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TREASURE ISLAND
SSIC NO. 5090.3.A

RESPONSES TO REGULATORY AGENCY COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT FOR INSTALLATION RESTORATION SITE 32 – FORMER TRAINING AND STORAGE AREA, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the regulatory agencies on the "Draft Remedial Investigation [RI] Report for Installation Restoration [IR] Site 32, Former Training and Storage Area, Naval Station Treasure Island (NAVSTA TI), San Francisco, California" dated October 20, 2006. The Navy received comments from (1) the San Francisco Bay Regional Water Quality Control Board (Water Board) on November 13, 2006; (2) the U.S. Environmental Protection Agency (EPA) on December 12, 2006; (3) the U.S. Fish and Wildlife Service on December 12, 2006; (4) the Treasure Island Developmental Authority (TIDA) project office and its consultants, Geomatrix Consultants, Inc. (Geomatrix) and Exponent, Inc., on January 5, 2007; (5) and the Department of Toxic Substances Control (DTSC) on February 27, 2007.

The Navy's responses are organized into seven sections, according to each reviewer that submitted comments, and are presented below.

RESPONSES TO COMMENTS FROM AGNES FARRES, PROJECT MANAGER, WATER BOARD

Specific Comments

1. **Comment:** **ES-7: This section concludes by saying that a feasibility study should be performed to evaluate the mitigation of risk from Aroclor-1260 to potential construction worker and residential receptors. An evaluation of the mitigation of risk from dioxins (TEQ) and benzo(a)pyrene should also be included in the feasibility study since they were also identified as risk drivers for soil. This comment also applies to Section 9.7 (Conclusion and Recommendation).**

   Response: Although dioxin-contaminated soil was a risk driver at IR Site 32, only calculated risks from Aroclor-1260 concentrations exceeded the cancer or noncancer risk criteria. A Feasibility Study (FS) for IR Site 32 is warranted to mitigate the potential risk from Aroclor-1260. With the exception of three low-level benzo(a)pyrene (B(a)P) detections below 2 feet, and Aroclor-1260 in one boring, all other chemicals of potential concern (COPC) risk drivers within IR Site 32 are located in the upper 2 feet of soil. Future remedial actions at IR Site 32 would be expected to effectively eliminate these COPCs within the upper 2 feet of soil.

2. **Comment:** **Section 3.3.3: This section provides a summary of the tidal mixing zone studies conducted at TI in 1995 and 2001, similar to the summary presented in the Introduction (Section 1.3.4). This summary is very general and addresses the range of tidal influence on groundwater throughout the island. It would be more helpful to relate this section more specifically to Site 32. For example, based on the results of the tidal mixing zone studies, what is the estimated degree of mixing between surface water and groundwater at Site 32 given its proximity to the bay? This should also be noted in Section 7.1 (Environmental setting and ecological characterization).**

Response: Sections 3.3.3 and 7.1 have been revised to indicate that tidal mixing is anticipated to range from 10 to 17 percent at IR Site 32.

3. **Comment:** **Section 4.2: This section states that the screening criteria for B(a)P EQ was set to 0.62 mg/kg to correspond with a cancer risk of 1×10^{-5}. Provide more clarification on how this screening criterion was developed and the rationale for using the less stringent risk criteria of 1×10^{-5} rather than 1×10^{-6}.**

Response: To screen data for potential stepout sampling, a B(a)P equivalent (EQ) screening criterion of 0.62 milligram per kilogram (mg/kg) was set in the risk management range. This screening criterion was not used for determining risk at the site.

RESPONSES TO COMMENTS FROM CHRISTINE KATIN, REMEDIAL PROJECT MANAGER, EPA

Specific Comments

1. **Comment:** **Section 6, page 6-13, RME Intake Parameters Table: The RME cancer risk estimate for the construction worker scenario falls within the EPA risk management range of 10^{-6} to 10^{-4} using an exposure duration of one year; however, it is unrealistic to assume that a construction worker will work on a contaminated site for only one year of his career. Please consider using a more realistic exposure duration to represent the risk to a construction worker on the site (25-30% of his career or 10 years).**

   Response: The exposure duration of 1 year used in the Site 32 RI Report risk assessment is consistent with DTSC and EPA guidance (DTSC 2000, EPA 2002b).

2. **Comment:** **Section 9: The report concludes that a feasibility study (FS) should be prepared to address PCB (Aroclor-1260) concentrations in soil. In addition to PCBs, it appears that dioxins in soil are contributing significantly to human health risk. Please explain why dioxin-contaminated soil was not recommended for further evaluation in an FS.**

   Response: Please see the response to Water Board specific comment 1 (page 1).

RESPONSES TO COMMENTS FROM SONCE DEVRIES, ECOLOGICAL RISK ASSESSOR, U.S. FISH AND WILDLIFE SERVICE

Specific Comments

1. **Comment:** **Section 7, General: The subject document states that the complete eco risk screening is forthcoming. This section in the draft is brief and incomplete; therefore, no assessment of total eco risk or the possible need for a baseline risk assessment can be made at this time.**

   Response: The "Final Screening-Level Ecological Risk Assessment (SLERA) for Sites 6, 12, 21, 24, 30, 31, 32, and 33, Naval Station Treasure Island, San Francisco, California" (SulTech 2007) was distributed on March 23, 2007. Forthcoming revisions of the Site 32 RI have been updated to include the SLERA document as it relates to IR Site 32.

2. **Comment:** **Section 7, General: Groundwater was never addressed as a pathway for contaminants to reach the Bay during the scoping discussions for the forthcoming eco risk assessment. This discussion should be part of the complete screening eco risk assessment. Please provide justification to support the conclusion that there is no possibility that groundwater with particulates carrying contaminants is reaching the Bay. If that is not the case, and there is a chance that the transport pathway is complete (as is suggested by the comparison of groundwater contaminant concentrations against screening criteria), then receptors have to be proposed and a screening performed. If there is risk, as is also indicated in the discussion, then a baseline is required.**

   Response: Concentrations of total petroleum hydocarbons (TPH) in groundwater samples were the only exceedances noted in the Environmental Baseline (EBS) Data Gaps initial sampling results (Shaw Environmental and Infrastructure, Inc. [Shaw] 2005a). TPH was reported as not detected in downgradient and crossgradient stepout sample locations. TPH as diesel and motor oil fractions are unlikely to be mobile.

   Because metals were not detected above both ambient and screening levels in samples below the surface soils (0 to 2 feet below ground surface [bgs]), metal detects in grab groundwater samples from Site 32 are considered to be a result of sample turbidity. Grab groundwater samples were collected using direct-push equipment immediately following completion of the soil boring. This sample collection process yields groundwater with suspended particulates. To verify that metals in grab

groundwater were a result of particulates at Parcel T065/T069, Shaw collected a grab sample and a filtered grab sample for metals analysis from boring T069HP004A. Metals concentrations in the grab sample from boring T069HP004A are comparable in both nature and extent to the grab groundwater metals results from Site 32, while the filtered metals results from boring T069HP004A show that only metals within ambient levels are dissolved in the groundwater (Shaw 2005a). Like parcel T065/069, metals detected in grab groundwater samples from Site 32 are considered a result of suspended particulates and not dissolved in groundwater; therefore, they are unlikely to be mobile. Section 7 will be revised to provide this comparison of data results from parcel T065/T069 to IR Site 32 metals detected in grab groundwater.

3. **Comment:** **Section 7: Please verify that the detection limits for pesticides and PCBs were sufficient to meet the screening criteria.**

Response: Table 7-1 has been added to Section 7 to present the statistical summary of sample detection limits as compared to the ecological screening criteria for groundwater. Additionally, Section 7 will be revised to include the following discussion:

> Although the majority of pesticide and polychlorinated biphenyl (PCB) detection limits for groundwater samples are greater than the ecological screening criteria, the lack of detected concentrations above screening levels in soil samples below 2 feet bgs indicates that pesticide and PCB contamination in groundwater is unlikely. The exception is Aroclor-1260, detected in soil at 3.7 feet bgs in boring location T111HP023. The chemical properties of Aroclor-1260—specifically, its low water solubility and high K_{ow}—indicates that PCB-1260 has a high affinity for suspended solids and is not dissolved in the groundwater. As a result, it is unlikely to be mobile.

4. **Comment:** **Section 7: Please identify the screening criteria being used to determine risk in this document (not by reference).**

Response: Please see the response to specific comment 3 above.

5. **Comment** **Section 7: The Navy must supply a supporting technical discussion for the following statement on page 7-2:** ***Metals sorbed to particulates are not considered to be mobile under groundwater conditions at NAVSTA TI.***

Response: Section 7 has been revised to include a discussion supporting the noted statement as well as a detailed discussion of groundwater conditions at NAVSTA TI.

6. **Comment** **Table 4-4: Please explain *NC – no applicable toxicity screening criterion established* as used for petroleum hydrocarbons and semivolatiles. Please identify the source of the screening values on the tables (not by referring to another document). Also, there are screening criteria available for PCBs and pesticides – please correct.**

Response: Table 4-4 provides analyte-specific screening criteria for chemicals detected in groundwater. Because there were no reported detections of PCBs or pesticides, analyte-specific screening criteria are not presented in this summary table. To provide specific sources for the groundwater screening values provided in Table 4-2, an appendix has been added to the RI Report.

RESPONSES TO COMMENTS FROM GARY FOOTE, PRINCIPAL GEOLOGIST, GEOMATRIX, ON BEHALF OF TIDA

General Comments

1. **Comment:** **The document concludes that a feasibility study should be performed to evaluate mitigation of risk from Aroclor-1260 (polychlorinated biphenyls [PCBs]) because PCB concentrations result in a non-cancer hazard index above the benchmark of 1. However, we note that the estimated cancer risk under several of the scenarios evaluated fall within, not below, the EPA's risk management range of 10^{-6} to 10^{-4}. The 10^{-6} level is used as the point of departure for determining remediation goals. From this point of departure, other site-specific risk management decisions are considered to justify a higher acceptable risk threshold within the 10^{-6} to 10^{-4} range (National Contingency Plan). Therefore, the final determination of the acceptable risk threshold is generally made on a site-specific basis by the lead regulatory agency.**

   Response: Comment noted.

Specific Comments

1. **Comment:** **Executive Summary, Page ES-4 Evaluation of Fate and Transport. In the second paragraph, the text states, "Because TPH is insoluble in water..." The text should clarify that middle-boiling (diesel range) and late-boiling (motor oil range) hydrocarbons have extremely low water solubilities. However, early boiling (gasoline range) hydrocarbons have relatively high water solubilities.**

   Response: The second paragraph in "Evaluation of Contaminant Fate and Transport" has been revised as suggested.

2. **Comment:** **Section 1.0, Section 1.2.2 History. This section does not describe the use of radio-nuclides associated with training activities at the U.S.S Pandemonium. For completeness, the text should include information from the recently completed Historical Radiological Assessment Report. Additionally, a figure should be provided that shows the location of the 11 historical buildings identified in this section, including Buildings 58, 403, and 404, which housed incinerators. This information will allow the reader to verify that the sampling program adequately addressed potential source areas. Finally, this section**

mentions the past storage of "pyrotechnics" in Building 42. Would the pyrotechnics have contained perchlorate?

Response: The report has been revised to include Section 1.3.6, Historical Radiological Assessment, which reads as follows:

> A Historical Radiological Assessment (HRA) was conducted in 2006 to designate sites on NAVSTA TI as either impacted, meaning the site has or at one time had the potential for radioactive contamination, or non-impacted, meaning there is no reasonable possibility for residual radioactive contamination. The HRA defined the extent of past operations, assessed the likelihood of potential contamination migration pathways, and recommended future actions. One site within the boundaries of IR Site 32 was assessed: the mock-up training ship USS Pandemonium (Building 371). The USS Pandemonium was moved to this location in 1969. It was used for radiation decontamination training exercises until 1992, and was demolished in 1996.
>
> The USS Pandemonium training site was designated a non-impacted site. Sealed cesium-137 (Cs-137) sources were used for fallout simulation, and leak tests confirmed there was no leakage. The short-lived liquid radioisotopes (bromine-82, bromine-80, sodium-24, and potassium-42) decayed away within 3 months of last use (1972). There were no reports of instrument check source leakage (Weston 2006).

Figures 1-4 and 2-1 have been revised to include historical building locations within the Site 32 boundaries as noted in the Basewide Environmental Baseline Survey Report (ERM-West, Inc. 1995). Although Building 42 was located on Parcel T111, the former building is not within the IR Site 32 boundaries.

3. **Comment: Section 1.0, Section 1.3.5 Environmental Baseline Survey Data Gaps Investigation. It would be helpful if this section summarized the information presented in the 1995 Environmental Baseline Survey that led to the data gaps investigation.**

Response: The first paragraphs of Sections 1.3.5.1 and 1.3.5.2 discuss the parcel-specific information leading to the requirement for further sampling at Parcels 111 and 115, respectively.

4. **Comment:** **Section 2.0, Section 2.4 Trenching Procedures. Please provide the information to support the statement that trenches were backfilled with "clean" material.**

Response: The following statement has been added to the second paragraph of Section 2.4: "The fill material was obtained from California Quarry in South San Francisco, California. Analytical data for this material is presented in Appendix C of the Dioxin Trenching Investigation (Shaw 2006)."

5. **Comment:** **Section 2.0, Section 2.8.6 Data Validation. Please identify which samples were considered unusable and why the data were rejected.**

Response: Section 2.8.6 has been revised to include the information on rejected analytes as presented in Appendix D, quality control summary report.

6. **Comment:** **Section 3.0, Figures 3-4 and 3-5. Please provide the source of information used to extrapolate geologic data below a depth of 7 feet, the typical maximum depth investigated at Site 32.**

Response: Figures 3-4 and 3-5 have been revised to include the source information, Lee 1969 and Geomatrix 1990, as provided in Section 3.2.2.1.

7. **Comment:** **Section 4.0, Section 4.0 Nature and Extent of Contamination. Please present and discuss data for sample locations that are near but not physically within Site 32 (e.g., locations T111HP018 and T115HP009). We understand that the data from these locations are not included in the human health risk assessment for Site 32. However, the data are useful for understanding the extent of contamination at Site 32.**

Response: Section 4.0 has been revised to include a discussion of neighboring sample locations outside the boundaries of IR Site 32.

8. **Comment:** **Section 4.0, Section 4.1.1.2 Dioxin Trenching Investigation. The text states that visual signs of burnt material were observed in trench ST-009. We could not identify this sample location on Figure 4-11. We understand that this burnt material was sampled and analyzed for dioxins. Please clearly identify which sample corresponds to the burnt material in this trench and discuss the results for this sample in Section 4.2.6.**

Response: The last sentence in Section 4.1.1.2 was revised to clarify that the location of the burnt material was trench S32-T009. Section 4.2.6 presents all dioxin detections at Site 32.

9. **Comment:** **Section 4.0, Section 4.2.1 Volatile Organic Compounds (VOCs; Soil). This section states that no VOCs were detected in soil samples. However, there is no discussion about whether the detection limits are below screening criteria. In fact, Table 4-3 indicates that no screening criteria were established for VOCs. We recommend establishing screening criteria and comparing the detection limits to the criteria to demonstrate that the data collected are adequate for assessing VOCs in soil at the site.**

Response: An additional table has been added to Section 4 to present the soil Preliminary Remediation Goals (PRG) for residential use (EPA 2004). Table 4-3 provides analyte specific screening criteria for soil only. Because there are no detections of VOCs, analyte specific screening criteria are not applicable.

Additionally, a statistical summary table for soil analyte detection limits as compared to the screening criteria has been added to Section 4.

10. **Comment:** **Section 4.0, Section 4.2.2 Total Petroleum Hydrocarbons (TPH; Soil). TPH quantified as diesel (TPHd) was detected at 7800 milligrams per kilogram (mg/kg) in the sample collected at a depth of 9 feet below ground surface (bgs) in boring T111HP012. Samples collected at nearly all other locations at the site were from depths shallower than 5 feet bgs. Therefore, there are no data to show the lateral extent of TPHd detected in the single sample collected from a depth of 9 feet bgs and this deeper soil has not been evaluated elsewhere throughout Site 32.**

Response: Although the photoionization detector used for field screening did not measure organic vapors at boring T111HP012, the boring was advanced beyond the soil-groundwater interface because discolored sand and a strong fuel odor were noted by the field crew. A sample was submitted for TPH analysis based on field indicators only. This was the only boring location noted having any TPH indicators at the soil-groundwater interface. Results from additional groundwater and soil stepout samples in the area of boring T111HP012 indicate the diesel contamination is limited to the area near T115HP007, T111HP012, and T115HP004.

11. **Comment:** **Section 4.0, Section 4.2.3 Polychlorinated Biphenyls (PCBs) and Pesticides (Soil). We note that the vertical extent of PCB contamination has not been delineated at location T111HP023 (35 mg/kg PCBs in the deepest sample collected at 3.7 feet bgs).**

Response: The potential for additional sampling at boring location T111HP023 will be addressed in the FS.

12. **Comment:** **Section 4.0, Section 4.3.2 Total Petroleum Hydrocarbons (Groundwater). The text describes two locations where TPH exceeds the screening criterion for groundwater, T115HP004 and T115HP007. It would be helpful if the text also pointed out that TPH did <u>not</u> exceed the screening criterion at locations immediately downgradient of these exceedances (T111HP026 and T111HP025, respectively). This discussion also should be included in Section 7.3.**

Response: Section 4.3.2 has been revised to include discussion of all detections of TPH. Section 7.3 has been revised as suggested.

13. **Comment:** **Section 4.0, Table 4-1. This table includes a summary of the total number of samples analyzed under various suites of analytes. However, this total should be subdivided based on sample matrix (soil vs. water).**

Response: Table 4-1 presents soil samples followed by water samples collected at IR Site 32.

14. **Comment:** **Section 4.0, Table 4-3. The number of reported analyses includes sample duplicates. For example, the table indicates that 5 groundwater samples were analyzed for PCBs and pesticides. However, 2 of these 5 samples were duplicates and samples were only collected from 3 locations. We believe the table is potentially misleading and that it should be revised to clarify the number of <u>locations</u> where groundwater samples were collected.**

Response: Table 4-4 "Statistical Summary of Groundwater Analytical Results" has been revised to eliminate duplicate groundwater samples.

15. **Comment:** **Section 4.0, All Figures. The figures should show sample depths at all locations, even when the analyte(s) were non-detect in all samples. The number of samples and the depth at which they were collected is important, <u>especially</u> when all samples were non-detect.**

Response: Figures 4-1 through 4-11 have been revised to include sample depths for nondetected results.

16. **Comment: Section 4.0, Figure 4-4. This figure indicates that 0.62 is the residential PRG in the description next to the blue dot. Consistent with the note at the bottom of the legend, this text should be revised to indicate that 0.62 mg/kg is the field screening value for TI.**

Response: Figure 4-4 has been revised to indicate that 0.62 mg/kg is the field screening criterion for B(a)P EQ data.

17. **Comment: Section 7.0, Section 7.2 Groundwater Data. The text states that chemical concentrations in groundwater above ecological screening criteria were due to suspended soil particulates in the grab groundwater samples and, therefore, were not considered to be chemicals of concern. While this assumption may be true, it is unfortunate that samples were collected in such a way as to include suspended particulates in the sample. To confirm the Navy's assumption, we suggest collecting groundwater samples that do not contain soil particulates. (This comment also applies to the Executive Summary, p. E-7).**

Response: Please see the response to U.S. Fish and Wildlife Service specific comment 2 (page 4).

RESPONSES TO COMMENTS FROM GREG BRORBY, EXPONENT, ON BEHALF OF TIDA

General Comments

1. **Comment:** **There is no mention of potential radionuclide contamination associated with the use of the U.S.S. Pandemonium for radiological decontamination training. At the July 2, 2005, scoping meeting for the Site 32 Remedial Investigation (RI), the U.S. Navy (Navy) proposed to evaluate this issue qualitatively based on information in the Historical Radiological Assessment (HRA). At that time, the Navy indicted that only very short-lived radionuclides were used. This information should be documented in the final Site 32 RI report.**

   Response: Please see the response to Geomatrix specific comment 2 (page 8).

2. **Comment:** **Several sections of the report suggest that there are no complete exposure pathways to chemicals in soil or groundwater at Site 32 under current site conditions, because the site is currently paved and mostly fenced, and the only current use of the site is for outside storage by Rubicon Landscaping Services (e.g., Executive Summary, p. ES-4, Section 1.4, p. 1-13). While the presence of pavement precludes direct contact with soil or groundwater, it does not prevent indirect exposure to volatile chemicals via inhalation of vapors in outdoor air. This potentially complete exposure pathway should be evaluated, at least qualitatively, in the final Site 32 RI report. Further, current utility workers could be exposed to chemicals in soil and groundwater at the site if utilities need to be installed or repaired in this area. While the Executive Summary (p. ES-5) and Section 1.5 (p. 1-13) acknowledge that the evaluation of the future hypothetical construction worker would be protective of utility workers, other sections of the report do not (e.g., Sections 6.1.3.1 and 6.1.3.2, p. 6-9). This should be made consistent throughout the entire Site 32 RI report.**

   Response: The presence of pavement not only prevents direct contact with soil or groundwater, it also acts as a barrier to prevent volatile chemicals from migrating to the outdoor air. Migration of vapors to outdoor air through cracks in the pavement would be minimal. The text has been modified to clarify this point.

   The text in Section 6 of the main report has been revised to acknowledge that the future hypothetical construction scenario would be protective of utility workers.

3. **Comment:** **Vapor intrusion into indoor air is a topic of much debate, especially with regard to volatile chemicals in soil. The Base Closure Team (BCT) is currently discussing this issue, and the Navy is in the process of developing a "weight-of-evidence" approach to assessing the importance of vapor intrusion from volatile chemicals in soil. This ongoing debate should be acknowledged in the Site 32 RI report, especially when approaches being used have not been agreed upon (e.g., use of a finite [as opposed to infinite] source model).**

Response: A detailed discussion of vapor intrusion issues is provided below in the responses to Eileen Hughes, DTSC, specific comments 74 and 75 (page 53).

Specific Comments

1. **Comment:** **Section 6.1.1, p.6-2. This section states that nondetect results with reporting limits greater than the maximum detected concentration were excluded from consideration. As explained in Section I.3.0 (p. I-2), these data were excluded from the calculation of summary statistics, because "...these highly censored measurements provide no useful information for estimating population parameters..." While this may be true, there should be some discussion of the number of data points eliminated, the number of data points remaining, and whether the elimination of data points affects the adequacy of site characterization data (e.g., if all of the eliminated data were from one area and no other data existed for that area, then additional information may be necessary to complete the site characterization).**

Response: The Risk Assessment Guidance for Superfund (RAGS) Part D Table 2s (Tables I-2.1 through I-2.8) have been modified to include an additional column listing the number of high censored measurements (that is, censored measurements exceeding the maximum detected concentration) that were excluded from the exposure point concentration (EPC) calculations in the RAGS Table 3s. The adequacy of site characterization is addressed through the data quality objectives (DQO), provided in Section 1, as well as in the discussion of the nature and extent of contamination, provided in Chapter 4.

2. **Comment:** **Section 6.1.1.1, p. 6-2, 2nd bullet. This bullet implies that indirect exposure to volatile chemicals in soil was evaluated only for indoor receptors, whereas other sections of the report (e.g., Section 6.1.2.1, p.6-5) state that inhalation of vapors from soil in outdoor air was also evaluated. The exposure pathways evaluated should be clear and consistent throughout the entire report.**

Response: Both statements are correct. As stated in Section 6.1.1.1, p.6.2, 2nd bullet, indirect exposure to volatile chemicals in soil is defined as "exposure to vapor migrating from subsurface soil into indoor air." Inhalation of vapor from soil in indoor air was evaluated for both residential and commercial/industrial worker receptors. Inhalation of vapor from soil in outdoor air, as stated in Section 6.1.2.1, is considered a direct pathway, and was evaluated for residential, commercial/industrial worker, and construction worker receptors.

3. **Comment: Section 6.1.2, p.6-4, 2nd bullet. This bullet provides a definition of volatile chemicals based on molecular weight and Henry's Law constant and implies that this definition was used to identify volatile chemicals for purposes of the HHRA. While this definition appears in the cited U.S. Environmental Protection Agency (EPA) references, inhalation of vapors was actually evaluated for those chemicals listed in EPA's (and California EPA's [Cal-EPA's]) vapor intrusion guidance, some of which do not conform to this definition (e.g., chrysene). It would be simpler to state that chemicals listed in EPA's (and Cal-EPA's) vapor intrusion guidance were considered volatile for purposes of the HHRA. This comment also applies to Sections I.4.1 and I2-1.1.**

Response: The Navy appreciates the commenter's suggestion; however, the Navy prefers to retain its definition of volatile chemicals because it provides the criteria for volatility based on physical characteristics of the chemical. For the purposes of the human health risk assessment (HHRA), volatile chemicals are defined as chemicals with a molecular weight of less than 200 g/mol and a Henry's Law constant greater than 1×10^{-5} atm-m^3/mol, as cited in the Region 9 PRG table. Borderline chemicals such as pyrene that did not meet the strict definition of a volatile chemical were included in the Region 9 PRG table as volatile chemicals. Chrysene was conservatively included as a volatile chemical based on its borderline molecular weight (228) and its Henry's Law constant (9.5×10^5 atm-m^3/mol).

4. **Comment: Section 6.1.2.2, p. 6-7. This section states that inhalation of vapors in outdoor air was evaluated for volatile chemicals detected in groundwater. In addition, the conceptual site model shown in Figure 6-2 indicates that this pathway was evaluated for all three receptors (i.e., future hypothetical residents, commercial/industrial workers, and construction workers). However, as explained further in Appendix I (Section I.5.2, p. I-6), this pathway was evaluated only for the future hypothetical construction worker. This exposure pathway should be evaluated for all three receptors, or an explanation should**

be provided as to why this exposure pathway is not evaluated for the hypothetical future resident and commercial/industrial worker.

Response: Inhalation of vapor in outdoor air from groundwater was not evaluated for the resident or commercial/industrial worker because inhalation of vapor in indoor air from groundwater is expected to be the dominant pathway of exposure for inhalation of vapor from groundwater. However, inhalation of vapor in outdoor air from soil is evaluated for each of these receptors. The text has been revised to clarify this point.

5. **Comment:** **Section 6.1.3.5, p. 6-13. The table on this page should include a reference to the location in the document of the chemical-specific dermal absorption factors (i.e., Table I-5). Further, this table should also list chemical-specific permeability constants as a parameter, and again refer the reader to Table I-5.**

Response: The table on page 6-13 has been revised to include a reference to chemical-specific parameters found in Table I-5.

6. **Comment:** **Section 6.2.2, p. 6-19. This section states, "HI is the sum of all chemical-specific HQ values and was not conducted because a chemical-specific HQ for Aroclor 1260 yielded a value greater than 1." This sentence is confusing. I believe it means that no target-organ-specific HIs were calculated, but it is unclear as currently written.**

Response: The purpose of conducting a target-organ analysis is to determine if the cumulative effect of the various chemicals would affect the same organ. If a chemical-specific HQ is greater than 1, a target-organ specific HI would also be greater than 1. Because Aroclor-1260 yielded an HQ of greater than 1, a target-organ-specific evaluation was not necessary. Section 6.2.2 has been revised to state, "HI is the sum of all chemical-specific HQ values. A target-organ specific HI analysis was not conducted because a chemical-specific HQ for Aroclor-1260 yielded a value greater than 1."

7. **Comment:** **Section 6.3.4, p. 6-26, 2nd paragraph. There is a single quotation mark in the middle of this paragraph. It is unclear whether the text in this paragraph is a direct quotation (and the second quotation mark is missing), or the single quotation mark is extraneous.**

Response: The single quotation mark is extraneous and has been removed from the text.

8. **Comment:** **Section 6.4, p. 6-32. This section states, "Although B(a)P is identified as a cancer risk driver for soil, the B(a)P EQ was not exceeded in any of the samples." This sentence is confusing, because the preceding sentences acknowledge that the B(a)P concentration exceeded the Region IX PRG in four samples. Based on information presented in Section 9.3.3 (p. 9-3), I believe that this sentence is referring to a site-specific screening criterion for B(a)P EQ, as opposed to the Region IX PRG for B(a)P. If so, this should be made clear in this section.**

Response: Sections 6.4 and 9.3.3 have been revised to appropriately discuss B(a)P and B(a)P EQ concentrations.

9. **Comment:** **Figure 6-1 and Section I.3.1, p. I-4. It is unclear why it "should be noted" that inorganic chemicals recognized as essential nutrients, and iron, were not analyzed for in soil and groundwater samples collected at IR Site 32. Unless there is a reason to make this note (e.g., these chemicals were *not* analyzed for but should have been), I suggest revising Figure 6-1 and the text to eliminate reference to essential nutrients and iron. I would also suggest removing the phrase "except for essential nutrients" from the first sentence of Section I5.2 in Attachment I5 (p. I5-1).**

Response: Figure 6-1 and Section I.3.1 have been revised to eliminate the discussion on essential nutrients.

10. **Comment:** **Figure 6-2. Under route of exposure, there is a sentence that states, "Groundwater is not a current or potential drinking water source at Site 33." This sentence should be revised to specify Site 32 rather than Site 33.**

Response: Figure 6-2 has been revised as noted.

11. **Comment:** **Section I.5.2.2.1. The reasonable maximum exposure (RME) inhalation rate for the future hypothetical commercial/industrial worker is the only value presented in units of cubic meters per day. For consistency (and comparability), this value should be presented in units of cubic meters per hour.**

Response: The RME inhalation rate discussion has been revised to present values in consistent units for all potentially exposed populations.

12. **Comment:** **Section I.5.2.2.3. The values for the central tendency exposure (CTE) dermal adherence factor should be included in this section for consistency (i.e., all other CTE Values are specified).**

Response: The values for the CTE dermal adherence factors have been added.

13. **Comment:** **Section I.6.4, p. I-14. The value for the chronic minimum risk level for dioxin developed by the Agency for Toxic Substances Disease Registry (ATSDR) should be included in this section consistency (i.e., all other toxicity values are specified).**

Response: The value for the chronic minimum risk level for dioxins developed by ATSDR has been included.

14. **Comment:** **Section I.6.4, p. I-15. It is my understanding that the World Health Organization has recently updated their recommended toxicity equivalent factors (TEFs) for dioxins and furans. Based on a comparison to the 1998 values, the TEFs for octachlorinated dioxins and furans went up, and the TEFs for pentachlorinated furans went down. The potential impact of these changes on the dioxin toxicity equivalent (TEQ) concentrations should be discussed in the Final RI report.**

Response: In June 2005, the World Health Organization (WHO) re-evaluated the previous 1998 values for the toxic equivalency factors for dioxins and dioxin-like compounds. Changes included an increase of the TEFs for OCDD and OCDF by a factor of 3 and a decrease of the TEF for 1,2,3,7,8-PeCDF and 2,3,4,7,8-PeCDF by 40 percent. The revised TEFs were published in the July 7, 2006, *ToxSci Advanced Access*. At the time of the release of document, the Navy was finalizing the internal review of the Site 32 RI. The impact of the most recent TEFs was evaluated. As shown in the table below, replacing the 1998 TEFs with the 2005 TEFs would increase the EPCs by less than 5 percent for both the surface soil and combined surface and subsurface soil datasets. The corresponding change to the cancer risks and noncancer hazard effects would not impact the remedial decisions.

Comparison of Dioxin (TEQ) Using WHO98 and WHO05 TEF Values			
Dataset	**$TEQ_{WHO\ 98}$ (ng/kg)**	**TEQ_{WHO_05} (ng/kg)**	**Percent Change**
Surface Soil	37.7	39.3	+4.26%
Combined Surface and Subsurface Soil	29.3	30.4	+3.48%

The potential impacts of these changes have been addressed in Section I.6.4.

15. **Comment:** **Section I.7.3, p. 1-17. A footnote should be added to the table to indicate that the noncancer hazard index (HI) estimates for the future hypothetical resident are based on the HIs calculated for the child resident (see Section 6.1.5, p. 6-15).**

Response: Section I.7.3 has been revised to include the suggested footnote.

16. **Comment:** **Attachment I5.4, p. I5-3. It is unclear what is meant by the term "significant" with regard to ambient arsenic concentrations.**

Response: The term "significant" has been removed, and the text has been revised with more precise language.

RESPONSES TO COMMENTS FROM EILEEN HUGHES, SENIOR ENGINEERING GEOLOGIST, DTSC

General Comments

1. **Comment:** ***Potential sources.*** **Multiple activities were conducted at Site 32 including: incineration, tear gas trainings, hazardous materials/waste storage, salvage operations, pyrotechnics and arms storage, transformers, and shop operations. These activities may be associated with source areas for contamination. However, information on the locations of activities is not provided (with few exceptions). Moreover, the report does not describe how various areas were included or excluded from investigation as potential source areas. That is, a logical path linking site activities and potential contaminants to the sampling and analysis program is not presented. Therefore, it has not been demonstrated that the investigation (i.e., analytes, locations, depths, number of samples) is appropriate or adequate. Questions are raised by the site activities, but the report does not provide answers to many questions. Examples of questions: Was tear gas contamination investigated? Were dioxin samples located proximate to the incinerators? How were "mock-ups" and USS Pandemonium used? Recommendations: The RI Report should be a stand-alone document providing a transparent summary of site activities and the rationale and approach to site investigations. To meet this objective, please respond to the following requests.**

   a) Provide a tabulated summary of all buildings, structures, storage areas for hazardous substances/wastes and radiological materials, and polychlorinated biphenyls (PCBs) areas. For each location, describe activities through time and hazardous materials used and stored. Identify potential source areas and potential contaminants. Summarize investigations associated with each potential source area. Discuss the use of lead-based paint and asbestos on site.

   b) Include a figure showing locations of all current and historic buildings, storage/staging areas, PCB areas, wash pads, and structures (e.g., mock-ups, tanks). Include buildings and structures on nearby parcels (e.g., Site 10). Have outfalls, drain lines, and sumps been investigated?

   c) Identify all regulated units (e.g., waste managements units, underground storage tanks).

d) Document all uses of radiological materials at Site 32 (e.g., tracers used for training exercises). Summarize radiological investigations and include citations.

e) At adjacent Site 12, multiple disposal areas were located along the Bay margin. Has similar disposal occurred at Site 32?

f) Include building plans and aerial photographs.

g) Summarize investigations on adjoining parcels and offshore areas. Include figures showing site features, sources, and extent of contamination (e.g., pesticide storage, USTs, offshore samples).

h) Are there current or historic water supply wells at Treasure Island?

i) Provide rationales for sampling locations. For example: Why were only shallow samples collected (generally less than 5 feet below the ground surface (fbgs), with only one sample below 9 fbgs)? Why was grid sampling used on T111 and not on T115? Biased sampling was conducted near the transformer pad. Was biased sampling considered for other areas of suspected contamination?

j) For references cited, provide document titles and page numbers and include the cited references (e.g., workplan) in PDF files on a compact disc included with the report.

Response: (a) To further document the sampling approach, DQOs for the data gaps investigation have been provided in more detail in Section 1.3.5. As discussed in Sections 1.3.5.1 and 1.3.5.2, PCB contamination was the only known source requiring investigation prior to the data gaps sampling effort. As noted in Sections 4.1.1 and 4.1.2, all contaminants of potential concern historically found at NAVSTA TI were initially sampled and analyzed across the site. Because the site was historically used to store hazardous waste, this catchall approach was used to determine contaminants of potential concern at the site.

Additionally, Section 1.2.2 has been revised to include information on operations at the USS Pandemonium training site and tear gas training within Building 463, as well as why sampling for 2-chlorobenzalmalononitrile (CS) powder and Bromine-82 was not considered necessary.

(b) Please see the response to Geomatrix specific comment 2 (page 8).

(c) No known regulated units have been identified at IR Site 32.

(d) Please see the response to Geomatrix specific comment 2 (page 8).

(e) Please see the response to comment "a" above.

(f) An aerial photograph is provided in Figures 1-2 and 1-3. Section 1.2.2 and Figure 1-4 have been revised to present all historical building locations and known operations.

(g) Please see the response to Geomatrix specific comment 7 (page 9).

(h) There are no documented or noted current or historic water supply wells at NAVSTA TI.

(i) Please see the responses to comment "a," above, and Geomatrix specific comment 10 (page 10).

(j) Specific information necessary to fully evaluate the IR Site 32 RI Report has been included in the text or appendices.

2. **Comment:** ***Extent of contamination.*** **The approach taken in these comments is that additional investigations are warranted where the extent of contamination has not been determined. However, the evaluation of the extent of contamination is hampered by the lack of information about potential sources (as discussed above). Therefore, comments on extent of contamination may be incomplete. Also, the need for additional investigation is somewhat dependent on proposed reuse. In some cases, investigation may not be necessary – for example, if a parking lot will function as a soil cap. In other cases, investigations may be postponed to the remedial action phase.**

a) Polychlorinated biphenyls. PCBs were not linked to the transformer pad exclusively. In fact, significant shallow contamination was measured over most of the site. Higher concentrations and deeper contamination was measured at the shoreline (far from the transformer pad). The extent of PCB in the direction of the Bay has not been determined (e.g., 79 mg/kg at T111HP016). The extent of PCBs at depth was not determined near the shoreline at T111HP023 (35 mg/kg at 3.7 fbgs) and at T111HP038

and T111014 and T111013 (1.6 at 4.3 fbgs and 0.35 at 4 fbgs and 0.30 at 4.4 fbgs). Parcel T115 was not investigated for PCBs.

Recommendations: **Perform additional sampling at depth (especially at the shoreline) to determine the extent of PCB contamination as well as stepout samples in the direction of the Bay. Discuss sources of PCB contamination.**

b) Total petroleum hydrocarbons (TPH). The extent of TPH-diesel (TPH-d) in soil at T111HP012 (7,800 mg/kg at 9 fbgs) was not determined, since nearby borings did not extend to 9 fbgs. The extent in groundwater was not determined.

Recommendations: **Perform additional sampling to determine the extent of TPH contamination in soil near T111HP012 (to depths of at least 9 fbgs). Discuss sources of TPH contamination.**

c) Dioxin. Dioxin was present above the dioxin toxicity equivalent level (TEQ) in shallow soils (at about 1 feet bgs) over most of the southern portion of Site 32. Except for two locations at opposite ends of the site, samples were not collected near the shoreline. The horizontal extent has not been determined at two locations along the shoreline (S32-T001 and S32-T009) and at three locations near the southern boundary (T111HP006, T111HP034, and T111HP011, on the boundary of T111 and T115). Parcel T115 has not been investigated for dioxins. Soils below 2 feet bgs were not analyzed for dioxins at most locations; therefore, the extent of dioxin contamination in deeper soils has not been determined. However, for locations where samples were collected at 3 fbgs, TEQs were not exceeded.

Recommendations: **Perform additional sampling at depth, at boundaries, and near the shoreline to determine the full extent of dioxin contamination. Discuss sampling locations with respect to the locations of incinerators and other incendiary activities. On Figure 4-11, identify cancer and noncancer risks levels for the screening criteria (i.e., TEQ of 12 ng/kg).**

d) Semi-volatile organic compounds (SVOCs).

> **i) Detection limits (DLs) for SVOCs in soil often exceed screening criteria, perhaps due to presence of TPH. Consequently, the extent of SVOCs (primarily polycyclic aromatic compounds, or PAHs) may be underestimated. Also, samples with elevated DLs were eliminated from the risk assessment (Appendix I, Section 1.3.0); therefore, risks due to SVOCs may be underestimated. Locations where**

benzo(a)pyrene B(a)P as non-detect (ND) and excludes B(a)P from risk calculations. Because of the manner in which NDs are depicted on figures, Figures 4-3 and 4-4 may be misleading regarding the possible extent of SVOC contamination.

Recommendations: **Collect additional samples near TPH areas and analyze using techniques for lower DLs. Revise figures and tables to show all DL exceedences and to include the DLs for all respective analytes (i.e., < x mg/kg, where x is the elevated DL).**

ii) *Recommendations:* Revise Figure 4-4 to show exceedences of B(a)P equivalent (EQ) of ECLR of 10-6 (not of 10-5).

iii) Maximum DLs for SVOCs (and other compounds) as shown on Appendix I Tables do not include maximum values shown in Appendix B: Analytical Results for Soil Samples.

Recommendations: **Please revise DLs on Appendix I tables (for SVOCs and other compounds) to be consistent with other tables.**

e) Volatile organic compounds (VOCs). Because of high potential VOC loss with other sampling methods (especially in sandy soils like Site 32 soils), DTSC guidance requires the use of EnCore™-type samplers or chemical preservation in the field (with methanol or sodium bisulfate) for VOC and TPH-purgeable (TPH-p) analyses in soil. Also, Method 5035 is required for VOCs. At Site 32, EnCore™ samplers were used for TPH-p analyses, but glass jars or acetate sleeves were used for VOC analyses by Method 8260B (Table D-1). Therefore, VOC results are considered to be very low-biased. DLs were low over most of the site and VOCs were not detected over most of the site. However, in areas of TPH contamination, DLs were elevated and the presence of VOCs has not been ruled out. DTSC is concerned regarding the potential for air vapor intrusion into occupied buildings. As noted below (in Attachment I2 Comments), active soil gas samples are recommended for risk assessment for the air vapor intrusion pathway. Passive soil gas samples may be useful for identifying hotspots.

Recommendations: **To confirm previous results, collect soil and groundwater for VOC analysis. In addition, collect soil gas samples at selected locations (e.g., TPH areas). For all media, use the sampling and analytical protocols in Interim Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (DTSC,**

2005). Provide an estimation of risks and hazards associated with the maximum DL for naphthalene.

f) Pesticides. Pesticides were measured above screening criteria at three shallow locations on the shoreline. Nearby samples are fairly distant (about 70 feet). Pesticides were stored at a site directly adjacent to Site 32.

Recommendations: **Further delineate pesticide contamination. Discuss sources.**

g) Metals and other inorganics

i) Arsenic (As) is ubiquitous at the site at elevated concentrations. Distribution and concentrations are consistent with ambient conditions.

ii) Lead.

Recommendations: **Stepout in the direction of the shoreline. Discuss possible sources for lead (Pb) on T115 (e.g., 994 mg/kg at T115HP004).**

iii) Metals in groundwater. Significant exceedances of screening criteria for metals and TPH were measured in groundwater grab samples collected at the shoreline. No wells exist and no wells are proposed. The text argues that no further investigation is needed because 1) high concentrations are due to high turbidity of grab samples, 2) soil near the groundwater/soil interface does not exhibit high concentrations, and 3) soil contaminants will not leach to groundwater (Section 5.3). However, if groundwater data is not representative due to high turbidity, then representative samples must still be collected in order to characterize the groundwater. Soil samples were not collected from deeper screened intervals of groundwater samples. Consequently, soil and groundwater samples do not correspond to the same intervals (or to the same volumes of media) and results are not directly comparable. TPH in groundwater may be associated with metals and other contaminants (e.g., metals and TPH north of Building 445). Moreover, groundwater analyses were limited. Few locations were sampled and all groundwater samples were not analyzed for all compounds. For example: no groundwater samples were collected from the southern half of the site. Pesticides and PCBs were analyzed at only three locations and dioxin was not analyzed in any groundwater

samples. Therefore, groundwater data are not sufficient to demonstrate whether leaching of compounds or mobilization in groundwater or in TPH occurred.

***Recommendations*: Install monitoring wells and initiate a monitoring program, particularly near the shoreline and in the TPH area, and analyze for metals and other site contaminants.**

iv) Hexavalent chromium has not been analyzed for; however, site activities do not rule out hexavalent chromium (i.e., paint shop). Total chromium (503 ug/L) exceeded screening criteria (50 ug/L) for groundwater.

***Recommendations:* Analyze groundwater and soil for hexavalent chromium. Discuss potential sources for hexavalent chromium.**

v) Manganese was not analyzed for. However, manganese can be a concern, especially for construction workers.

***Recommendations:* Sample for manganese in groundwater and soil. In the absence of samples, the risks associated with site-wide ambient values should be assumed. Calculate and discuss risks associated with site-wide ambient values for manganese.**

h) Pyrotechnics and munitions were stored or used at the site.

***Recommendations*: Analyze groundwater and soil for perchlorate. Discuss potential sources for perchlorate. Were pyrotechnics used during training activities? Discuss the potential for contamination due to munitions.**

i) Tear gas.

***Recommendations:* Provide more information on tear gas (e.g., site usage/storage, chemical properties). Discuss the investigation for tear gas, or provide the reasons an investigation was not conducted. Adjust sampling program, if necessary.**

j) The extent of contamination in nearshore areas of Site 32 has not been determined, as discussed in previous comments. In addition, the offshore area has not been investigated (Figure 5, Installation Restoration Site 13, Offshore Sediments, Record of Decision, April 7, 2005).

***Recommendations*: Stepout in nearshore areas and, if nearshore concentrations are high, investigate offshore areas.**

k) Discuss associated and/or commingled compounds (e.g., TPH and PCBs, TPH and metals).

l) Since composite samples dilute the concentrations of subsamples, discrete samples are generally preferred for remedial investigations, risk assessment, and confirmation sampling. Composite samples are mentioned in Section 6.0; however, composite samples are not distinguished from other samples in data presentations.

***Recommendations:* Identify all composite samples by the use of a different sample name (e.g., an identifying prefix or suffix) in all data presentations (i.e., tables and figures). Discuss composite samples within the text when investigations are described, including the number of subsamples and procedures used to make composites (e.g., mixed in field or mixed in the lab).**

m) Prior to conducting field work to address data gaps, provide supplemental remedial investigation workplans for DTSC's review.

Response: (a) Please see the response to general comment 1a above.

(b) Please see the response to Geomatrix specific comment 10 (page 10).

(c) In order to further document the sampling approach, DQOs for the dioxin trenching investigation have been provided in more detail in Section 1.3.6. Figures 1-4 and 2-1 have been revised to include all existing and historical building locations at IR Site 32.

(d) SVOCs:

(d-i) With the exception of TPH reported at T111HP012, TPH results exceeding the screening criterion are collocated with Aroclor-1260 contamination in the upper 2 feet of soil at IR Site 32. These elevated TPH detections necessitated the dilution of samples for PAH analysis, yielding high nondetected results. Because remedial actions are warranted to mitigate the risk from Aroclor—1260, these actions will effectively resolve the elevated TPH and any potential PAH concern in the upper 2 feet of soil.

(d-ii) Please see the response to Water Board specific comment 3 (page 2).

(d-iii) Appendix I tables do not present the same maximum detection limits as those shown in Appendix B, because the HHRA uses a reduced data set. For instance, nondetect results with reporting limits greater than the maximum detected concentrations were excluded from consideration since elevated censored measurements provide no useful information for estimating population parameters.

(e) Section 2.5 and Section D-2 of Appendix D present the correct method used for VOC sample collection. Table D-1 has been revised to reflect that U.S. Environmental Protection Agency (EPA) SW-846 Method 5035 (EPA 1996) was used for all VOC and TPH-p sample collection.

(f) Please see the response to Geomatrix specific comment 7 (page 9). Pesticides were sampled on a grid across the site and have been adequately characterized. Because the rip-rap area prevents further sampling along the shoreline, additional pesticide sampling is not feasible.

(g) Metals and other inorganics:

(g-i) Comment noted.

(g-ii) Because the riprap area prevents further sampling along the shoreline, additional sampling is not feasible in this area.

(g-iii) Please see the responses to U.S. Fish and Wildlife Service specific comments 2 and 3 (pages 4 and 5).

(g-iv) Hexavalent chromium was not identified as a potential contaminant of concern in the DQOs for the EBS data gaps sampling effort and therefore was not analyzed in the groundwater or soil samples.

(g-v) Manganese was not identified as a potential contaminant of concern in the DQOs for the EBS data gaps sampling effort and therefore not analyzed in the groundwater or soil samples.

(h) Please see the response to Geomatrix specific comment 2 (page 7).

(i) Please see the response to general comment 1a above.

(j) DQOs developed for the EBS data gaps sampling and the dioxin trenching investigation have been satisfied. Additional sampling at IR Site 32 is not warranted at this time.

(k) Section 4.4 has been revised to include a discussion on commingled compounds.

(l) Section 6 has been revised to indicate that composite samples were not collected at IR Site 32.

(m) Comment noted.

3. **Comment:** ***Preliminary remedial screening criteria (PRCs) for soil and groundwater***

Recommendations: **Provide additional information as requested below so that the appropriateness of RI screening criteria for Site 32, including intended reuses at Site 32, can be evaluated.**

a) Exceedence of PRCs is an indication that additional work or evaluation is needed for site characterization. However, stepouts were not performed at all PRC exceedences and human health data gaps still exist (General Comment 2). Moreover, ecological data gaps may exist since ecological concerns were not included in the development of soil PRCs. Chemicals of potential concern (COPCs) for the Human Health Risk Assessment (HHRA) were developed based on limited site data. Hence, the HHRA and the screening level ecological risk assessment (SLERA) may not fully describe potential site risks.

b) Discuss pathways of exposure that were considered during development of PRCs and the appropriateness of the PRCs with regard to Site 32 site conditions, site reuse, and the conceptual site model for Site 32. For example, were ecological risks, threats to groundwater and surface water, and volatization to indoor air considered for soil PRCs?

c) Include a table for soil criteria, similar to Table 4-2 which contains groundwater criteria.

d) Revise soil and groundwater tables to indicate various criteria considered and criteria selected as most conservative (e.g., ambient value, water quality criteria, maximum contaminant levels). Include each compound detected in soil and/or groundwater at TI.

e) Include the letter from the Regional Water Quality Control Board (RWQCB) stating that TI groundwater is not drinking water based on limited yields. DTSC does not support the groundwater potability determination as being the CERCLA remedy for contaminated groundwater. Instead, institutional controls should be the CERCLA remedy.

f) Discuss exposures assumed for TPH criteria (Appendix G).

g) With regard to ecological receptors, PRCs for TPH relate to tidal influence and tidal mixing zones (Appendix G). The concerns regarding proximity to ecological receptors apply for other contaminants as well. Revise figures to include tidal influence and tidal mixing zones.

h) With regard to preferential pathways for migration of TPH (and other compounds), Appendix G notes: "If groundwater discharges directly to storm drains, then groundwater concentrations should be compared directly to PRCs, without consideration of plume stability or tidal mixing effects." (Footnote 7) Discuss preferential pathways. Revise Figure 1-4 to distinguish reaches of utilities which lie below the high groundwater table.

i) Include a figure which shows proposed reuses. Revise text and figures to reflect recent decisions of the City (if any). If specific uses for each area have not been designated, please state this fact and indicate that, in absence of specific reuse designations, the most protective PRCs apply.

j) Reference to another document for information about PRCs (Table 4-2, Footnote a) is not sufficient since this RI Report should be a stand-alone document.

Response: (a) Please see the response to general comment 2j above.

(b) Screening criteria were developed along with DQOs during the EBS data gaps and dioxin trenching investigations. These criteria were used to assess potential stepout sampling locations only. Regardless of the screening criteria used for stepout sampling, all potential human health and ecological exposures were used for risk assessment assumptions.

(c) Please see the response to Geomatrix specific comment 9 (page 9).

(d) Please see the response to U.S. Fish and Wildlife Service specific comment 6 (page 6) and the previous response to comment 3c above.

(e) The 2001 letter from the Water Board to Ann Klimek of the Navy is attached to these responses to comments (RTC) and has been included as an additional appendix to the RI Report.

(f) For human receptors, criteria for petroleum organics in soil are based on Presidio calculations, and criteria for TPH constituents in soil are based on 2002 Region 9 PRGs. For soil exposures, pathways evaluated include ingestion, dermal contact, and inhalation of vapors and particulates in outdoor air.

Appendix G has been revised to provide the complete Final Preliminary Remediation Criteria for Petroleum and Petroleum Constituents Technical Memorandum (Tetra Tech 2001).

(g) The Technical Memorandum provided in Appendix G is a final document distributed in November 2001. The document may not be revised.

(h) Appendix G is a final document that was distributed in November 2001. Any deviations from this technical memorandum require documentation in the RI text and not in the document itself. The storm drains are presented in the IR Site 13 RI Report. The summary of the IR Site 13 RI Report affecting the IR Site 32 Site boundaries has been appended to Section 1.3.

(i) As presented in Section 1.2.4, the potential reuse scenario for IR Site 32 is generic in nature. Additionally, over time the potential for reuse may change, thereby making previous assumptions void. Because the potential for residential reuse is the most restrictive for human health exposure assumptions, a residential reuse scenario has been assumed for all human health risk calculations. Presentation of the current reuse scenarios is therefore not consequential to the outcome of the RI Report.

(j) Please see the response to comment 3d above.

4. Comment: ***Risk assessment (RA) data set***

a) In the RA, the data set was assumed to be homogenous and data was used to develop risks for the site as a whole. The text says that "No localized areas of elevated concentration were identified and the distribution of chemical concentrations can be considered relatively homogenous." (Section 6.1.3.4) However, several areas of higher concentrations of contaminants are shown on figures: PCBs along the

northern shoreline, TPH near the transformer pad, dioxins in the center of the site, and TPH and metals north of Building 445 along the shoreline. The RA assumption of homogeneity may result in underestimating of risk at hotspots. For example, the conclusion: "there is no potential for unacceptable health effects from lead" would not apply to a child exposed to the lead hotspot (994 mg/kg). Also, hotspots were not fully delineated (General Comment 2); therefore, the data set may under-represent the extent of contamination. And, because potential source areas and sampling locations have not been linked, some hotspots may have not been discovered. Risk distribution figures, showing risks associated with hotspots, were not presented. Risks were not determined with regard to typical residential and industrial plots. Moreover, data density was less than usual for residential reuse. Although risks fell within USEPA's "risk management" range (ELCR of 10-4 to 10-6) for many compounds, evaluation on the basis of hotspots would result in some areas exceeding USEPA's risk management range. Areas with low data density would be shown as "unknown" risks.

Recommendations: **Provide analyses for the risks at hotspots. Discuss data set limitations.**

b) Two different approaches to ambient values are included in the report. For RI results, TI site-wide ambient values were used as screening criteria (Table 4-3 and Appendices E and F). For the RA, two-population statistical tests were used (as per USEPA and Navy guidance) to compare TI site-wide ambient data to Site 32 site-specific data (Appendix H). High concentrations that were "within ambient" based on results of statistical tests were not included in the RA Method 1. Some high concentrations were not individually evaluated in the RA (e.g., mercury at 4.4 mg/kg); and, based on the RA, no further investigations or evaluation are proposed for the feasibility study (FS). However, additional evaluation or investigation of high concentrations of metals is warranted (e.g., lead at 994 mg/kg and silver at 22.6 mg/kg at T115HP004 and mercury at 4.4 mg/kg at T115HP002), as well as inclusion in the FS.

Recommendation: **Include all metals that exceed TI ambient criteria in the FS.**

c) ***Recommendation:*** **Because of high concentrations near the Bay margin, erosion of contaminated soil into the Bay should be considered in the screening level ecological risk assessment (SLERA).**

Response: (a) As DTSC noted in comments 2a and 2c, PCBs and dioxins were detected in concentrations above screening levels over most of the site.

The PCB Aroclor-1260 was detected in soil above the residential PRG in 22 of 35 locations (Figure 4-5). Dioxin TEQ was detected in soil above the residential PRG in 13 of 22 locations (Figure 4-11). Due to the high frequency of exceedances, covering the majority of Site 32, neither of these chemicals was evaluated for hotspots. TPH was evaluated through the use of a number of surrogates such as benzene, toluene, ethylbenzene, and xylenes (BTEX) and PAHs, none of which presented a potential hotspot. No volatile organic compound was detected at Site 32, and the only PAH with exceedances, benzo(a)pyrene, had four exceedances of the residential PRG at four different areas of the Site (see Figure 4-3). The lead concentration (994 mg/kg) located at T115HP004 was considered anomalous based on the results of lead concentrations from nearby soil samples; concentrations in three surface soil samples within 15 feet of T115HP004 ranged from 3 to 248 mg/kg.

To account for uncertainty associated with sampling data, the 95 percent upper confidence limit of the mean (95UCL) was used as the exposure point concentration for the human health risk assessment. The average concentration is used rather than a hotspot concentration, consistent with EPA guidance (1992a): "If you assume that an exposed individual moves randomly across an exposure area, then the spatially-averaged soil concentration can be used to estimate the true average concentration contacted over time. While an individual may not actually exhibit a truly random pattern of movement across an exposure area, the assumption of equal time spent in different parts of the area is a simple but reasonable approach." Therefore, the 95UCL provides a reasonable, conservative estimate of concentrations a receptor would be exposed to at a site.

(b) For the HHRA ambient evaluation, a two-population test was conducted comparing the TI site-wide ambient data set to the Site 32 site-specific data set. Concentrations at a specific sampling location were not compared to ambient concentrations, but rather the entire Site 32 data set was evaluated as a whole. Therefore, evaluation of a single concentration of a metal that was determined to be within the ambient range by the two-population test, such as mercury and silver, would be inappropriate. Lead was determined to be above ambient and was evaluated using DTSC's Leadspread model in the HHRA.

(c) The RI Report was drafted prior to the completion of the basewide SLERA. Now that the basewide SLERA has been finalized, subsequent versions of the Site 32 RI Report have been revised to document the findings of the SLERA.

5. **Comment:** **Conclusions. The report recommends that: "A feasibility study should be performed to evaluate the mitigation of the risk from Aroclor-1260 to potential construction worker and residential receptors." Because of inappropriate COPC elimination, the RI Report does not recommend that the FS evaluate other COPCs, including dioxin, pesticides, metals (including lead), and TPH.**

Recommendations: **The FS should consider all COPCs in soil and groundwater, since: 1) linkage between potential sources and the sampling program has not been provided; 2) the data set for soil is relatively small for the site acreage and hotspots may be under-represented; 3) the data set for groundwater is small and is not confirmed by monitoring well samples; and 4) data gaps exist. Also, the FS conclusions would not consider ecological considerations, since an ecological risk assessment was not included and ecological receptors were not considered in soil PRCs.**

Response: (1) An FS for IR Site 32 is warranted based on the potential risk from Aroclor-1260. An FS will evaluate alternatives available to reduce this risk. With the exception of three low-level B(a)P detections below 2 feet bgs, all other COPC risk drivers within IR Site 32 are located in the upper 2 feet of soil. Remedial actions at IR Site 32 will effectively eliminate these COPC concerns; however, confirmation sampling for all IR Site 32 COPCs is warranted following remedial actions.

(2) Please see the response to general comment 4a above.

(3) Please see the response to U.S. Fish and Wildlife Service specific comment 2 (page 4).

(4) Please see the response to general comment 4c above.

6. **Comment:** **Land use restrictions. Due to the limits of investigation at Site 32, the RI Report should recommend that the FS evaluate several land use restrictions, including the following: 1) no soil disturbance below elevation of groundwater table (because no investigation below groundwater table); 2) no homegrown produce (because the pathway was not considered in RA); 3) installation of vapor barriers (or other engineered or institutional vapor control systems) for areas with incomplete characterization for VOCs; 4) no drinking water (groundwater not characterized and groundwater does not meet RWQCB's minimum yield requirements); and 5) no pumping of groundwater (because of salt water intrusion). Also, because the RI Report is inconclusive with respect to the appropriateness of Site 32**

for terrestrial habitats and wetlands creation, blanket ecological restrictions may apply.

Response: Comment noted.

Specific Comments

1. **Comment:** **Site History, page ES-1. Include locations of PCB equipment/storage in the site description, including the transformer pad north of Building 463.**

   Response: The sixth paragraph of Section 1.2.2 and the third paragraph of the executive summary have been revised to include the following sentence: "A concrete pad that formerly held an electrical transformer is located approximately 10 feet north of Building 463." Additionally, Figures 1-4 and 2-1 have been revised to include the estimated location of the previous transformer pad.

2. **Comment:** **Section 1.3.1: Preliminary Assessment and Site Inspection. Clarify whether Site 32 was inspected and/or identified during the Preliminary Assessment and Site Inspection (PA/SI).**

   Response: The next to last sentence in Section 1.3.1 has been revised to include the following sentence: "The PA/SI did not identify any potential for contamination within the boundaries of IR Site 32."

3. **Comment:** **Section 1.3.4: Tidal Mixing Study. Discuss limitations of modeling regarding site utilities and soil heterogeneity (e.g., sand lenses).**

   Response: Because the general geology of NAVSTA TI is homogeneous, tidal mixing is anticipated to affect IR Site 32 groundwater gradients in the manner described in Section 1.3.4. IR Site 32 utilities are above the groundwater elevation.

4. **Comment:** **Section 1.3.6: Dioxin Trenching Investigation. Discuss how trench locations were selected (e.g., random/biased towards incinerator locations)? Use a different symbol for trench samples on figures.**

   Response: Section 1.3.6 has been revised to include the following sentences: "Trench locations were located with respect to previous investigation results as well as established site landmarks such as building corners and fences. To confirm the previous detections and assess the vertical extent of dioxins, trenches S32-T10, S32-T11, and S32-T12 were paired with

EBS data gaps locations T111HP028, T111HP031, and T111HP030, respectively (Shaw 2006)."

Figures 2-1 and 4-11 have been revised to distinguish trench sample locations from direct push sample locations.

5. **Comment:** **Section 2.8.3: Field Duplicates. Field duplicates are used to evaluate the precision (i.e., data variability) of overall sampling and analysis methods: collection of 5 to 10 percent is customary. Explain why field duplicates were collected for groundwater samples but not for soil samples.**

Response: Field duplicates were collected for groundwater samples only, as specified in the Sampling and Analysis Plan (SAP) (Tetra Tech 2003). Specifically, the 2003 SAP reads as follows:

> Although field duplicate soil samples are sometimes collected as soil samples from adjacent locations, duplicate samples for soil will not be collected for this project for two reasons. First, because adjacent soil samples incorporate some spatial variability, these samples cannot be used directly to assess sampling precision. Furthermore, it is not practical to set quality control (QC) limits for the relative percent differences (RPD) of these samples, which precludes their use for QC purposes. Second, while the information on spatial variability that can be obtained from adjacent soil samples may be useful in assessing or implementing remedial options, no objectives relating to these data uses have been identified for this project. Rather, it has been determined that this type of information on spatial variability will be obtained during subsequent investigations at this site, if deemed necessary. Field duplicate samples will be collected for groundwater samples at a rate of one per 10 environmental samples or less.

6. **Comment:** **Section 2.9: Deviations from the SAP. The text says that no deviations were recorded. However, some changes were noted in the report. For example, dioxin was not analyzed at T111HP010. Another boring was advanced so that a deeper sample could be collected at T111HP012. Please summarize all changes.**

Response: Section 2.9 has been revised to read as follows: "Because discolored sand and a petroleum odor were observed in the boring location T111HP012, the boring was advanced beyond the soil-groundwater interface to 10 feet bgs, and a sample was collected."

The dioxin sample location was designated in the SAP (Tetra Tech 2003) to be collected from a random location; therefore, collection of dioxin at T111HP010 was not a deviation.

7. **Comment:** **Section 3.2.1: Regional Geology. Include a stratigraphic column showing geologic units and descriptions. Include cross sections of TI and YBI which extend to bedrock.**

Response: IR Site 32 is located on NAVSTA TI; therefore, general NAVSTA TI and site-specific geology have been presented on Figures 3-2, 3-4, and 3-5 of the RI Report.

8. **Comment:** **Section 3.3.2: Gradients and Flow Direction. Include the fact that no wells exist on Site 32 and that horizontal gradients are estimated based on elevations from wells located on other sites. On Figure 3-3, include wells used for groundwater elevation monitoring. Discuss vertical gradients and seasonal variation.**

Response: Sections 3.4 and 3.4.2, which present IR Site 32 hydrogeology, have been revised as follows: Figure 3-3 has been revised to indicate the source of the groundwater flow interpretation. Section 3.4.2 has been updated to include information on anticipated vertical gradients and seasonal variations in groundwater flow.

9. **Comment:** **Section 4.1.1.1: EBS Data Gaps Investigation. Include T115HP009 in the figures and tables of the RI Report.**

Response: Please see the response to Geomatrix general comment 7 (page 9).

10. **Comment:** **Section 4.1.1.2: Dioxin Trenching. The text should note that "burnt material" was observed at T111HP010, "burnt odor" at T111HP011, and "charcoal" at T111HP031. Also, regarding the last sentence, the log for T009 says "grey + black spotting", which does not necessarily mean "visual observation of burnt material". In fact, although the absence of burnt materials was noted on trench logs, the presence of burnt materials was not recorded on any trench log.**

Response: Please see the response to Geomatrix general comment 8 (page 10). Section 4.1.1.2 has been revised as suggested to include information found on the boring logs.

11. **Comment:** **Section 4.2: Soil Sample Results. Provide example calculations for benzo(a)pyrene equivalent concentrations (B(a)P EQs) and dioxin toxicity equivalent concentrations (TEQs). Explain how DLs are used**

in B(a)P EQ and TEQ calculations. Include B(a)P EQs and TEQs on Appendix B tables (and change titles accordingly). Provide a table for B(a)P EQs, similar to Table I-7 (for TEQs).

Response: Section 4.2 has been revised to include the formula for calculating B(a)P EQ and dioxin TEQ calculations. Additionally, the B(a)P EQ and dioxin TEQ calculations have been added to Appendix B.

12. **Comment: Section 4.2.3: SVOCs. Change the penultimate sentence to: "the B(a)P EQ criteria of 0.62 mg/kg was not exceeded...."**

Response: The next to last sentence in the last paragraph of Section 4.2.3 was revised to read, "Although B(a)P exceeded the screening criterion for soil, the B(a)P EQ screening criterion of 0.62 mg/kg was not exceeded in any of the samples (see Table 4-3)."

13. **Comment: Section 4.2.5: Metals. Add a sentence listing other metals measured above ambient levels. Distinguish between TI ambient levels and ambient levels as per the RA process.**

Response: The following sentence will be added as the second sentence in Section 4.2.5: "Arsenic, beryllium, cobalt, copper, lead, mercury, molybdenum, selenium, silver, vanadium, and zinc were detected above NAVSTA TI ambient levels."

14. **Comment: Section 5.2.4. Discuss preferential pathways.**

Response: Section 5.2.4 has been revised to include a discussion on preferential pathways.

15. **Comment: Sections 6.0 and 7.0. Review of risk assessments is deferred to DTSC's toxicologists. This report is not complete because a SLERA is not included (as noted in the text).**

Response: Please see the response to U.S. Fish and Wildlife Service specific comment 1 (page 4).

16. **Comment: Section 6.1.1. Results with reporting limits greater than detected concentrations were excluded from RA. As noted in General Comment 2d, TPH contamination is associated with elevated DLs, and subsequent potential underestimation of contamination and risk. Also, as noted in General Comment 2e, the soil sampling and analytical protocols used for VOCs may result in very-low biased results, with subsequent underestimation of contamination and risk.**

Response: Please see the response to general comment 2e above.

17. **Comment:** **Section 6.1.2: Identifying Chemicals of Potential Concern (COPCs). Nutrients and iron can be toxic if they exist above toxic levels, a condition that has been observed in the Bay Area with respect to iron (e.g., Hunters Point). However, it is not possible to determine whether this condition exists at Site 32 since nutrients and iron have not been analyzed for. That is, the elimination of nutrients and iron as COPCs (Figure 6-1) occurred prior to the investigation. To check the validity of the assumption, future investigations should analyze for nutrients and iron.**

Response: Please see the responses to general comments 1a and 2j above.

18. **Comment:** **Section 6.1.3.4. The data set for subsurface soil extends from 0 feet bgs to the top of the water table. Use of the water table is problematic since the water table is a variable surface, rising and falling with precipitation, tides, and artificial recharge (e.g., irrigation). Also, it is difficult to devise land use restrictions by reference to a variable surface. Instead, a unique depth or ground elevation (e.g., the highest elevation of the groundwater table) is recommended.**

Response: Comment noted. For this evaluation, a unique depth of 8 feet was used as the groundwater depth, representing the maximum depth to groundwater at the site.

19. **Comment:** **Section 6.2.4. Method 2 is described as "Site-Related". Such phrasing is confusing and suggests that Method 1 is not site-related. Please revise.**

Response: Both Method 1 and Method 2 provide site-related risks and hazards. The total risk was estimated by adding the risks and hazards from ambient metals to Method 2 risks and hazards. The Navy does not agree that identifying Method 2 as "Site-Related" precludes Method 1 from being "Site-Related" as well. Therefore, no change to this section is required.

20. **Comment:** **Section 6.3.5 says that the sample collection strategy was "purposive" and "samples were collected in areas of suspected or known contamination" and that risk is therefore overestimated. However, as discussed in General Comment 1, the logic connecting potential source areas to sampling locations was not provided (with exception of the transformer pad).**

Response: Please see the response to general comment 1a above.

21. **Comment:** **Section 6.3.1.0 says that historic operations were not associated with hexavalent chromium, but the RI Report has not ruled out past usages of hexavalent chromium (e.g., paint shop). Describe operations in more detail.**

Response: Please see the response to general comment 1a above.

22. **Comment:** **Section 7.3 argues that compounds at Site 32 are not mobile in groundwater. For example: "Neither TPH as diesel nor motor oil are soluble in water and are not considered mobile under groundwater conditions at NAVSTA TI." However, lighter end hydrocarbons are soluble and mobile in water; also, hydrocarbons may move in the subsurface as a separate phase.**

Response: Section 7.3 has been revised to indicate the appropriate information on TPH solubilities in groundwater as well as mobility information.

23. **Comment:** **Section 8.0: Applicable or Relevant and Appropriate Requirements (ARARs)**

a) No ARARs are identified Section 8.0. Please include the list of ARARs supplied by DTSC in 1994 (Section 8.1). Update the list to include changes post-1994.

b) Section 8.1 says: "This report presents only potential location-specific ARARs" and concludes "no additional location-specific ARARs were identified." (Section 8.3) (Emphasis added) Please include all location-specific ARARs previously identified.

Response: The text has been revised to note that ARARs will be developed in the feasibility study.

24. **Comment:** **Section 6.3.1.0 says that historic operations were not associated with hexavalent chromium, but the RI Report has not ruled out past usages of hexavalent chromium (e.g., paint shop). Describe operations in more detail.**

Response: Please see the response to general comment 1a above.

Figures

25. **Comment:** **Include a figure that shows all VOCs measured in soil and groundwater.**

Response: Appendix I has been updated to include figures presenting VOC detections in soil and groundwater.

26. Comment: Include a figure showing the planned reuses of the area.

Response: Reuse scenarios at IR Site 32 are varied to such an extent that including such a figure would not provide additional meaningful information.

27. Comment: Include topography of Site 32 and nearby areas on a figure.

Response: Like the majority of NAVSTA TI, Site 32 is relatively flat, as presented on Figure 1-2.

28. Comment: Figure 3-1. Include an explanation for areas with blue oblique lines in the Legend.

Response: Figure 3-1 has been revised to include the description of the blue oblique lines in the legend.

29. Comment: Figure 4-13. To be consistent with preceding figures, include groundwater criteria for all metals which have exceeded criteria.

Response: Figure 4-13 has been revised to include a table of groundwater screening criteria for each analyte presented.

30. Comment: Include a figure showing exceedances of ambient groundwater concentrations. Distinguish between TI ambient and RA ambient criteria.

Response: Figure 4-13 presents grab groundwater results for all samples exceeding the NAVSTA TI groundwater screening criteria. Since the HHRA ambient evaluation considers the entire data set as a whole and not individual concentrations, a figure showing exceedances of ambient groundwater concentrations would only refer to TI ambient criteria.

31. Comment: At T11HP011, the concentration of zinc is given as 95.5 mg/kg on the Figure 4-13 but as 955 mg/kg on Table 4-4. Please correct the figure.

Response: Figure 4-13 will be revised to present zinc at 955 micrograms per liter at location T111HP021.

Tables

32. **Comment:** **Tables 4-3 and 4-4. Include statistics on DLs (e.g., number of DLs above ambient levels or screening criteria).**

Response: Please see the response to Geomatrix general comment 9 (page 10).

33. **Comment:** **Table 4-3. Include thallium.**

Response: Please see the response to Geomatrix general comment 9 (page 10).

34. **Comment:** **Table 4-4. Include all metals which are listed on Table 4-2 (e.g., aluminum, antimony, beryllium, cadmium).**

Response: Table 4-4 is a statistical summary table that presents only detected analytes for groundwater samples collected from IR Site 32.

Appendix A: Borehole Logs [and Trench Logs]

35. **Comment:** **Revise title to include trench logs.**

Response: The Appendix A title has been revised to read "Appendix A Borehole and Trench Logs".

36. **Comment:** **Include screened intervals for locations where grab groundwater (e.g., Hydropunch©) samples were collected. For groundwater grab samples, distinguish locations where the grab sample was pumped out from those where the temporary screen was left in the ground.**

Response: Grab groundwater was collected using a Hydropunch® tool on direct-push equipment, as described in Section 2.6 of the RI Report. Grab samples collected with this equipment are pulled directly into the sample chamber. Because the "Final Field Activity Report Environmental Baseline Survey (EBS) Data Gaps Investigation, Naval Station Treasure Island, San Francisco, California" (Shaw 2005b) does not further document the use of temporary well screens in the text or on the boring logs, the last paragraph of Section 2.6 has been deleted.

Please note that the EBS Data Gaps Investigation Report (Shaw 2005b) is a final report; to recreate boring logs at this time is inappropriate.

37. **Comment:** **The logs indicate very poor recovery below the water table. Were alternative soil sampling methods (for fine sands) considered?**

Response: Because it was not a DQO to collect samples below the soil-groundwater interface (Tetra Tech 2003), alternative means of soil sample collection were not considered.

38. **Comment: Recovery was not recorded for all intervals. Clarify whether recovery was omitted or not determined for all intervals. Also, use consistent notation for recovered intervals (e.g., compare T111HP003, T111HP040, and T115HP002).**

Response: The EBS Data Gaps Investigation Report (Shaw 2005b) is a final report; to recreate boring logs at this time is inappropriate.

39. **Comment: Visual identification of burnt material was not a sufficient indicator of dioxin contamination during trenching (since no "burnt materials" were noted on logs). On boring logs, "charcoal" (T111HP031) and "burnt odor" (T111HP011) were good (but not sufficient) indicators, since dioxin was measured at locations where these indicators were not observed**

Response: Comment noted.

40. **Comment: Descriptions of materials on some logs are separated by a horizontal line based on increased wetness of the material (e.g., T111HP015). Horizontal lines should be used to indicate changes in the type of material observed, not moisture content. Please revise**

Response: Please see the response to specific comment 38 above.

41. **Comment: Provide legible copies of all logs.**

Response: Boring logs have been rescanned from the EBS Data Gaps Investigation Report (Shaw 2005b) and the Dioxin Trenching Investigation Technical Memorandum (Shaw 2006).

42. **Comment: Provide global positioning system (GPS) coordinates for all ground penetrations and trenches.**

Response: A table containing GPS coordinates for sampling locations at IR Site 32 has been added to Section 2.

43. **Comment: Discrepancies were noted (e.g., depths) and all information was not provided on some logs.**

a) Two different values for depth were often presented on the same log. Sometimes, total depth did not include the depth of groundwater samples. Clarify discrepancies for: T111HP005 (depth given as both 5 feet and 7 feet), T111HP021, T111HP022, T111HP023, T111HP025, T111HP026, T111HP037, T111HP040, T115HP001, T115HP002, T115HP004, T115HP006 (depth at 8.0 feet did not include the push to 12.0 feet for groundwater sampling), T115HP007, and T115HP008.

b) T111HP010. Remarks says: "Not analyzed, submit dioxins from HP011 instead". However HP011 is 75 feet distant from HP010. Explain why the "burnt material in soil" at 1 fbgs in HP0101 was not analyzed for dioxins. Explain why HP010 and HP011 were not both analyzed for dioxins.

c) T111HP012A. Boring 12B was installed adjacent to 12A. Include both borings on figures.

d) Sampling Method, Sample Number, and/or Sample Type were not provided for: T11HP001 to 019, T111HP020, T111HP025, T111HP026 (for biased sample collected at 7 fbgs because of "heavy diesel fuel smell" with "sheen" and PID reading of 103 ppm), T111HP036 (explain the "?" descriptor), T111HP039. T111HP040, T115HP001, T115HP002, T115HP005, T111HP006, T1115HP007, and T115HP008.

Response: Please see the response to specific comment 38 above. Additional information pertaining to sampling locations, as provided in the EBS Data Gaps Investigation Report (Shaw 2005a), is documented in Section 4.1.1.1.

44. Comment: Include a log for 07/10-HP020 (from Figure 2-1).

Response: Sample location 07/10-HP020 was sampled for field screening of TPH in 1995. A lithologic log was not prepared for this field sample location.

45. Comment: Provide dimensions (depths, lengths, widths) and orientations for trench logs (T001 to T012).

Response: Information from the Dioxin Trenching Investigation Technical Memorandum (Shaw 2006) is provided in Section 2.4. Additional information, such as more specific trench depths, lengths, and widths, was not provided in the technical memorandum (Shaw 2006).

46. Comment: Photoionization detector (PID) readings were not taken at all ground penetrations, as required for health and safety.

Response: Comment noted.

Appendix B: Analytical Results

47. Comment: Distinguish concentrations, equivalent concentrations, and DLs that exceed criteria.

Response: Please see the response to Geomatrix specific comment 9 (page 10).

48. Comment: Include B(a)P EQs and TEQs on tables.

Response: Please see the response to specific comment 11 above.

Appendix D: Quality Control Summary Report

49. Comment: Explain why the QAPP reporting goals for dioxins and furans are significantly elevated (2,500 ng/kg).

Response: Reporting limit goals provided in Appendix D have been revised.

Appendix E: Background and Ambient Metal Concentrations in Soils (TM: June 19, 1996)

50. Comment: Please include documentation of approval of the TM by DTSC and other regulatory agencies.

Response: The Technical Memorandum Estimation of Background and Ambient Metal Concentrations in Soils (PRC Environmental Management, Inc. [PRC] 1996) was developed in consultation with Base Realignment and Closure (BRAC) Cleanup Team (BCT) members in 1996. Additional references to BCT meeting minutes from 1996 demonstrating consultation over the ambient and background methodologies have been included with these RTCs.

51. Comment: Maximum values on Table 2 do not agree with maximum values on boxplots in Attachment H1.

Response: A revised copy of the soil Tech Memo (PRC 1996) without handwritten notes, will be submitted, and Table 2 will be revised to show corrected minimum and maximum detections.

The box plots provided in Attachment H-1 were only prepared for internal use by the risk assessors to aid them in interpreting the results of the ambient screening, and were inadvertently included in the RI.

To eliminate confusion, the box plots have been removed from the Final RI Report.

52. **Comment:** **Tables 1 and 2 have been amended by handwritten notes; however, the notes are illegible. Please provide legible copies and explain changes made to the original tables.**

Response: A revised version of the text with corrected tables has been inserted in place of the version previously used.

53. **Comment:** **Provide a clean copy of Figure 1.**

Response: A revised version of the figure has been inserted in place of the version previously used.

Appendix F: Estimation of Ambient Concentrations of Metals in Groundwater (TM: March 30, 2001)

54. **Comment:** **Please include documentation of approval of the TM by DTSC and other regulatory agencies.**

Response: By memorandum dated August 3, 2001, James Polisini of DTSC concurred that the Navy had addressed all comments on the draft Tech Memo for groundwater with the exception of antimony and mercury, to be discussed at a later date. The memorandum has been appended to these RTCs.

55. **Comment:** **Data from YBI (a natural island) has been combined with data from TI (a manmade island) for ambient calculations. From a geological perspective, it is not appropriate to combine these two data sets, since the geology is different on both islands. From a statistical perspective, two-population tests should be performed to determine if data can be treated as a single population.**

Response: No wells from IR Sites located on Yerba Buena Island(YBI) were included in the ambient metals study. The list of wells sampled is as follows:

01-MW01, 06-MW09, 06-MW20, 12-MW03, 12-MW04, 12-MW09, 14-MW04, 15-MW03, 17-MW01, 20-MW0l, 20-MW05, 21-MW01, 22-MW05, 24-MW01, 24-MW03, 25-MW01, 143-MW2, 180C-MW2, 201-MW3, 227-MW1, 227-MW2, 227-MW3, 368A-MW2, 368A-MW3, 368B-MWl, 368B-MW3.

56. **Comment:** **Groundwater sampling forms are not provided; therefore, it could not be determined if the requirements for low flow sampling have been met.**

Response: Please see response to specific comment 54 above.

57. **Comment:** **The presence of some high concentrations (i.e., outliers) suggests that some wells are in contaminated areas (e.g., zinc at 2,900J ug/L at 25MW01).**

Response: Comment noted. The groundwaterTech Memo (PRC 1996) was drafted in careful consultation with BCT members, who provided input as well as comments that were reviewed and addressed before the document was finalized.

58. **Comment:** **It is not clear which data were included in the ambient calculations. For several metals, Table 3 indicates that no outliers were eliminated. However, high concentrations in Appendix B were not included in the count of outliers on Table 3 (e.g., arsenic at 46.4 ug/L (20MW05), lead at 71.4 ug/L (14MW04), mercury 0.57 ug/L (20MW05)). Please clarify which Appendix B results were used for ambient calculations. Clarify whether bailed results shown on Figures 4 thru 8 were used. Include outliers on Figures 4 thru 35. Distinguish outliers by different symbols.**

Response: Comment noted. The Tech Memo (PRC 1996) was drafted in careful consultation with BCT members, who provided input as well as comments that were reviewed and addressed before the document was finalized.

59. **Comment:** **The text says that the fresh water lens (at the top of the water table) shrinks due to evapotranspiration. Does evapotranspiration dominate over preferential flow or over groundwater-to-surface water flow? Extensive surface cover suggests reduced evapotranspiration.**

Response: The text supports a conclusion that evapotranspiration is a contributing factor; it does not identify it as the dominant factor. The text states "Evapotranspiration contributes to the shrinking of the fresh-water lens and tends to increase the concentrations of metals during the dry season."

60. **Comment:** **There was some uniformity among wells. Wells were screened at similar intervals (usually from 3.5 to 13.5 fbgs). Dedicated pumps were used and samples were drawn from the same depth at each event. However, pump locations varied between wells (from 7 to 11 fbgs). Pumps near the water table may preferentially sample the fresh water lens at the top of the water table. Pumps near the bottoms**

of wells may sample more saline water (where the saltwater interface is about 13 fbgs).

Response: Comment noted. The Tech Memo (PRC 1996) was drafted in careful consultation with BCT members, who provided input as well as comments that were reviewed and addressed before the document was finalized.

61. **Comment: Appendix B shows only detected compounds–for example, results for lead and mercury are generally not shown for low flow samples. Please report the results for all metals analyzed. Also, include the DLs for all non-detects.**

Response: The document is final; to recreate tables at this time is inappropriate. Comment noted.

62. **Comment: Figures 1 to 13: Symbols cannot be distinguished and numbers are unclear. Provide legible copies.**

Response: A revised version of the figure has been inserted in place of the version previously used.

Appendix G: TPH Screening Criteria Table.

63. **Comment: Include Table 2 referred to in Footnote 6.**

Response: Appendix G has been revised to include Table 2.

Appendix H: Calculating EPCs [of Metals] and Conducting Ambient Screening of Soil and Groundwater

64. **Comment: Review of Appendix H is deferred to DTSC toxicologists.**

Response: Comment noted.

65. **Comment: Discrepancies were noted between maximum site-wide values on Appendix H boxplots and Appendix E Table 2. Moreover, with respect to ambient data sets, different approaches were used for different metals. For example, outliers were removed from site-wide data sets for most metals (Appendix E Table 2), but were apparently included for barium (boxplot page 1). Please provide explanations or resolve discrepancies and revise statistics as needed. (Values given in mg/kg.)**

a) Barium: boxplot (1090)/Table 2 (393). Table 2 notes that no values were excluded for barium. However, higher value(s) were used on boxplots when compared to Table 2 – which implies a larger data set. But, n values are identical on Table 2 and Table H-4. If no values were excluded, where did 1090 come from?

b) Lead: boxplot (51.4)/Table 2 (337). The highest value used in the boxplot is 51.4, compared to 337 on Table 2. That is, on the boxplot, higher values were eliminated and the data set was smaller. The n for Table 2 is 261: the n for the boxplot is 227 (Table H-4). Explain why the highest values were removed (and a smaller data set used) for boxplot calculations.

c) Mercury: The Site 32 maximum (4.4: boxplot) is greater than the maximum value used to calculate the TI site-wide ambient value (2.4). However, 4.4 is not the maximum detected on site because one value was excluded from the ambient calculation (Table 2). To view the range of values easily, please include outliers from site-wide data sets on boxplots (for mercury and other metals), and distinguish excluded values by a different color or symbol.

d) Selenium: Boxplot (1.4)/Table 2 (1.2). Table 2 notes that no values were excluded for selenium. A higher value was used on boxplots when compared to Table 2. Is 1.4 a transcription error?

e) Silver: Two different data sets were used for "background" on boxplots. Please explain.

f) Thallium: Provide boxplots for thallium and include thallium on Table H-4.

g) For comparison, include the TI site-wide ambient values on boxplots.

Response: (a, b) As noted in the response to specific comment 51, there are several typographical errors in Table 2 from the Tech Memo (PRC 1996). Please see the response to specific comment 51 for the corrected concentrations.

(c) The high outlier removed from the trimmed mercury data set had a concentration of 3.0 mg/kg. The current version of the electronic database only stores the final trimmed data sets from PRC (1996) that were developed in conjunction with the regulatory agencies, so it would not be

a straightforward exercise to comply with the reviewer's request to plot all of the original data, including the trimmed outlier measurements.

(d) The box plots display all of the detected and censored data within each data set, and the 1.4 mg/kg maximum concentration shown is a nondetect. The maximum detected concentration for selenium is 1.2 mg/kg.

(e) The Navy assumes the reviewer is referring to differences in the appearance of the ambient box plots for silver shown for the 0-2 ft bgs versus 0-8 ft bgs soil. The same data are shown in both plots; the difference in appearance is explained by the scales used to display the concentration ranges. The maximum concentration shown on the 0-2 ft bgs plot is 2.4 (from the ambient data set), whereas the maximum concentration in the 0-8 ft bgs plot is 22.6 (from the site data set), so the ambient data displayed in the 0-8 ft bgs are compressed relative to the plot shown for 0-2 ft bgs.

(f) Ambient screening was only conducted for metals with detected concentrations in the site data, and all of the site measurements for thallium were nondetect.

(g) The box plots in Attachment H-1 have been removed from the revised RI (see the response to specific comment 51 above).

66. **Comment:** **Two approaches to ambient determination (TI side-wide vs. RA two-population) resulted in significant differences of categorization. For example: Mercury at 4.4 was significantly above TI site-wide ambient of 0.51 mg/kg, but was excluded because "below or within ambient" for the RA (Table I2.7). Silver at 22.6 mg/kg was above the TI site-wide ambient of 0.45 mg/kg but was "below or within ambient" for the RA (Table I2.7). An analysis of vertical profiles of these metals (and other compounds) indicates that high concentrations are site-related. In addition, TI site-wide ambient determinations were developed in the early 1990s. Appendix H references are generally very recent. Discuss the consequences of comparing data sets (TI site-wide ambient vs. Site 32 site-specific) that were developed using different approaches.**

Response: The Navy's official background policy and background statistical guidance advocate the use of hypothesis testing and application of two-population statistical tests for determining whether site concentrations exceed background levels. In general, background screening should employ a weight-of-evidence process, and calculation of population

metrics, such as the threshold values used as background (or ambient) limits in Tables 1 and 2 from Appendix E, can be used as a complement to statistical tests.

Exclusive use of single-point threshold limits in background screening is contraindicated in Navy guidance in most instances. However, in cases where only one or a small number of site measurements are available, it is not possible to conduct two-population tests, and comparison to ambient thresholds may be the only alternative. Comparison of site measurements to upper limits or maximum background concentrations, however, has been and continues to be widely used in environmental assessments. For Site 32, site concentrations were only compared to threshold ambient values as part of the nature-and-extent evaluation. Ambient threshold values were simply an additional benchmark, and were used in a manner similar to comparisons to PRGs. All formal comparisons of IR Site 32 data to ambient values used two-population statistical tests, following Navy guidance.

67. Comment: Revise boxplots to say "ambient" not "background" since TI site-wide ambient values were used (not YBI background values).

Response: As stated in the response to specific comment 51, the box plots in Attachment H-1 have been removed from the revised RI. Also note that in both Navy and EPA background guidance for soil, the term "background" includes both natural and anthropogenic sources; the term "ambient" is not used in this guidance. However, because the Tech Memo (PRC 1996) makes a distinction between "ambient" concentrations for Treasure Island artificial fill soil and "background" for Yerba Buena Island soil, these terms are still used in reports that reference the Tech Memo. "Ambient" is a synonym for "background" as defined in Navy and EPA guidance.

68. Comment: Section H.3.0 says: "Results of statistical comparison of soil samples from Site 32 with the ambient data set are provided in Tables H-4 and H-5 and discussed in Appendix E." (Emphasis added) Appendix E does not include a discussion on Site 32. In fact, Appendix E was written prior to collection of soil samples at Site 32. Please revise the text.

Response: The text has been revised to state that this discussion is included in the HHRA in Appendix I.

69. Comment: Change title of Appendix H to include "of Metals".

Response: The title for Appendix H has been revised as suggested.

70. **Comment: When figures and tables refer to "EPA recommendations", include citations.**

Response: Citations have been added to all figures and tables that reference EPA recommendations.

Appendix I: Supplemental Information to Human Health Risk Assessment

71. **Comment: Review of Appendix I and Attachments is deferred to DTSC toxicologists.**

Response: Comment noted.

72. **Comment: Table I-2.6: EPA RAGS Part D Table 2, Occurrence, Distribution, and Selection of Chemicals of Potential Concern, Method 2, Site-Wide Combined Surface and Subsurface Soil. With respect to locations of maximum concentrations of B(a)P, Aroclor-1260, 4.4"-DDD, 4,4'-DDT, arsenic and lead, Table I-2.6 is inconsistent with Figures 4-3 to 4-10. Please correct the inconsistencies. Discrepancies regarding maximum DLs were noted previously (General Comment 2e). Please check tables for accuracy.**

Response: A transcription error was identified for Tables I-2.1 to I-2.7. These errors have been corrected in the final version of this report.

Attachment I2: Indoor Air Vapor Intrusion Modeling

73. **Comment: Describe the data set by showing locations and concentrations on a site map.**

Response: Appendix I has been updated to include figures presenting VOC detections in soil and groundwater.

74. **Comment: Indoor air vapor concentrations were modeled from soil and from groundwater concentrations. DTSC recommends soil gas samples for modeling air vapor intrusion. For sites where depth to groundwater is less than five feet (as at Site 32), an attempt should be made to collect soil gas samples under existing hardscape (e.g., paving) to evaluate the potential for vapor accumulation.**

Response: Soil and groundwater results indicate the presence of volatile chemicals at Site 32 is limited. Only four chemicals classified as volatile were detected in soil: anthracene, chrysene, phenanthrene, and pyrene. Four chemicals classified as volatile were detected in groundwater: 2-methylnapthalene, 4-methyl-2-pentone, acenaphthene, and fluorene. All of the volatile chemicals in soil and groundwater are semivolatile organic chemicals, and the concentrations of these chemicals resulting from vapor intrusion are low relative to their toxicity, as indicated by the low risks from the vapor intrusion pathway. As a result, vapor intrusion is not a significant issue at Site 32, and the site should not require soil-gas sampling.

75. Comment: With respect to the finite soil source assumption, DTSC's guidance says: "Without sufficient [soil and soil gas] data, DTSC will not entertain the use of the finite source model to evaluate exposure due to vapor intrusion." (Page 22: DTSC, 2005) Since soil gas data has not been collected at Site 32, use of the finite soil source assumption is precluded. Revise this attachment and Section 6.1.3.4.

Response: At the July 2006 BCT meeting, the Navy demonstrated how the water table will limit the ability of soil gas to migrate through the soil column. Vapor migration through the saturated portion of the soil column will be insignificant in comparison to soil-gas migration through the unsaturated portions of the soil column. Therefore, the bottom of contamination used in the finite-source soil version of the Johnson and Ettinger model was equal to the depth to groundwater at Site 32. Volatilization from contamination below the water table was modeled using the groundwater-source version of the Johnson and Ettinger model. If the infinite-source soil version of the Johnson and Ettinger model were used, the concentrations of volatile chemicals in indoor air (and the risks from inhalation) would be overestimated because the reduction in volatilization and emissions caused by the water table is not incorporated into the model.

76. Comment: A crack-to-total area ratio of 0.005 should be used for all scenarios. Please include total residential area and confirm that the crack factor is 0.005 for all scenarios.

Response: The Navy will confirm that a crack factor of 0.005 is used for all scenarios.

77. Comment: The well sampling sheets (March to October 2000) show a temperature range of 15 to 24 °C, with a central tendency closer to 18 or 19 °C. Use of maximum temperatures would be more conservative. Provide support for 16.7 °C or revise as needed.

Response: As indicated in Section I2.2.1.2, the average soil and groundwater temperature (16.7°C) is based on the site location and information provided on Figure A-1 of "Guidance for the Evaluation and Migration of Subsurface Vapor Intrusion to Indoor Air" (DTSC 2005). The well sampling sheets do not include temperatures for the entire year and are missing temperature readings for months where temperatures are expected to be lower than those measured.

78. Comment: Section I2.4: Uncertainty Analysis. As previously noted (General Comment 2e), samples are considered low-biased because of collection and analytical methods used. DTSC guidance says: "Under no conditions should the risk associated with vapor intrusion be conducted with soil matrix samples collected by non-Method 5035A procedures." (Page 15: DTSC, 2005)

Response: Please see the response to general comment 2e above.

79. Comment: Section 12.5. "DTSC, 2005" is "Interim Final", not "Final". Please correct.

Response: Section 12.5 has been revised to indicate that DTSC 2005 is interim final and not final.

Attachment I5: Cancer Risks and Noncancer Hazard Estimates, Total Risk

80. Comment: Include tables showing selection of COPCs (similar to Appendix I Tables 1-2.5 and 6) so that data eliminated (if any) can be distinguished from data included. Include exposure point concentration tables, as well.

Response: Total risks include all detected chemicals; therefore, a table showing COPC selection is not necessary. Exposure point concentrations are located in Tables I-3.3 – I-3.7.

Typos/Errors

81. Comment: Page 1-5. On page 1-5, "403 acres" is cited; but on page 1-6, "402 acres" is cited.

Response: Section 1.2.2, second paragraph, has been revised to read "403 acres."

82. Comment: Table 1-1, Footnote h. Delete "8 to 6".

Response: Footnote "h" on Table 1-1 has been revised as suggested.

83. Comment: Section 4.1.1.2. Change "ST-009" to "S32-T009".

Response: Please see the response to Geomatrix specific comment 8 (page 10).

84. Comment: Figure 4-3, T111HP024. Switch locations of 4.7' and 3'.

Response: Figure 4-3 has been revised to present B(a)P results at location T111HP024 in order of increasing sample depth.

85. Comment: Figure 4-4, T111HP009. Switch locations of 4' and 3'.

Response: Figure 4-4 has been revised to present B(a)P EQ results at location T111HP009 in order of increasing sample depth.

86. Comment: Table 4-2. The "c" superscript on chromium does not relate to Footnote c.

Response: Table 4-2 has been revised to appropriately footnote the chromium toxicity screening criterion.

RESPONSES TO COMMENTS FROM BRIAN K. DAVIS, HUMAN AND ECOLOGICAL RISK DIVISION, DTSC

General Comments

1. **Comment:** **Please provide an explanation of the Site 32 boundaries. Site 32 is said (Executive Summary; Section 1.2.2) to consist of portions of Parcel T111 and Parcel T115. The map of Site 32 in Figure 1-4 confirms that some parts of both parcels are excluded from Site 32 and conversely Site 32 includes areas outside of either parcel.**

   Response: The executive summary and Section 1.2.2 have been revised to appropriately discuss the IR Site 32 boundaries.

2. **Comment:** **A. The DTSC Office of Military Facilities (OMF) has done a thorough review of this Remedial Investigation Report for Site 32 (DTSC 2007). This review identifies important issues regarding site characterization. We concur with the OMF concerns, which must be resolved before the risk assessments can be acceptable.**

   B. The absence of any discussion of Site 32 Data Quality Objectives (DQOs) in this report suggests that they were not developed for the Site 32 investigations. If DQOs are available, it is important to bring them into consideration.

   C. Of particular concern is the problem with high detection limits for polycyclic aromatic hydrocarbons (PAHs). For example, the detection limit for semivolatile organic compounds (SVOCs), including benzo(a)pyrene, was 39 mg/kg in soil Sample T111HP012 (Appendix B). The U.S. EPA Region 9 Residential Preliminary Remediation Goal (PRG) for benzo(a)pyrene is 0.062 mg/kg. The elevated detection limits may have resulted in a focus on less contaminated areas while overlooking more contaminated areas (Figures 4-3 and 4-4). This needs to be addressed.

   D. The absence of analysis for hexavalent chromium is also of particular concern. Hexavalent chromium is a known human carcinogen. There is at least one potential source of hexavalent chromium (paint shop) and a high concentration of total chromium was found in groundwater. Hexavalent chromium needs to be an analyte in soil at Site 32.

E. The absence of analysis for manganese is also of concern. Manganese needs to be an analyte in both soil and ground water.

F. The report (Section 4.2.1) states that no volatile organic compounds (VOCs) were detected in soil. This requires further discussion to address whether sample preservation methods were adequate and whether detection limits were sufficiently protective compared to screening criteria.

G. The existence of the U.S.S. Pandemonium is mentioned in five locations in this report, with no description of its function. Please add a discussion of its use in training personnel in handling radioactive contamination. Please add a discussion of sampling and analysis for radioisotopes for Site 32.

H. Other comments in DTSC (2007) should also be addressed.

Response: A. Comment noted.

B. Please see the response to Eileen Hughes, DTSC, general comment 1a (page 21).

C. Please see the response to Eileen Hughes, DTSC, general comment 2d(i) (page 27).

D. Please see the response to Eileen Hughes, DTSC, general comment 2g(iv) (page 28).

E. Please see the response to Eileen Hughes, DTSC, general comment 2g(v) (page 28).

F. Please see the response to Geomatrix specific comment 9 (page 10) and Eileen Hughes, DTSC, general comment 2e (page 28).

G. Please see the response to Geomatrix specific comment 2 (page 8).

H. Comment noted.

3. Comment: A. Ground water sampling at Site 32 was limited to 12 grab sample. Of these 12 samples, only six were analyzed for organic chemicals (Section 6.1.1.2).

B. The text (Section 6.1.1.2 and 6.1.2) notes the limitations in the data from these samples. The adequacy of the data has been questioned in DTSC (2007).

C. The report (Section 6.1.1.2; Appendix I, Section I.3.2) states that *"Groundwater sampling conducted at IR Site 32 to define possible effects to groundwater from various chemicals detected in soil and to evaluate if further investigation is warranted at IR Site 32."*

D. The adequacy of the ground water data could not be best determined by consulting the DQOs. If DQOs have been developed, they should be brought into this report to evaluate the ground water data.

E. The text in Appendix I, Section I.3.2 provides the important information that *"Based on the results of the Hydropunch samples and soil data, it was agreed upon by the BCT that no monitoring wells at IR Site 32 were necessary."*

i. Please provide a reference to the minutes of the BCT meeting at which this agreement was reached.

ii. Please elaborate on what was decided by the BCT and provide a summary of the rationale. What was the basis for determining that monitoring wells were not necessary? Did the BCT conclude that purpose of the ground water sampling as stated in the report (Section 6.1.1.2; Appendix I, Section I.3.2) had been achieved? Did the BCT conclude that additional characterization, such as additional grab samples, was not necessary?

iii. Please provide this information in Section 6.1.1.2 as well as in Appendix I.

Response: A. Comment noted.

B. Please see the response to Eileen Hughes, DTSC, general comment 4a (page 32).

C. Comment noted.

D. Please see the response to Eileen Hughes, DTSC, general comment 1a (page 21).

E. Initial sampling results from the EBS data gaps investigation at Parcel T111 were discussed at the May 6, 2003, BCT meeting (Navy 2003a). At the meeting, it was determined that additional stepout sampling was necessary to define the extent of TPH in groundwater at boring location T111HP012. Stepout groundwater sample results were nondetect for TPH constituents (Navy 2003b), and the area was recommended to proceed through the Comprehensive Environmental Response Compensation and Liability Act process.

Section 4.3, Section 6.1.1.2, and Appendix I have been revised and updated.

4. **Comment:** **A. Appendix E is a Technical Memorandum (PRC Environmental, 1996) evaluating background and ambient concentrations of inorganic chemicals in soil. Please provide any evidence of review and approval by the regulatory agencies.**

B. The text (Section 1.3.3) distinguishes between "ambient" conditions, which are altered by humans in creating Treasure Island from dredged fill, and "background" conditions, which are naturally occurring. We concur with the definitions and that "ambient" conditions apply at Treasure Island and "background" conditions apply at Yerba Buena Island.

C. The text (Section 1.3.3.1) states that for soil "*A one-sided tolerance limit was used to determine reasonable upper levels of ambient concentrations of metals at a site.*" The text (Section 1.3.3.2) states that for ground water ambient concentrations were the 95th percentiles. It appears that the text in Section 1.3.3.1 is incorrect and that the 95th percentiles were used for both soil and ground water. The original soil report in Appendix E and also Tables 1-2 and 1-3 all indicate 95th percentiles, not tolerance limits.

D. For lead in soil, sample numbers, outliers, the maximum concentration, and the 95th percentile all differ between Table 1-1 in the body of the report and Table 2 of Appendix E. The 95th percentile in Table 1-1 is 21 mg/kg, compared to 100 mg/kg in Appendix E.

E. Footnote "i" to Table 1-1 states that "*The ambient level for lead was estimated excluding the Installation Restoration Site 12 soil samples which were considered to be affected by contamination.*" Presumably, this accounts for the differences between Table 1-1 and Table 2 in Appendix E.

i. Please document the decision to revisit the data for lead and state where the details of the re-evaluation can be found.

ii. Does the decision to re-evaluate lead apply to all sites at Treasure Island or specifically for this report on Site 32.

iii. Please clarify whether all Site 12 soil data for lead or only a subset were excluded.

iv. Please explain why Site 12 soil samples were excluded only for lead, and not other inorganic chemicals.

Response: A. Please see the response to Eileen Hughes, DTSC, specific comment 50 (page 45).

B. Comment noted.

C. As discussed in Section 4.3 of the Tech Memo (PRC 1996), separate approaches were used to calculate ambient values for the artificial fill data set at NAVSTA TI and the natural soils data set at YBI. Because of the smaller size of the YBI data set (18 to 21 measurements), the 95 percent lower confidence limit on the 80th percentile ($LCL_{80/95}$) was used to establish an ambient threshold. The data set was considerably larger for artificial fill soils at NAVSTA TI (222 to 244 measurements), and a straight (referred to as "strict" in the Tech Memo and in Section 1.3.2.1) 95th percentile was used to establish an upper limit for ambient rather than a tolerance limit. The term "strict" was used to distinguish a straight or simple percentile of the distribution from a confidence (tolerance) limit for the percentile. A distribution-dependent approach was used to calculate 95th percentiles, as described in the Attachment ("Overview of Statistical Methods") in PRC 1996. For lognormal distributions, the 95th percentile was calculated as follows:

> $e(y + 1.645 \cdot sy)$, where y and s are the mean and standard deviation of the natural logarithms of the data.

For nonparametric distributions (listed as "Unknown" in Table 1-1), nonparametric 95th percentiles were calculated following Gilbert (1987). Distributions were treated as nonparametric if results of the Shapiro-Wilk W test did not confirm that they were either normal or lognormal at a significance level of 95 percent ($\alpha = 0.05$). The text in Section 1.3.2.1 will be corrected to reflect the approach used to calculate ambient limits for the NAVSTA TI artificial fill data set, as described above.

D. A revised version of the Tech Memo without handwritten notations has been substituted, and values in tables have been checked to ensure accuracy and consistency.

E. The revised version of the Tech Memo, without handwritten notes, does not have the differences between Table 1-1 and Table 2 in Appendix E.

i. The footnote in Table 1-1 is based on the information in the Tech Memo. Footnote "i" in Table 1-1 matches footnote "i" in Table 2 of the Tech Memo.

ii. There was no re-evaluation of lead for Site 32; the information provided in the Tech Memo was used as presented.

iii. The information is as included in the Tech Memo.

iv. The information is as included in the Tech Memo.

5. **Comment:** **A. Appendix F is a Technical Memorandum (Tetra Tech EM Inc., 2001) evaluating ambient concentrations of inorganic chemicals in ground water. We note that Appendix C to the Technical Memorandum has comments from the regulatory agencies and responses from the Navy. Please provide evidence of approval of the final Technical Memorandum by the regulatory agencies.**

B. Given the important distinction between ambient conditions and background conditions (General Comment 4B), it is surprising that monitoring wells on Yerba Buena Island were included in the this evaluation of ambient concentrations (Figure 1 of Appendix F). Please provide justification.

C. For a number of inorganic chemicals there were too few detections in ground water to support the evaluation of ambient conditions. Although ambient levels are reported in Table 1-2 (and Table 3 in Appendix F), the values are determined primarily by detection limits and therefore not relevant.

i. Ambient levels for antimony, beryllium, cadmium, chromium, mercury, and selenium are identified as based on detection limits rather than detected concentrations (footnote "e" to Table 1-2). The number of detections ranged from zero to only five for these six inorganic chemicals.

ii Footnote "e" to Table 1-2 states that "The ambient level was set at or below the minimum reported detection limit." The merit of this method is completely unclear.

iii. The probability plots illustrate the inadequacy of the data and the analysis. For example, the plot for cadmium shows the three detected values, ranging from about 0.7 ug/L to 1.4 ug/L, along with 109 nondetections all set at a dummy value of about 0.3 ug/L. The "95th percentile" has been assigned a value of 0.27 ug/L. This "ambient level" is not useful in evaluating site data. A population comparison between the ambient data and site data is also not useful.

iv. The number of detections in ground water was also small for aluminum (4), cobalt (7), lead (3), silver (6), and thallium (4). The use of ambient levels or population comparisons is very problematic for these chemicals as well.

v. In summary, for many of the inorganic chemicals the ambient data from ground water are inadequate and should not be used in the selection of chemicals of potential concern or otherwise in the risk assessment.

Response: A. Please see the response to Eileen Hughes, DTSC, specific comment 54 (page 46).

B. On close review of Figure 1, only USTs and ASTs are depicted on YBI. See the response to Eileen Hughes, DTSC, specific comment 55 (page 46).

C. The BCT commented on and concurred with the Groundwater Tech Memo as written. Comment noted.

6. **Comment:** **A. The text (Section 6.1.1) states that "Sampling data were assessed spatially, both laterally and vertically, to identify possible data gaps or localized areas of concern (such as 'hot spots')." Please provide an explanation of how this was done and what conclusions were drawn.**

B. The text (Section 6.1.3.4) states that "The potential for localized areas of elevated concentrations were evaluated horizontally and vertically, and based on historical activities. No localized contamination areas were identified and the distribution of chemical concentrations can be considered relatively homogenous."

i. Please provide an explanation of how this evaluation was conducted.

ii. Clearly, the historical activities and potential sources of contamination are quite disparate for different areas.

iii. The absence of any discussion of hot spots in Appendix I calls into question how thorough this evaluation was.

C. Candidates for hot spots include the findings in soil of 994 mg/kg of lead, 4.4 mg/kg of mercury, and 22.6 mg/kg of silver. Other candidates for hot spots of polychlorinated biphenyls (PCBs) and dioxins were identified in DTSC (2007). See also General Comment 11F.

D. We recommend that a review of the sample data be done by the Treasure Island team and examine putative hot spots. This should be done after site characterization issues (General Comment 2) have been resolved. However, the team might conclude that hot spots need further delineation.

Response: Please see the response to Eileen Hughes, DTSC, general comment 4a (page 32).

7. **Comment:** **The report considers surface soil to be zero to two feet below ground surface and subsurface soil to be zero feet to ground water (Section 6.1.1.1; Appendix I, Section I.3.1). We have previously pointed out (DTSC, 2005a, 2005b) that zero to two feet goes beyond what is reasonably surface. Since samples were selected "...on the basis of the top depth of the reported sample collection interval" (Appendix I, Section I.3.1), soil from greater than two feet below ground surface has been included as surface soil.**

We accepted that questionable definition of surface soil for risk assessments for Sites 30 and 31 because the issue had not been discussed prior to the development of data tables, selection of chemicals of potential concern, and determination of exposure point concentrations. However, the present report is dated October, 2006 and should have applied a defensible definition of surface soil. Please revise the risk assessment defining surface soil as zero to six inches or at most zero to one foot.

Response: Comment noted. During the scoping meeting in July 2005, Mr. Davis noted surface soil is defined as 0 to 2 feet bgs at most military installations, and suggested the Navy might want to reconsider this depth interval because it is not representative of surface soil. Mr. Davis said traditional surface soil samples are collected from 0 to 6 inches bgs, so the calculation of EPCs could underestimate risk because the contaminants of potential concern have been averaged by the data from samples collected from 6 inches to 2 feet bgs. The Navy has considered the depth interval and finds the 0 to 2 feet bgs interval acceptable.

8. Comment: **A. DTSC (1994) accepts the use of U.S. EPA Region 9 PRGs only for screening sites. DTSC doesn't accept the elimination of potential concern by comparison to PRGs. As discussed below (General Comment 9), the Navy has insisted that an alternative risk assessment be provided in which PRGs were used to screen chemicals of potential concern (COPCs).**

B. In a recent report, the Navy introduced additional screening values. Since these screening values were only used to identify a subset of COPCs for the discussion of fate and transport, and since this had limited impact on the risk assessment, we did not object to these values.

C. Unfortunately, the present report has greatly broadened the application of these screening values. The screening values have been used to select COPCs for presentation of results and conclusions about contamination (Section 4.4). This has resulted in misleading representations of the findings.

D. An example of this is the treatment of polycyclic aromatic hydrocarbons (PAHs) in soil.

i. Six carcinogenic PAHs are evaluated based on cancer potency relative to benzo(a)pyrene (B[a]P). This is inappropriate for one of the six PAHs (dibenz(a,h)anthracene), which has its own cancer potency value (4.1 mg/kg).

ii. This report presents the B[a]P results in Figure 4-3 with concentrations compared to the residential PRG and the sum of B[a]P equivalents from the other six PAHs in Figure 4-4 with concentrations compared to ten times the residential PRG. This is illogical and confusing.

iii. Further, the total cancer risk from all seven compounds (B[a]P itself plus the other six PAHs) is ignored in Section 4.

iv. These flaws are compounded by problems in presentation (Specific Comments 7 and 8).

E. Please remove all screening values, with the exception of U.S. EPA Region 9 PRGs, from the human health risk assessment.

Response: A. Comment noted.

B. Comment noted.

C. Please see the response to Eileen Hughes, DTSC, general comment 2d(i) (page 27).

D. Section 4 presents information on the nature and extent of contamination only. The screening values used in this section are provided only to determine requirements for stepout sampling.

E. Region 9 PRGs were used as screening values for all exposure pathways except for the vapor intrusion pathway, because the Region 9 PRGs do not account for this pathway. For the vapor intrusion pathway, screening values from Table 2c of EPA (2002a) were used for groundwater and soil gas media. These values are conservative in nature and appropriate for this pathway. No screening values were used for the vapor intrusion pathway from soil.

9. **Comment:** **A. The document uses two different human health risk assessment approaches. Method 1 (Section 6.1.2; Appendix I, Section 4.0) eliminates COPCs based on: (a) comparison to ambient concentrations of inorganic chemicals, (b) comparison to screening concentrations (PRGs), and (c) infrequent detection. Method 1 also uses only U.S. EPA toxicity criteria (Section 6.1.4; Appendix I, Section 6.0). Method 2 eliminates chemicals of potential concern (COPCs) based solely on comparison to ambient concentrations of inorganic chemicals. Method 2 uses Cal/EPA to U.S. EPA toxicity criteria.**

B. We have stated previously that DTSC accepts the elimination of infrequently detected chemicals of COPCs, provided that other factors (toxicity, potential for bioaccumulation, records of historical use, magnitude of the concentrations, persistence in the environment,

spatial distribution, and known sources of contamination) are considered. Nonetheless, the Navy has again chosen to apply this criterion only for Method 1, but not for Method 2. However, the report states (Section 6.3.2) that no chemicals were eliminated as COPCs for the Method 1 on the basis of infrequent detection.

C. In past Remedial Investigation Reports for Treasure Island, essentiality as a nutrient was applied as an additional criterion. It appears that nutrients, including iron, were eliminated in the site characterization phase for Site 32 (DTSC, 2007) That is to say that they were not analytes.

D. An additional evaluation was done to assess the total risks and hazards for all detected chemicals (Section 6.1; Appendix I, Section 3.2). Risk and hazard indices were evaluated for inorganic chemicals which were identified as consistent with ambient concentrations. These results were summed with the Method 2 results to provide estimates of total risk and hazards.

The estimates of total risk and hazards have been relegated to obscurity in Attachment I5 of Appendix I. Please report these results along with the results from Method 1 and Method 2 in the Executive Summary, in Section 6.2, and in Section I.7.of Appendix I.

E. The application of Method 1, Method 2, and total risk and hazard have been discussed at length in meetings and through document reviews. We have accepted these approaches. However, we have pointed out that screening chemicals with generic risk-based numbers can result in apparent inconsistencies between the different methods. We have also stated that neither Navy risk assessment guidance nor U.S. EPA guidance requires that the selection of COPCs include screening criteria comparisons. This report incorrectly references U.S. EPA (1989) as supporting the use of screening criteria comparisons. Please remove this reference.

Response: A. Comment noted.

B. Comment noted.

C. Comment noted.

D. Total risks and hazards estimates are presented both in Section 6.2.4 of the main text and Section I.7.3 of Appendix I. Total risks and hazards

estimates provide additional information, but do not impact the risk management decision, and will therefore not be included in the Executive Summary.

E. Navy guidance (Navy 2001) includes comparison with screening criteria in the selection of COPCs to "help focus the BHHRA on COPCs that will contribute significantly to the risk." In addition, RAGS, Part A (EPA 1998) includes screening criteria comparisons as an optional step in COPC selection (section 5.9.5). Therefore, both references in the report are appropriate.

10. Comment: **A. The human health risk assessment is presented in Section 6.0 and in the Appendix I text. Section 6.0 is titled "Baseline Human Health Risk Assessment for Installation Restoration Site 32". Appendix I is titled "Supplemental Information to Human Health Risk Assessment". This suggests that the intention was to provide an overview of the risk assessment in Section 6.0 and the details of the risk assessment in Appendix I.**

B. In fact, much of the text is redundant in the two sections. In some instances, the information in the Section 6.0 text is more detailed (e.g., Section 6.1.3) and in some instances the information in Appendix I text is more detailed (e.g., Section I.3.2 in Appendix I).

i. The description of exposure assessment in Section 6.1.3 is two full pages. In contrast, the one brief paragraph in Appendix I (Section I.5.0) about exposure assessment provides no "Supplemental Information".

ii. The discussion of toxicity assessment in Section 6.1.4 lists the hierarchy of toxicity criteria for Method 1 and the hierarchy for Method 2, but has limited information about route-to-route extrapolation and nothing about surrogates. In contrast, Section I.6.0 in Appendix I has detailed descriptions of route-to-route extrapolation and surrogates, but no information about hierarchies.

iii. The discussion of toxicity assessment in Section 6.1.4 explains why oral toxicity criteria were not adjusted for absorbed does when applied to dermal exposure. Section I.6.0 in Appendix I has no information on toxicity criteria for dermal exposure.

iv. Section 6.1.5 has detailed information about the risk results, while Appendix I has a brief summary

v. Section 6.3 has considerably discussion of uncertainty, while Appendix I has no discussion of uncertainty.

C. Thus, the reader is compelled to make his own synthesis of the two sections in order to get a complete understanding of what was done. Either the two sections should be combined into one complete description of the risk assessment, or else the text in both sections should be revised to match the intended purposes.

Response: At the request of the BCT, Chapter 6 of the main text was expanded to include greater detail in the evaluation of the HHRA. Text that was considered supplemental information for the HHRA is provided in Appendix I. The Navy has determined that the organization of Chapter 6 of the main text and Appendix I addresses this request, and no changes to the presentation of these sections are planned.

11. Comment: **A. The comparison of site data to ambient data is difficult to follow in this report because it is scattered. A discussion of the studies of ambient concentrations of inorganic chemicals in soil and in ground water is found in Section 1.3.3. The actual studies of ambient concentrations are found in Appendices E and F. The description of the human health risk assessment (Section 6.0) includes a brief statement without details, about comparing site data to ambient data. The elaboration of the human health risk assessment (Appendix I) provides even less information than Section 6.0. A description of statistical methods is found in Appendix H.**

B. Although ambient concentrations of inorganic chemicals in both soil and ground water are discussed in Section 1.3.3 and the two studies of ambient concentrations are found in Appendices E and F, the risk assessment report (Section 6.1.2) states that the ambient data for Site 32 ground water data were not used in the selection of COPCs. The description of statistical methods (Appendix H) refers to soil, with no reference to ground water.

C. We concur with the decision not to compare ground water site data to the ambient data, though for different reasons than those given in Section 6.1.2. We believe that the utility of the ambient data for ground water is quite limited and the data probably are not useful for any sites (General Comment 5).

D. The results of the comparison of Site 32 soil data to ambient soil data are difficult to follow.

i. The text in Section H.3.0 of Appendix H states that "Results of the statistical comparison of soil samples from Site 32 with the ambient data set are provided in Tables H-4 and H-5 and discussed in Appendix E." This is incorrect. There is no discussion of Site 32 in Appendix E, and no discussion of Site 32 in Appendix H. (add the corrected Appendix letter)

ii. The box plots in Attachment H1 to Appendix H are informative, but more information is needed. The data are labeled as ambient or site and the tables are identified as Site 32. They should be identified as soil data. It should be stated whether nondetections are included. It should be stated whether outliers are included.

iii. The reader is left to provide an interpretation based on the tables in Appendix H and throughout the report.

E. The following comments are primarily based on Tables H-4 and H-5 and the box plots in Attachment H1 to Appendix H.

i. For many inorganic chemicals the Site 32 data are strikingly different from the ambient data. For example, the maximum concentration of antimony is 0.8 mg/kg for the site data and 18.2 mg/kg for the ambient data. This difference is not limited to the maximum concentrations. Similar discrepancies are seen for the 90th percentile, 75th percentile, median, etc.

ii. Similarly, maximum concentrations for ambient data are far higher than maximum concentrations for Site 32 data for barium, cadmium, chromium, copper, molybdenum, nickel, and silver (0 to 2 feet). This calls into question the relevance of the ambient data to Site 32.

F. Nonparametric statistical comparisons of populations must consider outliers. A statistical test can indicate that two data sets are consistent with a single population because the magnitude of individual outliers is not considered. This is illustrated with mercury. A site sample had 4.4 mg/kg of mercury, about twice the maximum ambient concentration and about 10 times the next highest Site 32 concentration. Yet, the statistical analysis determined that mercury is not a COPC. Nor would mercury have been identified as a COPC if the concentration of that sample had been 440 mg/kg or even 44,000 mg/kg. A similar situation pertains for silver and perhaps for cobalt,

selenium and zinc. This illustrates the need for hot spot evaluation (General Comment 6).

Response: A. Section 1.3.3 presents a summary of the ambient metal study and references Appendices E and F for the reports. Similarly, the human health risk assessment references Appendix H to provide a description of the statistical methods used to determine ambient metals for the risk assessment.

B. Comment noted.

C. Comment noted.

D. (i) Tables H-4 and H-5 do present results of the comparison of soil samples from Site 32 with the ambient data set, as stated in the text. The reference to Appendix E was intended to point the reader to the discussion of the ambient data set at Treasure Island. The text in Section H.3.0 of Appendix H will be revised to read as follows: "Results of the statistical comparison of soil samples from Site 32 with the ambient data set are provided in Tables H-4 and H-5. A discussion of the ambient data set is provided in Appendix E."

(ii, iii) For further discussion on the box plots, please see the response to Eileen Hughes specific comment 51. The box plots in Attachment H-1 have been removed from the revised RI.

E. The reviewer is correct that site distributions for a number of metals are lower than those reported for the ambient artificial fill data set in PRC (1996). The Tech Memo was prepared using the most current protocols available at the time, and the selection of sampling locations and conduct of the background analysis was accomplished under regulatory agency review. The fact that site concentrations are below the established ambient levels does not in itself provide a technical basis for the reviewer's conclusion that ambient data is not relevant to IR Site 32.

F. The Navy's background statistical guidance advocates the use of hypothesis testing and application of two-population statistical tests to determine whether site concentrations exceed background levels. The Navy's background testing protocol primarily relies on comparison of two characteristics of the site and background data sets: (1) a measure of central tendency, such as the mean or median; and (2) evidence for a shift in the right-hand tails of the two distributions. It is acknowledged that under this protocol it is possible to conclude that site concentrations are

consistent with background in cases where a single or small number of site measurements exceed the maximum background concentration. The RAGS guidelines specify that risk estimates should be calculated using an upper-bound estimate of the mean concentrations of chemicals within an exposure unit.

12. **Comment:** **The risk assessment has determined exposure point concentrations based on Site 32 as a single area (Section 6.1.2.1). Once the important issue of hot spot analysis has been addressed (General Comment 6), then subdivisions of Site 32 must be considered. Site 32 is comprised of two parcels. More importantly, Site 32 had multiple uses and multiples sources of contaminants. The distributions of contaminants suggest that it may be appropriate to subdivide Site 32 into smaller exposure areas.**

Response: The contaminants of concern and risk drivers identified at Site 32 indicate that although the site has had multiple uses, the site contaminants driving risk are limited, with few exceptions, to the top 2 feet of the site.

13. **Comment:** **Exposure Point Concentrations: A. Field duplicate samples were treated differently in soil and ground water (Section H.2.0 of Appendix H). For ground water, the "original measurement" was included in the data and the "duplicate measurement" was excluded. For soil, both samples were included.**

B. Inclusion of duplicate samples clearly introduces a bias, the importance of which depends on the frequency of duplicate samples and the magnitude of the differences between the duplicates. The report (Section H.2.0 of Appendix H) provides no rationale for including both duplicates. We recommend including only one of the two duplicate samples for soil and ground water.

C. Please explain the sense in which one of the two samples is the "original measurement" and the other is the "duplicate measurement". We recommend selecting the higher of the two measurements for soil and ground water.

Response: The proper treatment of QC field duplicates in statistical calculations has always been a contentious issue in environmental assessment studies. EPA's quality assurance and quality control (QA/QC) guidance (EPA 1989, 1990) suggests that the sole purpose of these replicate QC measurements is to assess data quality (precision/accuracy) and, in the case of soil, to provide a measure of sampling error attributed to spatial

heterogeneity. A number of alternatives have been employed in assessment studies to treat QC field duplicates, but many of these approaches are considered undesirable from a statistical perspective. For example, averaging of QC duplicates is commonly employed, although this dampens estimates of the sample variance and results in a "derived estimate" that does not reflect a real measurement. Similarly, selection of the larger of two replicate measurements (or the detected measurement in cases where one replicate result is nondetect), imposes a high, unidirectional bias to estimates.

An unbiased approach is a priori selection of the initial or original measurement, and elimination of the duplicate measurement. This approach effectively relies on random selection of results when it is applied to all samples and was the approach used for groundwater data.

Due to the heterogeneous nature of soil, samples taken from the same soil core, even within the same sampling depth, may contain a unique chemical profile. Therefore, although labeled as duplicates, these samples were considered to be discrete samples. Rather than discarding the additional data, they were retained and used in the risk assessment calculations.

In addition, QC field replicates for soil are only found in historical data sets, as the Navy no longer collects these data. Therefore, when more recent data are combined with historical data, the incidence of QC field duplicates is very low. Given that small-scale spatial heterogeneity is a common property of soil, the consequence of treating a small number of field QC duplicates as independent measurements is likely negligible in terms of potential spatial bias.

14. Comment: Vapor Intrusion into Indoor Air.

A. Of the contaminants detected in bulk soil, four PAHs were identified as volatile and therefore of potential concern for inhalation (Section 6.1.2.1). One of those (chrysene) is carcinogenic and the other three (anthracene, phenanthrene, and pyrene) are not carcinogenic. Of the contaminants detected in ground water, 4-methly-2-pentanone and three PAHs (acenaphthene, fluorine, and 2-methylnaphthalene) were identified as volatile and therefore of potential concern for inhalation (Section 6.1.2.2). Carcinogenicity has not been established for any of the four volatile contaminants in ground water. No soil vapor data are available for Site 32.

B. Because of the characteristics of these eight contaminants and the fact that only one of them (chrysene) is carcinogenic, the potential for harm from vapor intrusion into indoor air is likely to be small. This must be taken in the context of demonstrating that the investigation of VOCs in soil was adequate (General Comment 2F). We did not perform an extensive review of the modeling (Attachment I2 to Appendix I). However, we do have the following comments.

C. The report (Section 6.1.3.4; Appendix I, Section I2.1.1 of Attachment I2) references DTSC's 2003 Vapor Intrusion Model, which is adapted from U.S. EPA's model. Please confirm that the most recent model on the DTSC website was applied.

D. Modeling vapor intrusion into indoor air from bulk soil data was done assuming a finite source (Section 6.1.3.4; Appendix I, Section I2.2 of Attachment I2). The issue of finite versus infinite source has been discussed at length for the Treasure Island sites.

i. Both U.S. EPA and DTSC have concluded that bulk soil sampling and analysis is unrealizable for modeling vapor intrusion into indoor air. There is a high degree of uncertainty associated with the results presented in this report.

ii. Since there are no soil gas data, the soil cannot be considered fully characterized, as is required for assuming a finite source.

iii. The uncertainty is further compounded by the absence of actual data from the existing buildings. U.S. EPA and DTSC have recommended that subslab sampling as an approach for Treasure Island sites.

E. The report (Appendix I, Section I2.2 of Attachment I2) states that "For indoor air concentrations from groundwater, the infinite source solution was applied." A similar statement appears in Section 6.1.3.4. It is misleading to imply that assuming an infinite source was a choice. There is no finite source alternative for ground water.

F. Based on the limited findings of volatile contaminants in soil and in ground water, and on the complications in collecting soil gas samples, we do not recommend a full investigation into soil gas. It might be prudent to collect some samples from selected areas, or to collect subslab soil gas samples.

G. We do recommend that the bulk soil modeling be revised to assume an infinite source.

H. The Uncertainty Analysis for vapor intrusion (Appendix I, Section I2.4 of Attachment I2) should be revised to provide a balanced discussion of uncertainty.

i. The introductory paragraph states that "All of the uncertainties discussed below result in an overestimation of indoor air concentrations, so the vapor intrusion model should be conservative in estimating risks to human health." This is true because uncertainties that lead to underestimation are not discussed. They should be.

ii. The primary uncertainty that may have led to underestimation of indoor air concentrations is the sampling and analysis of bulk soil. The difficulties in sample preservation for volatile compounds are well established in the literature.

Response: A. Comment noted.

B. Comment noted.

C. The advanced 2003 vapor intrusion model was used, but with adjustments to default values to make the model consistent with DTSC 2005 recommendations.

D. Please see the response to Eileen Hughes, DTSC, specific comment 75 (page 53).

E. The Navy does not mean to imply that a finite source is available for the vapor intrusion from groundwater model, but rather to inform the reader that concentrations of chemicals in groundwater are not modeled to diminish over time (as in an infinite model). To avoid confusion, the sentence will be removed.

F. Please see the response to Eileen Hughes, DTSC, specific comment 74 (page 53).

G. Please see the response to Eileen Hughes, DTSC, specific comment 75 (page 53).

H. Comment noted. The Navy has reviewed the uncertainty section and has determined that this section is sufficient and appropriate.

15. **Comment:** **Possible exposure to volatile contaminants during trenching activities was evaluated using a model from the Virginia Department of Environmental Quality (DEQ) (Section 6.1.3.3 and 6.1.3.4; Appendix I, Section I.5.1). We concur with the use of this model. However, the source should be assumed infinite for the reasons given in General Comment 14.**

Response: The algorithm used in the Virginia DEQ model, by default, assumes an infinite source, so no change to the evaluation is necessary.

16. **Comment:** **The recreational scenario was evaluated (Section 6.2; Appendix I, Section I.5.2.3) by comparison to residential exposure factors. This evaluation is superficial.**

A. The evaluation considers only a time factor and a spatial factor. The evaluation assumes that a recreator will visit Treasure Island two days per week. Therefore, the exposure frequency is approximately 100 days per year, compared to 350 days per year for residents. The evaluation assumes that a recreator will spend less than ten percent of his visit at Site 32, since Site 32 is about three acres and Treasure Island is about 400 acres. The evaluation concludes that the exposure of the recreator is approximately 1/35 of the exposure of the resident, based on these two factors.

B. Since recreation is specifically identified (Section 1.2.4) as a potential future land use of Site 32, this scenario may warrant more careful consideration.

i. The Reuse Plan identifies hotels and resort, and museums and cultural institutions as possible recreational uses of Site 32 (Section 1.2.4). Such activities might entail minimal exposure.

ii. The Reuse Plan identifies recreation areas (including golf), and festivals, markets, and fairs as possible recreational uses of Site 32 (Section 1.2.4). Such activities may result in considerable exposure.

C. A golf course or a hiking and running trail might well be used by a recreator two days per week or more, and provide significant exposure.

D. The evaluation assumes that the recreator will come to Treasure Island from elsewhere. It is more likely that the recreator would live on Treasure Island (e.g., Site 12) and will use the putative facilities at Site 32.

E. The evaluation assumes that the recreator goes randomly to areas of Treasure Island, arriving at Site 32 in proportion to its size. This is unlikely. The recreator will go to the area with recreational facilities.

F. In general, we concur that a recreator is likely to have less exposure than a resident. We recommend a more compelling evaluation.

Response

A. The comparison to residential exposure factors focused on exposure time and exposure frequency because these exposure parameters are likely to vary between a recreator and resident.

B. The qualitative evaluation of a recreator was performed because recreational use was a potential future land use. As a conservative estimate, activities more likely to result in exposure to site contaminants, such as golfing and hiking, were evaluated.

C. The Navy concurs that activities such as golfing and hiking may result in significant exposure. However, these activities are not likely to occur more than 100 days per year per receptor.

D. Comment noted. However, the exact location of the residence is not relevant as the evaluation is for incremental risks from exposure to chemicals at Site 32.

E. Although the recreator would not randomly access areas of Treasure Island, it is likely the recreator would not stay within the IR Site 32 boundaries while conducting activities such as golfing or hiking, based on the size of Site 32 relative to typical golfing or hiking areas. The text will be revised to compare the area of the site to the size of likely activity areas.

F. In summary, a RME value of 2 times per week (100 times/year) is reasonable. Exposure is assumed to be for full days, and for most people, nonwork or nonschool days are limited to 2 days per week. In addition, recreational activities planned for Site 32, such as hiking and golfing, will occupy an area significantly greater than the 2.6 acres at Site 32. These details will be described in the final RI.

17. **Comment:** **The text (Section 6.1.4) states that "...chronic RfDs were used to evaluate both chronic and subchronic exposures since few subchronic RfDs have been developed." We concur with the use of chronic reference doses (RfDs) in all cases. As a point of information, U.S. EPA headquarters has withdrawn all subchronic reference doses and reference concentrations from IRIS because of inconsistencies in their derivation (U.S. EPA, 2003).**

Response: Comment noted.

18. **Comment:** **The text (Section 6.1.4) states that "When route-specific toxicity values were not available, route-to-route extrapolations were used to derive toxicity values for organic chemicals, but not for inorganic chemicals..." A similar statement appears in Section I.6.1 of Appendix I.**

A. Extrapolation of toxicity criteria from ingestion to inhalation or from inhalation to ingestion is inappropriate for inorganic chemicals.

B. Oral toxicity criteria should be applied to dermal exposure for both organic and inorganic chemicals. It appears (Tables I-6.1 and I-6.8) that this was done in the risk assessment. Please clarify the text in both Section 6.1.4 and Section I.6.1 of Appendix I.

Response: A. Comment noted. Extrapolation from ingestion to inhalation or inhalation to ingestion has not been performed for inorganic chemicals.

B. The text will clarify that oral toxicity criteria were applied to dermal exposure for both organic and inorganic chemicals in Section 6.1.4 and Section I.6.1 of Appendix I.

19. **Comment:** **The text (Section I.6.4 in Appendix I) states that TEFs from the 1998 World Health Organization were used in the risk assessment. Please us the current human and mammalian toxic equivalency factors (TEFs) of dioxins and dioxin-like compounds from the World Health Organization (2005). This will entail changes in the TEFs for octachlorinated debenzodioxins, pentachlorinated dibenzofurans, and octachlorinated dibenzofurans.**

Response: As stated in the response to Exponent (for TIDA) general comment 14 (page 18), use of the WHO 2005 TEFs would increase the dioxin TEQ EPCs by less than 5 percent and would not change the remedial decisions for dioxin TEQs.

20. Comment: **A. More summary tables are needed to summarize risk characterization in both Section 6.1.5 and Section I.7.3 of Appendix I. Although the information is provided in exquisite detail in the U.S. EPA RAGS Part D tables in Appendix I, the reader should not have to search through those tables and generate his own summary. Further, because of the detail in the Part D tables a very small font has been used making them difficult to read.**

B. The summary tables should show risks and hazards for each receptor by exposure route and medium, and should show total risks and hazards.

C. The summary tables should show results for Method 1, Method 2 and total risks and hazards

Response: A, B. Section 6.1.5 and Section I.7.3 of Appendix I include summary tables providing the Method 1 and Method 2 potential risks and hazards of each evaluated receptor, the risk/hazard drivers for each evaluated receptor, the lead evaluation summary, and a comparison of total risks with Method 2 risks. U.S. EPA RAGS Part D tables in Appendix I are provided for those who are interested in more detailed information. Additional summary tables in the text would not provide any added value to the general reader.

C. Summary tables presenting results of Method 1, Method 2, and total risks and hazards are provided in Section 6.1.5 and Section I.7.3 of Appendix I.

21. Comment: **A. The first paragraph of Section 6.3.1 includes the statement that "Hence, the uncertainty associated with the characterization of groundwater is low." The second paragraph contradicts that statement with "Grab groundwater samples provide chemical results that may not be representative of in-situ conditions for the following reasons..." If the ground water samples may not be representative of in-situ conditions, then there is considerable uncertainty in the characterization of ground water.**

B. Section 6.3.2 begins with the statement that "The primary uncertainty associated with the COPC selection process is the possibility that a chemical may be inappropriately identified as a COPC for evaluation in the risk assessment." No rationale is provided for this statement. We think the statement is incorrect.

i. There are two possible errors in the process of selecting COPCs. First, a chemical may be included as a COPC when in fact it isn't a contaminant. Second, a chemical may be excluded as a COPC when in fact it should be included in the risk assessment.

ii. If a chemical is included as a COPC when in fact it isn't a contaminant, two subsequent levels of the decision-making process provide opportunities for correction. At the level of risk assessment, risk and hazard estimates associated with the false positive COPC may be insignificant, thus not triggering unnecessary remediation. At the level of risk management, estimated risks and hazards associated with the false positive COPC might have risks and hazards only slightly greater than ambient levels, a situation also unlikely to result in triggering unnecessary remediation.

iii. In contrast, there is no mechanism for correcting the error of excluding a chemical as a COPC when in fact it should be included in the risk assessment. Once the chemical has been eliminated, it is gone from the process.

iv. Therefore, the "primary uncertainty" is in incorrectly excluding a chemical as a COPC.

C. Section 6.3.2 also includes the statement that "The ambient comparison criterion is not likely to result in the inadvertent exclusion of chemicals as COPCs." Again no rationale is provided for this statement. This statement is also incorrect. Every statistical method has both Type 1 and Type 2 errors associated with it.

D. We quote Section 6.3.6 in its entirety. "The exposure variables used to estimate chemical intake are standard upper-bound estimates. All default exposure parameters are expected to err on the conservative side, rather than under predicting unforeseen human health risks. In general, considerable variation may occur in the activity patterns and physiological response of individuals. It is possible that the exposure variables used in this evaluation do not represent actual exposure conditions."

i. This discussion ignores the concept of Reasonable Maximum Exposure (RME). Of course individuals vary in their activity patterns and physiologies. The goal of RME is to protect most of the individuals in a population, not just to protect the average individual.

ii. It is not correct that "All default exposure parameters are expected to err on the conservative side..." Some default exposure parameters (body weight) are average values and not intended to be "conservative". Some default exposure parameters are known to underestimate potential risks and hazards for a substantial fraction of the population. The best (or worst) example of this is the failure to consider pica behavior in children.

Response: Comment noted. The Navy has reviewed the uncertainty section and has determined that this section is sufficient and appropriate. However, some text in the uncertainty section will be revised to avoid confusion. For example, the term, "The primary uncertainty" will be revised to say "An uncertainty." The phrase, "All default exposure parameters are expected to err on the conservative side..." will be revised to, "Collectively, the default exposure parameters are expected to err on the conservative side...." In addition, in Section 6.3.2, the statement, "The ambient comparison criterion is not likely to result in the inadvertent exclusion of chemicals as COPCs...," have been revised to, "To address the possibility of the inadvertent exclusion of chemicals as COPCs during the ambient comparison evaluation; a total risk scenario was included...."

22. Comment: The report (Section 7.0) states that a screening ecological risk assessment is being conducted. When this is complete, it will be reviewed by Dr. J. Polisini of DTSC. In the meantime, we have some comments on the overview of the ecological risk assessment included in this report (Section 7.0).

B. The report (Section 7.1) notes that the terrestrial habitat is currently of poor quality. We concur, but the risk managers should consider that future land use (Section 1.2.4) may change the nature of Site 32, generating areas of good terrestrial habitat.

C. The report (Section 7.1) notes that there is potential risk to aquatic receptors through transport of contaminants from ground water to the bay. Site 32 is located at the water's edge.

i. The report (Section 7.3) lists 11 inorganic chemicals found in groundwater concentrations exceeding the screening criteria and ambient levels. However, the report (Section 7.3 and 7.4) asserts that "These chemicals were a result of suspended particulates in the grab groundwater samples..." and concludes that none is a COPC for aquatic receptors.

ii. It seems likely that the suspended material has influenced the measurements of inorganic chemicals, but to what extent? It would seem that the ground water data are insufficient to determine whether there is a potential risk to aquatic receptors. See General Comment 3.

Response: Please see the response to general comment 3 above, and U.S. Fish and Wildlife Service specific comment 2 (page 4).

Specific Comments

1. **Comment: Section 1.4. As shown in Figure 6-2, another important component of a conceptual site model is the exposure pathways. This should be added to the list in Section 1.4.**

   Response: Section 1.4 has been updated to include an additional bullet, "known and potential exposure pathways."

2. **Comment: Figure 6-2. The figure includes a notation that "Groundwater is not a current or potential drinking water source at Site 33." This reference should presumably be to Site 32 rather than Site 33.**

   Response: Figure 6-2 has been revised as suggested.

3. **Comment: Figure 2-1. We appreciate the seven copies of Figure 2-1 that were included in the report.**

   Response: Comment noted.

4. **Comment: Figure 3-1. The figure is referenced as "Modified from Schloker (1971)". Please add this reference to the report's reference list (Section 9.0).**

   Response: Schloker 1971 has been added to the list of references.

5. **Comment: Section 4.0. The penultimate sentence in the second paragraph should be modified to note that Figure 4-1 through 4-11 pertain to soil.**

   Response: Section 4.0 has been revised as suggested.

6. **Comment: Section 4.2. The text states that "Metals and dioxin results also were compared with NAVSTA TI ambient concentrations for soil (see Table 4-3 and Appendix E)." This is incorrect. There are no ambient**

concentrations for dioxins and furans in soil in either Table 4-3 or Appendix E.

Response: The last sentence in the first paragraph of Section 4.2 has been revised to read, "Metals and dioxin results were also compared with NAVSTA TI ambient concentrations for soil (See Table 4-3)."

Table 4-3 includes the screening criterion of 12 nanograms per kilogram for dioxin TEQ in the screening criteria column, with a footnote indicating this is an ambient level concentration. The ambient level for dioxin is included in this column to prevent potential confusion with ambient metal concentrations for NAVSTA TI.

7. **Comment:** **Figure 4-3 and 4-4. These two figures are ambiguous.**

A. Figure 4-3 is titled "Benzo(a)pyrene in Soil", while Figure 4-4 is titled "Benzo(a)pyrene Equivalent in Soil". However, at the top of the text, both figures are labeled "Benzo(a)pyrene in Soil".

B. Figure 4-3 correctly states that the residential PRG is 0.062 mg/kg, but Figure 4-4 incorrectly states that the residential PRG is 0.62 mg/kg.

Response: A. Figure 4-4 has been revised to read "Benzo(a)pyrene Equivalent in Soil."

B. Please refer to the response to Geomatrix specific comment 16 (page 12).

8. **Comment:** **Table 4-3. This table uses "BAP(eq)", defined in the footnotes a "Benzo(a)pyrene equivalency". The text in Section 4.2 and the Acronyms and Abbreviation section uses "B(a)P EQ", defined as "Benzo(a)pyrene equivalent". The abbreviation and the definition should be consistent throughout the document.**

Response: The footnote for benzo(a)pyrene equivalent has been revised to read 'B(a)P EQ.'

9. **Comment:** **Page 6-11, penultimate paragraph. The text explains that for future land use scenarios, it was assumed that all surface cover at the site would be removed, exposing the soil. The text than states that "This approach is considered conservative since most of IR Site 32 currently paved and does not reflect current conditions." This assertion seems**

to overlook the difference between current exposure scenarios and future exposure scenarios. It is precisely the impermanence of paving and building structures that requires future scenarios. Please remove the sentence.

Response: The purpose of this sentence was to emphasize the possibility that future reuse might not entail the removal of all surface cover at Site 32, and therefore, the assumption that all soil would be exposed may be a conservative assumption. This sentence has been removed to avoid confusion.

10. **Comment:** **Section 6.1.3.5 and Appendix I, Section I.5.2. The definitions of reasonable maximum exposure (RME) are contradictory in these two sections. The text in Section 6.1.3.5 correctly states that most of the individual in a population are protected by RME assumptions, but highly sensitive individual are not protected. The text in Section I.5.2 of Appendix I incorrectly states that "The RME case represents the highest exposure reasonably expected to occur at the site and is calculated using the EPC and RME exposure parameters."**

Response: The text has been revised in Section I.5.2 to correctly state the definition of RME.

11. **Comment:** **Appendix H, Table H-4 and H-5. Please include a statement of the null hypothesis in the footnotes.**

Response: The null hypothesis is stated in footnote (a) in Tables H-4 and H-5. However, it appears that the underscore for the "<" symbol was not reproduced in the RI Report. Tables H-4 and H-5 have been revised to reflect that the null hypothesis is that site concentrations are less than or equal to ambient.

12. **Comment:** **Appendix I, Section I.4.1. The text references "DTSC 1992" for comparison of site concentrations of inorganic chemicals to ambient concentrations. The correct reference is DTSC (1997), as shown in the references to this memorandum.**

Response: The reference has been revised to DTSC 1997.

13. **Comment:** **Appendix I, Section I.5.2.2.1. While we concur with the inhalation rates cited in this section, we recommend that the same units be used for all receptors. Currently, the inhalation rates are reported as cubic meters per hour for construction workers, adult residents, and child**

residents, but as cubic meters per day for commercial/industrial workers.

Response: The units for the inhalation rates will be revised to cubic meters per day for all receptors.

Conclusions

1. **Comment:** **A major concern is the adequacy of site characterization for Site 32. Risk assessments results cannot be considered meaningful until a consensus is reached that site characterization is completed.**

2. **Comment:** **The issue of hot spots must be addressed.**

3. **Comment:** **The ambient concentrations of inorganic chemicals in ground water have limited utility.**

4. **Comment:** **Surface soil must be redefined with defensible depths.**

5. **Comment:** **Screening values in the risk assessment should be limited to U.S. EPA Region 9 PRGs.**

6. **Comment:** **Consideration needs to be given to subdividing Site 32 into smaller exposure areas.**

7. **Comment:** **Although vapor intrusion into indoor air may not be a major concern at Site 32, we remain in disagreement with some of the methods applied in modeling.**

8. **Comment:** **The presentation in the report needs improvement, as discussed in the comments.**

Response: The preceding conclusion comments 1 through 9 constitute a summary of the specific and general comments presented earlier. Responses to these comments have already been provided.

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ATTACHMENTS

5090
Ser 1832.5/L6337
13 Aug 1996

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities Engineering Command
To: Distribution

Subj: REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR NAVAL STATION, TREASURE ISLAND (NAVSTA TI)

Encl: (1) BCT/RPM Meeting Minutes - July 2, 1996

1. Enclosure (1) is provided for your file and information.

2. Thank you for your guidance and involvement in this project. For further information, please call me at (415) 244-2560.

Original signed by:

ERNESTO M. GALANG
By direction of
the Commanding Officer

Distribution:
California Department of Toxic Substances Control (Attn: Mr. Chein Kao)
California Regional Water Quality Control Board (Attn: Ms. Gina Kathuria)
California Department of Fish and Game (Attn: Dr. Michael Martin)(w/o encl)
U.S. Environmental Protection Agency, Region IX (Attn: Ms. Rachel Simons)
U.S. Fish & Wildlife Services (Attn: Mr. Steve Schwarzbach)(w/o encl)
Bay Area Air Quality Management District (Attn: Mr. Julian Elliot)(w/o encl)
Bay Conservation and Development Commission (Attn: Mr. Steve McAdam)(w/o encl)
National Oceanic & Atmospheric Administration (Attn: Ms. Laurie Sullivan)(w/o encl)
Copies to:
NAVSTA Treasure Island (Attn: Mr. Jim Sullivan)
NAVSTA Treasure Island (Attn: LT Nannette Roberts)
San Francisco Department of Public Health (Attn: Ms. Martha Walters)
PRC Environmental Management, Inc. (Attn: Ms. Sharon Tobias)(w/o encl)

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Subj: REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR NAVAL STATION, TREASURE ISLAND (NAVSTA TI)

Copies to: (cont)
Community RAB Members:

Mr. Joseph Alcedo
Mr. James Aldrich
Mr. John Allman
ARC Ecology (Mr. Saul Bloom)
Mr. Charles Boatman
Mr. Hans Christensen
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Mr. Fred Hayden
Mr. Paul Hehn(Alt. Co-Chair)
Mr. Gary Jensen
Ms. Chloe Jue
Ms. Alice LaPierre
Mr. Clinton Loftman
Mr. Daniel McDonald
Ms. Karen Mendelow
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Mr. Henry Ongerth
Ms. Patsy Reese
Ms. Dale Smith
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Mr. Thomas Thompson
TI CRC (Ms. Laurie Glass)
TI Yacht Club (Mr. Harlan Van Wye)
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NAVAL STATION TREASURE ISLAND
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
REMEDIAL PROJECT MANAGERS/BRAC CLEANUP TEAM
MEETING MINUTES

TUESDAY, JULY 2, 1996

On July 2, 1996, at 9:30 a.m., representatives from the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board, San Francisco Bay Region (RWQCB); the U.S. Environmental Protection Agency (EPA); the Navy; and PRC Environmental Management, Inc. (PRC), held a meeting of remedial project managers (RPM) and the Base Realignment and Closure (BRAC) Cleanup Team (BCT) at DTSC's office in Berkeley. The meeting was held to discuss issues related to the Navy's remedial investigation and feasibility study (RI/FS), and other ongoing programs at Naval Station Treasure Island (NAVSTA TI). These minutes summarize the discussion; they are not a verbatim transcript. A copy of the agenda and list of participants is provided as an attachment.

I. ESTIMATION OF BACKGROUND AND AMBIENT CONCENTRATIONS AT NAVAL STATION TREASURE ISLAND

The Navy summarized the approach used to estimate background and ambient concentrations at Yerba Buena Island (YBI) and Treasure Island, respectively. The Navy explained that the data sets were different for the two islands. At Yerba Buena Island, background samples were collected from unimpacted areas of the island, while for Treasure Island, the phase IIB RI data was used for the estimation of ambient levels.

DTSC stated that the estimation of background and ambient levels was a useful exercise to determine that the levels were below EPA Region IX preliminary remediation goals (PRG). DTSC also stated that no further evaluation of the data was necessary and the PRGs could be used to screen the data. The Navy stated that it had calculated the ambient concentrations using the approach recommended by John Christopher of DTSC for Mare Island Naval Shipyard. The Navy noted that the approach originally suggested for NAVSTA TI by DTSC in September 1994 included a comparison of site concentrations to PRGs; however, in November 1995, DTSC said that that approach could not be used because it did not take into account the cumulative risk of the metals.

EPA had a number of questions, including how to account for the difference in detection limits between the phase I and phase II RI, and why the results for antimony were rejected for the background samples collected at YBI. EPA also questioned why some detections of lead and zinc were excluded, and inquired whether there was a potential source of lead and zinc contamination near the area where the samples were collected. Lastly, EPA stated that it would like the mean, the standard deviation, and the coefficient of variation to be added to the tables of background and ambient concentrations.

It was determined that a working meeting would be held among the Navy and the agencies to further evaluate the results and address EPA's comments.

II. VOLATILE ORGANIC COMPOUNDS AIR SAMPLING WORK PLAN

The Navy provided the revised target analysis list of volatile organic compounds (VOC) for the BCT's review. EPA requested that the sampling results table in the work plan provide the frequency of detection; the Navy agreed. The Navy will submit to the agencies by July 12 the response to agency comments. The

final work plan will be submitted on July 25, barring any concerns that the agencies have regarding the responses. The Navy explained that the goal is to conduct the sampling in late July or early August 1996.

III. MEETING MINUTES

The BCT approved the May 15, 1996, meeting minutes without any revisions.

IV. RESTORATION ADVISORY BOARD MEETING

The July 23, 1996, restoration advisory board (RAB) meeting agenda was discussed. Topics for the RAB meeting include the finding of suitability to lease (FOSL) for the fire training school and a preview of the RI report.

V. NAVAL STATION TRANSFER, LEASING, AND REUSE

The Navy gave a brief update on the status of leasing property and buildings on NAVSTA TI. The Navy is waiting for the City of San Francisco to complete its draft FOSL plan which will address the proposed interim uses of the space. These uses may be different from those stated in the reuse plan that is currently being developed.

EPA suggested that the Navy consider preparing zone FOSLs to accelerate the process and minimize the number of FOSLs to be prepared. At Mare Island, the Navy prepares a FOSL for each zone that includes a number of lease restrictions, and then when more information is available, a supplemental page is attached to the FOSL to provide any updates or revisions to the lease restrictions.

VI. OTHER ITEMS

It was agreed that the response to comments on the draft phase I RI report would not be revised, since so much had changed in the past few years . The consensus statement will include issues that have been resolved over the past 2 years that have changed substantially from the time the response to comments was prepared.

VII. ACTION ITEMS AND FUTURE AGENDA ITEMS

The following are new action items:

- The Navy will research the approach being used at Mare Island to develop FOSLs for entire zones of the installation, to determine its applicability to NAVSTA TI (PRC).

- The Navy will provide an update on the development of sediment screening levels (PRC).

The following are continuing action items:

- The Navy will provide the RAB members with a survey to identify methods of improving communication between the Navy and the RAB (NAVSTA TI and PRC).
- The Navy will finalize the consensus statement on the Draft Phase I RI Report (PRC).
- The Navy will write the U.S. Coast Guard regarding mutual environmental cleanup issues, such as petroleum contamination (NAVSTA TI).

VIII. FUTURE RPM/BCT MEETINGS

Future RPM/BCT meetings are scheduled on the following dates:

- Wednesday, August 21, 1996, 9:30 a.m. to 4:00 p.m., at PRC

ATTACHMENT

MEETING AGENDA AND PARTICIPANTS LIST

NAVAL STATION TREASURE ISLAND
REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)
REMEDIAL PROJECT MANAGERS/BRAC CLEANUP TEAM MEETING

AGENDA

Date: **July 2, 1996**
Time: **9:30 a.m.**
Place: **Department of Toxic Substances Control, 700 Heinz Ave., Bldg. F, Suite 200, Berkeley, California**

9:30-10:30	Item:	**I. Estimation of Background and Ambient Concentrations for Naval Station Treasure Island**
	Opening:	RPMs/BCT
	Process:	Discuss the approach used to develop the background and ambient concentrations for Yerba Buena Island and Treasure Island
	Goal:	To reach consensus on the methodology used
10:30-11:00	Item:	**II. VOC Air Sampling Plan**
	Opening:	RPMs/BCT
	Process:	Discuss the analytes of concern for each site
	Goal:	To facilitate finalizing the work plan
11:00-11:15	Break	
11:15-11:30	Item:	**III. Meeting Minutes**
	Opening:	RPMs/BCT
	Process:	Discuss the May 15, 1996, meeting minutes
	Goal:	To approve the meeting minutes
11:30-12:00	Item:	**IV. RAB Meeting**
	Opening:	RPMs/BCT
	Process:	Discuss the July 23, 1996 RAB meeting agenda
	Goal:	To prepare for the meeting
12:00-1:00	Lunch	
1:00-1:30	Item:	**V. Naval Station Closure, Leasing and Transfer Issues**
	Opening:	Navy
	Process:	Navy to provide general update
	Goal:	To keep BCT up to date on current issues

1:30-2:00	Item:	**VII. Summarize Action Items/Discuss Future Agenda Items**
	Opening:	RPMs/BCT
	Process:	Summarize action items and identify agenda items for next RPM/BCT meeting
	Goal:	To agree upon action items and agenda items

Future BCT/RPM Meeting:

To be determined

Action Items:

- The Navy will provide for the BCT's review a list of target analytes for the VOC air sampling (PRC).
- The Navy will send a letter to DTSC and RWQCB, informing them of the transfer of nine petroleum sites from the CERCLA program (EFA WEST).
- The Navy will provide the RAB members with a survey to identify methods of improving communication between the Navy and the RAB (NAVSTA TI and PRC).
- The City of San Francisco will arrange a meeting between the RPMs/BCT and Frank Rollo to discuss the geotechnical issues that may affect the remediation of TI.
- The Navy will finalize the response to comments and consensus statement on the Draft Phase I RI Report (PRC).
- The Navy will write the U.S. Coast Guard regarding mutual environmental cleanup issues, such as petroleum contamination (NAVSTA TI).

RAB Action Items:

- The Navy will provide the RAB with copies of the amended portions of the Federal Facility Site Remediation Agreement (FFSRA) Appendix once it has been approved by the state.
- The Navy will review regulations concerning the administrative record and the information repository.
- The Navy will provide the RAB with a schedule indicating opportunities for public comment on the draft remedial investigation (RI) and the draft plug-in record of decision (ROD).
- The Navy will inform the RAB of its progress in incorporating phase I and phase II RI data into the geographic information system (GIS).

- The Navy and the RAB Community Co-chairs will complete the RAB operating procedures amendments to the RAB.

- The Navy will provide the RAB with a work plan or other guidance documents pertaining to lead-based paint analysis.

- Mr. McDonald will work with PRC and RAB members to determine appropriate steps for NAVSTA TI RAB participation in the Cal/EPA Advisory Group.

- Mr. McDonald will work with the external affairs subcommittee to determine how to enhance communication between the NAVSTA TI RAB and the CRC.

- The Navy will provide a cost figure for the cleanup of UST sites at NAVSTA TI and an estimate of the quantity of fuel present.

- The Navy will provide copies of the report, "Beneficial Use of Groundwater Within San Francisco and Northern San Mateo Counties," to RAB members who signed up to receive a copy of the report.

- The Navy will request the CRC to provide a presentation of the draft reuse plan at the June RAB meeting.

- The Navy will provide clarification on the status of projects for which funds were requested in FY 1996, but were not funded, and were not submitted in the FY 1997 funding request.

NAVAL STATION TREASURE ISLAND
RPM / BCT MEETING @ DTSC
JULY 2, 1996

	NAME	COMPANY	TELEPHONE
1.	Ernesto Galang	EPA WEST	(415) 244-2560
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3.	Vladimir Prilepin	PRC EMI	415 - 222 - 8249
4.	Christina Goddard	PRC	415-222-8234
5.	Thorsten Anderson	PRC	415 - 222 - 8208
6.	Gina Kathuria	SWRCB	510-286-4267
7.	Shein Kao	DTSC	510-540-3822
8.	Rachel Simons	USEPA	415-744-2383
9.	James B. Sullivan	Naval Station Treasure Island	415-395-5454
10.			

TABLE 3

EPA METHOD TO-14 TARGET COMPOUND LIST

Site 6	Site 22	Site 24
1,2-Dichloroethene (total)	1,1,1-Trichloroethane	1,1,1-Trichloroethane
Benzene	2-Butanone	1,1-Dichloroethane
Chloroform	2-Hexanone	1,1-Dichloroethene
Ethylbenzene	4-Methyl-2-pentanone	1,2-Dichloroethene (total)
Tetrachloroethene	Benzene	2-Butanone
Toluene	Carbon disulfide	Benzene
Trichloroethene	Chloroethane	Carbon disulfide
Vinyl acetate	Chloroform	Ethylbenzene
Xylene (total)	Chloromethane	Tetrachloroethene
	Ethylbenzene	Toluene
	Toluene	Trichloroethene
	Xylene (total)	Vinyl Chloride
		Xylene (total)

5090
Ser 1832.5/L7171
13 May 1997

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities Engineering Command

Subj: REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)
NAVAL STATION, TREASURE ISLAND (NAVSTA TI)

Encl: (1) RPM Meeting Minutes - 4 April 1997

1. Enclosure (1) is provided for your file and information The meeting was held to clarify comments received from the California Department of Toxic Substances Control (DTSC) and the U. S. Environmental Protection Agency (EPA) on the risk assessment component of the draft remedial investigation report. Comments received from the EPA and DTSC on the draft 4 April 1997 meeting minutes have been incorporated into this final meeting minutes.

2. As agreed during the meeting, revised text was sent to Ms. Sophia Serda on 2 May 1997 in partial response to EPA's comment regarding use of nonparametric methods in the baseline human health risk assessment (BHHRA). On 5 May 1997, the Navy received information from EPA on the 10 percent ambient screening tool used in the BHHRA. This information will be incorporated into the draft final Remedial Investigation Report as agreed during the meeting.

3. Thank you for your guidance and involvement in this project. For further information, please call me at (415) 244-2560.

Originally signed by:

ERNESTO M. GALANG
By direction of
the Commanding Officer

Distribution:
California Department of Toxic Substances Control (Attn: Ms Mary Rose Cassa)
California Department of Toxic Substances Control (Attn: Mr. Calvin Willhite)
California Regional Water Quality Control Board (Attn: Ms. Gina Kathuria)
California Department of Fish and Game (Attn: Dr. Michael Martin) (w/o encl)
U.S. Environmental Protection Agency, Region IX (Attn: Ms. Rachel Simons)
U.S. Environmental Protection Agency, Region IX (Attn: Ms. Sophia Serda)
U.S. Fish & Wildlife Services (Attn: Mr. Steve Schwarzbach) (w/o encl)
Bay Area Air Quality Management District (Attn: Mr. Julian Elliot) (w/o encl)
Bay Conservation and Development Commission (Attn: Mr. Steve McAdam) (w/o encl)
National Oceanic & Atmospheric Administration (Attn: Ms. Laurie Sullivan) (w/o encl)

5090
Ser 1832.5/L7171
13 May 1997

Subj: PHASE II ECOLOGICAL RISK ASSESSMENT
NAVAL STATION, TREASURE ISLAND (NAVSTA TI)

Distribution: (cont.)
NAVSTA Treasure Island (Attn: Mr. Jim Sullivan)
San Francisco Department of Public Health (Attn: Ms. Martha Walters)
PRC Environmental Management, Inc. (Attn: Ms. Sharon Tobias) (w/o encl)

Copies to:
Community RAB Members:
Ms. Patricia Nelson (Co-Chair)
Mr. Paul Hehn (Alt Co-Chair))
Mr. John Allman
ARC Ecology (Mr. Saul Bloom)
Ms. Usha Vedagiri

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MINUTES OF
MEETING TO CLARIFY COMMENTS SUBMITTED BY CAL/EPA AND U.S. EPA ON THE RISK ASSESSMENT COMPONENT OF THE DRAFT REMEDIAL INVESTIGATION REPORT NAVAL STATION TREASURE ISLAND

Date: April 4, 1997
Place: PRC Environmental Management, Inc. (PRC), San Francisco
Attendees: Mary Rose Cassa, Chein Ping Kao, and Calvin Willhite, Department of Toxic Substances Control (DTSC), California Environmental Protection Agency (Cal/EPA)
Sophia Serda and Rachel Simons, U.S. Environmental Protection Agency (EPA)
Gina Kathuria, Regional Water Quality Control Board (RWQCB), Cal/EPA
Ernesto Galang and James Sullivan, U.S. Navy
Thorsten Anderson, Gwen Caviness, Lynne Haroun, Richard Knapp, Sharon Tobias, and Alva Tse, PRC Environmental Management, Inc (PRC)

The meeting was held to discuss issues related to the baseline human health risk assessment (BHHRA) component of the Naval Station Treasure Island (NAVSTA TI) draft remedial investigation (RI) report submitted on October 22, 1996. The objective of this meeting was to discuss specific comments submitted by Cal/EPA and EPA in order to clarify their comments and to determine what action, if any, is necessary to respond to each comment and revise the RI report. The issues are numbered according to their presentation in the April 4, 1997 meeting agenda (Attachment A) and are consistent with the order of the regulatory comments identified in a March 21, 1997 letter prepared by PRC and addressed to DTSC (Attachment B). At the request of DTSC, Item VIII was moved to the second discussion topic of the day.

ITEM II: Statistical Versus Spatial Sampling Approach and Application to Baseline Human Health Risk Assessment (BHHRA)

Discussion

The Navy explained that the nonrandom sampling approach applied at NAVSTA TI was developed in consultation with the regulatory agencies and that this approach is commonly applied at other Naval facilities. The Navy explained that use of the phase IIB RI data and the statistical approach for the risk assessment described in Appendix H of the draft RI report was conservative and health protective.

Resolution

Mr. Kao stated that no action was necessary to address this comment as long as the Navy resolved the issue raised by EPA involving calculation of the concentration term when the data sets are neither normal nor lognormal.

ITEM VIII: Calculation of Concentration Terms for the Central Tendency Exposure (CTE) Case and Reasonable Maximum Exposure (RME) Case for Data Sets That Are Neither Normal nor Lognormal

Discussion of the Nonparametric Distribution

Dr. Serda suggested that a data set should be assumed to be lognormal rather than nonparametric for data sets that are neither normal or lognormal. The Navy provided all attendees with revised concentration terms and a risk assessment summary table for Site 08 (Attachment C). As suggested by EPA, these tables presented new concentration terms that were calculated assuming that the data set is lognormally distributed rather than nonparametric. This example calculation indicates that the results of the risk assessment do not change significantly when the assumption of the underlying distribution changes from nonparametric to lognormal. The Navy also provided EPA and DTSC with a copy of new concentration terms calculated for every site evaluated in the draft human health risk assessment. This information was provided to allow the regulatory agencies an opportunity to compare the concentration terms when the distribution is assumed to be nonparametric versus lognormal. Based on an internal review, the Navy indicated that there is no significant difference between these concentration terms. The Navy also indicated that the level of effort necessary to revise these concentration terms would be significant and would not necessarily provide any additional information or alter the results of the draft BHHRA.

Resolution

The Navy agreed to clarify the discussion in the text on the statistical approach and calculations used to derive the CTE and RME concentration terms when the distribution is nonparametric. The revised text and an example calculation of the CTE and RME concentration terms when the distribution is nonparametric will be provided to Dr. Serda for her review. When her review is complete, Dr. Serda agreed that she will notify the Navy if the approach applied in the draft BHHRA could be retained or would require revision.

Discussion of Data Sets "Not Tested" for Distribution

For purposes of comparison, the new concentration term tables provided to EPA and DTSC revise the approach applied when the data set is not tested. The Navy explained that, in the draft BHHRA, the data set was not tested when the chemical was detected three or fewer times at the site. For the not tested case, the maximum concentration for the chemical was used as the concentration term. The Navy stated that it would prefer to apply a different approach than the one used in the draft BHHRA to calculate the concentration term when there are few detected values. Using the proposed approach, the data sets composed of three or fewer detected concentrations would be assumed to be normally distributed and the 95 percent upper confidence level of the arithmetic mean would be used as the concentration term rather than the maximum concentration detected at the site. The Navy justified the change in approach by stating that use of a maximum concentration when there are few detections is not representative of the exposure concentration because often the chemical was not detected in the majority of the samples.

EPA responded that it would prefer the Navy to use the maximum value because it is not possible to assign a specific statistical distribution to a data set comprising few detected values. All participants recognized that use of the maximum concentration as the concentration term is a very conservative approach. However, EPA emphasized that when risk management decisions are made, the project managers will consider whether a risk is driven by a few detections.

Resolution
It was agreed that the Navy would retain use of the maximum concentration as the RME concentration term when there were three or fewer detected values. In addition, the Navy agreed to further clarify in the text the approach applied to calculate the concentration term when the data set is not tested.

ITEM III: Evaluation of Human Health Risks Associated with Beneficial Uses of Groundwater (Agricultural, Process, and Industrial Supply)

Discussion
Ms. Kathuria reviewed the RWQCB mandate to protect beneficial uses of groundwater (agricultural and industrial process and supply), and provided water quality objectives for agricultural supply (irrigation and livestock). Ms. Kathuria indicated that use of groundwater to water residential homegrown produce is not defined as an agricultural beneficial use but instead is considered a domestic and municipal use.

Resolution
Ms. Simons suggested that the project managers meet at another time to discuss evaluation of the beneficial uses associated with groundwater at NAVSTA TI. Ms. Kathuria stated that the Navy did not need to evaluate human health risks associated with beneficial uses (including agricultural and industrial process and supply uses) of groundwater for this report.

ITEM IV: Elimination of Metals from Consideration in the BHHRA when 10 percent or Fewer of the Site Concentrations Exceed the Respective Ambient Concentrations (10 Percent Rule) and Rationale for Comparison of Metals Concentrations at Site 11 - Yerba Buena Island Landfill with Treasure Island Ambient Concentrations

Discussion of the Ambient Screening Criterion (10 Percent Rule)
EPA confirmed that the ambient screening criterion (10 percent rule) was established by the NAVSTA TI project team at meetings that took place on July 2 and 10, 1996. EPA further indicated that the 10 percent screening criterion was selected based on a comprehensive review of site data and the spatial distribution of the data, and on an understanding of historical operations at the site. Dr. Serda and Ms. Simons indicated that, based on their review of the site information,

they believe that use of the 10 percent rule is health protective and is not eliminating metals that should be retained in the BHHRA.

Resolution
It was agreed to retain the 10 percent rule as an approach to eliminate metals present at ambient concentrations from the BHHRA. However, Dr. Serda indicated that additional discussion was needed in the text of the BHHRA to clarify the rationale used to determine that the 10 percent rule was appropriate and to expand the explanation of the approach applied to evaluate ambient metals at NAVSTA TI. Dr. Serda and Ms. Simons agreed to provide the Navy with this information. The Navy agreed to send it to DTSC for review and to incorporate it into the text of the BHHRA. In addition, the Navy agreed to present risks associated with ambient levels of metals at Treasure Island and background levels at Yerba Buena Island in the text.

Discussion of the Site 11 Ambient Comparison
Dr. Serda and Ms. Cassa provided the rationale for use of TI ambient levels for comparison for Yerba Buena Island Site 11 and indicated that the decision was based on knowledge that the geology at Site 11 is similar to the artificial fill at TI. Ms. Tobias indicated that the rationale is provided in Appendix F to the NAVSTA TI RI report, "Estimation of Background and Ambient Metal Concentrations in Soils".

Resolution
The Navy agreed to present the rationale for using ambient levels developed for TI as a basis for comparison with metals concentrations detected at Site 11 in Section 3.6 of the RI report entitled "Establishing Ambient or Background Concentrations".

ITEM V: Toxicity Profiles for Total Petroleum Hydrocarbons

Discussion
Dr. Willhite (DTSC) pointed out that several references and materials related to total petroleum hydrocarbons (TPH) could be included in the toxicity profiles for TPH (Appendix G). The Navy asked if Cal/EPA had published new guidelines for evaluating TPH in a human health risk assessment. Dr. Willhite indicated that the only procedure available was the constituent-based analysis used in the draft BHHRA for NAVSTA TI.

Resolution
It was agreed that the approach applied in the draft BHHRA was appropriate at this time. It was further agreed that the ecological and not the human health evaluation of impacts associated with TPH are anticipated to drive the site management strategy. However, it was also agreed that the human health effects associated with TPH will be reviewed after the ecological toxicity evaluation has been completed. At that time, if it is decided that a more extensive evaluation of TPH toxicity

is warranted, the Navy will consult the references indicated by Dr. Willhite and expand the discussion presented in the TPH toxicity profile.

ITEM VI: Evaluation of Exposure Associated with Fish Consumption

Discussion
Ms. Kathuria noted her concern that the RI text does not indicate that impacts to fish in San Francisco Bay from contaminants at NAVSTA TI are being evaluated in the ecological assessment. She explained that groundwater concentrations at the point of compliance will be compared to ambient water quality criteria (AWQC) to address the impact of on-shore contaminants to fish. An evaluation of sediment data will address off-shore concerns.

Resolution
The Navy agreed to revise the text in the fish consumption section of the BHHRA to indicate that impacts to fish associated with contaminants on-shore are evaluated in the ecological risk assessment portion of the RI, and impacts to fish associated with off-shore sediments surrounding NAVSTA TI will be assessed in the off-shore RI report by evaluating the contaminant levels detected in the sediment samples. Collection of fish tissue will also be evaluated as part of the off-shore ecological risk assessment.

ITEM VII: Evaluation of the Inhalation Pathway and Review of the Air Sampling Technical Memorandum (Distributed February 5, 1997)

Discussion
The objective of this discussion was to determine how the results of the air sampling technical memorandum should be incorporated into the BHHRA. It was agreed that the EPA comments on the air sampling technical memorandum would not be discussed at this meeting in order to allow DTSC an opportunity to submit comments on the document. The issues addressed in this meeting included (1) the method used to estimate the risks associated with outdoor air concentrations, (2) indoor air modeling, and (3) incorporation of the air results from the petroleum sites (Site 6 and Site 22) in this BHHRA.

Resolution
(1) Dr. Serda and Ms. Simons indicated that additional risk calculations are not necessary because the required risk information can be obtained by comparing the air concentration to the ambient air preliminary remediation goals as presented in the Air Sampling Technical Memorandum.
(2) The Navy indicated that the level of uncertainty associated with the few models available to estimate indoor air concentrations is extremely high and that use of these models would defeat the purpose of collecting direct measurements. Consequently, based on the level of uncertainty associated with the models and the extremely low concentrations detected in outdoor air at the

(3) worst-case sites, it was agreed that models would not be used to calculate indoor air concentrations.
(4) EPA said that all available information should be used to evaluate the inhalation of volatile compounds pathway, including the results from the air sampling technical memorandum for both petroleum sites and Site 24, and existing site-specific environmental baseline survey documents to support findings of suitability to lease. The Navy agreed to summarize all relevant information in each site-specific risk assessment section.

ITEM IX: Ecological Assessment Issues

Ms. Cassa provided the Navy with reference citations requested from Dr. Polisini.

ITEM X: Other Items

Discussion
Ms. Kathuria stated that the utility worker scenario was evaluated in the human health risk assessment for the Hunters Point site at the request of EPA. For purposes of the Hunters Point assessment, it was assumed that a utility worker might be exposed to volatile compounds in groundwater via inhalation and all chemicals of potential concern in groundwater via the dermal contact pathway. Ms. Simons said that she thought that exposures by construction/utility workers were regulated by the Occupational Safety and Health Administration and that this issue was primarily a disclosure issue rather than a risk assessment issue.

Resolution
Dr. Serda will consult Dan Stralka (EPA toxicologist) to determine why the utility worker scenario was evaluated for Hunters Point when it has not been evaluated at any other installation.

ATTACHMENT A

MEETING AGENDA AND PARTICIPANTS LIST

NAVAL STATION TREASURE ISLAND
MEETING TO CLARIFY COMMENTS SUBMITTED BY
CAL/EPA AND U.S. EPA ON DRAFT REMEDIAL INVESTIGATION REPORT

AGENDA

Date:	April 4, 1997
Time:	9:30 AM
Place:	PRC Environmental Management. 135 Main Street, Suite 1800, San Francisco, CA

9:30 - 9:40	I.	Introduction
9:40 - 10:00	II.	Statistical Versus Spacial Sampling Approach and Application to Baseline Human Health Risk Assessment (BHHRA)
10:00 - 10:20	III.	Evaluation of Human Health Risks Associated with Beneficial Uses of Groundwater (Agricultural, Process, and Industrial Supply)
10:20 - 10:40	IV.	Elimination of Metals from Consideration in the BHHRA when 10% or Fewer of the Site Concentrations Exceed the Respective Ambient Concentration and Rationale for Comparison of Metals Concentrations at Site 11 - Yerba Buena Island Landfill with Treasure Island Ambient Concentrations
10:40 - 10:50	Break	
10:50 - 11:05	V.	Toxicity Profiles for Total Petroleum Hydrocarbons
11:05 - 11:20	VI.	Evaluation of Exposure Associated with Fish Consumption
11:20 - 11:50	VII.	Evaluation of the Inhalation Pathway and Review of the Air Sampling Technical Memorandum (Distributed February 5, 1997)
11:50 - 1:00	Lunch	
1:00 - 1:30	VIII.	Calculation of Concentration Terms for the Central Tendency Exposure (CTE) Case and Reasonable Maximum Exposure (RME) Case for Data Sets that are Neither Normal or Lognormal
1:30 - 1:45	IX.	Ecological Assessment Issues
1:45 - 2:00	X.	Other Items
2:00 - 2:15	XI.	Summary of Agreements/Action Items

NAVAL STATION TREASURE ISLAND
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

RPM MEETING (BHHRA)
APRIL 4, 1997

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2.	Sharon Tobias	PRC EMI	415-222-[illegible]
3.	Gwen Caviness	PRC EMI	(415)222-8262
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6.	Gina Kathuria	RWQCB-2	510286-4267
7.	Thorsten Anderson	PRCEMI	415 222-8205
8.	Mary Rose Cassa	DTSC	510-540-3925
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13.	Richard Knapp	PRC	415-222-8229
14.			
15.			
16.			

California Regional Water Quality Control Board
San Francisco Bay Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov
1515 Clay Street, Suite 1400, Oakland, California 94612
Phone (510) 622-2300 FAX (510) 622-2460

Gray Davis
Governor

Date: January 23, 2001
File No. 2169.6013 (SLR)

Ms. Ann Klimek
Environmental Business Line Team Leader
Southwest Division
Naval Facilities Engineering Command
BRAC Operations Office
1230 Columbia Street, Suite 1100
San Diego, CA 92101-8517

Subject: Concurrence that Groundwater at the Naval Station Treasure Island, San Francisco, Meet the Exemption Criteria in the SWRCB Sources of Drinking Water Resolution 88-63

Dear Ms. Klimek:

Regional Water Quality Control Board (RWQCB) staff have reviewed your letter to Mr. Chris Maxwell dated March 24, 2000 regarding the Navy's request for written concurrence that groundwater at Treasure Island meets the exemption criteria for State Water Resources Control Board (SWRCB) Resolution No. 88-63. In your letter, the Navy evaluated existing and potential beneficial uses of groundwater at Treasure Island (see letter attached). Based on RWQCB staff review of the data provided, RWQCB staff find that the quality and the hydrogeologic conditions of the groundwater beneath Treasure Island is such that this water is not a potential source of drinking water pursuant to SWRCB Resolution 88-63 and Regional Water Quality Control Board (RWQCB) Resolution No. 89-39.

If you have questions, please feel free to contact Sarah L. Raker of my staff by telephone at (510) 622-2377 or by electronic mail at slr@rb2.swrcb.ca.gov.

Sincerely,

Curtis T. Scott

Curtis T. Scott, Division Chief
Groundwater Protection and
Waste Containment Division

Resolution88-63-exemption

cc: Mr. David Rist, Department of Toxic Substances Control
Mr. Phillip Ramsey, U.S. Environmental Protection Agency
Ms. Martha Walters, San Francisco Redevelopment Agency

DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132-5190

5090
Ser 06CA.EC/0345
30 March 2001

From: Commander, Southwest Division, Naval Facilities Engineering Command

Subj: REQUEST FOR CONCURRENCE ON FINAL TECHNICAL MEMORANDUM ESTIMATION OF AMBIENT CONCENTRATIONS OF METALS IN GROUNDWATER, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

Encl: (1) Final Technical Memorandum Estimation of Ambient Concentrations of Metals in Groundwater, Naval Station Treasure Island dated March 2001

1. Enclosure (1) is provided for your files. Please provide concurrence by April 13, 2001.

2. Thank you for your guidance and involvement in this project. For further information, please call me at (619) 532-0968.

Ellen M Casados

ELLEN M. CASADOS
Remedial Project Manager

Distribution:
California Department of Toxic Substances Control (Attn: Mr. David Rist)
California Department of Toxic Substances Control (Attn: Dr. James Polisini)
California Regional Water Quality Control Board (Attn: Ms. Sarah Raker)
San Francisco Redevelopment Agency (Attn: Ms. Martha Walters)
Geomatrix Consultants (Attn: Mr. Gary Foote)
Tetra Tech EM Inc. (Attn: Mr. Jerry Wickham) (w/o encl)
International Technology Corporation (Attn: Mr. John Baur)

Department of Toxic Substances Control

Edwin F. Lowry, Director
700 Heinz Avenue, Bldg. F, Suite 200
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Winston H. Hickox
Secretary for
Environmental
Protection

Gray Davis
Governor

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From: D. Rist Phone: _____

Comments:

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Department of Toxic Substances Control

Edwin F. Lowry, Director
1011 "I" Street, P.O. Box 806
Sacramento, California 95812-0806

Winston H. Hickox
Secretary for
Environmental
Protection

Gray Davis
Governor

MEMORANDUM

TO: David Rist, Project Manager
Office of Military Facilities – Berkeley
700 Heinz Street, Building F, Second Floor
Berkeley, CA 94704

FROM: James M. Polisini, Ph.D.
Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: August 3, 2001

SUBJECT: FINAL TECHNICAL MEMORANDUM, ESTIMATION OF AMBIENT CONCENTRATIONS OF METALS IN GROUNDWATER
[PCA 18040, SITE 201209-00 H:34]

Background

We have reviewed the document titled *Final Technical Memorandum, Estimation of Ambient Concentrations of Metals in Groundwater, Naval Station Treasure Island, San Francisco, California*, dated March 30, 2001. This document was produced by Tetra Tech EM Inc., of San Francisco, California. This review is in response to your written request dated February 5, 2001.

Naval Station Treasure Island is in San Francisco Bay between the cities of Oakland, California and San Francisco, California. Naval Station Treasure Island consists of two contiguous islands, Treasure Island (TI) and Yerba Buena Island (YBI). YBI is a natural island in San Francisco Bay, while TI was constructed by placement of sediments on the former Yerba Buena Shoals by hydraulic dredging during the period of 1936 and 1937. The U.S. Army occupied YBI from 1866 to 1896. TI was leased to the Navy in 1941 and Navy operations continued until 1997. The City of San Francisco currently coordinates the reuse of the property.

General Comments

These comments concentrate solely on the HERD comments provided on the Draft Final document which proposed groundwater 'ambient' concentrations in a HERD memorandum dated February 23, 2001. HERD defers to the San Francisco Regional Water Quality Control Board (SFRWQCB) and the DTSC Geological Services Unit regarding the scientific basis for the 'ambient' groundwater concentrations proposed for Naval Station TI.

HERD has only minor differences of opinion in the responses to comments provided (Appendix C).

Specific Comments

1. HERD would agree that historical operations are an appropriate basis for determining whether an inorganic element (e.g., antimony) represents a release, but would not necessarily agree that the origin of the fill material (Response to Specific Comment number 9) is an appropriate criterion for TI. Naval Station Treasure Island (NAVSTA TI) was constructed by depositing hydraulic dredge materials onto an existing shoal to the north of YBI. Given the method of development for TI, it would seem that the current soil materials would be more homogeneous than those at other naval bases such as Hunters Point Shipyard, where portions of terrestrial deposits were graded into San Francisco Bay and supplemented with San Francisco Bay sediments. HERD will evaluate any reported groundwater concentrations of the elements aluminum, antimony, beryllium, cadmium, mercury and thallium independently. Please do not remove these elements from any risk assessment of groundwater.

2. HERD will review any risk assessment decision based on 'ambient' groundwater concentrations of aluminum, beryllium, cadmium mercury and thallium (Specific Comment number 12) independently. Please provide the groundwater concentrations for these elements and not screen them out of any report on groundwater based on 'ambient' concentrations.

3. The HERD reference to a copper 2.9 µg/l value for unfiltered water and 2.4 µg/l for filtered water (Response to Specific Comment number 14) was obtained from the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQUIRTs). These tables, with references, are available on the internet at the NOAA Hazmat web page.

Conclusions

The vast majority of the comments contained in the HERD memorandum of February 23, 2001 have been addressed. Only a few inorganic elements (e.g., antimony and mercury), as presented in the previous HERD comment number 9 and 12, will likely require discussion when implementing the proposed groundwater 'ambient' concentrations into any ecological risk assessment.

HERD Internal Reviewer: Michael Wade, Ph.D.
Senior Toxicologist, HERD

cc: Clarence Callahan, Ph.D., BTAG Member
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