The first sentence appears to contain a typographical error and should be corrected to read, "There does appear to be impact . . . "

## 6.0 RECOMMENDATIONS

The following actions are recommended.

- The RFI should be expanded to include a discussion on data gaps. A work plan should be prepared to address the SWMU-specific data gaps identified in page-specific comments and submitted for regulatory approval. The work plan should use a conceptual understanding of release characteristics and transport mechanisms at each SWMU in order to develop an appropriate number of samples to adequately characterize the extent of contamination at each SWMU. The plan should present the specific locations of the proposed samples for each media. The plan should also present the methodology to address human health and ecological risk assessment concerns.
- The Navy must discuss the rejected data as related to the completeness objectives of the project and the impact to the analysis.

ENCL# 2  
T/m

COMMONWEALTH OF PUERTO RICO / OFFICE OF THE GOVERNOR



May 28, 1998

Ms. Nicoletta DiForte, Chief  
Caribbean Permit Section  
Hazardous Waste Facilities Branch  
US Environmental Protection Agency  
290 Broadway  
New York, NY 10007-1866

Dear Ms. DiForte:

Re: RCRA Facility Investigation Report  
for Operable Unit 3/5  
US Naval Station Roosevelt Roads  
Ceiba, Puerto Rico-PR2170027203

The Puerto Rico Environmental Quality Board (PREQB) has evaluated the RCRA Facility Investigation (RFI) Report for the Operation Unit (OU) 3/5 submitted by Baker Environmental on behalf of US Naval Station Roosevelt Roads.

The Operational Unit 3/5 consists of SWMU 1, SWMU 2, and SWMU 11/45. The SWMU 1 is the former Army Cremator disposal site, which consists of abandoned, unlined waste-pile/landfill, on the edges of, and encroaching into the mangrove swamps along the shoreline of the Ensenada Honda Bay. The Langley Drive disposal site (SWMU 2), is also abandoned unlined waste-pile/landfill, on the edges and protruding into the mangroves along the shoreline of the Ensenada Honda Bay. The SWMU 11/45 includes the Building 38, a former powerhouse and related underground storage tanks and cooling water tunnels.

The Navy commenced preliminary investigations during the RFI-Phase 1 in the fall of 1996 which was generally limited in scope and was designed to identify whether releases of hazardous waste had occurred. These investigations performed in the Operation Unit (OU) 3/5 detected several hazardous constituents in sediments, soil (surface/subsurface) and groundwater samples. Sediment and soil (surface/subsurface) samples contained high concentrations of metals such as Arsenic, Beryllium, Mercury and Lead. Surface soil samples detected these metals above their Residential and Industrial RBC action level. Volatile Organic Compounds (VOCs) and Dioxins were found at concentrations that exceeded the Residential RBC level. Whereas groundwater samples collected at the OU 3/5, indicated that VOCs, Semivolatiles Organic Compounds (SVOCs), Dioxins and Pesticides and Metals have been released into the uppermost aquifer at the facility. Groundwater samples were found in concentrations above the MCL and Tap water action/levels.

Additional investigations for the RFI-Phase II Operational Unit 3/5 were conducted in the fall of 1997. The RFI Phase II included a collection of surface, subsurface soil samples, and groundwater samples from permanent and temporary wells. In addition, sediments samples at the nearby areas of Ensenada Honda and Puerca Bays were collected for SWMUs 1, 2 and 11/45. The analyses performed for SWMUs 1, 2 and 11/45 contained low to high concentrations of VOCs, SVOCs, Inorganic Compounds (Total and Soluble), Dioxins, Chlorinated Herbicides, and Pesticides/PCBs.

After evaluating the report submitted by Baker, EQB concurs with the Navy that a Corrective Measure Study (CMS) is required for SWMU 11/45 due to the extended contamination of TPH and PCBs on the surface water in the Puerca Bay. As proposed by the Navy, the CMS will focused on the tunnel soils, Puerca Sediments and Building 38 UST area. In the letter of March 8, 1998, EQB recommended the approval of the closure activities of the Building 38 Underground Storage Tanks. The activities related to the Interim Corrective Measure (ICM) has been achieved and completed eliminating the USTs and the cooling lines as potential release source in the SWMU 11/45 and therefore it is expected that no further action will be required for the Building 38 UST. The CMS should address corrective measure alternatives such as filter fences to remediate or to contain further spread of the contaminated sediments found in the Puerca Bay.

However, EQB does not agree with the conclusions and recommendations (given in section 7.3.1 and 7.3.2), that no further investigations are necessary at the study area for SWMUs 1 and 2. The analytical results clearly indicated that SWMUs 1, 2 contained high concentrations of contaminants, demonstrating that releases of these compounds have occurred and contaminated the sites, affecting the quality of their respective soil, sediments and groundwater media. Although, as the report described that for most of the constituents, their concentrations are not above the regulatory standards, sediment samples, soil samples up to 12 ft. deep and groundwater samples did indeed contained high concentrations of contaminants that exceeded the RBC (Industrial and Residential), RBC Tap Water standard, MCL action level and the 2X Average Detected Screening Values.

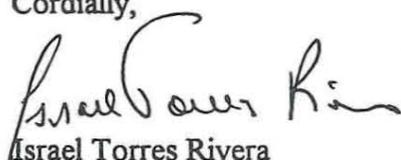
EQB agrees with the recommendations provided by the Navy to limit and restrict the land areas for SWMUs 1 and 2. The facility should install a security fence around the perimeter of the site, warning signs and other measures to limit access to the SWMUs. The report indicated that the Navy may consider the sites for industrial land use in the future, the facility should be noted the presences of contaminants at high concentrations above the RBC Industrial standard and therefore, for any construction or excavation operations, there is still a threat to construction workers at both SWMUs.

Furthermore, due to the uncertainties in the data collected by Baker, that can be derived from the absence of field duplicates and the presence of contaminants in the equipment rinsate blanks, field blanks and trip blanks during the RFI Phase I and II, EQB recommends to continue on-going monitoring the contamination and migration pathways for groundwater, soil and sediment environmental media in SWMUs 1 and 2. Notwithstanding, a cleanup remedy may not be viable and technical practicable for SWMUs 1 and 2, and the contaminants detected in the soil, sediment and groundwater samples (may not migrate far), it may still threaten human health/the environment by direct contact or by leaching contaminants to groundwater.

The Navy mentioned that the Mangroves near the sites have not been affected by the contamination due to visible condition of the vegetation, these comments are only assumptions based on visual observations. EQB recommends to the US Navy, to performed an Ecological Risk Assessment for soil, sediments and groundwater media in Ensenada Honda Bay and Puerca Bay for Operational Unit 3/5 to determine any potential for risk to aquatic environment at SWMUs 1, 2, and 11/45. The Ecological Risk Assessment must include an evaluation of environmental risk caused by impact of contaminated groundwater discharges to the Ensenada Honda Bay and Puerca Bay.

If you have any questions regarding this matter, please do not hesitate to contact Ms. Luz A. Muriel, of my staff, at (787) 766-2817 or (787) 767-8181 ext. 2820.

Cordially,



Israel Torres Rivera

Director

Land Pollution Regulation Program

Enclosure

## Comments on the Operation Unit 3/5

### Background Samples

Soil (surface/subsurface) and groundwater were collected for Background samples during the RFI-Phase II investigation. Samples were analyzed for Volatiles (VOCs), Semivolatiles (SVOCs), Polychlorinated Biphenols (PCBs), Chlorinated Herbicides, and Metals-Appendix IX (Totals, Solubles). Analytical analyses performed in surface soil samples detected low concentrations of Butylbenzylphthalate, Bis(2-ethylhexyl) phthalate and Fluoranthene. In addition, subsurface soil samples contained low concentrations of SVOCs, VOCs (xylene), Dioxins (total HxCDD), Chlorinated Herbicides (2,4,5-T). Only inorganic compounds such as Arsenic and Beryllium were found to be exceeding their Residential Risk Based Concentrations (RBC) action level in surface and subsurface soil samples. All the constituents detected in these samples contained concentrations significantly below the Industrial RBC level. For Groundwater samples, VOCs (Acetophenone), SVOCs, (Bis(2-ethylhexyl)phthalate and Dimethyl phthalate) and Inorganic Compounds (Vanadium, Beryllium and Cadmium) were detected with concentrations that exceeded their respective USEPA MCLs and Tap Water-RBCs Region III levels. The groundwater samples did not contain Dioxins, chlorinated herbicides, or pesticides/PCBs compounds.

### Comments

- Sample BGMW03-03 contained HxCDD with a concentration of 0.31J ppb. Although this concentration is below the industrial soil RBC of 0.38 ppb, the value of 0.31J ppb is estimate (above and below the given value) and can be considered as a potential contaminant exceeding the industrial RBC standard as well as the residential RBC for soil of 0.043 ppb.
- Volatiles Organic Compounds, Semivolatiles Organic Compounds, PCBs/ Pesticides are not commonly found in the environment, and therefore it is uncomplicated to determine the extent to which a site or contaminate source area has impacted its surrounding, this is not the case for metals that are naturally occurring. Due to their natural occurrence, it is necessary for hazardous site environmental investigations to determine what levels of metals are in the soil that is beyond the influence of the site.
- Therefore, EQB recommends to include confirmatory samples at the background area to verify if this site should be consider as a representative background sample location. All of the constituents detected in this investigation were previously found in the RFI-Phase I investigation. These detected constituents exceeded their Industrial RBC for soil. In addition, groundwater samples contained SVOCs, and inorganic compounds that exceeded their USEPA MCL and Tap Water RBC levels.
- Based on the definition of background samples described in the RCRA Sampling Procedure Handbook, 1995, *a sample taken from media characteristic of the facility, but outside the zone of contamination. Yield information to determine the natural background concentrations of constituents inherent to that area*, the background site selected by the Navy it is not recommended to be used as background samples for soil and groundwater media for constituents such as Dioxins, VOCs, SVOCs and Chlorinated Herbicides which are unlikely (not commonly found in the environment) to occur in natural soil-volcanic rock and

groundwater at the site.

- Although the Navy continuously use these background sampling points, it is known that the occurrence of these metals arsenic, barium, chromium, copper, lead, nickel and zinc is likely the result of nature. Whereas, the occurrence of these metals antimony, cadmium, mercury, selenium, silver and thallium is likely the result of man's impact at the site. Therefore, the background site used in this investigation may have been impact by contamination and will not be a useful background comparison point.

### SWMU 1 - Former Army Cremator Disposal Site

#### Surface and Subsurface Samples

Only Subsurface soil samples were collected and analyzed for full Appendix IX list, Explosives and Asbestos. A total of four (4) soil samples were collected at this SWMU during RFI-Phase II. Only Di-n-butly phthalate (Semivolatile) was detected in soil samples at low concentrations below the screening criteria. Total HxCDF (Sample 1MW05-05, 0.14J ppb) was the only organic compound exceeded the Residential and Industrial RBCs levels of 0.0043 ppb and 0.038 ppb, respectively. No Chlorinated Herbicides, Pesticides/PCBs, Explosives, Asbestos or Volatiles were detected in the subsurface soil samples. All the inorganic constituents listed in Appendix IX were found in the subsurface soil samples. Antimony and Silver were detected above the 2X Average Detected background screening criteria. None of them exceeded their respective RBCs for Industrial and Residential levels. Only Beryllium was found to be exceeding the EPA Region III Residential RBCs (150 ppb) with a concentration range from 120 - 200 ppb.

#### Groundwater Samples

Two permanent groundwater monitoring wells were installed during the RFI-Phase II activities. These wells were sampled for VOCs, SVOCs, Pesticides/PCB, Dioxins, Chlorinated Herbicides, Explosives and Asbestos. Total and Soluble Metals analyses were performed to detect any inorganic compounds on the groundwater. Inorganic compounds such as Arsenic, Barium, Beryllium, Chromium, Cobalt, Cadmium, Cooper, Lead, Mercury, Nickel, Silver, Sodium, Tin, Vanadium and Zinc were the only compounds found in the analyses at relative low concentrations below their screening criteria. Groundwater samples from monitoring wells 1GW05 and 5GW02 contained Beryllium (0.82J - 0.67J ppb) and Vanadium (330 - 344 ppb) at concentrations above their EPA Region III Tap Water RBC of 0.16 ppb and 260 ppb, respectively.

#### Comments

- Chemical analyses submitted by the Navy indicated the presence of inorganic compounds (Total and Soluble) in subsurface soil and groundwater samples. No Pesticides, Herbicides, Volatiles Organic Compounds (VOCs), Semivolatiles Organic Compounds (SVOCs), Dioxins were found in the samples.

- Inorganic compounds such as Antimony, Beryllium, Cadmium, Cadmium Soluble, Chromium, Copper, Copper Soluble, Lead, Mercury and Nickel previously detected in the RFI-Phase I at concentrations that exceeded their Tap Water RBC-Region III Standards and USEPA MCL were not found in the groundwater analyses performed for the RFI-Phase II. Except for Beryllium and Vanadium (Total) which were detected at concentrations above the EPA Region III Tap Water RBC level. Chromium (sample-1GW05, 113 ppb) was also found to be exceeding the USEPA MCL of 100 ppb.
- In addition, analytical analyses performed in the groundwater samples collected in the RFI-Phase I detected Chloroform, 4-4'-DDE, Total HxCDD, 2,4,5-TP, 2,4,5-T with concentrations above the EPA Region III Tap Water RBC in four (4) groundwater samples from seven (7) groundwater monitoring wells. None of these constituents were detected in the RFI-Phase II analyses.
- SWMU 1 is considered to be industrial land usage area due to their previous use as a Hazardous-Non Hazardous Waste Disposal area. A site may have been industrial in nature; the land usage judgment is based on the area surrounding the site as well. Mercury and Arsenic occur at significantly higher rates in industrial and mixed land usage areas than rural, suggesting that their occurrence is likely a function of land usage. Vanadium, Beryllium, Copper, Sodium, however, occurs at significantly lower rates in industrial areas than in mixed or rural settings, suggesting its occurrence is likely a soil property (as indicated in the soil borings performed at the site). The soil series (is not a soil series at much as it is simply an indication of severely disturbed (either by cutting or filling). Given the nature of the sites used in this study (Hazardous-Non Hazardous Waste Disposal Sites for SWMUs 1 and 2), which is more an indicator of land usage than soil type, showed significantly higher rates of occurrence for antimony, arsenic, beryllium, cadmium, selenium, and silver, suggesting their occurrences are related to man's activities.
- Although the presence of metals in the groundwater samples can be directly identified with concentrations of the groundwater at the area due to the occurrence of these metals in the soils and volcanic bedrock, many of these metals such as antimony, cadmium, lead, mercury cobalt and vanadium are unlikely to occur naturally in the groundwater.

### SWMU 2- Langley Drive Disposal Site

#### Soil and Subsurface Samples

Only a RFI-Phase I was conducted for SWMU 2. The investigation consisted of the collection of surface eight (8), subsurface eight (8) soil samples, four (4) groundwater samples and sediments samples.

Surface and subsurface samples detected 1,1,1-Trichloroethane (1.00 ft, 12J) and Acetone (4.00-6.00 ft, 21 ppb). All the Semivolatiles Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)pyrene, Benzo(K)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene and Pyrene found in the soil samples contained concentrations below the action level except for samples 2SB02-00 (340J ppb) and 2SB04-00 (150J ppb) that exceeded the Benzo(a)pyrene EPA Region III Residential RBCs of 88 ppb.

Pesticides/PCBs were detected at concentrations significantly below the Industrial and Residential RBCs. Dioxins (Total HxCDD and HxCDF) were also found at concentrations in sample 2SB03-00 of 0.37J ppb and 0.17J ppb above both their respective Industrial and Residential RBC screening standards of 0.038 ppb and 0.17 ppb. No Chlorinated Herbicides, Explosives or Asbestos were detected in the soil samples.

All the metals listed in the Appendix IX were detected in the analyses for inorganic compounds performed in the eight (8) surface samples. Sample 2SB05-00 contained inorganic compounds such as Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Tin, Vanadium and Zinc were above their 2X Average Detected Background.

### Groundwater Samples

Detection of organic compounds in the groundwater included Volatiles: Carbon Tetrachloride, Chloroform, and Trichloroethane ; Semivolatiles: Pentachlorophenol; Dioxins: (2,4,5-T); Pesticides: Aldrin, Heptachlor Epoxide and Isodrin. Carbon Tetrachloride was detected with concentrations varying from 1 ppb to 2 ppb above the Tap Water RBC of 0.16ppb. Chloroform concentrations between 4 ppb to 6 ppb were found at two sampling locations 2MW01 and 2MW02. Trichloroethane was detected on samples 2MW01, 2MW02 and 6GW01 with concentrations ranging from 6 ppb to 8 ppb that exceeded both criteria Federal MCL and EPA Region III Tap Water. Only sample 6GW01 contained Pentachlorophenol (5 ppb) that exceeded the USEPA MCL (1 ppb) and Tap Water RBC (0.56 ppb). Aldrin and Heptachlor Epoxide were detected in samples 2MW01 and 2MW03 with concentrations above the Tap Water RBC. Isodrin was found at three sampling points at significant low concentrations ranging from 0.02 ppb to 0.05 ppb. There are no standards established of Federal MCL and EPA Region III Tap Water RBC for Isodrin. No Chlorinated Herbicides, Explosives or Asbestos were found in the groundwater samples.

Inorganic Compounds (Total and Soluble) were also detected in the four groundwater samples collected for the RFI-Phase I. The following parameters were found in these samples: Antimony, Antimony Soluble, Arsenic, Barium, Beryllium, Cadmium, Cadmium Soluble, Chromium, Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Selenium Soluble, Sodium, Vanadium, Vanadium Soluble and Zinc. Antimony with concentrations varying from 16.1J ppb to 19.6J ppb exceeded the Federal MCL and EPA Region III Tap Water Standard criteria of 6 ppb and 15 ppb, respectively. Dissolved Antimony showed concentrations of 21.2 ppb. In addition, Lead, Vanadium, Arsenic and Beryllium exceeded the Tap Water Screening criteria in samples 2MW01, 2MW02 and 2MW03. Whereas, sample 2MW02 was the only sample that Lead concentrations exceeded the USEPA MCL.

### Sediment Samples

Three sediment samples 2SD01, 2SD02 and 2SD03 were collected for RFI-Phase I. Only sample 2SD02 contained Benzofluoranthene (Semivolatile) at concentration of 63J ppb. No Chlorinated Herbicides, Pesticides, Dioxins, Explosives, Asbestos and TOC were found in the samples. All the metals listed in Appendix IX were detected in the analyses performed in the sediment samples. The higher concentrations found were of Cadmium, Copper, Lead, Nickel and Zinc. All of these parameters are above their background of ERL Sediment Screening Value and ERM Sediment Screening Value.

### Comments

- Arsenic was detected at ten (10) surface and subsurface sampling points with concentrations ranging from 370 ppb to 18,600 ppb. These concentrations exceeded the EPA Residential RBC of 430 ppb in nine (9) of the soil samples.
- Semivolatiles Compounds were detected in six surface soil samples (6) at concentrations below the EPA Region III Industrial and Residential RBCs. Only Benzo(a)pyrene concentrations varying from 150J ppb to 340J ppb were found in sample 2SB03-00 exceeding the Residential RBC level of 88 ppb.
- The presence of Semivolatiles, Volatiles Compounds, Dioxins and high concentrations of Metals in the surface (0.00-1.00 ft) and subsurface soil (2.00-12.00 ft) samples above the 2X Average Detected Background and EPA Region III Residential RBCs indicated releases of contaminants at the Langley Drive Disposal Site.
- Sediment sample 2SD02 contained the highest concentrations of Semivolatiles: Benzo(b)fluoranthene concentrations of 63J ppb and Inorganic Compounds: Copper (399,000 ppb), Lead (390,000J) and Zinc (841,000) compounds. These metals concentrations exceeded their respective ERM Sediment Screening Values.
- Groundwater samples in five (5) groundwater monitoring wells installed at the site detected high concentrations of Aldrin, Heptachlor Epoxide, Pentachlorophenol, Carbon Tetrachloride, Chloroform, and Trichloroethane and 2,4,5,-T. Due to the presence of these constituents, a release has already occurred and affected the quality of the groundwater due to land usage (man's impact) at SWMU 2.

### SWMU 11/45-Building 38

The SWMU 11/45 consists of Building 38, a former powerhouse and related underground storage tanks and cooling water tunnels. The cooling water tunnels had undergone Interim Corrective Measure (ICM). During these activities the tunnels were closed and cleaned reducing the potential of continuing releases at the site. Subsurface soils near the tunnel were found to be heavily oil stained. Based on this finding, a soil investigation was performed at the site. This investigation included 18 subsurface soil samples and groundwater samples from 14 temporary wells at the nearby area of the intake tunnel leading to Puerca Bay. For the RFI-Phase II investigations: Total Petroleum Hydrocarbons: Diesel Range Organic and Gasoline Range Organic; Pesticides: (Aroclor-1260); Semivolatiles: (Acenaphthene, Benzoic Acid, Chrysene, Benzo(a)pyrene, Benzoic Acid, Chrysene, Pyrene, Diethylphthalate) and Volatiles (Acetone, Toluene, 2-Hexanone, 4-Methyl-2-pentanone); Inorganic Compounds total: (Arsenic, Barium, Cadmium, Chromium, Lead and Mercury) and Inorganic dissolved: (Arsenic Soluble, Barium Soluble, Cadmium Soluble and Lead Soluble) were found in soil groundwater samples collected from SWMU 11/45.

### Surface and Subsurface Soil Samples

Only four (4) Subsurface samples were collected at a depth ranging from 2.00 ft to 13.50 ft. Volatiles and Semivolatiles were detected at significant low levels, below the EPA Region III Residential and Industrial RBC. Samples 11SB01-02, 11SB05-02, 11SB06-02, 11SB07-02, 11SB19-04, 11SB22-04, 11SB26-01, 11SB27-04 and 11SB08-02 contained Volatiles: (Acetone, Toluene, 2-Hexanone, 4-Methyl-2-pentanone); Semivolatiles: (Acenaphthene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(g,h,i)perylene, Di-n-butylphthalate, Diethylphthalate and Pyrene) and PCBs: (Aroclor-1260). Total Petroleum Hydrocarbons (TPH) analyses for Diesel Range Organic (DRO) and Gasoline Range Organic (GRO) were performed on each soil sample. All the inorganic constituents listed in Appendix IX were found in the subsurface soil samples. Antimony, Arsenic, Cadmium, Chromium, Silver and Zinc were detected above the 2X Average Detected background screening criteria. Arsenic and Beryllium exceeded their respective RBCs for Residential levels. Only Arsenic with a concentration of 4500J ppb was found to be exceeding the EPA Region III Industrial RBCs of 3,800 ppb and the Residential RBCs of 430 ppb.

### Groundwater Samples

A series of fourteen (14) groundwater samples were collected from the fourteen (14) temporary wells installed during these activities. The groundwater samples were analyzed for VOCs, SVOCs, PCBs, and Appendix IX metals, TPH GRO, TPH DRO and TOC. The analyses submitted confirm the presences of Volatiles: Acetone; Semivolatiles: Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzoic Acid, Benzyl alcohol, Bis(2-ethylhexyl)phthalate, Diethylphthalate, Dimethylphthalate, m&p Cresol, o-Cresol, Chrysene, Pyrene; TPH: DRO and GRO. Sample 11GW05 contained high levels of Benzo(a)anthracene and Chrysene above the EPA Region III Tap Water RBC screening standard. Only Semivolatile Organic Compounds Benzo(a)pyrene in sample 11GW05 (7J ppb) and Bis(2-ethylhexyl)phthalate in sample exceeded both the Tap RBC and the USEPA MCL standards. TPH for Diesel Range Organic and Gasoline Range Organic were found in five (5) samples collected from 7 (seven) groundwater monitoring wells with concentrations varied from 110 ppb to 71,100 ppb. In addition, 16 different Inorganic Compounds (Total) listed in Appendix IX were found in the groundwater samples. Dissolved Inorganic Compounds such as Arsenic, Barium, Chromium, Mercury, Vanadium and Zinc were also detected in the groundwater samples. TOC and PCBs were not detected in the samples.

### Sediment Samples

A total of nine (9) sediment samples were taken at SWMU 11/45. One sample was collected at the mouth of the tunnel, three samples at 50 feet away from the mouth, three samples at 100 feet away from the mouth and two samples at 200 feet from the tunnel. All the samples were obtained with a used of a sampling dredge and analyzed for Volatiles, and Semivolatiles Organic, PCBs, Appendix IX metals, TPH and TOC. The following constituents were detected on the samples: Volatiles: Acetone; Semivolatiles: Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Bis(2-ethylhexyl)phthalate, Chrysene, Dibenzo(a,h)anthracene, Di-n-butylphthalate, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene and Pyrene; PCBs: Aroclor-1260 and TPH for DRO including all the sixteen (16) inorganic compounds listed in Appendix IX. Several Semivolatile Organic Constituents exceeded the ERL (Effects Range Low) Sediment Screening Value. Only sample 11SD03 collected at a depth

range from 0.0ft to 3.0ft contained Benzo(a)pyrene and Dibenzo(a,h)anthracene concentrations exceeding the ERL and ERM (Effects Range Medium) Sediment Screening Values. Aroclor-1260 was detected in all nine (9) sediment samples with values exceeding the ERL screening criteria.

### Comments

- The most contaminated sediment samples (11SD01, 11SD03 and 11SD09) contained Semivolatiles, PCBs, and Inorganic Compounds with concentrations that exceeded the ERL and ERM Sediment Screening Values.
- All nine (9) samples 11SD01- 11SD09 detected TPH concentrations varying from 19,000 ppb to 65,000 ppb although there are no established ERL and ERM Screening Values for TPH Diesel Range Organic, these concentrations represent releases of these contaminants into the sediments.
- Aroclor-1260 concentrations with a range from 33 ppb to 62 ppb were detected in all nine (9) sediment samples collected for this investigation, exceeded the ERL Sediment Screening Value of 22.7 ppb.
- A total of ten (10) groundwater samples from 14 samples collected at SWMU 11/45 contained high levels of Arsenic Total with 1.7 ppb to 18.9 ppb and Arsenic Dissolved with a range from 1.3J ppb to 15 ppb. All of these concentrations exceeded the EPA Region III Tap RBC level of 0.045 ppb. In addition, Mercury Soluble (2.6 ppb) in sample 11GW16 was detected above the USEPA MCL standard of 2.0 ppb.
- Elevated TPH concentrations (Gasoline Range Organic and Diesel Range Organic) found in the groundwater samples collected at SWMU 11/45 indicated releases of free-product hydrocarbons (oil/fuels spills) from the underground storage tanks and tunnels located near Building 38.
- Fourteen (14) Subsurface soil samples collected at the site at a depth range of 0.00-10.00 ft contained high levels of Arsenic (total) above the Residential RBCs level.
- Subsurface Soil Samples 11SB01-02, 11SB09-02 and 11SB22-04 taken from 2.00 to 9.50 ft contained concentrations of Total Petroleum Hydrocarbons (the sum of Diesel Range Organic and Gasoline Range Organic) varied from 110,540 ppb to 250,140 ppb. These levels exceeded the Industrial and Residential RBC standard of 100,000 for TPH. Although TPH does not have a regulatory level, EQB as well as EPA-Region II usually use 100,000 ppb in soil samples. These standards are use as reference levels, and they should not be consider as clean up action levels. As the report submitted by Baker indicated the EPA Region III Residential and Industrial RBC for individual Gasoline Organic Range (100,000 ppb) and Diesel Organic Range (100,000 ppb) these levels are not included nor established in the Risk Based Concentration Table of January - June 1995.

### Quality Assurance and Quality Control Samples

Quality Assurance and Quality Control (QA/QC) samples were obtained during RFI-Phase I and II for SWMUs 1, 2 and 11/45. The QA/QC samples consisted of equipment rinsate samples, field blank samples and trip blank samples. The samples were analyzed for full Appendix IX parameters (Volatiles, Semivolatiles, Pesticides/ PCBs, Herbicides, Dioxins and Inorganic Compounds), Explosives, and sulfide. The trip blanks were only analyzed for VOCs.

### Equipment Rinsate Blanks

During the RFI-Phase I, a series of five (5) equipment rinsate samples (1RB01-1RB05) were taken for SWMU 1. The analyses performed on these samples reveal low concentrations of Volatiles: Acetone; Semivolatiles: Bis(2-ethylhexyl)phthalate, Diethylphthalate and Phenol; Inorganics Compounds (Soluble): Chromium, Copper, Lead, Mercury and Zinc. No Pesticides/PCBs, Herbicides, Dioxins, Explosives were detected in the equipment samples.

Five (5) samples collected for RFI-Phase I for SWMU 2 detected low concentrations of: Volatiles: Acetone; Semivolatiles: Bis(2-ethylhexyl)phthalate and Inorganic (Soluble) Compounds: Chromium, Copper, Sodium and Zinc. No Pesticides/PCBs, Herbicides, Dioxins and Explosives were detected.

Two equipment rinsate blank samples (45RB01 and 45RB02) were collected during the Phase-I for SWMU 11/45. Minor concentrations of Acetone, Toluene, Barium (Soluble) and Lead (Soluble) were detected in the samples. No Semivolatiles or PCBs were found.

For SWMU 1 RFI-Phase II, only one (1) equipment rinsate sample (1ER01) was collected. The sample contained Bis(2-ethylhexyl)phthalate with 24 ppb in concentration. Several Inorganic (Total) Compounds such as Chromium, Lead and Zinc were also found at low concentrations.

Seven (7) equipment rinsate samples were obtained for SWMU 11/45. These samples contained low levels of the following constituents: Volatiles: 2-Butanone; Semivolatiles: 4-Chloroaniline, Benzoic acid, Bis(2-ethylhexyl)phthalate, Phenol and Pyridine; and Inorganic Compounds (Total): Antimony, Barium, Chromium, Lead, Mercury and Zinc. No Pesticides, Herbicides, Dioxins, Explosives and TPH were found in the samples.

No equipment blanks samples were collected during the RFI-Phase II for SWMU 2.

### Field Blanks

A total of three (3) field blanks were obtained for SWMUs 1 and 11/45 during the RFI-Phase I. The samples reveal low levels of Volatiles: Acetone, Bromodichloromethane, Chloroform, Methyl methacrylate, Toluene; Semivolatiles: Bis(2-ethylhexyl)phthalate; Metals (Total): Barium, Copper, Lead, Mercury, Zinc. No Dioxins, Pesticides/PCBs, Herbicides and Explosives were found in the three (3) field blanks samples.

For the RFI-Phase II, three (3) samples analyzed for SWMUs 1 and SWMU 11/45 indicated the presence of Volatiles: 1,1-Dichloroethane, Acetone, Bromodichloromethane, Chloroform, Dibromochloromethane, Ethylbenzene and Xylene (Total); Semivolatiles: 2,3,4,6-Tetrachlorophenol,

Acetophene, Bis(2-ethylhexyl)phthalate, Phenol, and sym-Trinitrobenzene; Inorganic (Total) Compounds: Barium, Chromium, Copper, Lead, Vanadium, and Zinc. In addition to these constituents, TPH for Gasoline Range Organic with 25J ppb were also detected in sample FB01. No Dioxins, Pesticides/PCBs, Herbicides and Explosives were found in the three (3) field blanks samples.

No Field blanks samples were collected during the RFI-Phase II for SWMU 2.

#### Trip Blanks

During the RFI Phase-I, fourteen (14) Trip blank samples were collected for SWMUs 1, 2 and 11/45. Various Volatiles (the only constituents analyzed for these samples): Acetone, Isobutanol, Propionitrile and Trichlorofluoromethane were detected at low concentrations. Except for sample TB08 which contained Isobutanol and Propionitrile with high concentrations of 2,000 ppb and 50 ppb, respectively.

A total of nine (9) Trip blanks were collected for the RFI-Phase II. Only Acetone at 11J was detected in sample 13TB02.

No Trip blanks samples were collected during the RFI-Phase II for SWMU 2.

#### Comments

- EQB agrees with the Navy that minor concentrations of Acetone in the equipment blanks, trip blanks and field blanks samples can be consider as laboratory artifacts. However, EQB does not agrees with the determination by the Navy that most of the contaminants such as chloroform and phthalate are due to laboratory artifacts.
- The decontamination procedures performed by the company are not proper and adequate due to the positive detection of Volatiles, Semivolatiles and Metals (Total and Soluble) concentrations in the Equipment blanks samples during the RFI Phase I and II investigations. EQB is concern that contaminant materials have been transported into non contaminated areas during the RFI Investigations for SWMUs 1, 2, and 11/45. Proper decontamination is not only a health and safety concern but also an analytical and sampling consideration. Therefore, the Navy must review these decontamination procedures and prevent possible cross contamination at the site.
- These quality control samples assess the quality of sampling procedures performed by the facility. After reviewing the analytical results from the field blanks, equipment blanks and trip blanks, potential problems during sampling can be deduce from incomplete decontamination; contamination introduced in the field from careless sample handling; container or preservatives contamination, atmospheric contamination; variability in the samples; and incomplete homogenization.
- Field blanks are used to determine whether site conditions are contributing to contamination levels. The field blanks collected from SWMUs 1 and 11/45 indicated contamination levels and numerous air releases from the facility due to the presence of contaminants Volatiles: (Xylene, Toluene, Benzene, Ethylbenzene); Semivolatiles: Acetophenone, Phenol, Bis(2-

ethylhexyl)phthalate including TPH (GRO and DRO constituents) and metals such as Chromium, Lead, Mercury (Total) during RFI Phase I and II investigations.

- A series of Field duplicates (one per ten/media) and Matrix Spike/Matrix Spike duplicates (MS/MSD) (two per twenty/media) samples will be collected at every sampling event for QA/QC purposes as established in the approved RCRA Facility Investigation Work Plan of September, 1995. These samples were not collected during RFI-Phase I and II. The field duplicates and Matrix Spike samples are essential for field quality control checks and necessary to determine the accuracy and precision of the analytical methods performed by the laboratory. If the Navy collected these samples, the analyses were not included as part of the RFI Final Report, if in the other hand the facility did not indeed obtained the samples, the Navy must indicate clearly state, justify and document why these samples were not collected during the RFI investigations for the SWMUs 1, 2 and 11/45.