COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN II)
Northern and Central California, Nevada, and Utah
Contract Number N62474-94-D-7609

Contract Task Order No. 0009

Prepared For

DEPARTMENT OF THE NAVY
Engineering Field Activity West
Naval Facilities Engineering Command
San Bruno, California

PHASE 1B ECOLOGICAL RISK ASSESSMENT RESPONSE TO AGENCY COMMENTS ON THE DRAFT PHASE 1B ECOLOGICAL RISK ASSESSMENT REPORT HUNTERS POINT SHIPYARD

March 17, 1997

Prepared By

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Enclosure (1)

5090
Ser 1832.2/L7129
17 Mar 1997

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

Subj: ECOLOGICAL RISK ASSESSMENT, PHASE 1B, ENGINEERING FIELD ACTIVITY, WEST, NAVAL FACILITIES ENGINEERING COMMAND, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

Encl: (1) Phase 1B Ecological Risk Assessment, Response to Agency Comments On The Draft Phase 1B Ecological Risk Assessment Report, Hunters Point Shipyard, 17 March 1997
(2) PRC EMI letter dtd 14 March 1997

1. Enclosure (1) is forwarded in accordance with the Hunters Point Annex Federal Facilities Agreement, and it contains the Navy's Response to Agency Comments on the Draft Phase 1B Ecological Risk Assessment Report. The Response to Agency Comments is being submitted instead of a Draft-Final Phase 1B Ecological Risk Assessment Report as agreed to by the Hunters Point Shipyard BCT during the 30 January 1997 BCT/RPM meeting. Enclosure (2) contains the proposed FAA schedule for Parcel F. Please review these enclosures and provide your written comments to Commanding Officer, Engineering Field Activity, West, Naval Facilities Engineering Command, (Attn: Mr. Richard Powell, Code 1832), 900 Commodore Drive, San Bruno, CA 94066-5006, with a copy to Mr. William Radzevich, Code 1832.2. The receipt of your response by 17 April 1997 will allow the Navy to keep this Ecological Risk Assessment report on schedule.

2. If you have any questions regarding this enclosure, please contact either Mr. Richard Powell, Code 1832, at (415) 244-2655, or Mr. William Radzevich, Code 1832.2, at (415) 244-2555.

Original signed by:

RICHARD POWELL
By direction of
the Commanding Officer

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March 14, 1997

Mr. William Radzevich
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900 Commodore Drive, Building 208
San Bruno, CA 94066-24020

Subject: Parcel F Feasibility Study Through Record of Decision, Hunters Point Shipyard, San Francisco, California - Comprehensive Long-Term Environmental Action Navy Contract No. N62474-94-D-7609 (CLEAN II) CTO 009

Dear Mr. Radzevich:

The U.S. Navy is conducting a comprehensive, parcel-based remedial investigation/feasibility study (RI/FS) at Hunters Point Shipyard (HPS) in accordance with applicable state and federal laws and regulations. The FS for Parcel F, which comprises the offshore subtidal portion of HPS, will incorporate all of the information that is contained in the Ecological Risk Assessment (ERA), Phases 1A and 1B, for HPS. The schedule proposed for these RI/FS documents includes (1) preparation of a comprehensive FS report; (2) preparation of a proposed plan (PP); and (3) preparation of a record of decision (ROD) document.

The schedule for implementation is as follows:

Deliverable/Event	Due Date	Comments
Draft Parcel F FS Report	October 5, 1997	Duration of preparation six months - April 5, 1997 through October 5, 1995. Regulatory review period of Draft Parcel F FS Report - 30 days Duration of responses to comments and revisions to Draft - 30 days
Draft Final Parcel F FS Report	December 5, 1997	Regulatory review period of 30 days
Draft Parcel F Proposed Plan	March 5, 1998	Duration of preparation - 60 days
Draft Final Parcel F Proposed Plan	April 4, 1998	30 days after submittal of Draft Proposed Plan

Enclosure (2)

Deliverable/Event	Due Date	Comments
Final Proposed Plan Published	April 15, 1998	15 days after submittal of Draft Final Proposed Plan to agencies
Start of Public Comment Period on Proposed Plan	April 20, 1998	5 days after publication of Proposed Plan
Draft Record of Decision	May 20, 1998	30 days after start of public period. May be extended to 60 days if review extension for Proposed Plan requested, giving revised deadline of June 19, 1997.
Final ROD (to agencies)	September 17, 1998	90 days after submittal of Draft ROD
Final ROD Approval	October 17, 1998	30 days after submittal of Final ROD

The above schedule is based on two major time constraints as follows:

1. The schedule has been created to meet the deadline imposed by the National Defense Authorization Act (NDAA), which requires that all draft final RI/FS documents be submitted and/or completed at HPS (a Base Realignment and Closure II site) by December 5, 1996.
2. The above schedule does not include time for additional sampling to be able to prepare the FS and meet the requirements of NDAA deadline as mentioned above.

The Navy will begin scoping the FS in March and April of 1997, with the actual preparation for the document to begin in April, 1997. The Navy will arrange for meetings to review the FS scope with the regulatory agencies.

If you have any questions, please do not hesitate to call me at (415) 222-8344, or Neill Morgan-Butcher at (415) 222-8378.

Sincerely,

Jim Sickles

Jim Sickles
Installation Coordinator
Hunters Point Shipyard Project

cc: Neill Morgan-Butcher, PRC
File

CONTENTS

1.0 INTRODUCTION

This document presents the U.S. Department of Navy's (Navy) responses to comments from regulatory agencies on the Hunters Point Shipyard (HPS) Phase 1B ecological risk assessment (ERA) draft report that was issued in three parts: Volume I, Part 1, Nature and Extent of Contamination (PRC Environmental Management Inc. [PRC] 1996b); Volume I, Part 2, Risk Characterization to Aquatic Receptors (PRC 1996d); and Volume II, Chemistry and Toxicity Results (PRC 1996c). Responses were received from the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), the DTSC Human and Ecological Risk Division (HERD), the California Regional Water Quality Control Board (RWQCB), and the National Oceanic and Atmospheric Administration (NOAA). This document is organized by agency comments.

2.0 U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS

The following are the responses to comments on the Phase 1B ERA draft report (PRC 1996b, c, d) from EPA.

2.1 GENERAL COMMENTS

This section presents general comments from EPA.

1. **Comment:** **As we have outlined previously in our November 28, 1994 letter, we expect the Navy to determine the potential impact to human receptors from fish ingestion. The Navy had previously indicated that fish tissue collection would be included as part of the Human Health Risk Assessment, however this has not been included in the Remedial Investigation documents submitted to date. In fact, the Navy has indicated that fish tissue collection would be conducted as part of the ecological risk assessment effort, which has not been the case. The Navy must resolve this issue, particularly in light of recent concerns regarding fish consumption raised by community members during the RAB meetings in November and December 1996.**

   Response: Collection of fish tissue was evaluated during the preparation of the Phase 1B work plan (PRC 1995c), but no suitable species were identified to assess the potential human health risk associated with consumption of fish at HPS. Most food fish (such as the California halibut) are highly mobile, ranging all over San Francisco Bay. The Navy acknowledges that the consumption of aquatic life from the San Francisco Bay adjacent to HPS represents a potentially

complete exposure pathway; however, data gathered from collection and analysis of most fish would not represent contaminant uptake from HPS alone.

Species of gobies (yellow fin goby and bay goby) are known to inhabit the HPS offshore area and have a limited enough range that they could be assumed to represent contaminant uptake solely from HPS. Previous field surveys (PRC 1994), however, have indicated that insufficient population densities exist to make analysis of goby tissue feasible (please also see response to EPA Specific Comment [Part 2] No. 18, Section 2.3.1.2).

The surfperch and croaker were previously proposed for collection as part of the Phase 1B investigation and are two of the species studied by the San Francisco Bay Regional Water Quality Control Board (RWQCB) as part of their San Francisco Bay fish tissue survey (RWQCB and others 1995). Although these species are the most localized of the fish studied by RWQCB, they are not so localized as to remain primarily in the HPS offshore area. Nonetheless, the study concluded that consuming fish caught in San Francisco Bay including those in the vicinity of HPS may pose a human health threat.

The Navy has cooperated with the Restoration Advisory Board (RAB), the City of San Francisco, and EPA in their efforts to advise the community of the risks posed by consumption of fish caught in the vicinity of HPS and is committed to addressing this serious issue. The Navy does not believe that additional fish tissue sampling will help in the evaluation of the fish consumption pathway if contaminant exposure can not be clearly tied to HPS sediment contamination. The fish studied to date may or may not have been exposed to contaminants in the offshore area around HPS.

The Navy expects that the risks related to exposure to contaminants released from HPS to San Francisco Bay through this pathway are not significant because (1) contaminants in the San Francisco Bay near HPS originate from numerous locations throughout the Bay and (2) analysis of preliminary calculations of risks from ingestion of mussel tissue collected during sampling under the environmental sampling and analysis plan (ESAP) indicate that the primary contaminants of concern were not detected in sediment samples collected in the vicinity of the mussel stations.

Contaminated sediments and surface water migrate throughout the San Francisco Bay, which is contaminated with a variety of inorganic and organic contaminants as documented in the RWQCB ambient sediment concentrations (RWQCB 1996) and the RWQCB in fish tissue study (RWQCB and others 1995).

Benthic invertebrate tissues, specifically mussels, were placed in cages at 17 stations located in subtidal areas in South Basin during the sampling under the ESAP (see Section 2.5.2.3, Volume I, Part 1). Mussel tissues were collected about 30 days later, and concentrations of metals, semivolatile organic compounds, pesticides, and polychlorinated biphenyls (PCB) were detected in

mussel tissues collected at some of these stations. In addition, the ESAP project collected a surface and subsurface sediment sample near each of the 17 mussel stations. Because sediments and surface water migrate throughout the San Francisco Bay, any risk estimates based on contaminant levels measured in the tissues of mussels would at best represent some estimate of risks associated with potential exposure to both HPS and baywide contamination. It has not been determined what portion of contaminants are from HPS and from other sources in the Bay.

Estimation of risks related to potential exposure to HPS-related contaminants from mussel tissues are not practical because of difficulties with estimating the concentration term from HPS sources. In an attempt to qualitatively estimate the potential contribution of HPS-related contamination to risks associated with potential exposure through the mussel ingestion pathway, the Navy performed preliminary calculations using primarily EPA default exposure factors. Contaminant concentrations used in the calculations were the maximum concentrations measured in the mussel tissues. Preliminary calculations indicate that the contaminants contributing most significantly to total risks are arsenic, cadmium, Aroclor-1254, and Aroclor-1260.

Cadmium, Aroclor-1254, and Aroclor-1260 were not detected in surface and subsurface sediment samples collected at the 17 sampling stations around HPS. Arsenic was detected in all 34 sediment samples; however, only one sample contained arsenic exceeding the San Francisco Bay sediment ambient concentration of 16.1 milligrams per kilograms. Therefore, the clean mussels placed at the 17 HPS sampling stations may have been contaminated as a result of exposure to contaminants from particulate and water in the San Francisco Bay that originated from numerous locations throughout the Bay.

2.a. **Comment:** **The groundwater to bay pathway has not been addressed as part of the ecological risk assessment. The Navy has continually pointed to the ecological risk assessment to provide information regarding this pathway as part of their response to comments on the Parcel B and D RI documents. As clarified during the ecological meeting, we believe that this evaluation should be included in the appropriate RI Reports from now on, however as the Parcel B and D reports have been finalized it would be better to include the assessment for these parcels in the draft final ecological report and eliminate this data gap.**

Response: The Navy regrets the confusion caused by the references in the Parcel B and D remedial investigation (RI) reports to a groundwater-to-Bay pathway discussion in the Phase 1B ERA report. The draft final Parcel C RI and draft Parcel E RI reports will include evaluations of groundwater-to-Bay pathways. Indirect contributions to the Bay from groundwater entering storm sewers and direct migration of groundwater to the Bay will be estimated. Upon BRAC Cleanup Team (BCT) concurrence on an approach, the groundwater-to-Bay pathway in Parcels B and D will be addressed. If the schedule permits, this evaluation will be included as an appendix to the draft final Parcel E RI report. Otherwise, our plan is to include it in the Parcel F feasibility study (FS).

2.b. **Comment:** **In addition, as EPA has mentioned previously, the soil remaining on site with levels of contamination below human health risk assessment cleanup goals should also be screened against ecological screening criteria to ensure that if a pathway exists through run-off or storm drains, that ecological receptors will not be exposed to contaminants at unacceptable levels.**

Response: The draft Parcel E RI report will contain an assessment of risk to terrestrial ecological receptors associated with surface soils (0 to 3 feet below ground surface). This report will also estimate transport of surface soil contaminants to the Bay in storm water runoff. The relative contribution of groundwater and storm water pathways to offshore contaminant loading will be evaluated; however, the Navy does not believe that screening of surface soils against aquatic ecological criteria or a more formal risk assessment is necessary since current City of San Francisco plans call for the decommissioning of the storm drain system.

3. **Comment:** **The risk assessment did not meet one of its stated objectives, "to provide an interpretation of risk and how it affects the transfer of Parcel F or the offshore area of HPS," which requires a synthesis of all nature and extent and risk information for use in determining potential future actions (i.e., identification of problem areas, data gaps, and prioritization for future activities). We suggest that the Navy include analysis of all the data in overlays that will indicate areas that require further evaluation (i.e. areas that are toxic versus those that are nontoxic). Further, once the areas that are considered toxic have been identified, the extent of contamination should be determined. Unfortunately as the Microtox data did not prove to be a viable predictor of toxicity, these data can not be used in place of toxicity tests to determine extent (the Navy could use the toxicity data collected and apply the results to areas where only chemistry data has been collected).**

Response: The Navy acknowledges that additional data analysis and presentation will be required for the Phase 1B data but has not decided what specific analytical tools to employ. The Navy will present detailed plans for future work in upcoming scoping meetings with the agencies. Special attention will be paid to delimiting areas that are considered toxic versus nontoxic. The Navy understands that the current approach to the assessment of offshore risk as discussed with the BCT calls for the preparation of an FS for Parcel F. No revisions to the draft Phase 1B ERA report are anticipated; however, this response-to-comment document should be appended to the draft Phase 1B ERA report and is a formal part of the administrative record.

4. **Comment:** **Based on the discussions in the December 3, 1996 meeting between the Navy and regulatory agencies, there also appears to be an interest in beginning a preliminary Feasibility Study for Parcel F, focusing on potential actions and associated costs that may be incurred under various cleanup scenarios. EPA has identified some preliminary data gaps regarding the extent of contamination in our subsequent comments that would need to be addressed prior to or during implementation of a feasibility investigation phase. We suggest that additional data for extent definition could be collected to better define areas that are determined to**

be toxic and limit the areas requiring remediation, if this is deemed necessary.

Response: The Navy does not believe that additional data for the definition of the nature and extent of contamination is required at this stage in the investigation. Sufficient data appears to exist to define general areas of contamination such that necessary volume estimates could be made for the purposes of the FS. Subsequent sampling to help pinpoint "hot spots" may be justified.

2.2 ISSUES REQUIRING ADDITIONAL DISCUSSION

The issues identified as potentially requiring additional discussions are organized by topic and described in the following comments. Specific comments regarding technical issues and editorial items are also presented in comments below.

5.a. Comment: **Evaluation of Toxicity Data: Echinoderm Larval Screening Criterion**

The criterion selected for use in screening the echinoderm larval bioassay data does not represent an ecologically conservative level for identifying adverse effects. Specifically, the use of an LC_{50} at a porewater concentration of 80 percent as a screening value means that at a diluted concentration, it takes a reduction in normal survival of 50 percent to classify a result as toxic, which ecologically represents a substantial adverse effect at both the diluted and whole water concentrations. Reductions in normality of 15 and 30 percent (relative to reference or control normality) are considered adverse effect thresholds, which support a more ecologically protective screening process.

To evaluate the potential impact of the Navy's use of a less conservative screening criterion on the overall evaluation of which samples exhibited "toxic" larval responses, EPA evaluated the normal survivorship data at the 100 percent porewater concentration relative to a more conservative criterion of normal survivorship less than 70 percent (relative to control) as representing a toxic response. Because the majority of the HPS echinoderm bioassay results exhibited ecologically significant mortalities (less than 3 percent normal survivorship), the results of the comparison were similar (i.e., the same samples were identified as toxic or non-toxic) with the exception of four stations: S1ST01, TBBST03, TXST02, and TYST04. Percent normal survivorship at these stations ranged from 39 to 57 percent; these results suggest toxic echinoderm responses, but were not identified as such using the Navy's approach. It is recommended that the Navy also consider these data as indicative of toxicity and reevaluate their station-specific results accordingly.

Response: The Navy did not measure lethal effects (LC_{50}) but looked at the more sensitive abnormal effects endpoint (EC_{50}). The Navy will evaluate the interpretation of the EC_{50} data in light of these comments and will reanalyze the data in the Parcel F FS as necessary.

5.b. **Comment:** Microtox™ Data Evaluation

Several of the regulatory agencies raised an issue in their comments on the draft work plan (as responded to by the Navy in PRC, 1995) regarding how the Microtox™ data would be interpreted in the risk assessment if stimulatory responses were observed. The Navy indicated in their response to EPA's specific technical comment #1 that hormesis (when "the bacterium produces more light than would be expected because of low levels of potentially toxic elements which are an indicator of toxicity") could be "accounted for by the use of a comparison test." However, it appears that the comparison test is only conducted when a significant decrease in luminescence (from controls) occurs, which therefore does not assist in the interpretation of significant increases in luminescence (or stimulatory responses). Furthermore, it is stated in Section 9.4 of Part 1 of the risk assessment (Nature and Extent of Contamination) that "sediment pore water samples that yielded stimulatory responses were considered nontoxic, and no further testing was conducted." This statement directly contradicts the Navy's previous statement that a stimulatory effect may signal low-level toxicity.

Because of the uncertainties associated with the ecological significance of stimulatory responses in the Microtox™ bioassay, and the prevalence of stimulatory responses within the data set, EPA does not recommend that these data be used quantitatively in the risk assessment. However, at a minimum, the risk assessment should discuss the overall test results [which are currently excluded from mention in the "Risk Characterization to Aquatic Receptors" (Volume I, Part 2)] and the potential for the stimulatory responses to indicate low-level toxicity. Because Microtox™ was the most extensively used biological effects test (i.e., over twice as many Microtox™ tests were conducted as amphipod and echinoderm larval bioassays), the failure of the Microtox™ data to provide reliable estimates of toxicity resulted in the evaluation of risks to the benthic community (where no other toxicity tests were conducted) being based primarily on sediment and porewater chemical data.

Response: Microtox® test data are presented in Tables 9-24 through 9-35, Volume I, Part 1. A negative percent difference indicates an increase in production of light which results from hormesis and indicates marginal toxicity. A positive percent difference indicates inhibition of light output, which indicates toxicity. If the significance level exceeded 95 percent, then a 90 percent basic test was conducted. The high level of significance (greater than 95 percent) indicates that bacteria experienced a significant difference between the sample and the control, therefore confirming the percent difference. An EC_{50} result, greater than 90 percent in the 90 percent basic test, indicates that some toxicity is exhibited by the sediment pore water. Sampling locations with an EC_{50} of greater than 90 percent include: TA04, TD03, TD04, TF03, TG01, TH01, TI01, TI03, TJ01, TJ03, TK01, TL01, TL03, TM01, TN01, TN03, TP01, TQ03, TO03, TS03, TT03, TU04, TAA01, and TAA03. This information will be evaluated further in the FS for Parcel F.

6. Comment: Screening of Sediment Chemical Data

The presentation of the sediment chemical screening process in Part 1 of the risk assessment (Nature and Extent of Contamination) is confusing, as different sections of the document imply different screening results. Clarification of the screening process is necessary to identify what actual data were retained in any given assessment; specific details regarding the inconsistency in presentation are provided below. In addition, the use of "ambient" concentrations as screening tool for assessing risks does not appear to be the most ecologically conservative approach; recommendations regarding how these data may be used are also provided below.

In Section 6.2.1, it is stated that sediment chemicals of potential concern (COPCs) were initially screened by comparing site concentrations with "preliminary ambient values specific to the Bay," which are based on the California Regional Water Quality Control Board's (RWQCB's) Regional Monitoring Program (RMP) and Bay Protection and Toxics Cleanup Program. Any given chemical that was not detected at a concentration exceeding its corresponding ambient value was assumed to "not occur at a concentration that was toxic to the benthos." Furthermore, Section 7.2.3 states that "COPC concentrations less than the ambient level will not be carried further in the analysis." The Navy's presentation at the December 3rd meeting also implied that chemicals were screened out if concentrations did not exceed ambient levels. However, it was noted that the RWQCB ambient values for several chemicals (i.e., arsenic, chromium, copper, mercury, nickel, zinc, and total DDT) are higher than corresponding Effects Range-Low (ER-L) concentrations. Based on the screening process as described in these sections, it would appear that these particular chemicals could have been screened out of the risk assessment based on a lack of exceedance of ambient values, yet be present in Parcel F sediments at concentrations that could pose risks to more sensitive members of the benthic community (based on numerical exceedances of effects-based criteria or ER-Ls).

In contrast, the list of sediment COPC characteristics in Section 7.2.5 suggests that any chemical detected in greater than five percent of the analyzed samples at concentrations exceeding either ER-Ls or ambient values were retained as COPCS. In addition, the data presented in the figures in Section 8 indicate that COPCs at concentrations between ambient and benchmark levels were retained for analysis, as data are plotted for chemicals with concentrations between ER-Ls and ambient values. The text description of the approach to identifying COPCs for the risk assessment should be made consistent or clarifying text should be provided if there was a reason for the differences.

Because the purpose of the risk assessment is to identify and quantify risks to selected receptors, it would be inappropriate at this phase of the project to screen-out chemicals that exceed effects-based criteria (i.e., an ambient value should not be considered to represent a lack of potential toxicity or risk if it exceeds an effects-based screening level). Instead, it is recommended that the RWQCB values be considered for use in the interpretation of potential sediment problem areas that may be acting as sources (based on the presence of highly elevated concentrations relative to

ambient), and as part of future risk management or remedial action evaluations, as these values may represent appropriate cleanup goals.

Response: The Navy used a 5 percent COPC frequency of detection as a screening criterion to focus its resources on those COPCs that are most likely to cause an unacceptable risk to the environment. Sediment COPCs that did not occur at a frequency of detection greater than 5 percent were not carried further through the evaluation process. The use of 5 percent is based on standard practice. If the COPC did occur at a frequency of detection greater than 5 percent, it was carried through the evaluation process. Next, if a COPC did not exceed the ambient value, it was not carried any further through the process. However, it was noted in the discussion of the nature and extent of contamination whether the ambient value exceeded either the ER-L, the ER-M, or both. If the COPC exceeded the ambient, it was then compared to the ER-L and ER-M and noted in the nature and extent discussion. If the ambient COPC value exceeded an effects level, it was assumed that the COPC concentration did not pose a risk to potential benthic receptors as indicated in the second paragraph of Section 12.e.2 of the cleanup order for the Shearwater site (RWQCB 1996). The Navy acknowledges EPA's concern that "hot spots" could be excluded using this protocol. The procedure will be reevaluated in the FS for Parcel F, and the data will be reassessed if significant risk related to ambient concentrations of contaminants appears to exist.

7.a. Comment: **Statistical Evaluations of Relationships Among Chemical and Biological Data**

The information presented in Section 7.4 of Part 1 of the risk assessment (Nature and Extent of Contamination) regarding the statistical analysis of the chemical and biological data was difficult to follow; this suggests that modifications to the statistical evaluations may be necessary. In particular, clarification regarding what data were used in the correlations of sediment chemical, physicochemical, and bioassay data is needed. It is stated in Section 7.4 that "analyses were performed with the Phase 1B collocated toxicity, COPC, and physicochemical data collected between surface and to a depth of 1-foot below the sediment-water interface." However, the toxicity tests were conducted on the surface (0 to 0.5 ft) grab samples collected from the site. It is therefore extremely important that all correlation analyses using the toxicity data be conducted using the co-located surface (0 to 0.5 ft) sediment (and porewater) chemical and physicochemical results, as these data are the most appropriate representation of the conditions under which the bioassay organisms were exposed. In the assessment of potential causality, it would be inappropriate to conduct such correlations using data representative of deeper horizons.

Response: The Navy will rerun a portion of the statistical analyses as part of the Parcel F FS. If better correlations are observed, all statistical analyses will be rerun.

7.b. Comment: **The results of the correlation analyses (as presented in Section 9 of Part 1 and throughout Part 2) indicated "significant" correlations among some chemical endpoints and biological responses; however, it is important that these results be qualified, as most were not "ecologically significant."**

Typically, a correlation coefficient ("r") of at least 0.7 is used to designate ecological significance, as the associated regression coefficient of determination ("r^2") of 0.5 means that approximately 50 percent of the variation in the dependent variable (in this case, toxicity test response) is explained by the independent variable (chemical concentration). Correlation coefficients less than 0.7, therefore, explain little of the variation observed in the biological response and thus are not considered ecologically significant.

Response: All correlations indicated as significant by the statistical program used were reported regardless of the "r" value. In the FS for Parcel F, the Navy will *review the process* used to assess significance of correlations and will modify the evaluation scheme as necessary.

7.c. Comment: **Given the concerns expressed above regarding the overall statistical approach to evaluating the chemical and biological data, EPA proposes that the following evaluations be conducted to further investigate and clarify any relationships among the data:**

- **Revise correlation analyses using only co-located toxicity test results, porewater chemical concentrations, and surface sediment chemical data, as necessary.**

Response: Please see response to EPA General Comment No. 7.b, Section 2.2 above.

7.d. Comment:

- **Detection limits can be retained in the correlation analyses, but the frequency of non-detects and the effects on any correlations needs to be discussed in the interpretation of results.**

Response: The Navy acknowledges this statement. The effect of using nondetects will be assessed in the FS for Parcel F.

7.e. Comment:

- **Multivariate analyses such as principal components could be used to assist in the identification of multiple factors that may contribute to the toxic responses.**

Response: Comment acknowledged. The use of principal components analysis or another multivariate procedure will be evaluated for inclusion in the FS for Parcel F.

8.a Comment: **Nature and Extent of Contamination Evaluation**

EPA has recommendations regarding modifications to the overall presentation and interpretation of the sediment chemical and porewater data that are intended to further clarify the distribution of COPCs and presence and locations of "hot spots" or potential sources.

COPC Distribution

To further define the overall extent of contamination, it is recommended that the data collected during the Environmental Sampling and Analysis Plan (ESAP) program and the 1991/1992 intertidal (IR) sediment study be included in the nature and extent of contamination assessment. As the Phase 1B investigations were designed to establish whether contaminants

had been transported from nearshore sources to offshore locations, rather than overall distribution of COPCS, some areas documented as exhibiting elevated chemical concentrations relative to sediment benchmarks were not resampled (e.g., see locations of ESAP stations 02, 15, and 17, and IR stations between ESAP locations 11 and 12). The ESAP and IR data therefore provide relatively recent information on the extent of contamination in such areas, and although this data apparently included in the risk assessment, it was not represented in the overall assessment of nature and extent. Presentation and analysis of both data sets relative to the Phase 1B data should be included to complete the risk assessment.

As past dredging of the berthing areas may have had a direct impact on the gradient assessments in these areas, as contaminant patterns may have been altered by the removal of sediments, it is recommended that this information be included in the risk assessment discussion. Further, discussion of sediment resuspension and deposition from tidal activities should be included.

Separate presentations of surface and subsurface sediment chemical data are also recommended, as these data typically serve different purposes:

- Surface grab chemical data are evaluated in conjunction with bioassay data to establish potential relationships between chemical concentrations and toxicity, as well as the areal extent of contamination; these data are also used to identify ongoing or recent sources to sediment.

- Subsurface core data are used to assess historical source contributions, contaminant trends with depth below surface, and the vertical extent or maximum depth of sediment potentially requiring remediation.

Response: The Navy agrees that the ESAP and intertidal studies include useful sediment data, and the Parcel F FS will incorporate these results to define the full extent of contamination. For the FS, the Navy will examine the surface and subsurface data separately.

8.b. Comment: **Delineation of Hot Spots**

Further delineation of "hot spots" is necessary to assist in the prioritization of areas requiring further action. The use of Effects-Range Median (ER-M) screening values from Long and others as the basis for defining sediment chemical hot spots is acceptable; however, it is also recommended that AVS/SEM ratios be considered in the hot spot analysis, particularly those SEM/AVS ratios substantially greater than 1.0, as they suggest a strong probability that selected metals are bioavailable. In the Nature and Extent of Contamination document (Part l), it would be useful to include a figure similar to Figure 2-6 in the risk characterization document (Part 2), that presents ER-M and NAWQC exceedances, and includes SEM/AVS ratios greater than 1.0, on a station-by-station basis. These data could then be visually inspected to identify areas representing apparent hot spots.

Response: Further definition of "hot spots" incorporating simultaneously extracted metals (SEM) to acid volatile sulfides (AVS) ratios (SEM/AVS) as suggested will be included in the FS for Parcel F. The Navy would like clarification from the agencies on what defines a hot spot.

9. **Comment:** **Definition of Current Impacts to and Risk Drivers for the Benthic Community**

Although the method by which COPC risk drivers were identified for the benthic community is a typical approach used for predicting risks to higher order receptors, it misidentifies risk drivers and those chemicals that may pose the highest risks to benthic organisms. This appears to be due to the use of hazard indices (HIs) and results of a risk driver algorithm to identify adverse effects and predict future risks, rather than interpreting site-specific bioassay results and chemical data as representing current impacts and as being indicative of future risks.

The bioassays provided direct measures of impacts to the invertebrate community, and thus the "drivers" behind these measured effects should be evaluated using the existing co-located sediment and porewater chemical data. Co-located chemical exceedances of effects-based criteria (i.e., HQs), or data suggesting chemicals of concern are bioavailable at these locations (e.g., SEM/AVS quotients greater than 1.0), are considered potential contributors to (or drivers of) the currently measured impacts. In the case of HPS, review of the co-located toxicity and chemical results suggest that metals (particularly mercury and copper) are primary contributors to observed toxicity throughout Parcel F, with TBT contributing to toxicity observed in the India Basin area. Furthermore, the widespread distribution of metals at concentrations exceeding effects-based criteria suggests that these COPCs represent the greatest potential for ongoing and future risks to the benthic community.

In contrast, the Navy's assessment of the sediment chemical data suggests that "PAHs and organochlorine pesticides are responsible for most of the adverse effect on the benthos, followed by PCBs, with TBT and metals exerting the least effect" (Part 2, page 6-6). Review of how the HIs and COPC risk drivers are calculated indicates that these endpoints are highly skewed by HQs of high magnitude at single locations, and do not include "area-weighting" or an assessment of the relative degree of distribution. Therefore, organic COPCs were identified as posing the most risk because of their presence at a limited number of stations at highly elevated concentrations.

Because the toxicity test results represent site-specific measures of current biological effects, these data should take precedence in the assessment of risks, rather than be used as "supplemental evidence to support HQ-based risk estimates," as described in Section 7 of the risk characterization document (Part 2). If the HI-based approach to estimating risks is retained, then the results must be interpreted in light of all other endpoints (i.e., the preponderance of evidence), including areal distribution of COPCs, to ensure that the predicted risks reflect observed site conditions. Because this does not currently appear to be the case, it is recommended that the Navy reassess their results as suggested above.

Response: Comment acknowledged. The Navy will reevaluate the HQ data in the FS for Parcel F.

10. Comment: **Assessment of Potential Risks to Avian Receptors**

The assessment of risks to avian receptors is not well presented and is difficult to follow. It does not appear that current risk assessment guidance has been followed. As an example, parts of the exposure assessment were conducted incorrectly, particularly for the peregrine falcon. The contaminants of concern appear to have been selected based on exceedance of ambient concentrations, rather than the bioaccumulative properties of the chemicals measured at the site. Furthermore, assumptions and input parameters are not well substantiated. Finally, it is not clear whether or not the Navy has concluded that risks are present or are significant (conflicting statements are presented in the document).

The purpose of this risk assessment is to evaluate the potential for injuries to selected avian receptors to determine the need for cleanup; some of this document attempts to make risk management decisions. Risk management decisions are the BCT's responsibility and will be included as part of the selection and justification of the final remedy.

Response: A number of different criteria were used to identify COPCs in sediment in the offshore area of HPS. One criterion used was a comparison to ambient. Chemicals detected below ambient concentrations characterized for sediments in San Francisco Bay (RWQCB's Regional Monitoring Program and Bay Protection and Toxics Cleanup Program) were not included as COPCs. Comparison to ambient was considered to be a reasonable criterion because the objective of the ERA was to characterize potential risks based on releases from HPS, not total risk (that is, risk based on chemicals released from HPS, as well as those whose presence is a result of ambient conditions within the Bay). Metals in the sediment at HPS detected below ambient were assumed not to relate to site activities. Excluded chemicals based on this criterion were arsenic, chromium, silver, and vanadium.

The proposal to use bioaccumulation potential as another criterion for selecting COPCs is not feasible because the information available regarding bioaccumulation of most metals from sediments is too limited. A number of factors influence bioaccumulation of metals from sediments including metal speciation, transformation, inhibitory interactions of different metals, sediment chemistry, and binding to dissolved organic matter (Barron 1995). The available body of bioaccumulation literature focuses on heavy metals, especially lead and organic forms of mercury and selenium. Studies that address some of the factors that influence bioaccumulation are available for arsenic, silver, and chromium, but information on vanadium is scarce.

In general, literature focuses on direct toxicity rather than bioaccumulation for this group of compounds because of a lack of evidence exists indicating bioaccumulative effects. For example, in studying the relationship between lake sediment concentrations for various metals (such as, arsenic) and the

concentration in fish muscle tissue, Harrison and Klaverkamp (1990) concluded that metal concentrations in muscle were poor indicators of metal concentrations in sediment.

Using bioaccumulation potential as a criterion for COPC selection also does not address the original objective of the ERA, which is to characterize risks based on site releases rather than total risk. If it is agreed that the objective of the ERA is to assess total risk, then all detected chemicals should be assessed, whether or not they are within ambient or bioaccumulate. The Navy will evaluate the determination of total risk for inclusion in the FS for Parcel F.

11. **Comment:** **Integration of Nature and Extent of Contamination with Risk Assessment**

The ecological risk assessment provided a relatively comprehensive point-by-point summary of the specific results of the Phase 1B sampling effort; however, these data must be further synthesized to provide an overall assessment of risks to receptors inhabiting various areas within Parcel F. Inherent in this assessment is a delineation of potential sediment problem and cleanup areas, based on the sediment chemical and biological data and the results of the modeling effort used to estimate risks to select avian receptors, and prioritization or relative ranking of areas requiring further actions.

Response: The Navy acknowledges this statement. Additional summary tables and figures will be evaluated for inclusion in the FS for Parcel F.

12. **Comment:** **Data Gaps Regarding the Extent of Offshore Contamination**

A number of data gaps were preliminarily identified with respect to establishing the extent of offshore contamination:

- **Historical ESAP and IR data need to be incorporated into the extent evaluation to provide information on areas not resampled during Phase 1B.**
- **The areal extent of contamination offshore of stations TAST03 and TBSM03 (transects A and B) is not well defined, as two of the outermost stations on these transects (TASM04 and TBSS04) exhibited similar contaminants as the nearshore stations, but were relatively distant from the nearshore stations. Additional sampling between these locations would further define the offshore extent of contamination. A similar data gap was observed between stations TEST03 and TESS04 (transect E) and TFSM03 and TFSS04 (transect F).**
- **The area encompassed by ESAP Station 02 was not resampled during the Phase 1B investigation and is near two nearshore clusters representing potential cleanup areas (the nearshore area of transacts A and B and C, D, and E). This area should be evaluated further.**

- **Each of the berthing slips was characterized by chemical exceedances at the outermost transect stations sampled, thereby indicating that the extent of offshore contamination has not been fully delineated. Additional evaluation is recommended in the offshore reaches of these berthing slips.**

If contamination in these areas is documented above effects based screening criteria, the risk assessment and overall weight-of-evidence approach will need to be revisited to ensure that all potential problem and cleanup areas are included.

Response: The Navy will incorporate the ESAP and intertidal data into the analysis of nature and extent of contamination in the Parcel F FS (please see response to EPA General Comment No. 8.a, Section 2.2 above). Evaluation of additional potential data requirements will be included in the FS for Parcel F.

2.3 SPECIFIC COMMENTS

This section presents specific comments from EPA.

2.3.1 Technical Issues

This section presents comments concerning technical issues.

2.3.1.1 Part 1 - Nature and Extent of Contamination

This section presents comments on Volume I, Part 1 - Nature and Extent of Contamination (PRC 1996b).

1. **Comment:** **Global: Please see General Comments regarding the use of San Francisco Bay ambient concentrations in the sediment chemical screening evaluation, the ecological significance of observed correlations, and use of the Microtox™ data.**

   Response: Please see response to EPA General Comments Nos. 5.b and 6, Section 2.2 above.

2. **Comment:** **Executive Summary: It is recommended that the Executive summary be revised to provide more general discussions of investigation results; as currently written, the station specifics do not provide a "big picture" view for the reader. Generalizing results by geographic area may provide the reader with a better sense of where particular problem areas exist.**

Response: Comment acknowledged. The Navy understands, however, that the draft Phase 1B ERA report (PRC 1995b, c, d) will not be finalized. This response-to-comment document is an integral part of the Phase 1B ERA report and will be included in the HPS information repositories.

3. **Comment:** **Executive Summary, Page ES-4: As discussed in the December 3, 1996 data presentation meeting between the Navy, regulatory agencies and their contractors, EPA's Ecotox Thresholds have been withdrawn and therefore should be excluded from use as sediment chemical screening criteria.**

Response: The only screening criteria affected by withdrawal of the EPA Ecotox thresholds are the sediment screening values for endosulfan, lindane, and methoxychlor. As stated in EPA Specific Comment No. 2, Section 2.4 below, the Navy will retain Great Lakes Water Quality Initiative Tier II values. The effect of the elimination of the screening criteria from EPA Ecotox Thresholds will be evaluated in the FS for Parcel F.

4. **Comment:** **Executive Summary, Page ES-5: The apparent toxicity of the reference sediments (less than 80 percent survival) should preclude their use in comparisons with site data. Therefore, it is recommended that the last paragraph on this page be modified to indicate this.**

Response: The Navy agrees that, because the reference locations exhibited toxicity, they should not be used in the analysis. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5. **Comment:** **Section 2.3, Geology and Hydrogeology, Page 2-4: Please specify the type of materials that constitute "industrial fill."**

Response: Industrial fill refers to construction debris, sand blast waste, and in portions of Parcel E, paint sludges and other industrial waste.

6. **Comment:** **Section 2.5.1.2, Organotins, Page 2-17: Please clarify the reporting units for the butyltins, i.e., are the data reported "as TBT (the ion)," "as tin (Sn)," or "as TBT-chloride?"**

Response: The butyltin results were reported as the chloride (for example, tributyltin [TBT] chloride). To convert the data to the monobutyltin, dibutyltin, and TBT cation equivalents, butyltin chloride concentrations should be multiplied by 0.62, 0.77, and 0.89, respectively. Tetrabutyltin does not require any adjustment.

7. **Comment:** **Section 2.5.2.1, Homeporting Study, Pages 2-18 and 2-19: Please include a figure depicting the locations sampled for sediment chemical and biological analyses as part of the homeporting investigations.**

Response: The Navy agrees that an additional figure would have been helpful, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

8. **Comment:** **Section 2.5.2.2, Intertidal Sediment Study, Page 2-19: It is stated in this section that the sediment data collected during the 1991/1992 HLA investigation have not yet been assessed, yet these data were included in the statistical evaluations of sediment chemical and biological data. As indicated in the General Comments, the use of historical data that is of known good quality, in conjunction with the data collected during the Phase 1B investigation, may provide a more complete picture of potential sediment problem areas in Parcel F. A complete evaluation of the 1991/1992 HLA data should be conducted and the results presented in this section. In addition, please see the General Comments above regarding the statistical evaluations of current and historical sediment data.**

Response: Intertidal sediment data collected during the 1991/1992 Harding Lawson Associates (HLA) investigation were not included in the statistical analysis. The data analysis will be reevaluated in the FS for Parcel F.

9. **Comment:** **Section 3.6, Assessment of Risks to Endpoint Species, Page 3-7, and Table 3-1: Because Microtox™ was originally selected as a measurement endpoint for assessing risks to the benthic invertebrate community, it should be mentioned in the last paragraph on page 3-7 and included in Table 3-1. Its ultimate exclusion from the risk assessment based on non-predictive results should then be presented in the toxicity test result section (Section 9, Part 1).**

Response: Please see response to EPA General Comment No. 5.b, Section 2.2 above.

10.a. **Comment:** **Section 4.1, Contaminants of Potential Concern, Page 4-1: In the first paragraph of this section, please clarify whether updated ER-Ls and ER-Ms, as referenced in "Long and others, 1995," were used in the screening of ESAP data.**

Response: To evaluate ESAP sediment data for identification of COPCs, the values of Long and Morgan (1991) were used (see Section 3.2, Phase 1B WP [PRC 1995a]). For the Phase 1B ERA report, updated effects range values were taken from Long and others (1995) except for antimony, chlordane, DDD, DDT, dieldrin, and endrin, which came from Long and Morgan (1991) (see Table 6-1, Volume I, Part 1).

10.b. **Comment:** **Also, it is unclear why the 43 intertidal stations sampled by HLA in 1991 and 1992 are referenced in the second paragraph, as these data have "not yet been assessed" (see section 2.5.2.2) and were apparently not used in the identification of contaminants of potential concern (COPCs) as discussed in Section 4. In addition, the depth horizon representing "surface" grab samples (e.g., 0 to 0.5 feet) should be specified.**

Response: In preparation of the Phase 1B Work Plan (WP), intertidal data was analyzed for determination of COPCs, which were carried through to the Phase 1B ERA report. Surface grab samples imply sediment from the 0- to 0.5-foot depth horizon.

11. **Comment:** **Tables 4-2 and 4-3: It would be helpful for the readers if Tables 4-2 and 4-3 were modified to include listings of those chemicals that exceeded ER-Ls and ER-Ms.**

Response: The Navy believes that Tables 4-4 and 4-5 show the requested information.

12. **Comment:** **Section 5.3.1, Collection Methods, Page 5-3: The depth horizon representing "surface" grab samples (e.g., 0 to.0.5 feet) should be specified.**

Response: Surface grab samples were collected from the upper 0 to 0.5 foot of the sediment.

13. **Comment:** **Section 5.3.2, Analytical Procedures, Page 5-4: It is stated near the end of the first paragraph of this section that "a discussion of the actual detection limits attained" is provided in Section 5.5.1; however, this section could not be located in the documented and should be provided. Such a discussion should include information regarding whether detection limits were below applicable screening criteria.**

Response: The reference on page 5-4 to Section 5.5.1 was inadvertent; no such section number appears in Volume I, Part 1. The discussion of detection limits attained during analysis of Phase 1B samples may be found in Volume II, Sections 3.0 to 8.0.

14. **This number was omitted by EPA.**

15. **Comment:** **Section 5.4, Invertebrate Tissue Studies, Page 5-6: Please clarify why invertebrate tissue data have not been normalized to lipid content. The Navy stated in the response to comments on the draft work plan that this would be considered.**

Response: Invertebrate tissue data are commonly normalized to lipid content when:

- A dose to invertebrates is being modeled and will be compared to toxicological data from surrogate bioassay species. In this case, lipid-normalized doses can allow for interspecies comparisons between site-relevant and bioassay species.

- An invertebrate body burden is being modeled to estimate food-chain transfer when site-specific tissue data are lacking. This is especially important when organic chemicals that readily bioaccumulate in lipids are present at the site.

For the Phase 1B ERA at HPS, site-specific invertebrate tissue was collected in the intertidal area and analyzed. Because willets feed on the whole body of the invertebrate and not only lipids, it would be inappropriate to normalize tissue data to the lipid content of samples. Normalization in this case would incorrectly estimate the dose to the willet.

16. **Comment:** **Section 6.0, Water and Sediment Screening Criteria, Page 6-1: See the Specific Technical comment for page ES-4 regarding the use of EPA's ecotox thresholds.**

Response: Please see response to EPA Specific Comment No. 3, Part 1, Section 2.3.1.1 above.

17. **Comment:** **Section 6.3.2, Sediment Screening Criteria, Page 6-9: The second bullet of this section is not entirely accurate, as the sediment screening values developed by Long and others include results of field studies in which aquatic organisms were exposed to sediments containing a variety of chemicals (rather than "individual compounds"), and therefore the screening values account for some potential synergistic effects.**

Response: The Navy concurs and will not use the values for lindane, endosulfan, or methoxychlor in any future data analyses. Previous data analyses will be reevaluated in the Parcel F FS.

18. **Comment:** **Section 7.1, Analytical Result Modifications, Page 7-2: At the top of page 7-2, it is stated that "detected analytes are denoted by the letter 'U'"; however, this qualifier is typically used to denote *non-detected* values. The text should be reviewed and modified as necessary.**

Response: The text on page 7-2 incorrectly stated that detected analytes were denoted by the letter "U." The Navy adheres to the standard use of "U" as a data qualifier for nondetected analytes. The discussion in Section 7.1 refers to result "modifications" for data as it originally appeared in a preliminary draft of Volume II. The "D" and "U" symbols were not applied to the data tables in the September 30, 1996, version of Volume II. Only the quality control summary report, presented as Appendix E of Volume II, retained the "U" denotation.

The text on page 7-2 goes on to state, "Concentrations reported as 'not detected' were set equal to one-half the detection limit." For purposes of statistical calculations, COPCs that were not detected at individual sampling locations were assigned concentrations equal to one-half of the sample quantitation limit. Data tables in Volume II do not reflect this data modification and simply report the actual sample quantitation limit for each nondetected analyte.

19. **Comment:** **Section 7.2.2, Comparison of Frequency of Detection, Page 7-3: Section 7.2.2 indicates that a COPC had to occur at a frequency of at least 5 percent to be retained for further evaluation. However, it is recommended that this criterion be revisited to ensure that chemicals that occurred infrequently but at high concentrations (i.e., exceeding screening criteria) were not excluded, as these chemicals would still pose a risk to receptors residing in their immediate vicinity.**

Response: Please see response to EPA General Comment No. 6, Section 2.2 above. Data will be reevaluated in the FS for Parcel F.

20. **Comment:** **Section 7.3, Determination of Contamination Gradient, Page 7-5: See General Comments regarding the need to describe the uncertainties associated with the chemical gradients analysis.**

Response: The Navy agrees that a discussion should have been included on the sensitivity and uncertainties associated with the sediment gradient groupings. Uncertainty does exist regarding identification of sources for contaminants found at the offshore ends of the transects (in the outer channels) because of multiple sources or release points in the HPS vicinity. These issues will be addressed in the Parcel F FS.

21. **Comment:** **Section 7.3, Determination of Contamination Gradient, Page 7-6: It appears as though reference values have been fixed to a single threshold value. Please describe how this was determined. If the reference value is based on the six reference locations sampled by the Navy, all the data (and their inherent variability) should be represented in the statistical analysis, so a two-sample t-test should be used.**

Response: The need for reanalyses using a two-sample t-test will be evaluated for inclusion in the FS for Parcel F.

22. **Comment:** **Statistical Analysis of Chemistry and Toxicity Data, Pages 7-6 through 7-11: See general comments regarding modifications to the overall statistical approach used to evaluate the chemical and biological data.**

Response: Please see response to EPA General Comments 7.a, 7.b, 7.c, and 7.e, Section 2.2.

23.a. **Comment:** **Table 7-1: Table 7-1 currently presents results of chemical gradient analyses for both site and reference stations. However, it is recommended that this table be split into two separate tables that present site group comparisons and reference station comparisons separately, as the reference comparisons are not associated with establishing offshore contaminant gradients from the site.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

23.b. **Comment:** **More importantly, the selection rationale behind the groupings presented in this table should be clarified. For example, why were transects C, D, E, and F all grouped for testing, instead of testing C and D separate from E and F, particularly given that these transacts originate from separate locations?**

Response: Sampling locations along transects C, D, E, and F were grouped together to obtain better statistical definition between nearshore and offshore locations. Further separation of sampling locations between the transects will be evaluated in the FS for Parcel F.

24. **Comment:** **Section 8.0, Nature and Extent of Contamination, Pages 8-1 through 8-38, plus Tables and Figures: It is difficult to synthesize all of the information presented in the text of Section 8 with respect to identifying risks, without**

the inclusion of chemical summary tables that present frequency of exceedance of the various screening criteria (e.g., ER-Ls and ER-Ms, and NAWQC). It is recommended that this information be presented by geographic area, similar to the format of Tables 8-1 through 8-3. In addition, the figures would be more useful for identifying potential gradients of contamination and problem areas (based on exceedances of screening criteria) if all chemical results were posted, and those exceeding the various screening criteria were color coded (either by station or geographic area using Theissen polygons). The inclusion of the locations of all outfalls is also important and useful information.

Response: The Navy felt that if all COPC concentrations were placed in each figure, figures would be difficult to interpret. The use of Theissen polygons was not deemed applicable because of the position of sampling locations. Further revision of the tables will be evaluated for inclusion in the FS for Parcel F. The Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

25. **Comment:** **Section 8.7.1.2, Grain Size, Page 8-33: Sediment grain size data are typically reported on the Wentworth scale, which defines fine-grained sediments (i.e., silts and clays) as smaller than 63 μm. Review of the HPS data indicates that fine-grained sediments were defined as smaller than 75 μm. Because the fraction between 63 and 75 μm includes very fine sands, rather than silts and clays, it is recommended that the text in this section be modified to indicate that very fine sands have been included in the fine-grained sediment fraction.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

26. **Comment:** **Tables 8-1 through 8-6: The last two column headers in these tables require modification, based on the information presented. The headers "frequency of detection" appear to actually represent "number of detected samples," and the headers "percent of detection" appear to actually represent "frequency of detection."**

Response: For statistical analysis, nondetects were included as one-half of the detection limit. The last two columns in the tables in Section 8.0, Volume I, Part 1 are incorrect in their meaning. The column labeled "Frequency of Detection" includes both detects and one-half of detection limit values. Therefore, the last column labeled "Percent of Detection" included both one-half of detects and nondetects and was always 100 percent. The Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

27. **Comment:** **Table 8-7: As described above, percent "fines" as defined in this report includes a fraction of very fine sands, rather than just silts and clays, which are typically used as representative of "fine-grained" sediments. Therefore, it is recommended that the headers "percent fines" be footnoted to indicate that these data represent the fraction of silts, clays, and some very fine sands present in a given sample.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

28. **Comment:** **Section 9.1.1, Whole Sediment Amphipod Toxicity Test, Page 9-1: It is suggested in this section that the results of other studies conducted within the bay using *Eohaustorius estuarius* would be compared with the HPS data; however, no comparative discussions were found in the document. Were any such comparisons made, and if so, what were the results?**

Response: Comparisons to other similar studies in San Francisco Bay were not done for the Phase 1B ERA report. Comparison with other studies will be evaluated for inclusion in the FS for Parcel F.

29.a. **Comment:** **Section 9.4, Toxicity Text Data Validation, Analysis, and Interpretation, Pages 9-4 and 9-5: It is indicated in the second paragraph on page 9-4 that statistical testing of site data versus reference data was conducted; however, review of the laboratory data reports indicated that only control samples were statistically compared with site data. Because the reference sediments elicited toxic responses in the amphipod bioassay, comparisons with reference would not be appropriate, and the text of the document should be revised to indicate this.**

Response: Comment acknowledged. The HPS site amphipod toxicity results were not compared to reference sediments. The statement on page 9-4 inaccurately referred to originally planned statistical analyses.

29.b. **Comment:** **In addition, please see General Comments regarding the screening criterion selected for use in interpreting the echinoderm toxicity test results.**

Response: Please see response to EPA General Comment 5.a, Section 2.2 above.

29.c. **Comment:** **Also, it is recommended that the second sentence of the second full paragraph on page 9-5 be revised to include the statement that the 90 percent basic test was only conducted on sediment porewater samples that exhibited a significant difference from control and *decreased luminescence*. As discussed in the General Comments for the Microtox™ test, previous information supplied by the Navy suggested that the comparison test could be used to help interpret stimulatory (i.e., increased luminescence) responses; however, the basic test is not conducted on samples that exhibit such responses. This should be clarified in the document. Furthermore, a discussion of hormesis and the potential for stimulatory responses to be exhibited under conditions of low-level toxicity should be added to the discussion of Microtox™ results (see also General Comments).**

Response: Please see response to EPA General Comment 5.b, Section 2.2 above.

30. **Comment:** **Section 9.6.1, Amphipod Whole Sediment Toxicity Tests, Page 9-10: Table 9-13 is referenced in the second full paragraph on page 9-10 as presenting co-located bioassay test results and sediment COPC concentrations; however, these data are not presented in the referenced table and did not appear to be summarized in the Part 1 document. As discussed in the General Comments, it is critical that such summaries be developed and**

presented to assess overall current impacts and predicted future risks to the benthic community.

Response: Table 9-12 presents amphipod toxicity test results and the collocated sediment grain size. Other COPC information associated with amphipod toxicity test results may be found in Appendix A, Volume I, Part 1. Appendix A was modified for inclusion as Table 2-1, Volume I, Part 2.

31. **Comment:** **Section 9.6.2, Echinoderm Abnormal Development Toxicity Tests, Pages 9-10 and 9-11: See General Comments regarding the echinoderm screening criterion and the ecological significance (or lack of) for correlation coefficients less than 0.7. See also Technical Comments below regarding Table 9-23.**

The discussion of echinoderm results does not currently include any references to co-located sediment porewater screening criteria exceedances. As discussed above for the amphipod results discussion, these data need to be synthesized and presented in this section of the document.

Response: Please see response to EPA General Comment No. 5.a, Section 2.2 above. Table 9-13 presents some of the echinoderm toxicity test results. Other COPC information associated with the echinoderm toxicity test results may be found in Appendix B, Volume I, Part 1. Appendix B was modified for inclusion as Table 2-2, Volume I, Part 2.

32. **Comment:** **Section 9.6.3, Microtox™ Toxicity Tests, Page 9-12: See General Comments regarding the need for discussion of Microtox™ stimulatory responses.**

Response: Please see response to EPA General Comment No. 5.b, Section 2. above.

33. **Comment:** **Section 9.6.4, Comparison Between Toxicity Tests, Pages 9-12 and 9-13: It is recommended that this discussion be expanded to describe areas (e.g., South Basin) of observed toxicity, rather than just providing a station-by-station synopsis.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

34. **Comment:** **Figure 9-1: It is recommended that this figure be modified to reflect the degree of toxicity associated with each sample. For example, the stations could be color-coded to reflect the observed non-toxic, marginally toxic, and toxic responses based on the screening criteria exceedances.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

35. **Comment:** **Figures 9-2 and 9-3: As indicated in the General Comments regarding the echinoderm screening criterion and the overall interpretation of chemical and biological data, it would be helpful to include a figure that presents the percent normality results for the echinoderm bioassays using the nondiluted (or 100 percent) porewater concentration. Also, as commented**

above for Figure 9-1, it would be very useful to color-code the stations with endpoints for which screening criteria exist and were exceeded.

Response: Comment acknowledged. Revision of tables and creation of new figures will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft phase 1B ERA (PRC 1996b, c, d) will not be finalized.

36. **Comment:** **Tables 9-12 and 9-23: These tables are misleading to the reader, as both exclude those stations that exhibited toxic responses. These data must be summarized and incorporated to provide a complete picture of observed sediment and porewater toxicity. It would also be useful if the tables were modified to include footnotes or visual evidence (e.g., boxing or shading) for each response endpoint that exceeds a screening criterion. In addition, it is recommended that Table 9-23 be modified to present all sulfide and ammonia data, and then that either footnotes or visual evidence be used to indicate those values that exceeded effects-based concentrations.**

Response: The Navy acknowledges this statement. Revision of tables will be evaluated for inclusion in the FS for Parcel F. The Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

37. **Comment:** **Section 10, Summary of the Nature and Extent of Contamination, Pages 10-1 through 10-3: It is stated in the second paragraph at the top of page 10-1 that Section 10 "identifies those sampling locations that should be considered as hot-spots, those that are not toxic, and those where the ambient or ER-L was exceeded;" however, review of this section indicated that such conclusions were not drawn. Section 10.3 attempts to describe the overall results of the chemical and biological sampling, but the data are not synthesized in any way that identifies overall hot-spots or areas of marginal to no toxicity. As discussed in the General Comments, this information must be synthesized in a manner that assists in the interpretation of current effects and potential future risks to the aquatic community, which will ultimately be used in the delineation of potential problem areas that may require additional investigations and/or remedial actions.**

Response: Comment acknowledged. Further data summarization will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

2.3.1.2 Part 2 - Risk Characterization to Aquatic Receptors

This section presents EPA's specific comments on Volume I, Part 2 - Risk Characterization to Aquatic Receptors (PRC 1996d).

1. **Comment:** **Global: See General Comments regarding the ecological significance (or lack of) for correlation coefficients less than 0.7 and the exclusion of the Ecotox Thresholds from the sediment screening process.**

Response: Please see response to EPA General Comment No. 7, Section 2.2 and EPA Specific Comment No. 3, Section 2.3.1.1 above.

2. **Comment:** **Executive Summary, Pages ES-3 and ES-4: Please see Specific Comments below regarding normalization of inorganics data to total organic carbon (TOC) content.**

Response: Inorganic data are normalized to TOC because metals are bound by organics. Please see NOAA National Status and Trends Program (NSTP) Technical Memorandum publications; for example, "Magnitude and Extent of Sediment Toxicity in the Hudson-Raritan Estuary" (Long and others 1995).

3. **Comment:** **Executive Summary, Page ES-5: The discussion of the comparisons of site toxicity test results to reference responses should be deleted from the document, given that reference sediments exhibited toxicity.**

Response: Comment acknowledged. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4. **Comment:** **Executive Summary, Page ES-8 (Last Paragraph): The document should be more specific regarding what kind of data are missing in the willet evaluation.**

Response: Please see response to EPA Specific Comment No. 23, Section 2.3.1.2 below. This information would be added to the executive summary, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5. **Comment:** **Executive Summary, Page ES-9 (Top of Page): The terminology of "worst-case" and "best-case" is confusing; use "high" and "low" range HQ only. Also, add actual HQs with the bulleted contaminants for each receptor and include the percent of the total risk for those that represent significant factors.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

6. **Comment:** **Executive Summary, Page ES-11 (Bottom of Page): Add the actual HQs to the list of contaminants for each receptor.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

7. **Comment:** **Executive Summary, Page ES-12 (First Paragraph): The Category approach is presented in a clear manner, but the paragraph that follows is confusing and difficult to follow. It would be helpful to bullet out and put into a table which contaminants fell into what category for which receptor.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

8. **Comment:** **Executive Summary, Pages ES-12 and ES-13 (Conclusion Paragraphs): The statements made in the concluding paragraphs of the executive summary and in the text are unfounded and should not be presented in this risk assessment. Discussion should not include statements such as "no immediate action is warranted," "contamination will not likely affect the population as a whole," and "further risk management should be considered."**

Response: Comment acknowledged. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized. These comments will be considered during the preparation of the Parcel F FS.

9. **Comment:** **Section 2.1.1.1, Summary of the Nature and Extent of Contamination, Pages 2-1 and 2-2: The summary of chemical exceedances would be more informative if it included references to the frequency of exceedances (e.g., "mercury exceeded the ER-M at 20 percent of the stations sampled").**

In addition a brief discussion of the number of chemicals that exceeded ER-Ls and the frequencies at which these criteria were exceeded, is relevant information that should be summarized in this section.

The summary of toxicity test exceedances was difficult to follow. It is recommended that this section be revised to include references to the screening criteria used (e.g., "marginal toxicity for the amphipod bioassay was defined as average percent mortality between 76 and 85 percent"), the overall frequency of exceedance for the bioassay (e.g., "overall, amphipod toxicity was indicated in 75 percent of the stations sampled"), the relationship between toxicity data and geographic area (e.g., "highest toxicity was observed at locations offshore of Parcel B"), and a more general listing of chemicals present at these stations at potentially toxic concentrations.

Response: Tables 2-1 and 2-2 provide all detected COPC concentrations collocated with toxicity test results for the amphipod and echinoderm, respectively. Concentrations that exceeded a screening criterion are denoted in each table. Further update will be evaluated for inclusion in the FS for Parcel F. The Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

10. **Comment:** **Section 2.1.1.2, Correlation Between Sediment Toxicity Test Results and COPCs, Page 2-2: It is stated in the second paragraph that inorganic COPCs were normalized to TOC content, but it is not clear why this was done. Inorganics are not typically normalized to TOC, as TOC-normalization is conducted to account for potential sorption (reduced bioavailability) of nonionic organics to organic matter. It is therefore recommended that the inorganics TOC normalization be dropped from the evaluations.**

Response: Inorganic data are normalized to TOC because metals are absorbed by organics. Please see the NOAA NSTP Technical Memorandum, for example, "Magnitude and Extent of Sediment Toxicity in the Hudson-Raritan Estuary" (Long and others 1995).

11. **Comment:** **Section 2.1.2.1, Summary of the Nature and Extent of Contamination, Page 2-3: See Technical Issue comments for pages 2-1 and 2-2 regarding recommended revisions to this summary.**

Response: Please see response to EPA Specific Comment No. 9, Section 2.3.1.2 above.

12. **Comment:** **Section 2.1.3.2, Summary of Nature and Extent of Sediment and Sediment Pore Water Toxicity Test Results, Page 2-6: The discussion of the comparisons of site toxicity test results to reference responses should be deleted from the document, given that reference sediments exhibited toxicity.**

Response: The Navy agrees that comparisons of site toxicity test results to reference responses should be deleted. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

13. **Comment:** **Section 2.2, Gradient of Contamination, and 2.3, Comparison of COPC Concentrations at the Hunters Point Shipyard Sampling Locations and Reference Locations, Pages 2-6 through 2-11: These discussions of contaminant gradients would be more appropriately included in the Nature and Extent of Contamination (Part 1) document, as they do not contribute significantly to the risk evaluations. Please also see General Comments regarding the gradient analyses.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

14. **Comment:** **Figures 2-1 through 2-5: It would be helpful if these figures included the actual numeric criteria used to screen the chemical data. This would allow the reader to evaluate the magnitude of any given exceedance.**

Response: Comment acknowledged. Further update will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

15. **Comment:** **Tables 2-1 and 2-2: It is recommended that the results of the statistical comparisons of the test responses with controls be included in these summary tables (i.e., denote which results were statistically significantly different from controls). Although not a requirement based on the selected screening criteria, the statistical data help in the interpretation of the "marginally toxic" results, as those that were significantly different from control are likely more toxic than those that were indistinguishable from controls. The statistical results were denoted in the summary tables presented in Section 9 of the nature and extent document (Part 1); therefore, it should not require much additional effort to include these results in Tables 2-1 and 2-2.**

Response: Comment acknowledged. Any similar statistical analyses in the FS for Parcel F will present the requested information. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

16. **Comment:** **Table 2-3: The current format of Table 2-3 provides little useful information. It would be more informative for the readers if this table were revised to include information such as which chemicals exceeded the various screening criteria and the magnitude of these exceedances (expressed using HQs) on a station-by-station basis, particularly given that this table was referenced as presenting summary information regarding sediment and sediment pore water contamination.**

Response: The Navy acknowledges this statement. Further update will be evaluated for inclusion in the FS for Parcel F. The draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

17. **Comment:** **Section 3.1.3, Spatial Distribution of COPCs, Page 3-3: EPA disagrees with the statement that Figures 8-1 through 8-22 provide a visual representation of "the geographic areas of uncertainty." As previously noted, these figures do not include all data for all sampling transacts, nor do they present results of historical sampling activities in areas that were not resampled during Phase 1B. Therefore, these figures cannot be used to identify areas of uncertainty. Please see previous specific technical comments regarding recommended revisions to the data presentation format of these figures.**

Response: The Navy acknowledges this statement. Further update will be evaluated for inclusion in the FS for Parcel F. The Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

18. **Comment:** **Section 3.2, Exposure Assessment to Aquatic Avian Receptors, Page 3-9: The introductory paragraph of this section needs to be expanded to include more information on why these receptors were chosen and what kind of stressors are being evaluated. There is no explanation of why the falcon and the willet were chosen and how these receptors relate to the objectives of the risk assessment. Natural history summaries are usually included as an appendix; the text should include the logic and relationships behind the selection of receptors.**

Response: In the Phase 1B WP (PRC 1995a), the Navy proposed the following assessment endpoints: peregrine falcon, American kestrel, California brown pelican, double-crested cormorant, great blue heron, willet, benthic invertebrate community, and native goby species. For the actual risk assessment, only the peregrine falcon, willet, and benthic invertebrate community were kept as assessment endpoints.

During tissue collection in the South Basin area, only polychaetes and clams were available in sufficient quantity to obtain the necessary biomass for chemical analysis. No fish were found in the collection process, such as gobies, which would be representative of the local environment at HPS and would not be moving into other parts of the Bay.

Section 7.2, of the Phase 1B WP (PRC 1995b) acknowledged that there may be a problem with collecting fish tissue. Bottom dwelling fish in San Francisco Bay include sand dab, yellow fin goby, and bay goby. The sand dab moves

around and is not a good representative of conditions specific to HPS. The goby is localized, but is not abundant in the Bay. Gobies can be obtained by dredging or bait and hook fishing. Dredging disturbs large areas of the bottom and is not as effective as bait and hook fishing, which is very time consuming. Considering sparseness of the goby and time required to collect by bait and hook, if it were available, it was deemed not to be cost-effective to collect fish tissue.

Therefore, without fish tissue analysis, it was decided to eliminate the California brown pelican, double-crested cormorant, and goby as assessment endpoints. For information on the problems encountered in collection of tissue see Section 2.2.3, Volume II of the Phase 1B ERA report.

Both the willet and the peregrine falcon have been observed at HPS. The falcon does feed on shore birds and the willet is a representative shore bird. The willet has a long bill and has been observed feeding in the muddy, intertidal area at HPS on several occasions. Also it is sufficiently large to use for risk characterization.

19.a. Comment: **Section 3.2.2., Exposure Dose Calculation Methodology, Page 3-12: The ingestion of soil by the falcon was not stated as an exposure pathway in this section, but appears to have been included in the risk assessment (see page 3-21).**

Response: Incidental ingestion of soil by the peregrine falcon was erroneously identified as a potential exposure pathway in the ERA. Because the site is intertidal, there is, by definition, no soil; there are, however, sediments. The appropriate pathway to assess (and the one that was assessed in the ERA) is incidental ingestion of sediments, not soil (see response to EPA Specific Comment No. 19.b., Section 2.3.1.2 below).

19.b. Comment: **Incidental ingestion of sediment seems unlikely for raptors. Please explain why this has been included. Also, the text needs to have a consistent description of the methodology used.**

Response: Inclusion of sediment ingestion as an exposure pathway to the peregrine falcon reflects a very conservative approach to this facet of exposure dose calculation for this receptor. The text on page 3-12, Section 3.2.2, Volume I, Part 2, states that the falcon may be indirectly exposed to COPCs through the ingestion of the willet and other shore birds. What was not clearly stated was that incidental sediment ingestion was included as a component of the modeled dose to the falcon based upon its hunting and feeding behavior.

The conservative nature of the exposure pathway results from the fact that peregrine falcons usually take their prey "on the wing," and the preferred portions of their prey are the liver, kidney, and heart, which are obtained after ripping open the breast. However, there is a slight potential for falcons to be directly exposed to site sediments either by ingesting sediments deposited externally on the willet as they are dissecting it, or by directly feeding on an

exposed, intertidal mudflat at low tide. In the later case sediments upon which the dissection was performed could adhere to the raw flesh prior to consumption resulting in exposure.

Because of the conservatism of this approach, exclusion of incidental sediment ingestion from the exposure dose calculation would decrease the following:

- The modeled dose to the peregrine falcon
- the corresponding hazard quotient for each of the COPCs
- the overall risk to the falcon

20. **Comment:** **Section 3.2.3, Sensitive Life Stages, Page 3-14: The information provided in this section does not relate to the development of doses for the receptors. A statement about conservative assumptions is needed where life stage, low body weight, and high ingestion rates (to name a few) are discussed; these assumptions should be discussed in context with the calculation of doses. The paragraph and section structures are very hard to follow.**

Response: The Navy agrees that Section 3.2.3 could be deleted, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

21. **Comment:** **Section 3.2.4, COPC Properties, Pages 3-15 and 3-16: The information presented here does not inform the reader about the site and how the aquatic bioaccumulative properties relate to the COPCs, exposure pathways, and receptors that were selected. It appears that COPCs were selected based on comparison to ambient levels rather than association with bioaccumulative characteristics. This approach needs to be rewritten to include only those contaminants that are expected to bioaccumulate in the willet and the primary source of food for the willet. The way bioaccumulation is discussed provides little information as to how the COPCs were selected and discussed in context with what is actually occurring at the site. The approach for determining which contaminants bioaccumulate needs to be more technically defensible (i.e., need some more defensible parameters from which to select bioaccumulative contaminants). Also, more references are needed in defense of the new approach.**

Response: Please see response to EPA General Comment No. 10, Section 2.3 above.

22. **Comment:** **Sections 3.2.4 through 3.2.10, Pages 3-15 through 3-18: All of these sections need more information about the site and how all this relates to the environmental parameters discussed there (i.e., spatial distribution, receptors, exposure routes). Specifically, the concentrations detected in the sediments of the South Basin need to be related to the uptake and exposure to the willet and subsequently to the falcon or another receptor. There needs to be a link between potential causes and effects. Also, include more discussion on why the receptors were selected for this area and how much of each area is expected to be utilized by the receptors.**

Response: The Navy acknowledges this statement. In calculating the exposure point concentration, all tissue analytical results were combined. The Navy assumed that the entire intertidal area in the South Basin would be available for feeding to the willet and the peregrine falcon, and that it would be extremely difficult to specify a percentage of time that each receptor would spend at a particular tissue sampling locality.

The reasons for choice of receptors is discussed under EPA Specific Comment No. 18, Section 2.3.1.2. Utilization of the site is explained in response to EPA Specific Comment No. 13, Section 2.4 below.

23. **Comment:** **Section 3.2.10, Exposure Dose Calculations, Page 3-19: Calculating a body burden for the willet and using this concentration for modeling contaminant uptake in the falcon contains considerable uncertainty and should be discussed with this in mind. This type of theoretical modeling is extremely complex and uses many different physiological parameters, including individual energy requirements and assimilation capacities, so the variability with this type of calculation is so great that results are inconclusive.**

Response: The uncertainties associated with calculation of body burden for the willet and the subsequent contaminant uptake in the peregrine falcon are collectively discussed in Sections 3.2.10.1, 3.2.10.2, and 3.2.11, Volume I, Part 2.

Three exposure parameters of the dose equation were not available from literature sources and, therefore, were held constant (for example, body weight and daily ingestion and incidental soil ingestion rates). Because of this paucity of data specific to the willet, only one dose could be calculated.

A summary of the uncertainty inherent in calculating a willet body burden follows.

Body Weight

In order to arrive at a dose to the willet, the only source for body weight found in the literature was used. Because body weight is the denominator in the dose equation, body weight has an inverse effect on dose. Although it is difficult to predict to what degree an individual body weight would affect the uncertainty associated with estimations applied to a population, it is important to note that this uncertainty is passed on when ingestion rates are estimated (see below).

Daily Ingestion Rate

No daily ingestion rates were found in the literature for the willet. Therefore, daily ingestion was calculated using the allometric equation of Nagy (1987). Uncertainties in the use of the allometric equation used to estimate daily ingestion rate are discussed thoroughly in Nagy (1987). In a general sense, Nagy states that most field metabolic rates used to construct allometric bird models were measurements from breeding birds. As a result, field metabolic

rates and corresponding allometric regressions are strongly biased toward the breeding season. He also mentions that cohorts within species, such as males, females, and juveniles, may occupy different ecological niches, and individual animals may have different metabolic rates at various times of the year. In the application of this equation to the estimation of a daily ingestion rate for this project, the inherent uncertainty of the single body weight (discussed above) for the willet is transferred through its use as a major component of the Nagy allometric equation.

In addition, the ingestion rate calculated from the Nagy allometric conversion (as shown in Table 3-1) was incorrectly transcribed at 0.168 kilograms per day (kg/d). The correct ingestion rate is 0.021 kg/d. The Navy expects that incorporation of this value into exposure calculations would result in a reduction in dose and overall risk to both avian receptors.

Incidental Soil Ingestion Rate

Incidental soil ingestion is the only parameter where a range of literature-based values was obtained. However, the data are not species-specific and pertain to incidental ingestion rates as percentages of the diet for four species of sandpipers. The use of surrogate species introduces a level of uncertainty into dose equations for the willet. In addition, because soil ingestion rates obtained for the sandpiper are provided in terms of percent diet, uncertainties associated with the daily ingestion rate (discussed above) are carried forth with its multiplication by the percentage of sandpiper diet chosen to best represent the willet. Because there was a range of soil ingestion percentages from 7.3 to 30 percent, high and low values were initially used to compare the difference in overall dose to the willet. Results for all COPCs were within the same order of magnitude using high and low percentages of soil in diet. The biological relevance of each ingestion scenario to the willet were then evaluated. The Navy determined that because increased soil ingestion results in decreased caloric intake because of the associated reduction in invertebrate prey consumption, the most biologically relevant scenario involves the lowest incidental soil intake rate, which corresponds to the highest rate of vertebrate prey intake.

Contaminant Source

To estimate the source of contaminants ingested by the willet, the Navy conservatively assumed that the willet's diet was solely composed of invertebrate tissue supplemented by an incidental sediment component. The availability of site-specific invertebrate tissue and sediment data minimized uncertainty in modeling body burdens and preempted the need for the use of literature-derived bioaccumulation factors for the invertebrates.

Exposure Route

In evaluating exposure routes, ingestion was considered to be the most significant, while dermal routes and incidental ingestion of water during feeding were not evaluated. This approach created a potential for underestimation of the exposure dose to the willet. The Navy expects the magnitude of this potential underestimation to be low relative to the magnitude of exposure by ingestion.

Exposure Point Concentrations

In estimating the concentration of COPCs to the willet, 95 percent upper confidence limits (UCL) of the arithmetic mean of data sets with greater than three detections were determined. The lower of either the 95 percent UCL or the maximum detected value was used for the exposure point concentration. The same value was used for both the high and low dose estimate calculations. The arithmetic mean of sampling results for a COPC likely overestimates the true mean of the statistical population within a given habitat. Because the arithmetic mean is likely to overestimate the true mean, the 95 percent UCL on the arithmetic mean is likely to further overestimate the exposure point concentration.

For data sets with greater than one detect but less than 100 percent detects, values one-half of the sample quantitation limit (SQL) replaced the nondetect values, and the entire data set was used to produce a UCL. If the value for one-half of the SQL was greater than the maximum detected value, then the maximum detected value replaced the nondetect value.

Site Use Factor

Species-specific foraging ranges taken from the literature indicated forage ranges from 0.0023 to 0.41 acre. Based on this comparatively small feeding range, the Navy assumed that the willet could potentially forage 100 percent of the time within the 11.45 acre of the site. By forcing the high and low site use factor to a value of 1.0, the dose to the willet is protective and likely to result in a dose overestimation.

Willet Body Burden

The Navy assumed that peregrine falcons only eat willets that forage at the site. Because female falcons are known to eat adult shore birds, a reasonable estimate of the potential body burden of the willet was developed. Three years of continual exposure was considered to be a conservative estimate of body burden. This estimate was based upon the willets' potential for continuous exposure as juveniles, which would last about a year. After reaching breeding age, only part-time falcon presence would occur on site, as breeding grounds would be their home during the remainder of the year. Therefore, the extra two

years were added to the one year spent on-site as a juvenile to cover the time each year potentially spent as an on-site adult.

A body burden for the willet representing a dose by ingestion of prey to the falcon was calculated using the following conservative assumptions:

- 100 percent of the COPC was bioavailable.
- No depuration over time occurred.

Therefore, a body burden of a specific COPC in a 3-year-old willet was calculated by multiplying the willet daily dose by 1,095 days (3 years) to estimate a cumulative concentration.

The conservatism of the willet model produced body burdens unlikely to be seen in the field. Based on empirical studies that verified food-chain models in the field (for example, Pascoe and others 1994, 1996) the cumulative concentration in willets was modeled by taking a percentage of the theoretical cumulative total. As seen in Tables 3-6 and 3-7, Volume I, Part 2, doses to the peregrine falcon were also estimated using 10, 1, and 0.01 percent of the total, theoretical, cumulative concentration in the willet. As found in other studies (such as Pascoe and others 1994, 1996), it is probable that the actual willet body burden is closer to three to four orders of magnitude less than the total, theoretical, cumulative body burden. Since site-specific body burden data are lacking for HPS, a range of falcon doses were calculated for both the high and low dose scenario that incorporated 10 percent of the total cumulative body burden for the high and 0.01 percent for the low. The Navy considers this method to be appropriate, because the conservative nature of the approach addressed the large uncertainty associated with the absence of willet body burden data.

24. **Comment:** **Section 3.2.10.1, Receptor-Specific Exposure Parameters, Page 3-19: The use of dry vs. wet weight ingestion rates and dry and wet weight media concentrations in the dose equations should be corrected so that dry weight ingestion rates are used with dry weight media concentrations. This could potentially change the risk results several fold. Please review all of the ingestion rates and make the determination of dry vs. wet weight status.**

Response: As stated on page 3-22, Volume I, Part 2, "all concentrations for site sediment and tissue were converted to dry-weight terms prior to statistical evaluation and subsequent inclusion in dose calculations." With respect to the remaining parameters, only dry-weight parameters were included when a determination could be made as to how the values were reported in literature. In many cases, a determination could not be made, and the Navy assumed that the value provided was in dry weight. A summary the values used follows.

The ingestion rate for the willet was calculated using the allometric equation of Nagy (1987), which provides a dry-matter ingestion rate based on body weight in terms of wet weight. Because the incidental sediment ingestion rate for the willet was provided in terms of a percentage of the dry-weight ingestion rate, these values were also reported in terms of dry weight.

Peregrine falcon daily ingestion and the incidental sediment ingestion rates were unclear. The Navy could not determine from Cramp (1980) whether falcon ingestion rates were given in wet- or dry-weight terms. It is also unknown from the Research Triangle Institute (RTI) reference (1994) whether the incidental sediment ingestion rate (as estimated by RTI) for the falcon is in terms of wet or dry weight.

Body weights for the willet and the peregrine falcon, which serve as denominators, in dose equations, are in terms of wet weight.

25. **Comment:** **Section 3.2.10.3, Chemical-Specific Exposure Assumptions, Page 3-23: See Specific Technical Comments above for pages 3-15 and 3-16 regarding COPC selection.**

Response: Please see response to EPA General Comment No. 10, Section 2.2 above.

26. **Comment:** **Section 4.1.4, Uncertainties, Pages 4-4 and 4-5: The first sentence of this section should be modified to indicate that the uncertainties presented are for both sediment and sediment porewater. In addition, please see the Technical comment for Part 1, page 6-9 (Section 6.3.2) regarding the accuracy of the statement in the second bullet on page 4-5.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

27. **Comment:** **Section 4.2.1.2, Literature Review and Data Extraction, Pages 4-10 and 4-11: This section is very confusing and difficult to follow. It would be helpful to bullet out the steps that were followed or present a flow-chart outlining the decision tree and decision points along the way.**

Response: The Navy acknowledges this statement. A decision tree used in the review process is presented in Figure 4-2, Volume I, Part 2.

28. **Comment:** **Section 5.0, Characterization of Potential Adverse Effects on Endpoints and Receptors, Page 5-1: It is recommended that the second sentence in the first paragraph at the top of this page be revised to state that Section 5.0 presents information used to characterize the ecological effects "of stressors to HPS receptors."**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

29. **Comment:** **Section 5.1.1, Hazard Quotients and Hazard Indices, Page 5-2: The assumption that all chemicals are additive (i.e., adding up HQs to obtain an HI) is not correct when considering individual receptors such as the**

willet and the falcon. This assumes that each chemical acts on the same endpoint and acts in an additive manner (i.e., discounts synergistic or antagonistic mechanisms).

Response: The calculation of a hazard index (HI) was done only in the risk characterization for benthic receptors and not for aquatic avian receptors. The Navy understands that each COPC does not have the same endpoint nor does it act in an additive manner. This is a common assumption for HI calculation.

30. **Comment:** **Section 5.2.2, Evaluation of Synoptic Toxicity Test and Chemistry Data, Page 5-10: As indicated in the General Comments regarding the statistical evaluations, it is often difficult to establish specific dose-response relationships among individual chemical concentrations and bioassay organism responses, given that test organisms are often exposed to varying doses of multiple chemicals at one time. This uncertainty should be discussed in light of the third item listed for the chemical and biological data evaluation.**

Response: Comment acknowledged. Further updates will be evaluated for inclusion in the FS for Parcel F. The Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

31.a. **Comment:** **Section 5.3, Avian Receptors, Page 5-17 (1st Paragraph): See Specific Technical Comments above for pages 3-15 and 3-16 regarding COPC selection.**

Response: Please see response to EPA General Comment No. 10, Section 2.2 above.

31.b. **Comment:** **Also, the HQ range approach (HQl and HQ2) is very confusing and should be eliminated and discussed in the uncertainty analysis.**

Response: Comment acknowledged. The suggested procedure will be included in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

32. **Comment:** **Section 5.3.1, Hazard Quotients, Page 5-18: Please present the HQs for each contaminant and present the percentage of the total risk if it is significant, such as stated for lead.**

Response: The Navy acknowledges this statement. The hazard quotients (HQ) are presented in Tables 5-10, 5-11, and 5-12, Volume I, Part 2. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

33. **Comment:** **Section 5.3.2, Relationship of Measurement Endpoints and Assessment Endpoints, Page 5-19: The logic and flow of text in this section is difficult to follow. Please present the receptors and assessment and measurement endpoints in tabular format so that the reader can relate all of these in logical manner.**

Response: A table of assessment and measurement endpoints is presented in Table 3-1, Volume I, Part 1.

34. **Comment:** **Section 6.1.2.2, Echinoderm Toxicity Tests, Page 6-9: The second paragraph of this section should be expanded to include a discussion of other COPCs that were detected in pore water samples at concentrations exceeding screening criteria (i.e., contaminant levels that may have contributed to the observed toxicity).**

Response: Comment acknowledged. Such a discussion will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

35. **Comment:** **Section 6.2.1, Summary of Hazard Quotients, Page 6-12: See Specific Technical Comments regarding pages ES-9 and ES-11.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

36. **Comment:** **Sections 6.2.2 and 6.2.3, Identification of Risk Drivers and Joint Action Discussion, Page 6-13: Eliminate these sections or expand upon them significantly; they currently do not provide much useful information.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

37. **Comment:** **Section 6.2.4, Analysis of Risk Estimation Uncertainties, Page 6-14: Remove this section and incorporate any additional information with the Uncertainty Analysis (page 7-14). The information presented in the section starting on page 6-14 appears redundant and out place as presented in this part of the risk assessment.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

38. **Comment:** **Section 7.1.4.3, Confidence in Benthic Receptors at Risk, Page 7-6: It should be recognized that the characteristics of the benthic community described in this section may have been induced, in part, by exposures to site-related contaminants. Therefore, suggesting that receptors at risk may somehow be overestimated due to the lack of a robust benthic community appears to be somewhat misleading.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

39. **Comment:** **Section 7.3, Risk Summary for Avian Receptors, Page 7-12: See Specific Technical Comments above on pages ES-12 and ES-13 regarding objectives of the risk assessment. Also, it would be much clearer to present the willet and the falcon or other receptor under separate headings within this section. More information could be presented to the reader and it will be easier to follow.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

40. **Comment:** **Section 7.3.1, Receptors at Risk, Page 7-13 (Paragraph 1 and bullets): Remove this text from the risk assessment and include the bullets of uncertainty in the uncertainty analysis. See also Specific Technical Comments on pages ES-12 and ES-13 above.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

41. **Comment:** **Section 7.3.3, Uncertainty Analysis, Page 7-14 (Last Paragraph): The mention of a "screening level risk assessment" here was the first mention of this term in the report. Please redefine the objectives and approach to the risk assessment and correct the inconsistencies in the text throughout; then proceed with the risk calculations. Please also see Specific Technical comments for pages ES-12 and ES-13 and page 3-19.**

Response: The term "screening level risk assessment" was used in a limited sense in this section. The sentences following the above-referenced statement provide sufficient information to explain what is meant. No additional correction appears to be necessary.

42. **Comment:** **Section 7.4, Ecological Significance of Potential Risk to Avian Receptors, Page 7-23: Delete this section from the risk assessment; see also Specific Technical comments for pages ES-12 and ES-13.**

Response: Comment acknowledged. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

2.3.2 Editorial Comments

This section presents editorial comments from EPA.

2.3.2.1 Part 1 - Nature and Extent of Contamination

This section presents the editorial comments for Volume I, Part 1 - Nature and Extent of Contamination (PRC 1996b).

1. **Comment:** **Executive Summary, Page ES-1: Because the document presents the results of the Phase IB investigations, it is recommended that the third full paragraph on this page be revised to read in past tense.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

2. **Comment:** **Executive Summary, Page ES-2: See editorial comment above regarding modifications to the partial paragraph at the top of this page.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3. **Comment:** **Executive Summary, Page ES-7: It would be helpful if the second paragraph on this page further summarized the overall results of the toxicity tests by indicating the total number (and relative percent) of stations that exhibited a toxic or marginally toxic test result for either the amphipod or echinoderm bioassay.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4. **Comment:** **Introduction, Page 1-1: See editorial comments for page ES-1 of the Executive Summary regarding the tense of the second paragraph when referencing the Phase 1B work.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5. **Comment:** **Section 3.1, Offshore Environment, Page 3-2: The phrase "in addition to the pelagic area" is used twice in the last sentence of the paragraph at the top of the page; one of these phrases should be deleted.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized..

6. **Comment:** **Table 6-1: Footnote "a" should be modified to define "A" (as acute) and "S" (as freshwater).**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

7. **Comment:** **Section 8.7.1.2, Grain Size, Page 8-34: There is a typographic error at the top of page 8-34 ("wa" instead of "was").**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

8. **Comment:** **Section 9.5.1, Ammonia, Page 9-7: Given that the comparison of stations at which both ammonia and sulfide effects-based criteria were exceeded is presented in Section 9.5.2, appropriately following the discussion of sulfide screening criteria, it is recommended that the discussion of sulfide exceedances of effects-based concentrations presented in the paragraph at the top of page 9-7 be deleted.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

9. **Comment:** **Section 9.5.2, Sulfides, Page 9-8: The units of measurement (mg/L) are missing from the sulfide LC_{50} criterion presented for *Eohaustorius estuarius* in the first full paragraph at the top of the page.**

Response: Comment acknowledged, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

10. **Comment:** **Tables 9-3 through 9-11, 9-13 through 9-22, and 9-24 through 9-35: It would be extremely helpful if these tables were reorganized to present the data in order of transect and sampling location.**

Response: The Navy evaluated this potential reorganization and realized that the site toxicity data would then be separated from the respective control data, which the Navy believed would further confuse the situation.

2.3.2.2 Part 2 - Risk Characterization to Aquatic Receptors

This section presents editorial comments for Volume I, Part 2 - Risk Characterization to Aquatic Receptors (PRC 1996d).

1. **Comment:** **Executive Summary, Page ES-1: See Editorial Comment for Part 1 (Nature and Extent of Contamination), Page ES-1, Executive Summary regarding the tense used in the second and third paragraphs on this page.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

2. **Comment:** **Executive Summary, Page ES-6: The phrase "of the sediment and sediment porewater the amphipod and echinoderm" in the first sentence of the first full paragraph on this page does not make sense and should be revised accordingly.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3. **Comment:** **Sections 1.0 and 1.1, Pages 1-1 and 1-2: See Editorial Comment above for page ES-1 regarding the tense used in the second paragraph on page 1-1 and the paragraph following the bullets on page 1-2.**

Response: The Navy agrees that tense could be clarified, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4. **Comment:** **Table 2-1: There appears to be a typographic error in the definition of note "C;" which appears to indicate exceedances of ER-Ms, rather than ER-Ls.**

Response: The Navy agrees that the table could be clarified, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5. **Comment:** **Section 4.1, Ecological Effects Assessment for Benthic Receptors, Page 4-1: The first "of" in the last sentence of the first paragraph of Section 4.1 should be deleted.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

6. **Comment:** **Section 6.1-1.3, Hazard Indices, Page 6-7: The first use of the word "metals" in the first sentence at the top of page 6-7 should be deleted.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

7. **Comment:** **Section 6.1.1.4, Joint Action, Page 6-7: The second sentence of this section should be rephrased to state "assessing the potential risk of individual COPCs to benthic receptors."**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

8. **Comment:** **Section 7.1.2, COPCs Driving Risk to Benthic Receptors, Page 7-3: There is a typographic error in the fourth sentence of the second paragraph of this section ("practically" instead of "practicality").**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

9. **Comment:** **Section 7.2, Ecological Significance of Benthic Risk Estimates, Page 7-7: The third sentence of the third paragraph should be rephrased to state "exposure of sediments to sunlight."**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

2.4 COMMENTS FROM U.S. ENVIRONMENTAL PROTECTION AGENCY'S ECOLOGICAL RISK ASSESSOR

This section presents comments from EPA's ecological risk assessor.

1. **Comment:** **Page 2-2, Correlation between sediment toxicity test results and COPCS. Where is the decision tree that was proposed by the Navy and discussed with the BTAG? Has this been dropped from consideration?**

Response: The HPS site-specific approach was already adopted by the agencies before regional approach had been presented to the Biological Technical Assistance

Group (BTAG). The HPS decision tree was submitted in the Phase 1B WP (PRC 1995a), which was basically followed. It was never submitted to the BTAG for review but did receive comments from regulators during the WP review process. The major change from the decision tree process was correlating HIs with toxicity measurements. That analysis was conducted, and no significant correlations existed, even at a significance of less than 0.5. Therefore, the approach was modified as indicated in the text of the report, but reference back to the decision tree was not made in the Phase 1B ERA report (PRC 1996b, d).

2. **Comment:** **Table 2-3 is a very good summary showing the various benchmarks, however, now is the time to target the contaminants that are the probable risk drivers using a combination of the bioassays, the chemistry and any literature that has reported NOAEL or LOAEL concentrations for the bioassays performed. A ranking of the five benchmarks shown by most important to least important in interpreting the chemistry would be as follows: NAWQC, Ambient, GLWQI Tier II, ER-L and ER-M. Actually, the Long et al data set should be the last resort for interpreting these results unless there are relevant studies that are directly related to a COC and the test organism at HPS. We would further suggest that the bioassays collected be used for setting site specific decision criteria.**

Response: The Navy will evaluate this ranking process for use in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3. **Comment:** **The figures (Figs 2-1 through 2-7) should be combined in some way e.g., overlays or site ranking of contaminants to show the combined or summation of potential effects. Figures 2-6 and 2-7 do this in part, but should include other benchmarks i.e., ambient levels and the NOAEL and/or the LOAEL.**

Response: Comment acknowledged. Further modifications of the figures will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4.a. **Comment:** **Page 2-9, Comparison of COPC Concentrations. Were there any data transformations, why not use the median which has been shown to be more representative of the central tendency of the data?**

Response: The Navy assessed general patterns in data distribution to determine whether parametric or nonparametric tests should be performed. Commonly used tools were employed to assess data normality, including both visual techniques and statistical tests. Visual techniques included normal probability plots and detrended probability plots. The normal probability plot depicts expected value versus observed value; in general, a straight line indicates normally-distributed data. Detrended probability plots show clustering around a horizontal line through zero; in general, normally distributed data show no clustering patterns.

The Shapiro-Wilks test ($p=0.05$) was performed as a formal statistical evaluation of normality. The visual techniques and statistical test were used

together to assess data normality. If data showed a substantial departure from normality, several commonly used transformations were performed, including (1) natural log, (2) square root, (3) reciprocal, (4) reciprocal of square root, and (5) square.

In general, data were nonnormal, and transformations were unsuccessful in normalizing the distribution. For this reason, variance homogeneity was not assessed, and the Navy concluded that nonparametric techniques were more appropriate for correlation analyses.

T-tests were used in gradient analyses to determine whether nearshore COPC concentrations were significantly greater than farshore concentrations. Despite the nonnormal data, t-tests were used because they are valid unless data normality is severely skewed. For this reason, the mean and not the median was assessed.

4.b. **Comment:** **It should be noted that there was a significant difference between the near shore stations and the far shore stations indicating that there is a strong likelihood that Navy activities have resulted in the distribution of contaminants at HPS. The figures provided for showing these data are very good.**

Response: Comment acknowledged.

5. **Comment:** **Table 2-1, Several questions about the table include the reburial data seems confusing to me because it is almost identical to the survival data; the SEM/AVS data should be presented as a "difference" rather than a ratio; the grain size should be presented as a median; the dissolved organic matter (DOC) should be presented; and what does BOD add to this data set? Where are the cadmium data?**

Response: Review of the toxicity testing laboratory report indicates that reburial was correctly calculated according to EPA (1994). The Navy is unfamiliar with the use of a difference when evaluating AVS/SEM data. SEM/AVS was presented as a ratio. The amphipods response is more closely correlated to percent fines (see NOAA NSTP documents). DOC results should have been added to the table, but BOD data could be deleted. Only COPC concentrations that were above the detection limit were included, and most of the cadmium data was not above the detection limit. Further update will be evaluated for inclusion in the FS for Parcel F.

6. **Comment:** **Table 2-2, The SEM/AVS data are more important for these pore water data than the amphipod; what's the difference between "total sulfide" and "sulfide"? Where are the cadmium data?**

Response: The AVS/SEM ratio probably should have been included in this table. The column designations of sulfide in this table are somewhat misleading. "Sulfides" represent total sulfide results as measured on extracted sediment pore water. "Total sulfides" were results measured during toxicity tests.

Only COPC concentrations that were above the detection limit were included, and most of the cadmium data was not above the detection limit. Further update, will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

7.a. **Comment:** **Page 3-2, What part of Long and Morgan's data set "exhibit acute sensitivity to low concentrations of sediment contaminants?"**

Response: The Navy agrees to delete the statement, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

7.b. **Comment:** **[W]hat is the "preceding information" that is referred to concerning the toxicity benchmarks used to compute whole sediment hazard quotients?**

Response: The statement refers to the effects range benchmarks of Long and others (1995), but the ER-L was the sediment benchmark used to calculate HQs.

8. **Comment:** **Page 3-3, The Navy is encouraged to evaluate the pore water chemistry including the SEM/AVS, soluble metals, TOC, DOC and the pore water bioassays for any explanations that help to explain the distribution of the contaminants.**

Response: Comment acknowledged. Further updates will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

9. **Comment:** **The figures that are presented to show the distribution of the contaminants are very helpful, however these are based on the 95th UCL of the mean, whereas the median may be a more representative benchmark. The 95th UCL may not be the "reasonable maximum exposure concentration for benthic receptors." Perhaps the Navy could show the median plotted along with the mean and the 95th UCL to compare the distributions and maybe present a couple of figures with the median plotted.**

Response: Figures in both Section 8.0, Volume I, Part 1 and Section 2.0, Volume I, Part 2 are actual concentrations and are not based on 95th UCL.

10. **Comment:** **Distribution of receptors. It is unreasonable and illogical to assume that the populations of receptors are equally distributed throughout any particular habitat or that there is an equal chance of collecting the same fauna from any random location in the subtidal or offshore of HPS. The only assumption that is reasonable is to assume that the receptors in the Bay will react to the contaminant concentrations in the same manner as the bioassays, for both acute and chronic tests.**

Response: The assumption is that COPCs are being distributed over the project area by currents, and depositional and erosional patterns and, as a result, benthic receptors have a high likelihood of being exposed.

11. **Comment:** **Because of the sampling design, the spatial distribution may not be fully described, which is a significant deficiency for describing the distribution of cleanup effort.**

Response: The Navy acknowledges this statement and will include the intertidal and ESAP data in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

12. **Comment:** **Page 3-7, Exposure point concentrations should be the maximum when less than five detections were made.**

Response: The Navy uses the maximum value detected when less than five detections were made.

13. **Comment:** **Page 3-27, Site use factors for these species as shown seem to be highly uncertain at 0.000143 for the low value and 00.00542 for the high for the peregrine falcon. This seems to be a very low fractions.**

Response: Seasonal activities, habitat preference, and the feeding behavior of a receptor, as well as spatial variation in contaminant distribution, can influence the degree to which it is exposed to a contaminant. A receptor's exposure is influenced by the likelihood of its using the habitat in which contamination is found. One measure of habitat use is the receptor's home range. Species with comparatively large home ranges relative to the area of contamination may be exposed less than those with small home ranges. However, standard estimates of home ranges in published literature may need to be modified for exposure assessment. Home range generally includes the total area in which an animal spends some amount of time during a certain season, including breeding, foraging and roosting areas, and travel routes. A further complication is that home ranges vary by gender, reproductive condition, season, size, and other dynamic factors.

To minimize the uncertainty associated with including areas where there is a low probability of exposure, such as breeding and roosting areas and travel routes, site use factors (SUF) developed for the HPS ERA focused on areas most representative of receptor exposure, such as foraging, burrowing, or digging areas. Home range was not used unless the natural histories of the species indicated that feeding occurred over the whole home range. Therefore, the SUF was determined by dividing the area of the site by the foraging area used by the receptor.

Although the literature is scarce with respect to actual foraging ranges for the peregrine falcon, indications of home range, territory, and feeding behaviors were obtained. As an opportunistic feeder, the falcon will take its prey when available and will chase prey in flight. Therefore, its home range, nesting territories, and distances flown to and from "foraging marshes" are all considered to be part of the area from which a falcon will feed.

The smallest home range found in the literature for the peregrine falcon, used as the low forage range to calculate SUF in the HPS ERA, was a value obtained from Zeiner and others (1990) providing a distance of 3.3 miles from nesting areas to the nearest foraging marsh. This was converted into an area by squaring and subsequently, was converted into 2,112 acres. The high forage range, selected as an exposure point value, was based upon a Sonoma county home range reported as 125 square miles and converted into 80,000 acres.

The peregrine falcon covers such great distances that the site area, estimated at 11.45 acres, is a very minor part of the territory from which a falcon could feed. Because the site area is the numerator in the SUF equation, the result of dividing foraging ranges of 2,112 and 80,000 acres equals a small fraction.

14. **Comment:** **Page 4-2, Sediment Benchmarks - The listed benchmarks on this page should be used with caution for screening of sample data during the predictive phase of the ERA. Many of the contaminants from the Long and Morgan (1991) and Long et al (1995) are confounded by co-occurrence of many contaminants that make the use of these data questionable at best. The ambient values from the San Francisco Regional Water Quality Control Board (SFRWQCB) should be the target numbers for bulk sediment concentrations and for pore water the National Aquatic Water Quality Criteria (NAWQC) should be used along with the Great Lakes Water Quality Initiative (GLWQI) Tier II standards. It is most likely that for those metals without benchmarks manganese, molybdenum and vanadium, other collocated contaminants will be more important in determining toxicity. For those individual contaminants without any benchmark, toxicity may have to be evaluated through bioassay results already completed or through new efforts.**

Response: The Navy acknowledges this statement. The Navy realizes the limitations of the screening criteria and has agreed to use only the effects range values and the RWQCB ambient values for sediments. For sediment pore water, the NAWQC and GLWQI Tier II values will be used. The Navy will include a revised analysis of the data in the FS for Parcel F.

15. **Comment:** **Page 4-4, Uncertainties (and how they are incorporated into the process). The four bullets listed as uncertainties would be minimized i.e., less important, in the overall process of screening if bioassays were fully incorporated in the ERA to validate the screening phase of the ERA. The first bullet involving "naturally occurring sediment features" would be virtually eliminated by site specific bioassays. The second bullet and the fourth bullet seem to be contradictory and the second bullet is a more realistic situation that is often clarified by use of the kinds of tests referred to in the fourth bullet. The concern raised in the third bullet is best reduced by examining several receptors as part of a comprehensive weight of evidence approach. The Navy has not suggested how these uncertainties will be dealt with in the ERA.**

Response: Comment acknowledged. The uncertainties will be reviewed and methods to deal with these uncertainties will be evaluated in the FS for Parcel F. The

Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

16. **Comment:** **Page 4-5, Ecological effects assessment for aquatic avian receptors. The site specific bioassays could be used to determine the NOAEL for sample areas and sample chemistry rather than any of the three benchmarks shown on page 4-2.**

Response: The site-specific bioassays were used to evaluate only the invertebrate community. The benchmarks shown on page 4-2, namely ER-L, ER-M, and Ecotox Threshold values, were not used in the ecological effects assessment for avian receptors. Toxicity reference values were determined for each receptor, which were submitted to BTAG for consensus.

17.a. **Comment:** **Page 5-4, Stressor-response analysis. In addition to the objectives listed, the Navy should consider a fifth objective: to describe the distribution of all significant effects across the entire site.**

Response: Comment acknowledged. The description of all significant effects across the entire offshore area will be included in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b,c,d) will not be finalized.

17.b. **Comment:** **The Navy must show the contaminant levels that produced a significant bioassay result for the bulk sediments and the pore water tests to fulfill the first objective listed. What were the chemicals that "most probably" caused the bioassay results? How do the contaminant concentrations observed in the sediment samples compare with reported concentrations that have been tested with these same bioassays? These questions are needed to address objectives (1), (2), and (3) as well.**

Response: The Navy acknowledges this statement. The Navy will evaluate various means to determine if specific COPCs can be identified as being responsible for the toxicity to the amphipod and the echinoderm. This information will be included in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

18. **Comment:** **Page 5-6, The 95th UCL of the mean COPC concentration data should have been transformed (to meet the normality requirement) or use the median value because it best represents the central tendency of the concentration data.**

Response: Please see response to EPA Specific Comment No. 4.a, Section 2.4 above.

19. **Comment:** **As stated earlier, the use of the HQ beyond the screening process is not based on sufficient data to have confidence that the interpretation is meaningful. HQ values that exceed one at the screening level are considered to be indicative of potential risk with any other interpretation of the HQ being unacceptable.**

The use of bioassays is a more direct measurement of toxicity and bioaccumulation compared to the hazard quotient approach. Bioassays

performed using site specific samples provide direct measurement of impact that can be related to the concentration of the contaminants in the same sample from which the bioassay was performed i.e., split sample. From these tests, a response and a concentration level is obtained from the same sample at the same time, rather than an estimate using the 95th UCL of the mean which is estimated and unrelated to the actual site receptors but is instead compared to literature values derived from other samples that may or may not have similar sediment characteristics as the site sample. There are many more uncertainties in the hazard quotient (HQ) approach because the site specific contaminant availability is unmeasured and unknown. This is especially important because toxicity data reported in the literature may have been developed using species that are more sensitive than the site specific receptors and in some cases may not even represent the same species i.e., surrogate species.

Bioassays performed on site samples provide the actual measurement of site specific toxicity that can be used to define the COCs that are responsible for toxic impacts, what site specific contaminants most likely caused the impact, and based on the distribution of COCs determined from site specific samples, where the significant levels of COCs on site may produce significant impacts to the site receptors.

Response: The Navy acknowledges this statement and its emphasis on the use of site-specific bioassays for evaluation of potential risks to the site ecological community. The Navy believes that a weight-of-evidence approach should be taken for analysis of potential risk to the community and that both bioassay and HQ data should be included in that analysis. The Navy intends to focus on the site-specific information, but must also rely on HQ data and the relation to bioassay results for those areas not tested with bioassays.

20. **Comment:** **Page 5-7, Whole sediment hazard quotients. The scale presented for the interpretation of HQ values is inappropriate, as stated previously, any HQ above one indicates a potential risk and therefore, must be further evaluated. The level of evaluation depends upon the confidence in the data that went into the estimate of the HQ, not the value of the HQ.**

Response: All HQs greater than one are considered to indicate potential risk and will be evaluated as such. This assumes that a higher HQ value indicates higher risk potential.

21. **Comment:** **Table 5-1. Presenting the mean HQ calculated from the combined transect data may be more of a summary than called for, "diluting" the apparent pattern between near shore and far shore sample concentrations. Some of the values in the table suggest that detection limits may have been very high for some contaminants e.g., tributyltin.**

Response: The Navy acknowledges this statement. The Navy will have to evaluate the effect as suggested by the EPA. For a response to tributyltin detection limits, see response to EPA Specific Comment No. 24, Section 2.3.2.2 below.

22. **Comment:** **Table 5-9, What does "NA" mean exactly, is it "non detects" or were samples or analyses not completed?**

Response: The "NA" means that these COPCs did not occur above detection limits at the reference locations and, therefore, could not be used in the derivation of HQs and HIs.

23. **Comment:** **Page 5-10, Summary whole sediment and sediment pore water hazard quotients.**

Based on the sediment and sediment pore water HQs, several broad conclusions about potential adverse effects of the COCs can be stated:

When whole sediment and pore water effects are observed from bioassay results receptor groups that may be impacted include epibenthic species; benthic species; including filter feeders, tube builders, and scavengers directly affected. If the contaminants are bioaccumulative, then any predator may be impacted as well.

Based on the distribution of the COCs, shallow water species are exposed to significant concentrations of COCs, epibenthic and benthic species may be acutely impacted. Because of the bioaccumulative characteristics of the COCs, these species may be important sources in transferring COCs to predatory aquatic species e.g., fish and invertebrates as well as wading birds, diving birds and predatory birds utilizing the area for feeding.

Response: The Navy acknowledges this statement, and no response appears to be necessary.

24. **Comment:** **Page 5-11, Synoptic whole sediment toxicity data and whole sediment chemistry data.**

Sediment chemistry - All COC metals except cadmium were detected in the synoptic whole sediment samples. PAHs, total PCBs, DDT, DDE, DDD, chlordane, and TBT were also detected in the sediment samples. TBT is one of the COCs with suspected problems with detection limits being too high, as no samples had a detected TBT concentration whereas all of the pore water samples had measured amounts (100% of samples with detected levels of TBT).

Response: Although the text states that cadmium was not detected in whole sediment samples, several sampling locations had detectable concentrations of cadmium (please see Appendix A, Volume I, Part 1).

Table 2-2, Volume I, Part 2, correctly shows that of the 46 sediment pore water samples tested for echinoderm toxicity, the laboratory detected TBT in only three of the samples. Section 8.5.2 and Table 8-3, Volume I, Part 1, incorrectly stated that TBT was detected in all sediment pore water samples (see response to EPA Specific Comment, No. 26, Section 2.2.1.1). For the statistical analysis, nondetects were included as one-half of the detection limit. The last two columns in the tables in Section 8.0, Volume I, Part 1 are incorrect. The column labeled "Frequency of Detection" includes both detects and one-half of detection limit values. Therefore, the last column labeled "Percent of Detection" is also incorrect. Out of the 110 sediment pore water

samples that were successfully analyzed for TBT, TBT was only detected in six samples (see Volume II, Section 8).

TBT detection limit goals, as specified in the Phase 1B Quality Assurance Project Plan (QAPP) (PRC 1995e), were generally met for both the whole sediment and sediment pore water samples. Whole sediment sample detection limits ranged from 2.0 to 5.3 micrograms per kilogram (µg/kg) on a dry weight basis. The wet weight detection limit goal of 5 µg/kg was achieved for all 207 sediment samples. The laboratory detected TBT in only 28 of these samples; of those 28, 16 exceeded the 13 µg/kg screening criterion.

Sediment pore water detection limits ranged from 0.050 to 0.060 micrograms per liter (µg/L), and the detection limit goal in the QAPP was 0.050 µg/L. Although the detection limit goal was substantively achieved, some of the "nondetect" sediment pore water samples are likely to have contained concentrations of TBT above the screening criterion of 0.010 µg/L. Because all of the whole sediment samples corresponding to the six TBT-positive sediment pore water samples exceeded the screening criterion for sediment, the Navy proposes to rely exclusively on the whole sediment TBT data.

In the Parcel E FS, the Navy will reevaluate each individual COPC relative to its various screening criteria to see to what extent high detection limits may have influenced the analysis presented in the Phase 1B ERA. The Navy believes that the detection limit criteria as specified in the Phase 1B QAPP (PRC 1995e) were substantively met for the COPCs.

25. **Comment:** **When comparing the results between the whole sediment samples and the pore water samples, there were many more COCs that were above the benchmarks compared to the one (TBT) in the pore water which was not even detected in the whole sediment samples. The "risk" to receptors would seem to be divided between those that are exposed to whole sediments e.g., sediment dwellers such as epibenthic species that may be scavengers or those that burrow and inadvertently consume whole sediment as well as those that probe into the sediment for food such as wading birds and diving birds. The "risk" from pore water exposure includes the epibenthic and benthic invertebrates and the burrowing species that exist beneath the sediment surface. Both of these groups of species are exposed at several stages in their life history including eggs, larval, and juvenile development as well as a reproducing adult.**

Response: The Navy will review the detection limits achieved for all COPCs relative to their effects levels in the Parcel F FS.

26. **Comment:** **Pages 5-13 and 14, Sediment pore water ammonia and sulfide data. Some toxicity may be due to total sulfide and unionized ammonia for the echinoderm test, however, neither amphipod survival nor reburial were found to be correlated to sediment ammonia.**

Response: The Navy agrees with this statement, and no response appears to be necessary.

27. **Comment:** **Page 5-16, Sediment grain size. Because of the questions surrounding the possible influence of grain size on survival of amphipods in toxicity testing, it is a major deficiency for the Navy to exclude a grain size control for this testing.**

Response: The Navy anticipated that reference locations, which were recommended by RWQCB, would provide a grain size control. The toxicity that was encountered was totally unexpected (PRC 1996a). The Navy does not believe that the loss of the grain size control is a major deficiency because not all HPS stations where percent fines was high exhibited toxicity.

28. **Comment:** **Page 5-19, Relationship of measurement endpoints and assessment endpoints. The purpose of the discussion presented for the avian species is not clear. The interchanging of "receptor species" for "assessment endpoint" is awkward and detracting to the overall meaning of the relationship among assessment, measurement endpoints and the data needed for calculation and evaluation. The Navy seems to question the identification of appropriate TRVs (p 5-20), especially the use of data from surrogate species, which is one of the many problems with the HQ strategy in ERAs. The Navy should examine the data set used to identify the low TRV and the high TRV for any other appropriate data that include relevant endpoints to evaluate the potential risk at the concentrations (and subsequent doses) observed. If systemic and reproductive effects are deemed to be a limiting aspect for identifying TRVs then, other data on growth, behavior, nesting, neurological, etc may be available for use either singly or in combination.**

Response: The Navy acknowledges that this section is confusing and that it did not intend to question the identification of appropriate toxicity reference values (TRV). This discussion is only meant to acknowledge the uncertainty involved in extrapolating data from laboratory test organisms to receptors. This uncertainty is inherent in the application of laboratory data to field exposures. The Navy has addressed this uncertainty by: (1) using allometric conversions to extrapolate a dose in a laboratory organism to a dose in a receptor, (2) applying confidence ratings to each TRV, and (3) fully discussing the uncertainty involved in the HQ approach.

For all receptors and all COPCs, every type of effect, whether it was reproductive, systemic, immunological, or otherwise, was put into the spreadsheet and considered. In other words, if there were appropriate publications on any type of ecologically relevant endpoint, it was included and considered. The totality of the data set and the quality and quantity therein, guided decisions in BTAG's selection of TRVs.

29. **Comment:** **Pages 5-20 and 5-21, The last paragraph in this section seems to be the most direct and clearly written statement about the use and interpretation of the HQs for the avian species. The task now is to define the areas where the HQs are significant (above 1.0) for each receptor.**

Response: The risk to avian receptors was evaluated over the whole intertidal area of the South Basin and was not split into specific areas. These receptors range over

the entire intertidal area during foraging. The Navy would have to assess the costs and problems associated with development of HQs for specific parts of the intertidal area, and if appropriate, it will be considered for inclusion in the FS for Parcel F.

30.a. Comment: **Page 6-2, COPC risk drivers. The use of a "scoring algorithm" is one means for applying the "local" sample data to a broader more comprehensive area such as the geographic areas of HPS, however, the three terms shown on p 6 to 3 do not provide adequate "transfer mechanisms" to perform the proposed interpretation. A more adequate interpretation should include: 1) the distribution of sediment receptors; 2) the concentration of COCs; 3) the level of impact as provided by the toxicity test; 4) the level of impact as provided by the bioaccumulative effects; and 5) the known literature concentrations that resulted in impact with similar (i.e., guild) organism as found at HPS.**

Response: The Navy acknowledges this statement. The Navy believes that the algorithm is sufficient. Other factors suggested by EPA for incorporation into a new algorithm can best be included in the weight-of-evidence approach; therefore, a new algorithm is not necessary.

30.b. Comment: **Several problems are evident with the proposed terms in the Navy algorithm including adequate detection limits will greatly impact the "frequency" of COPC detection. For instance, the Navy reported that the moisture content in whole sediment samples "doubled" the detection limits of COCs. One result of this is the apparent lack of detection for TBT for whole sediments, yet 100% detection for pore water samples.**

Response: Please see response to EPA Specific Comment No. 24, Section 2.4 above.

30.c. Comment: **Because the sampling was directed at the most likely distribution of COCs along a transect that was related to storm drain discharges, the observed distribution of COCs may not be representative of chemical concentrations in an area, otherwise, the Navy can use the observed concentrations of COC to define all of the area without further sampling. The "weighting" of COCs with high HQs places an overemphasis on the hot spots that the HQs represents. The distribution of the HQs is essentially unknown, but would most likely represent the distribution of the exposure point concentration of the COCs. The "relative hazard" of the HQ is a component of the concentration of the particular COC and its toxicity, either of which could greatly influence the relative hazard because hazard is a product of concentration and toxicity. The overall value of the calculated "risk driver" is questionable because all three of the components are directly related to each other.**

Response: The Navy concurs that the risk driver approach is affected by the magnitude and distribution of COPC concentrations. Use of the risk driver approach will be evaluated for modification in the FS for Parcel F following EPA's suggestions.

31.a. Comment: **Page 6-3, The risk driver algorithm. The frequency of detection is faulted by the example provided above for TBT. The fraction of HQ values equal**

to or greater than one is not clearly defined because the benchmark is not defined and any of the three or four benchmarks listed could change the fraction drastically. The maximum HQ is not appropriate because the benchmark is not defined.

Response: Please see response to EPA Specific Comment No. 24, Section 2.4, above.

31.b. Comment: **Any algorithm must be shown to represent the actual risk for the receptor(s) at a particular site. Two terms of any algorithm for risk assessment must be representative of the stressor and the receptor. The stressor is best represented by the concentration of COCs that produces a significant effect e.g., the TRV, which should be displayed as a distribution across HPS shown in an areal distribution. The receptor is best represented by its "exposure term" or the exposure point concentration (EPC) for all of the locations where the particular receptor's TRV is exceeded, which could also be a distribution of EPCs from low to high. Thus, the best term for this relationship is the HQ for each COC, endpoint, and receptor. In this evaluation, the distribution of each particular receptor is expected to occur at every sampling point or the distribution is adequately described by sampling or known characteristics of its biology. The observed TRVs at HPS should be compared and contrasted with known literature concentrations that resulted in an impact with similar (i.e., guild) organism as found at HPS.**

Response: The parts of the algorithm are presented in Section 5.1.1, and the TRV process is discussed in Section 4.2, Volume I, Part 2. The process used to derive the TRVs already provides a mechanism of comparison with concentrations that impact other similar organisms. A TRV was determined for each receptor and each COPC for the entire intertidal area of South Basin.

32.a. Comment: **Page 6-2 and 6-3, The process described by the Navy to define "risk drivers" is inappropriate because it does not incorporate relevant and sufficient information and only adds another level of comparisons for potential elimination of areas that are at risk as determined by the data collected at the site. From Table 6-1, the frequency of detection adds very little if any "sensitivity" for the calculation of the risk driver for the whole sediment samples because it ranges from 0.79 to 1.0 and TBT is 0.0 because detection limits are suspected to be a problem with this COC. This component of the algorithm is not any better for the pore water because it ranges from 0.95 to 1.00, a mere 5% range.**

Response: Please see response to EPA Specific Comment No. 24, Section 2.4 above concerning detection limits.

32.b. Comment: **The second component of the algorithm, the fraction of HQ values greater than 1.0 is not clearly defined. What is the basis of this, what is the total number considered, what is the benchmark considered in calculating the HQ? The fraction of total risk driver value is artificial in that it is merely a standardization to make the number a percentage with the cutoff point of 1.0% very subjective and without logical basis. Also, what is the basis for standardizing to each group when the groups are unequal and subject to detection limits which directly affects the number of contaminants and the basis for deciding the resultant fraction.**

Response: The Navy realizes that there is a problem with some of the values calculated for some COPCs that appear in the "fraction of HQ values greater than or equal to 1.0" column. Any corrections that may be necessary will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

32.c. **Comment:** **The use of the algorithm is of overall questionable value because the maximum HQ value provides essentially the same outcome, for instance, the whole sediment results show 57 of 63 possible correct or matching answers that agree with the maximum HQ. The area with the largest disagreement is in the organochlorine pesticides including DDT, DDE, DDD either individually or as a sum, total endosulphan and antimony once, from the metals. When the pore water data are evaluated 69 of 74 results are the same as examining the maximum HQ. Again, the largest error is in the organochlorine compounds and methoxychlor where the maximum HQ value was 2.63 and the fraction of HQ above 1.0 was listed as 0.0, which doesn't make sense.**

Response: Please see responses to EPA Specific Comments No. 30.c and 32.b., Section 2.4 above.

33. **Comment:** **Page 7-4, Relevance of measurement endpoint information. The COPC HQ values indicated a high potential for sensitive benthic fauna to be adversely affected by COCS. This information is relevant to the assessment endpoint because it broadly predicts that, due to elevated levels of COCS, sediment may not be protective of important indigenous fauna. The toxicity test information is directly relevant to the assessment endpoint because it indicates that sediments may not be protective of (1) population of amphipods, (2) organisms which may come into contact with sediment pore water, and (3) early life stages that subsist at the sediment-surface water interface. Reduced abundance of these fauna directly affected detrital processing which alters organic matter mineralization and the transfer of organic matter up into the food web.**

The EPA takes exception to the statement, "The bioassay measurement endpoint information does not however, discern between adverse effects caused by COPCs and adverse effects caused by naturally occurring factors, such as high levels of ammonia and hydrogen sulfide, high organic carbon content, poor circulation, or areas of deposition that are common to estuarine sediments, particularly mud flat." There were several assessments of ammonia, grain size, and total sulfides for whole sediment samples that showed no indications of impact to the amphipod, while there was a possible impact to the echinoderm tests with pore water samples.

Response: Bioassays do not discern between an effect to the test organism attributable to the COPC by itself or to such things as ammonia or hydrogen sulfide or a combination. Measurements were taken during the test to evaluate whether either ammonia or hydrogen sulfide may possibly be contributing to the toxicity, but that level of contribution is often not definable. An EC_{50} or other endpoint is a measure of the total toxicity of the sample tested and not the components that make up the toxicity.

34. Comment: Several statements are made as general facts about the HPS habitats that is based on general information from the literature without any site specific data or measurements. This information apparently is presented to provide a "context" of the HPS risk assessment, however the information is very general, unsupported and not directly related to RPS. For instance,

1) "Sediments of estuarine tidal flats serve as sources and sinks for a wide variety of compounds and materials produced by various process in the habitat, and by sources outside of the habitat." What data collected in this ERA suggests that any of the areas of HPS are sources and sinks? for what "compounds and materials" and by what "processes in the habitat" and by what sources outside the habitat? EPA did not see any data that related to these statements except that many of the COCs observed are suspected to have originated from the operation of the site.

2) "The major tidal influences include resuspension and deposition of sediments, dispersal of benthic organisms, and enhanced benthic productivity through exposure to sediments to sunlight during the low tides of spring and summer." What data were collected to support these statements? EPA has not seen any measurements for the tidal influences of the dispersal of benthic organisms for HPS, nor any measurements of benthic productivity.

3) "The composition of benthic communities of tidal flat sediments is strongly affected by tidal and wind influences, and temporal variations in salinity ..." EPA has not seen any data in this ERA that show the changes in composition of benthic communities with tidal influences and temporal variations in salinity.

4) "Temporal variations in salinity due to the influx of fresh water directly affects the distribution of benthic macrofauna." EPA has not seen any data that shows the distribution of benthic macrofauna based on salinity. The measurements of salinity that were presented were made only on the day of sampling, rather than over any extended time period.

5) "The benthic macroinvertebrate community of the South Bay mud flats is fueled by organic carbon from settled phytoplankton and benthic algae ..." EPA has not seen any measurements or data otherwise relating the production of benthic communities to organic carbon in this ERA.

6) "The macroinvertebrate populations of the South Bay mud flat beaches are characteristically r-strategists or opportunists ..." EPA has not seen any measurements of benthic communities that describe the species as "r" or "K" strategists.

7) "For the South Bay mud flats, the benthic community has low diversity and is dominated numerically by a few opportunistic species that are tolerant of wide salinity variations ..." EPA has not seen any data in this ERA that relates to the diversity of the mud flats.

8) **"The structure of the benthic community is a permanent feature of the mud flats ..." This needs clarification.**

9) **"The sediments around HPS are numerically dominated by polychaetes, crustaceans, and bivalves." Where are the data to support this statement? Has the Navy attempted to sample any other benthic fauna at HPS?**

10) **"Ostracods are the important meiofaunal food item. Polychaetes and clams were reported as the preferred food item." What makes ostracods important and polychaetes and clams the preferred food item? and for what predator?**

Response: This information comes from the literature, and the Navy acknowledges that no supportive data exists for HPS in specific. The Navy is willing to delete this section, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3.0 DEPARTMENT OF TOXIC SUBSTANCES CONTROL COMMENTS

The following are the responses to comments on the Phase 1B ERA draft report (PRC 1996b, c, d) from DTSC.

3.1 GENERAL COMMENTS

The Department of Toxic Substances Control (Department) received the above report on two separate occasions. Information on chemistry and nature and extent was submitted on September 30, 1996. Information on risk characteristics to aquatic receptors was submitted on November 15, 1996. The Phase IB Ecological Investigation report was initially due on October 1, 1996. However, the Navy argued that since the Toxicity Reference Values were not available, an extension of 45 days was necessary.

To the EPA's request of technical presentation of the report, the agencies met with the Navy and its contractor, PRC Inc., on December 3, 1996. In that meeting the contractors recited sections from the Executive Summary and Conclusion. The Navy also stated that resources should be spent in developing the feasibility study in lieu of further sampling and analysis. Although some limited sampling might be necessary, the Department concurs with the Navy.

3.1.1 Introductory General Comments

This section presents comments from the introductory remarks from DTSC.

A. **Comment:** **Realizing the complexity that the ecological data present in understanding and interpretation, we ask the Navy to conduct a quality control on the report. It appears that, in some places, the report contains ambiguous, obscure and hard to find information. This additional layer of scrutiny will limit any misunderstanding and misinterpretation of data and Navy's position with respect to cleanup. Such report will not be especially useful to the community members if it contains vague and contradictory information.**

Response: Comment acknowledged. The Navy understands, however, that the current approach to the assessment of offshore risk as discussed with the BCT calls for the preparation of an FS for Parcel F. No revisions to the draft Phase 1B ERA report (PRC 1996b, c, d) are anticipated. This response-to-comment document should be appended to the draft Phase 1B ERA report and is a formal part of the administrative record.

B. **Comment:** **Further, the issue of groundwater migration into the Bay must be resolved. The Navy must state whether or not such migration will be addressed in the ecological investigation. The current ecological investigation does not address the migration of groundwater into the Bay. Despite this deliberate absence, the remedial investigation reports have erroneously deferred the issue for the ecological investigation to address.**

Response: Please see response to EPA General Comment No. 2.a, Section 2.1 above.

C. **Comment:** **Overall, the report provides a large amount of data in a fragmentary fashion. Despite data tables and several figures, the report has some difficulty in providing a lucid picture on data gaps, scope of toxic areas, and recommendations for future actions. Although figures 8-2A through B-30B provide useful chemical information in showing the hot spots and gradient, contour maps seem to be necessary to relate all the site related information such as, bathymetric study, chemical data, toxicity data and data on assessment end points. Where feasible, chemical contour maps should link the offshore areas with onshore sites. Maps with overlays of chemical and toxicity data are also needed to be able to limit the areas of concern. ESAP data should also be linked to the Phase IB data.**

Response: The Navy acknowledges this statement. Data gaps and recommendations were not provided. The use of contours was evaluated for use in the figures in Section 8.0, Volume I, Part 1; but because of the position of the sample locations along transects, the use of contours would not supply useful information because there are no data points between transects except close to shore (Intertidal and ESAP data). The connection between onshore and offshore contamination will be supplied in the FS for Parcel F. The use of additional maps will be evaluated for inclusion in the FS for Parcel F.

3.1.2 General Comments

In addition to providing contour maps, the revised report should include important information on the following:

1. **Comment:** **Deviation from the workplan. Under this section, the Navy must explain if there have been any deviation from the workplan. And if there were, why? We have been able to identify a number of deviations.**

   Response: Changes to proposed activities, namely sampling and analyses, was included in Section 2.5, Volume II. No such section was included in Volume I. Some of the deviations from the Phase 1B WP include the following:

   - The decision tree presented in Figure 8-1 was not specifically addressed.
   - Correlation analysis using HI values and COPC concentrations were performed; but not discussed in the ERA report, because no correlation was found.
   - Piscivorous receptors were eliminated because fish were not available for collection to conduct tissue analysis.
   - Ecotox Threshold values were not discussed in the Phase 1B WP, because they were not available when the WP was finalized.

   If DTSC would like to present their list of deviations to the WP, the Navy will evaluate their significance. Revisions to the draft Phase 1B ERA (PRC 1996b,c,d) are not anticipated (please see response to DTSC Introductory General Comment A, Section 3.1.1 above).

2. **Comment:** **Section on variance is incomplete and unacceptable. Correspondence from Navy to and from its contractors does not constitute a variance. Any variance granted to PRC Inc. by the Navy is not recognized by the State. The report must include correspondence between the agencies and the Navy.**

   Response: The Navy believes that variances discussed in Section 2.5.1 did not appreciably alter planned activities nor affect the ERA results.

3. **Comment:** **In view of available data, the Navy should make extra effort in presenting the information in a clear, coherent and complete fashion. Any ambiguous statements should be revised. The report should explain, clearly, the status of each step in the investigation and analysis. Ambiguous description, presentation, and conclusion of areas of contamination, toxicity and future plans should be revised.**

   Response: The Navy acknowledges this statement. In the future, the Navy will do its best to minimize this problem. Revisions to the draft Phase 1B ERA (PRC 1996b,c,d) are not anticipated (please see response to DTSC Introductory General Comment A, Section 3.1.1 above).

4. **Comment:** **As we have done with other reports, the Navy needs to prepare a summary report for the community members. We are not sure if the Navy has done that.**

Response: A public summary of the Phase 1B ERA has been prepared.

5. **Comment:** **In remedial investigation reports submitted to the agencies so far, the Navy has strived to identify sources to the soil and groundwater contamination. However, it appears that with respect to Parcel F investigation there is no attempt to identify onshore sources to offshore contamination.**

Response: The Navy acknowledges this statement. Identification of onshore sources of contamination will be included in the FS for Parcel F. Revisions to the draft Phase 1B ERA (PRC 1996b,c,d) are not anticipated (please see response to DTSC Introductory General Comment A, Section 3.1.1 above).

6. **Comment:** **In its letter of November 15, 1994 to the Navy, the Department asked the Navy to analyze some samples for radioactivity and dioxin. The Department of Health Services also requested the Navy to analyze some samples for dioxin in a letter to the Navy on August 16, 1995. We have not been able to find related information and data with respect to that request.**

Response: The Navy regrets that apparently, no specific written response was ever made to agency concerns related to radioactivity and dioxin. The DTSC letter of November 15, 1994, expressed concern about areas of Parcel E where "incineration of liquid wastes and burial of radium dials took place." Offshore sampling for dioxins and radium are addressed below.

In an April 11, 1994, letter from HLA to PRC, HLA identified three areas in Parcel E where the presence of dioxin soil contamination was suspected because burning of domestic refuse, waste solvents or oils, or other wastes had been documented (HLA 1994). The three areas included the Navy burning disposal site at the southeastern corner of Parcel E (IR-02 Southeast), Triple A Site 19 near the Building 600 baseball field (IR-02 Central), and the former incineration "tank" (Triple A Site 12, now IR-11/14/15).

Recent soil sampling and analysis to be presented in the Parcel E RI report confirmed the presence of dioxins in soil at each of these three sites (furans were also detected at IR-11/14/15). With the exception of IR-02 Central, the horizontal extent of the dioxins was quite limited with concentrations decreasing sharply outside the area where the actual burning took place. Dioxins associated with these sites may have been carried by the wind and eventually deposited in sediments adjacent to Parcel E; however, any such contamination would be expected to be dispersed and at very low concentrations.

During the ERA for the Parcel E RI report, the risk caused by the presence of dioxins and furans will be examined for the American kestrel. If the risk to the American kestrel is low at the point source in Parcel E, then it can be assumed

that risk to aquatic avian receptors in the offshore environment would also be low to nonexistent because the presence of dioxin in offshore sediments would be expected to be much less than the concentration in soils at the source. If risk exists to the American kestrel, then measurement of dioxins and furans in offshore sediments will be reevaluated for Parcel F.

Radium contamination could exist as radium dial point sources and as dispersed radium in sediment. Previous investigations have concluded that offshore areas were not used for the burial of radium dials, and that the point sources encountered along the beach area were due to sloughing of materials over the edge of the riprap barrier which separates the disposal area (IR-02 Northwest) from the tidal area (PRC 1996e). During the Phase 1B field activities, sediment samples collected in the vicinity where radium dials potentially could have been encountered were screened in the field using appropriate instrumentation (a sodium iodide detector). Screening was intended to locate radium point sources that might have been collected as part of sediment grab or core samples. No gamma radiation anomalies were detected during any of the sample collection activities.

Background radium-226 activities in Parcel E range from 0.5 to 2.4 picocuries per gram, which is consistent with U.S. averages. Except in the immediate vicinity of radium dials, activities of radium-226 in offshore sediments would be expected to mirror Parcel E soil results.

7. **Comment:** **The Department also asked for VOC analysis in certain areas. Although the Navy has analyzed for VOCs, it is not clear how samples were taken and processed. What precautionary measures were taken to avoid volatilizing the VOCs before analysis were done? Please explain in detail how those samples were taken, shipped and analyzed in the lab.**

Response: As discussed in Section 2.2.1 of Volume II, whole sediment samples for volatile organic carbons (VOC) and AVS/SEM analyses were collected from the first grab sample recovered at a given location before any compositing or homogenization to minimize sample aeration or VOC loss. Two 8-ounce, wide-mouthed jars were filled with as much sediment as practicable to limit any headspace. Jars were then sealed with Teflon-lined lids and kept on ice for transport to the laboratory. After samples were received at the laboratory, they remained in secure, refrigerated storage until ready for analysis.

Section 2.5.2.2 of Volume II addressed limitations of VOC data obtained from analysis of sediment pore water samples. Because the Navy is concerned about the quality of sediment pore water VOC data, the Navy proposes to rely exclusively on whole sediment VOC data.

3.2 SPECIFIC COMMENTS

This section presents specific comments from DTSC.

8. **Comment:** **Section 2.4.2 of Volume I, Part 1, the Navy should refrain from contributing contamination in the Bay to other sources in an investigation phase. It is not clear how, in an investigative phase, the Navy has identified another party to be responsible for the contamination in the Bay. It is stated that the Southeast Water Pollution Control Plant is the "most notable contributor" to offshore contamination. However, the intent of this investigation has been to understand the nature and extent of contamination and their associated risk. This section is irrelevant to the Facility Operation and Site History. Please delete.**

Response: This statement concerning the Southeast Water Pollution Control Plant is taken from published reports. The Navy is willing to delete references to contribution of contamination from other sources, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

9. **Comment:** **Section 2.1.1.1, of Volume 1, Part 2, it is not clear how it is determined that, with few exceptions, the toxicity test results of amphipods were "marginally" toxic. This appears to be one of the deficiencies in the report format and organization. Definitions of terms and criteria are scattered throughout the report without any method and system. This apparent disorderly reporting has added yet another layer of difficulty in deciphering the complexity of data interpretation and understanding.**

Response: The explanation for determination of toxic, marginally toxic, and nontoxic for the amphipod test is presented in Section 9.4, Volume I, Part 1 with appropriate references to previous studies.

10. **Comment:** **Section 2.2.3, Volume 1, Part 2, the text states that there does not seem to be a gradient in the South Basin for sampling locations on Transects U, V, and W. It is not clear how this conclusion was made. Figures 8-2A through 8-22C indicate rather a different picture. Examining the data closely, there appears to be a distinct vertical and horizontal chemical gradient in many sampling locations. We are not sure why the Navy has put all the data together to conclude that there are no vertical or horizontal gradient with respect to one or several sampling locations.**

Response: The statement concerning a lack of a gradient at Transects U, V, and W was based on the fact that no statistical difference in COPC concentrations existed between nearshore and farshore sampling locations for those transects and for the grouping of sampling locations that was used in the analysis. Horizontal gradients were present and were discussed in Section 2.2, Volume I, Part 2.

The presence of a vertical gradient was minimally discussed in this report; that information is best used in the FS. To evaluate the risk of sediments below where the majority of the benthos live does not accomplish the intent of this Phase 1B ERA.

11. **Comment:** **Section 2.3.3, Volume 1, Part 2, we are not sure why and how the Navy divided the offshore area into two parts. It seems that the Navy is implying a distinction and discontinuous contaminated and toxic areas. But what is lacking is a thorough explanation on the purpose, the geographical area of "nearshore" and "farshore" and how they are distinct and discontinuous. It appears that this division was not discussed in the workplan. Further, comparison of nearshore and farshore data with reference points seems to be confusing. Because, it is not clear if the reference points are considered nearshore or farshore.**

Response: The division of sampling locations along a transect as nearshore and farshore, which was used to characterize the gradient of contamination, is presented in Table 7-1, Volume I, Part 1. Nearshore sampling locations are defined as the first two or first three stations along a transect. The difference in number of stations used in the analysis relates to the number of stations along a transect. If a transect had five stations, the first three were chosen to represent the nearshore portion for that transect. If the transect had four stations, the first three were chosen to represent the nearshore portion. The farshore sampling locations were either Stations 4 and 5 along a five-station transect or Station 4 along a four-station transect. Along three station transects, Stations 1 and 2 were nearshore, and Station 3 was "farshore" (farshore in this case typically meant far from the outfall at the start of the transect). The only exception to this pattern was at Transect X, where four out of five stations were deemed to be nearshore because the transect runs somewhat obliquely to the shoreline.

These nearshore and farshore divisions were somewhat arbitrary, but grouping of sampling locations provided increased statistical power to discern differences. Other combinations of sampling locations are possible, and the Navy will evaluate these possibilities during the FS. The division of locations for the analysis of contamination gradient was not presented in the Phase 1B WP (PRC 1995a).

The Navy agrees that comparison of nearshore and farshore sampling data to reference data is confusing. Reference locations were considered as neither nearshore nor farshore sampling locations; and for purposes of comparison, this information is irrelevant. The point of the evaluation was to assist in the evaluation of the contaminant gradients as being different from ambient conditions.

12. **Comment:** **Table 2-4 of Volume 1, Part 2, please indicate which samples are considered nearshore.**

Response: Transect designations followed by the numbers "1,2,3" or "1,2" are considered to be nearshore. Please see the response to DTSC General Comment No. 11, Section 3.2 above.

13.a. Comment: **Section 4.1.4 of Volume 1, Part 2, please provide further information on "naturally occurring stressors." How did you measure them? Were you able to empirically identify them? Did you take direct site specific information?**

Response: Natural stressors, such as ammonia, hydrogen sulfide, and grain size, were measured in this project. Ammonia and total sulfides were measured during each toxicity test and in each sediment pore water sample. Both ammonia and grain size were measured in each grab sample of whole sediment. These parameters were empirically measured following procedures described in Section 10.0, Volume II.

13.b. Comment: **In section 5.2.2.5 of Volume 1, Part 2, it is stated that toxicity tests did not have grain size control. Please also explain how these uncertainties will influence the toxicity results.**

Response: Please see EPA Specific Comment No. 27, Section 2.4 above.

4.0 DEPARTMENT OF TOXIC SUBSTANCES CONTROL HUMAN AND ECOLOGICAL RISK DIVISION COMMENTS

The following are the responses to comments on the Phase 1B ERA draft report (PRC 1996b, c, d) from the DTSC HERD.

4.1 BACKGROUND

We have reviewed the three documents titled "Hunters Point Shipyard Phase 1B Ecological Risk Assessment, Volume I Ecological Risk Assessment, Part 1 Nature and Extent of Contamination Draft, Hunters Point Shipyard Phase 1B Ecological Risk Assessment, Volume II, Ecological Risk Assessment, Chemistry and Toxicity Test Results Draft," dated September 30, 1996 and "Hunters Point Shipyard Phase 1B Ecological Risk Assessment, Volume I Ecological Risk Assessment, Part 2 Risk characterization to Aquatic Receptor Draft," dated November 15, 1996. All three documents were prepared by PRC Environmental Management, Inc. of San Francisco, California. This review is in response to your written work request dated November 11, 1996.

We participated in an inter-agency technical meeting on December 17, 1996 to discuss data interpretation. Due to the amount of material submitted, this review focuses solely on technical issues and interpretation of the results submitted.

4.2 GENERAL COMMENTS

This section presents the general comment from DTSC HERD.

1. **Comment:** **These reports contain an immense amount of information which could take months to analyze completely. Our main analytical recommendation is that the Navy and Navy contractors attempt to develop a discriminant function which can separate sediment samples likely to be toxic from those likely to be non-toxic. This attempt is necessary because of the failure of the Microtox test to provide an indication of whether sediments would be toxic in more standard sediment toxicity tests.**

   Response: The Navy acknowledges this statement. The use of a multivariate test will be evaluated for inclusion in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4.3 SPECIFIC COMMENTS

This section presents the specific comment from the DTSC HERD.

4.3.1 Volume 1, Part 1 - Nature and Extent of Contamination

This section presents specific comments from DTSC HERD concerning Volume I, Part 1 - Nature and Extent of Contamination (PRC 1996b).

1. **Comment:** **The willet is selected as a representative avian species to assess, among the group of bird species which could potentially be exposed to sediment contaminants (Figure 2-3), with only minimal discussion regarding the exclusion of the other potential receptors. The double crested cormorant would seem more likely to have a higher exposure than the willet based on ingestion of fish rather than invertebrates. Please provide a more detailed discussion regarding selection of the representative species.**

   Response: Please see response to EPA Specific Comment No. 18, Section 2.2.1.2 above.

4.3.2 Volume 1, Part 2 - Risk Characterization to Aquatic Receptors

This section presents the specific comments from the DTSC HERD concerning Volume I, Part 2 - Risk Characterization to Aquatic Receptors (PRC 1996d).

2. **Comment:** **Please provide plots of the correlation between sediment contaminants and toxicity results. A positive correlation between mercury and amphipod survival (Section 2.1.11, page 2-2), where amphipod survival increases with increasing mercury concentration, cannot be biologically-based. Also please provide plots of the echinoderm larva correlations.**

Response: The Navy also does not understand why there was a positive, significant correlation between amphipod survival and mercury and agrees that it cannot be biologically based. Plot usage will be evaluated for inclusion in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3. **Comment:** **Rather than individual or multiple linear correlation analysis, please attempt to develop a discriminant function which separates those sample locations with significant toxicity test results from those which demonstrate no significant toxicity response. Divide the sample data into a group with significant toxicity response and a group with no significant toxicity response. Remove a small number of sample data sets from each group at random. Perform a multiple discriminant analysis on the remaining samples. Test the success of the discriminant function developed by assigning the previously removed sample data sets to either group using the discriminant function. Transformation of the percent survival or percent with normal development in the echinoderm bioassay may prove more amenable to discriminant analysis than the calculated EC50 values presented in the current report.**

Response: To better identify COPCs that may be driving the observed toxicity, DTSC has requested that the data be segregated by whether toxicity was observed. The Navy agrees that inclusion of samples with no toxicity could increase the "noise" associated with correlation analysis. However, the Navy is also concerned about a segregation approach. It is possible that a concentration of a specific COPC could be statistically associated with toxicity in the segregated data set and found at the same level in the data set with no toxicity. The Navy believes that caution should be exercised with the suggested approach and that comparisons should be made between the two data sets to determine if these relationships exist. The Navy proposes to evaluate the use of this analysis in the FS for Parcel F.

4. **Comment:** **We are not familiar with a statistical test which allows evaluation of variance equality when one group has a single value (Section 2.2, page 2-6).**

Response: The Navy concurs and is willing to delete this statement from Section 2.2, Volume I, Part 2. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized

5. **Comment:** **The results of a comparison to National Oceanic and Atmospheric Administration (NOAA) Effects Range-Median (ER-M) values for station TXSA05 (Figure 2-3) appear to be placed on transect Y rather than transect X.**

Response: The figure is correct. The 3-foot core sample that was scheduled to be collected at Station 5 of Transect X was inadvertently cored at Station 5 of Transect Y (see Section 2.5.1, Volume II).

6. **Comment:** **Please provide the justification for concluding that ingestion of water is "... minor because less water is taken up during ingestion ..." (Section 3.1.6, page 3-4). DTSC guidance on ecological risk assessments recommends ingestion of water be maintained in estimation of intake.**

Response: Incidental ingestion of water has not been considered for the following reasons:

- This scenario was not included in the original dose equation presented in the Phase 1B WP (PRC 1995b).
- Collecting water samples during the Phase 1B ERA was not planned.
- Currents and wind move the water of San Francisco Bay to such an extent that it is doubtful that the water a shore bird may be exposed to can accurately be said to be solely contaminated by HPS.

7. **Comment:** **Please provide the justification for using the upper 95 percent confidence limit on the mean as the exposure point concentration for contaminants detected five or more times while using the mean for contaminants (selected less than five times (Section 3.1.8, page 3-6).**

Response: The rationale for the approach to determine an exposure concentration was brought about by a concern regarding the influence of the detection limit in the calculation. For samples with a higher frequency of detection, it is EPA guidance to use one-half of the detection limit. However, when the frequency of nondetects is above 50 percent, EPA guidance (EPA 1995) suggests alternative methods for determining the representative concentration. One of the suggested approaches is to use the median value of the data set to represent the mean of the population, which takes into account nondetected results. The Navy modified this approach by using the mean of detections rather than the median of the data set. The Navy believes that this exposure concentration is protective and is not overly influenced by the method detection limit.

8. **Comment:** **What value was used for the foraging range of willets (Section 3.2.1.1, page 3-10)? The text cites a range of 3,300 feet to several miles at breeding grounds without specifying what value is proposed.**

Response: Vogt (1938) reported that a female willet "did most of her feeding on a space... not over 100 feet square." To convert the reported value from feet squared into acres, it was multiplied by 0.000022957 to arrive at a low forage range of 0.0023 acres. This foraging range represents the lowest range found in available literature.

Howe (1982) mapped feeding territories of willet pairs, the largest of which was measured based upon the scale provided, to be about 1,650 meters

squared. When multiplied by 0.00024711, this feeding territory equates to 0.41 acre. This foraging range represents the largest foraging range found in available literature.

A third set of values were also provided in the table. These values reflect home ranges reported in Zeiner (1990) and in Kelly and Cogswell (1979), who observed "the usual distance traveled (one way) between roosts and feeding areas was about 1,000 m" (3,300 feet). This information was included in Table 3-1, Volume I, Part 2, entitled Natural History Summaries for the willet, along with a statement of a home range of "several miles," also taken from Zeiner. Home range is defined as the area used by an individual animal during its usual daily activities and usually defines an area larger than the area over which an individual feeds (foraging area). Therefore, because actual foraging ranges were obtained (Vogt 1938; Howe 1982), and exposure was assumed to occur during feeding, the home range estimate was not used to derive site use factors.

9. **Comment:** **It seems the arguments for utilizing the willet as a representative species for shorebirds (Section 3.2.2, page 3-12) could be equally applied to the double-crested cormorant. The cormorant could be exposed to higher concentrations of bioaccumulative contaminants than the willet, due to prey item selection. Please provide a more detailed discussion regarding selection of the representative species.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2, above.

10. **Comment:** **While we agree that conservation concerns make consideration of tissue sampling of rare, threatened or endangered species unreasonable, tissue sampling of common shorebirds does not seem unreasonable (Section 3.2.2, page 3-13).**

Response: The Navy acknowledges this statement. Sampling of common shore birds was not included in the Phase 1B WP (PRC 1995c), which was approved by regulators.

11. **Comment:** **The length of exposure in the toxicity experiments which serve as the basis for the toxicity reference value (TRV) should be assessed to determine whether a site use factor (SUF) should be employed in estimating dose. If the exposure period is equivalent to, or less than, the site-use period no SUF should be employed.**

Response: A SUF was used in dose calculations because the exposure is greater than the site use period (see Section 3.2.10.1, Volume I, Part 2). Please also see responses to EPA Specific Comments No. 23, Section 2.3.1.2 and No. 13, Section 2.4 above and response to DTSC HERD Specific Comment No. 16, Section 4.3.2 below.

12. **Comment:** **The low water solubility of polychlorinated biphenyls (PCBs) lessens the potential exposure for aquatic receptors in the water column (Section 3.2.4, page 3-15), not necessarily the benthic receptors. We are not familiar with an adequate study of the relative intake from pore water versus bulk sediment for those receptor which live in, or ingest, sediments.**

Response: The Navy is willing to modify the statement in Section 3.2.4, page 3-15, Volume I, Part 2, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

13. **Comment:** **Please provide a comparison of the biomagnification factors developed from sampling benthic invertebrates as part of this study (Section 3.2.6, page 3-16) and biomagnification factors from the literature.**

Response: Bioaccumulation factors for the intertidal area of HPS were not developed, because no concurrent samples of sediment and tissue were taken from the same location. Therefore, there are no site-specific values to compare to literature-derived values. Site-specific biomagnification factors were not necessary because site invertebrate tissue data were available. Therefore, the actual dose to the willet by dietary intake of invertebrates was empirically derived rather than modeled. This precluded the need to use a modeling approach to estimate tissue concentration from a sediment value. This approach also reduced uncertainties inherent in modeling tissue concentrations using literature-based biomagnification factors.

14. **Comment:** **Please amend the text to include an explanation of the three year "accumulation" period assumed in this assessment (Section 3.2.9, page 3-18) prior to introduction of the intake equations which contain this factor (Section 3.2.10.1, page 3-20). This is not a standard method of assessing bioaccumulation, so inclusion of a 3 year period in the intake equation is, at first, confusing. The description is currently located on page 3-22.**

Response: Please see response to EPA Specific Comment No. 23, Section 2.3.1.2 above.

15. **Comment:** **We do not agree with the decision to exclude the "high" soil ingestion rate from the analysis (Section 3.2.10.1, page 3-20). While the argument presented may hold for bioaccumulative contaminants which reach a higher concentration in prey than in environmental media, it is not supportable for contaminants which are toxic, but not bioaccumulative. Please include both a high and low estimate of soil ingestion.**

Response: Please see response to EPA Specific Comment No. 23, Section 2.3.1.2 above and DTSC HERD Specific Comment No, 16, Section 4.3.2 below.

16. **Comment:** **Please amend the text to include a description of the low vertebrate and high vertebrate tissue concentrations prior to the intake calculation for the peregrine falcon (Section 3.2.10.1, page 3-21).**

Response: As stated on page 3-19, Volume I, Part 2, "due to the paucity of species-specific data on the willet, only one dose could be calculated." Therefore the calculations on page 3-21, Volume I, Part 2, that erroneously refer to $[\text{vertebrate}]_{low}$ and $[\text{vertebrate}]_{high}$ components of the peregrine falcon high- and low-dose calculations should be corrected to refer to a single, vertebrate dose designated in the equation as [vertebrate]. The approach to the willet dose was based on the following conservative assumptions: (1) 100 percent of the COPC was bioavailable and (2) no depuration over time occurred. Therefore, a body

burden of a specific COPC in a 3-year-old willet was calculated by multiplying the willet daily dose by 1,095 days (3 years) to estimate a cumulative concentration.

From this single dose, fractions of 10, 1, and 0.1 percent were calculated for incorporation into the dose to the peregrine falcon. This provided a range of potential concentrations in willet tissue from the originally modeled willet dose. This approach was based on empirical studies that verified food-chain models in the field (for example, Pascoe and others 1994, 1996). These studies indicate that the total, actual, cumulative body burden for the willet could be closer to three to four orders of magnitude less than theoretically modeled values. Fractions of the willet dose were, therefore, applied to both high- and low-dose scenarios for the falcon to minimize the extreme conservatism of the modeled willet body burden. The 10 percent fraction was used to model the high dose and a 0.1 percent fraction was used to model the low dose.

Pages 3-22 and 3-23, Volume I, Part 2 contain the discussion of the approach summarized above.

17. **Comment:** **We are familiar with methods for calculating the 95 percent upper confidence limit on the mean for normal and log-normal distributions, but are unaware of a statistical procedure for calculating the 95 percent upper confidence limit for data with non-normal distributions (Section 3.2.10.2, page 3-21). Please provide a reference for this method.**

Response: The text incorrectly stated that an equation was used to calculate a 95 percent UCL for data with non-normal distributions. A method for determining a 95 percent UCL for data sets with nonparametric distributions is not available in guidance documents. For the HPS ERA, the maximum detected value was used for nonnormally distributed data sets as the exposure point concentration.

18. **Comment:** **We do not agree, nor recommend the methodology used to develop avian tissue concentrations in this assessment (Section 3.2.10.2, page 3-23). However, based on comparison with measured avian tissue concentrations from other sites, the prey item concentrations appear protective.**

Response: The Navy acknowledges this statement. The methodology is fully documented and follows standard procedures used at other Naval facilities in San Francisco Bay.

19. **Comment:** **Please provide the basis for using carcinogenesis as the criterion for placing fluoranthene and pyrene in the low molecular weight (LMW) polycyclic aromatic hydrocarbons (PAHs) (Section 3.2.10.3, page 3-23) in an assessment which does not evaluate carcinogenic endpoints.**

Response: The grouping of LMW and high molecular weight (HMW) PAHs for the HPS ERA is consistent with the approach used for regional derivation of TRVs. For regional TRVs, PAHs were primarily grouped based on structure. HMW PAHs are those with four or more rings, while LMW PAHs contain three rings or less. Generally, PAH structure is reflected in its toxicity. In mammals,

LMW PAHs tend to produce acute toxicity, while HMW PAHs do not. All known PAH carcinogens, cocarcinogens, and tumor producers are found in the HMW group (Eisler 1987). While fluoranthene and pyrene have a structure similar to other high molecular weight compounds, their mammalian toxicity is more similar to LMW PAHs (they are not carcinogenic). For avian receptors, there was very little toxicological data on PAHs, carcinogenic or otherwise, and carcinogenicity was not evaluated as an endpoint. Because the paucity of avian toxicological data, the Navy followed the mammalian categorization scheme and included fluoranthene and pyrene with LMW PAHs in the draft Phase 1B ERA. Since that time, it has been decided that fluoranthene and pyrene should be grouped with the HMW PAHs and, therefore, some doses must be recalculated. This information will be included in the FS for Parcel F.

20. **Comment:** **As far as we can ascertain, there is no "average" dose estimate (Section 3.2.11.1, page 3-25) in this evaluation. There is a low dose and high dose estimate for the willet and peregrine falcon. Please correct the text. Average dose is referenced again on page 3-27 (Section 3.2.11.4).**

Response: Comment acknowledged. Only a high and low dose (no average dose) were calculated, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

21. **Comment:** **Please provide the basis for the statement that ingestion was determined to be the most significant route of exposure (Section 3.2.11.2, page 3-26). This same section states that dermal absorption was not evaluated while the earlier description stated that dermal contact was evaluated qualitatively (Section 3.2.2, page 3-13).**

Response: Dermal exposure was not evaluated because the Navy believes that the ingestion route is the dominant route of exposure. This statement is referenced in the text (see Section 3.2.11.2, Volume I, Part 2). A discussion of the exposure pathways is also presented in the Phase 1B WP (PRC 1995c).

22. **Comment:** **Please expand the discussion of ingestion rates (Section 3.2.11.3, page 3-26) to include the low-dose and high-dose method used in this document. This section now discusses a single dose estimate.**

Response: The Navy concurs with the suggested modifications, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

23. **Comment:** **The first column heading (Table 3-3) should be species rather than specie.**

Response: Comment acknowledged, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

24. **Comment:** **It is our understanding from representatives of the U.S. EPA Region 9, that the Ecotox Thresholds (Section 4.1.1.1, page 4-2) recently published by EPA headquarters have been withdrawn. Please contact U.S. EPA Region 9 regarding the applicability these criteria.**

Response: Please see EPA Specific Comment No. 3, Section 2.3.1.1 above.

25. **Comment:** **We support the effort to develop a standard set of TRVs for ecological risk assessments at Navy sites in the San Francisco Bay area. The lack of a TRV should not however, exclude a contaminant from consideration if there is some toxicity information of lesser quality than that used to develop the TRVs. For example, the following dose estimates appear applicable for contaminants which were not included in the avian assessment (Table 4-1):**

Contaminant	Tested Organism	Low Dose (mg/kg-d)	Comment	Reference
aldrin	mallard	0.5	LI'L for mortality over 30 days	Hudson, et al., 1984
heptachlor	chicken	1.0	NEL for mortality over 8 weeks, 10 ppm in diet converted with 0.097 kg diet/kg bw/day	Ritchey, et al., 1972
BHC - Lindane	ring-necked pheasant	2.4	LC50 for BHC	Hudson, et al., 1984
Methoxychlor	mallard, sharp-tailed grouse, california quail	40	LC50 exceeded 2000 mg/kg for all species	Hudson, et al., 1984

The results of the Navy literature search from the TRV effort should be reviewed and used to establish provisional TRVs for those contaminants which lack sufficient data to meet all the evaluation criteria.

Response: Section 5.3.3 details the qualitative assessment of contaminants that lack sufficient data to derive TRVs. In general, site-specific high and low doses are calculated and plotted against available toxicological data to determine where site-specific doses fall in comparison to the range of published effects. This information is used in a weight-of-evidence analysis for that COPC.

26. **Comment:** **The equation for a scaling factor (Section 6.1.1.1, page 6-3) appears to emphasize those contaminants with very large hazard quotients. We suggest that maps portraying a range of hazard quotients or hazard indices be prepared to provide a broader picture of any sediment contamination patterns.**

Response: The Navy acknowledges this statement, which will be evaluated for inclusion in the FS study for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

27. **Comment:** **Zooplankton are not primary producers (Section 8.0, page 8-1).**

Response: The Navy agrees that zooplankton are not primary producers, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

28. **Comment:** **We attempted to assess the multiple methods used to rank sample sites. Attachment A is a summary of the sample locations exceeding NOAA ER-Ms. exceeding water quality criteria (WQC), having amphipod**

survivals less than 80 percent and having an echinoderm EC_{50} of less than 50 percent. The following conclusions were drawn:

A. **The near-shore areas are the areas of major concern as well as the areas where consideration of remedial alternatives is most supportable.**

B. **Sample sites with PCB and tributyltin values exceeding the water quality benchmark may pose a significant threat and require further investigation.**

C. **The South Basin area is an obvious problem which should be address. Yosemite Creek may be a contributor to this area and should be investigated.**

D. **The shallow, near-shore areas of India Basin require evaluation.**

E. **Some of the berthing areas (Transects G, H, I, J, Q, R) appear to present a higher threat than others and should be prioritized.**

Response: The Navy acknowledges this statement and agrees with some of the conclusions. The use of additional summary tables will be included in the FS for Parcel F. It is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

29. **Comment:** **We believe it is appropriate for the Navy to proceed with development of a document which would present the evaluation of remedial alternatives for those near-shore sediments which appear to present an ecological hazard based on the results of the toxicity testing. This document should provide the information usually contained in a feasibility study (FS) for consideration by the project risk managers. Specifically, the nine "balancing" criteria outlined in CERCLA/SARA should be addressed. We understand that full evaluation of some of the remedial alternatives may require some additional geographically-limited sampling. Remedial alternatives which might be considered, in addition to dredging and the no action alternative, are:**

A. **Solidification/stabilization - The addition of Portland cement, fly ash, or other binding agents to reduce the amount of contaminants that can leach from the sediments**

B. **Particle separation - The application of mineral processing and mining techniques to separate clean sediment particles from contaminated sediment particles**

C. **Bioremediation - The management and use of existing microorganisms to break down and destroy organic contaminants present in the sediment**

D. **Base catalyzed decomposition - A process that uses simple chemical reagents to remove the chlorine atoms from contaminants such as PCBs**

E. **Basic Extractive Sludge Treatment (BEST) process - An extraction technology that uses the solvent triethylamine to remove and concentrate, but not destroy, organic contaminants from the sediments**

F. **Low temperature thermal desorption - Several technologies that heat the sediments to temperatures less than those used in incinerators; the organic contaminants are vaporized from the sediments and then concentrated in an oil fraction, but they are not destroyed**

G. **Wet air oxidation - The use of elevated temperature and pressure to break down and destroy organic contaminants such as polycyclic aromatic hydrocarbons (PAHs)**

H. **Thermal reduction (Ecologic process) - The chemical reduction, or degradation, of organic contaminants in a heated reactor**

I. **In situ stabilization - The use of clean materials to cap, or armor, sediment deposits in place at the bottom of a river or harbor.**

Response: The Navy acknowledges this statement. Each of these methods will be evaluated for inclusion in the FS for Parcel F.

4.4 CONCLUSIONS

This section presents concluding comments from DTSC HERD.

1. **Comment:** **Some additional analysis is required to determine if some method can separate sample locations likely to be toxic from those likely to demonstrate no significant effect in more traditional toxicity tests.**

   Response: Please see response to HERD Specific Comment No. 3, Section 4.3 above.

2. **Comment:** **In light of the demonstrated sediment gradient, the near-shore areas should be the focal point of the proposed assessment of remedial alternatives. A combination of numerical sediment criteria and toxicity test response should be used to define the area for which the remedial alternative is evaluated. Consideration of the risk management balancing criteria may indicate that more focused sampling in several locations is desirable to more clearly define the area considered for remediation.**

   Response: The Navy agrees, and this approach will be evaluated for inclusion in the FS for Parcel F.

Attachment A. Summary of results of Phase 1B ecological assessment for aquatic receptors at Hunters Point Annex.

Transect	Sediment Metal > ER-M	Sediment PAH > ER-M	Sediment Pesticides and PCBs > ER-M	Pore Water Metals > WQC	Pore Water PCBs and TBT > WQC	Amphipod Survival#80 Percent	Urchin Development EC50 < 50 percent
A				SS02,ST03, SM04		ST03	
B	SD03		SS02	SS02,SM03	ST01	ST01	ST01
C	ST01,SM03			ST01	ST01,SM03	ST01,ST05	ST05
D		SM01, SM05	ST01	ST01	ST01	ST03,ST04	ST04
E	SS02,SB03	SF02,SE03,SM05	SA03		SS01	ST03	
F	ST01,SM03	SS04,SM05		ST01	ST01,SM03	ST01	
G				SM01		ST03	ST03
H				SS02			
I				SM03		ST01	ST01
J							
K				SM03			
L							ST03
M							ST01
N				SM01	SS02		
O						ST03	ST03
P		SM03				ST01	ST01
Q							
R							
S				ST03			
T			SD03	ST01,SM03		ST01	
U	SB04						
V	SS02						
W	SA03					ST03	
X	ST01,ST02, SA03		ST02,ST03, SA03,SA05	ST02	ST01,ST02,S T03	ST02,ST03,S T05	
Y	SB03		ST02,ST03, SB05	ST02		ST01,ST02,S T03,ST04	
Z	SB01,SA03, SB03,SC03	SC01,SC03, ST03,SC05	SA01,ST01,SS 02,ST03, SA03	ST03,SS04			
AA						ST02	
BB						ST03	

5.0 CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD COMMENTS

The following are the responses to comments on the Phase 1B ERA draft report (PRC 1996b, c, d) from the RWQCB.

5.1 GENERAL COMMENTS

This section presents general comments from RWQCB.

1. **Comment:** **There is a tremendous amount of information presented in this report including a conclusion section (8.0), however, it does not contain conclusions or recommendations. RWQCB staff believe that one of the next steps should be a preliminary evaluation of remedial alternatives. In general, the data seem to indicate that there is a threat to beneficial uses at some areas of Hunter's Point. Given the complexity of the site and the volume of data, we believe that the Navy, in concert with the agencies, should begin discussions on the scope and feasibility of possible actions.**

   Response: The Navy acknowledges this statement and is preparing to begin a FS for Parcel F.

2. **Comment:** **The assessment endpoints described in the Phase 1B *workplan* is far more comprehensive than the actual report. Piscivorous birds and amphipods, isopods, bivalves, gastropods and decapods are described as assessment endpoints in Figure 2-5 of the workplan. Further the report states that the endpoints selected for the Phase 1B report (willet, peregrine falcon) were "selected with agency approval" as the "representative measurement endpoint receptors". When? Our agency was never contacted nor did our agency approve changes for the assessment endpoints.**

   Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

3.a. **Comment:** **Cesium^{137} analysis was performed by RWQCB staff on three cores in South Basin to date sediments and then compare with co-located chemical analyses performed by the Navy. RWQCB staff request that the results of the cesium study be integrated into the Navy's evaluation of vertical and horizontal contamination and the subsequent evaluation of remedial alternatives.**

   The results of the cesium analysis were shared with the regulatory and trustee agencies on December 17, 1996 and forwarded to PRC for the Navy's information. The cesium profiles at Hunter's Point are very similar to the profiles observed by USGS in San Francisco Bay, and in other areas of the country. The comparison of cesium and chemical profiles indicate (i) a vertical chemical gradient that correlates well with dates of industrial activity at Hunter's Point, and (ii) the rate of sediment deposition appears to be too slow for natural capping to sufficiently protect aquatic species from contaminated sediments.

Response: The Navy has received the cesium analysis results. Use of this data in the Phase 1B ERA did not meet the objectives of the ERA. The results will be evaluated in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3.b. **Comment:** **Cesium^{137} analysis was performed on six-foot cores at stations TX04, TY03, and TW04. These stations were selected, in part, because the Phase 1B workplan indicated that two of the stations would analyze chemistry to three feet, and the third (TW04) would be a six-foot core. Although the three-foot cores limit the ability to fully characterize a pattern over time, this approach would allow for characterization of the sediment deposition and determine a vertical chemical gradient, if present. Unfortunately, metals data is available for only two of three cores. Chemical results reported in Volume II indicate that only a surface sample was taken for chemical analysis at TX04. This is a deviation from the workplan. RWQCB staff request that if the Navy has archived the remainder of the sediment core at TX04, that it be analyzed for metals and PCBs, at one-foot intervals to six feet. RWQCB staff are willing to work with the Navy to obtain the additional analyses, if necessary.**

Response: Only a surface grab sample was collected at sampling location TX04, but a 3-foot core was collected at TX03, which is contrary to the Phase 1B WP (PRC 1995a). The field logbook does not record why a 3-foot cores was collected at TX03 instead of TX04. Section 2.5.1, Volume II indicates that several sampling locations along Transect X were shifted further offshore to avoid the shoreline or other obstacles; however, this deviation was probably inadvertent.

4. **Comment:** **A shore to offshore data evaluation is still needed.**

Response: The Navy acknowledges this statement. The use of a shore-to-offshore data assessment will be included in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5. **Comment:** **In our comment letter of November 14, 1994 regarding the preliminary draft workplan for Phase 1B, we requested that the Navy consult any historical bathymetric studies, surveys, or maps to "groundtruth" the relative accretional and erosional areas at Hunters Point. The Navy has not addressed this issue in the report and will need to provide any information to this effect for the feasibility study.**

Response: The Navy has not agreed to conduct any bathymetric studies but will evaluate the possibility for inclusion in the FS for Parcel F. Please see response to DTSC Comment No. 6, Section 2.3 of the "Response to Agency Comments on the Draft Final Work Plan, Draft Final Field Sampling Plan, Draft Quality Assurance Project Plan, Hunters Point Shipyard" (PRC 1995b).

6. **Comment:** **We've noticed many inconsistencies among the three volumes. A more thorough QA prior to publication is necessary.**

Response: Comment acknowledged.

5.2 SPECIFIC COMMENTS

This section presents specific comments from RWQCB.

5.2.1 Volume I, Part 1 - Nature and Extent of Contamination

This section presents specific comments from RWQCB concerning Volume I, Part 1 - Nature and Extent of Contamination (PRC 1996b).

1. **Comment:** **Page ES-2: Volume I, Part 2 (page 8-1, second paragraph) states that groundwater contributions will be assessed under the *Parcel E RI* report. The executive summary ES-2 and page 1-2 Volume I, Part 1, states that evaluation of groundwater contributions will be conducted under *the Parcel B RI; the Parcel B RI* conversely states that it will be conducted under the *Phase 1B ERA*. Given the status of the *Parcel B RI,* the Navy must address contamination from groundwater contributions in the *Phase 1B ERA* in order to complete the risk characterization.**

   Response: Please see response to EPA General Comment No. 2.a., Section 2.1 above.

2. **Comment:** **ES-2, third paragraph: These are not all the assessment endpoints from the Phase 1B workplan.**

   Response: Please see response to EPA Specific Comment No. 18, Part 2, Section 2.3.1.2 above.

3. **Comment:** **Page 2-2, fourth paragraph: "10 kilometers" is not a rate.**

   Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4. **Comment:** **2.2.2., Sediment Deposition: This section references section 8.7.1.2 which describes the "Sediment Budget Study." Do the cores indicate "sediment textures" indicative of erosional or depositional environments? How are these influences accounted for in describing gradients? Further the "gradients" of contamination described are horizontal only. The vertical gradient is another important element that has been omitted. Please see also General Comment #3.**

   Response: Grain size analysis was conducted on grab samples only and not the core sections. Most sediments appear to be primarily fine-grained, which would represent depositional sediments. The assessment of the gradient of contamination did not account for sediment texture, but the presence of mostly fine-grained sediments would support the results. Evaluation of a vertical gradient is discussed in response to DTSC Specific Comment No. 10, Section 3.2 above.

5. **Comment:** **Page 2-19, Intertidal Sediment Study: The "raw data" of intertidal zone samples, collected in 1991 and 1992, that have "not yet been analyzed" is not found in Appendix C of Volume II of this report as stated.**

Response: This data may be found in Appendix A, Volume II.

6. **Comment:** **Page 6.7, Section 5.4.2, Offshore Sampling and Analysis, Test Organisms: This section and the Phase 1B workplan states that demersal fish with limited mobility would be analyzed for the tissue residue study. However, the Navy collected only invertebrates and provided no explanation for not collecting fish tissue. The Navy must clarify why fish tissue was not collected. Performing fish tissue analysis is especially relevant to estimate exposure to piscivorous birds, which were listed in the workplan as an assessment endpoint.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

7.a. **Comment:** **Page 6-4, Section 6.2, Sediment Quality Criteria and Page 6-5, Section 6.2.1, Ambient Sediment Screening Values: The Navy should note the following modifications for documents referred to in these sections. The reference for the California RWQCB 1996, tentative Site Cleanup Requirements for the Shearwater Site/Former US Steel Facility was adopted by the Board on July 17, 1996, and should be referenced as California RWQCB Order No. 96-102.**

Response: The Navy acknowledges this statement. The necessary corrections will be made in the future when referring to the Shearwater site.

7.b **Comment:** **In addition, the reference listed as EPA and others 1996 is not listed in the Reference Section.**

Response: This reference is the last reference on page R-9, Volume I, Part 1.

8.a. **Comment:** **Page 6-5, Section 6.2.1, Ambient Sediment Screening Values and Section 7.2.3, Comparison with Ambient Concentrations: The second sentence in Section 6.2.1 discussing the relationship between ambient concentration and toxicity is incorrect and should be deleted..**

The Navy assumed that if the COPC did not exceed the ambient concentration, it would not be toxic to the benthos. The ambient values developed by RWQCB and those listed in the Draft EIS for the LTMS (April 1996) were derived from a number of studies merely determining chemical concentrations in SF-Bay, away from known sources. The ambient values are not biologically based. Initially screening bulk sediments against ambient may present a level of uncertainty in the risk characterization.

Response: Please see response to EPA General Comment No. 6, Section 2.2 above.

8.b **Comment:** **In addition, the Navy should note in this section that the two sets of ambient values (those values derived by RWQCB listed in the Site Cleanup Requirements for the Shearwater Site and those values listed in the LTMS**

Draft EIS) were derived using different statistical methodologies. In both cases, these values should be considered preliminary.

Response: The Navy acknowledges this statement. This information will be incorporated into the discussion when reference is made to ambient values.

9. **Comment:** **Page 6.5, Section 6.2.1, Ambient Sediment Screening Values: The last sentence of this section states that COPCs exceeding ambient were compared to their corresponding ER-L values. However, Volume I, Part 2 compares and discusses only those values exceeding the ER-M. The Navy should clarify the discrepancy and should compare to both ER-L and ER-M values, where available.**

Response: All sediment COPC concentrations were screened against the ambient values, ER-Ls, and ER-Ms. If the ambient value also exceeded the ER-L or ER-M, it was so stated in the discussion of nature and extent (see Section 8.0, Volume I, Part 1). Those concentrations that exceeded the ambient were then screened against the ER-L. Values that exceeded the ER-L were then screened against the ER-M. Sampling locations were reported for those COPCs that exceeded the ER-L or ER-M.

In Section 2.0, Volume I, Part 2, the Navy chose to discuss COPCs that exceeded the ER-M or what may be considered as "hot spots," because a large number of sampling locations exceeded the ER-L for one or more COPCs in all parts of the offshore area. These results are shown in Figure 2-7 and presented in Table 2-1.

10. **Comment:** **Page 6-7, Section 6.2.3.2., [Benchmark for] Tributyltin: Since this section reports a range of Kd values for tributyltin, the Navy must explain the basis for using Kd reported for Chesapeake Bay sediments as relevant to San Francisco Bay to determine an appropriate benchmark for tributyltin.**

Response: Most of the work for TBT has been done in Chesapeake Bay, which was the primary available data. The Navy is not aware of a Kd value for TBT based on San Francisco Bay sediments. The Navy is aware of the derivation of screening benchmarks by EPA Region 10 for Puget Sound that appeared in EPA Contaminated Sediment News (1997), which will be evaluated for inclusion in the FS for Parcel F.

11. **Comment:** **Page 7-2, Section 7.2, Data Assessment for Mapping the Nature and Extent of Contamination: The approach described In this section for screening bulk sediments is different than that described on page 6-5. As stated in specific comment #9 above, COPCs were to be screened against ambient. followed by the respective ER-L. However, in this section the approach is described as screening against ER-M, followed by ambient then by ER-L. The Navy must correct the inconsistency, describe the approach that was used, and provide the rationale for that approach.**

Response: Please see response to RWQCB Specific Comment No. 9, Section 5.2.1, above.

12. **Comment:** **Page 7-3, Section 7.2.2, Comparison of Frequency of Detection: The Navy should provide the basis for analyzing only those COPCs that were detected in 5% or more of the samples and also exceeded ambient values.**

Response: The use of screening against a 5 percent frequency of detection is standard practice. For the decision to use the ambient value, please see response to EPA General Comment No. 6, Section 2.2 above.

13. **Comment:** **Page 7.4, Section 7.2.5, Information Mapped: In this section and throughout the document, the Navy provides analysis of the EC_{50} value from the echinoderm larval development test, although the workplan indicates that EC_{10} and NOEC values would be derived. The Navy should consider more extensive analysis of the echinoderm toxicity data than has been provided. At a minimum, the Navy should describe why the emphasis is on the EC_{50}.**

Response: The Navy has been unable to find where it was stated in the WP (PRC 1995b) that an EC_{10} would be derived for the sea urchin test; as this is not the normal procedure. Standard operating procedure, as presented in the QAPP (PRC 1995d), specifies an EC_{50}. The use of an EC_{50} is what is usually derived when testing a dilution series, and that is what was submitted in the QAPP and approved by all parties (please also see response to EPA General Comment No. 5.a, Section 2.2 above.)

14. **Comment:** **Page 7-5, 7.3, Determination of Gradient: How are the influences of the vertical gradient accounted for?**

Response: Please see response to DTSC Specific Comment No. 10, Section 3.2 above.

15. **Comment:** **Page 9-7, Section 9.5, Physicochemical Parameters Affecting Toxicity, Ammonia: There is a discrepancy in the value listed as the EC_{50} for unionized ammonia in the echinoderm development test; it is listed as 0.7 mg/l and 0.07 mg/l. The Navy should provide the correct value and also provide a more detailed description of the reference which indicates the EC_{50} for ammonia.**

Response: The correct value is 0.07 milligrams per liter (mg/L). The value was obtained from discussions with Brian Anderson, University of California, Santa Cruz, in May 1996. Dr. Anderson has conducted many of the San Francisco Bay toxicity tests for RWQCB.

5.2.2 Volume I, Part 2 - Risk Characterization to Aquatic Receptors

This section presents specific comments from RWQCB concerning Volume I, Part 2 - Risk Characterization to Aquatic Receptors (PRC 1996d).

16. **Comment:** **ES-2: "... water interface were not identified as hot spots because the benthos does not extend below that depth." This statement is inappropriate. Removal may be considered as a remedial option for addressing contaminated sediments. Pollutants may exist below three feet that would be "available" to the benthos following dredging. The Navy has not addressed sediment deposition and erosion. Therefore sediments below three feet may become "hot spots" following dredging or through erosion.**

Response: The Phase 1B ERA addressed the risk to benthic receptors that primarily live in the top 18 inches of the sediment. Almost all (99 percent) of the benthos present in San Francisco Bay live in the top 18 inches of sediment; even the deeper burrowing clams, such as *Macoma* or *Mya*, do not extend below 2 feet, which is still well above the contaminated zone (PRC 1995a). Contaminants below that depth do not pose an immediate risk to benthos until they are disturbed by dredging activities. When an area is disturbed by dredging, then that action falls within the U.S. Army Corps of Engineers dredge removal guidelines. The vertical extent of contamination is best handled in the FS for Parcel F. The draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

17. **Comment:** **Page ES-3, first paragraph: Bulk sediment chemistry is compared only to ER-Ms. USEPA, in ECO Update - Ecotox Thresholds, January 1996, recommends comparing sediment chemistry to ER-Ls. Please see also Specific Comment #9.**

Response: Bulk sediment chemistry was compared to both ER-Ls and ER-Ms. Please see response to RWQCB Specific Comment No. 9, Section 5.2 above.

18. **Comment:** **Page ES-3, second paragraph and Sections 6.2.2.1 and 6.2.2.2: It is unclear as to why the Navy compared amphipod and echinoderm toxicity test results to non-normalized bulk sediment chemistry. Typically, the purpose of normalizing bulk sediment chemistry is to compare to other chemistry databases. The Navy should explain the reason for this analysis.**

Response: The Navy looked at both nonnormalized and normalized data, and significant values derived as a result of correlation analysis with both types of data were presented.

19. **Comment:** **Page ES-4: This section discusses the correlation of EC_{50}s and NOECs for the echinoderm development test with chemistry, but has not provided the concentration values. The Navy should provide a table detailing this information.**

Response: Comment acknowledged, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

20. **Comment:** **Page ES-13, first full paragraph: The Navy's statement that because the willet is widespread in the Bay Area, any potential effects due to contamination at Hunter's Point will not affect the population as a whole, is somewhat short-sighted. The willet was used as a representative, or indicator species for the risk characterization to birds in that same guild.**

RWQCB staff are concerned about threats to beneficial uses which may impact a number of different species.

Response: The Navy agrees that the risk to the willet and birds of the same guild should be reevaluated, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

21. **Comment:** **ES-9: Please explain how a "reasonable maximum HQ" value was determined. Reasonable to whom?**

Response: The use of "reasonable" should be deleted, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

22. **Comment:** **ES-9: Piscivorous birds are listed as assessment endpoints in the Navy's workplan, but were not carried through into the risk characterization. The Navy should explain how and why this endpoint was excluded from risk characterization and evaluation.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

23. **Comment:** **ES-10: The Navy's equation lists RMHQ and describes it as MHQ.**

Response: The "R" should be deleted, but the Navy understands that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

24. **Comment:** **ES-12: The document is inconsistent with regard to the conclusion of the risk to the willet. The Navy describes different categories for HQ values. Category 1...is highly unlikely that the COPC presents a risk and therefore *no action is recommended.* Category 2 ... *risk management* is recommended. In Category 3, HQs ... indicates a high potential for risk and therefore *action is recommended.* The next paragraph states that COPCs quantitatively assessed for the peregrine falcon fall into Categories 1 and 2. COPCs for the willet fell into category 3 "indicating a high potential for risk where risk *management* or action is recommended." Category 3: which is it management or action?**

In addition on page ES-12, the Navy states "In conclusion, *most of* COPCs detected *do not appear to pose a significant, immediate risk* to the peregrine falcon and willet." Most don't but some do? Please clarify. The next page ES-13 states that "*no* immediate action is warranted but further risk management might be considered" for the willet.

These pages should be re-written to be accurate and consistent.

Response: The Navy agrees that clarification is necessary, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized. The issue will be addressed in the Parcel F FS.

25. **Comment:** **Page 2-2: "At only two of the sampling locations in the deeper cores sections...did the respective COPC exceed the ER-M: however, the affected samples were collected at greater than three feet.. below where *most* of the benthos live." The Executive Summary and Volume I, Part 1,**

Section 9.6.1, page 9-10 states that, "Sediments were toxic or marginally toxic at all deeper sampling locations of a transect." Please describe what this statement is based on. As stated previously, sediments that are at deeper depths may become "available" at locations where both erosional and depositional areas are adjacent. Fine grained sediments next to coarse grained sediments may be indicative of such an area.

Response: Please see response to RWQCB Specific Comment No. 16, Section 5.2.2 above.

26. **Comment:** **Page 2-6, 2.2, Gradient of Contamination: The Navy should also examine vertical gradients for remedial alternative evaluation and changes in the spatial distribution of sediments.**

Response: Please see response to RWQCB Specific Comment No. 16, Section 5.2.2.

27. **Comment:** **Page 3-9, Section 3.2, Exposure Assessment to Aquatic Avian Receptors: The text states "indicator avian species were selected, *with agency approval,* as the representative measurement endpoint receptors." Who and when?**

Response: Please see response to EPA Specific Comment No. 18, Section 2.2.1.2 above.

28. **Comment:** **Page 3-23, PAHS: Fluoranthene and pyrene were included with the low molecular weight PAHs based on their status as noncarcinogens. PAHs should be grouped according to structural similarities which exhibit similar effects (e.g. bioaccumulation). For additional information on fluoranthene see: EPA document 822-R-93-012: *Sediment Quality Criteria for the Protection of Benthic Organisms: Fluoranthene, ECO Update: Ecotox Thresholds,* Volume 3, number 2, *PAH Hazards to Fish and Wildlife and invertebrates: A Synoptic Review,* US Dept. of Interior, Contaminant Hazards Review Report #11.**

Response: Please see response to DTSC HERD Specific Comment No. 19, Section 4.3.2 above.

29. **Comment:** **Table 3-4, Sediment Exposure Point Concentrations: The Navy should indicate if the data were TOC-normalized.**

Response: The sediment data used in Table 3-4 was not normalized, because it includes data from the Installation Restoration Program ("IR") intertidal study, the ESAP, and the Phase 1B study. TOC was only collected during the Phase 1B ERA.

30. **Comment:** **Table 3.5, Tissue Exposure Point Concentrations: The Navy should indicate if the data were lipid-normalized.**

Response: Please see response to EPA Specific Comment No. 15, Section 2.3.1.1 above.

31. **Comment:** **Page 6.7, 6.1.2., Interpretation of Toxicity Test Data: The microtox data were thrown out because of "low sensitivity" which "did not indicate that any of the sediment pore water samples were toxic." The Navy should**

adjust the scale of the data and compare the echinoderm EC_{50} data and the microtox data to determine if there is a correlation.

Response: Please see response to EPA General Comment No. 5.b, Section 2.2 above.

32. **Comment:** **Page 7-11, 7.2.3, Spatial Extent of Adverse Effect, first bullet: Please change this statement to reflect the highest risks *emanating from HPA property*.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

33. **Comment:** **Page 7-23 , 7.4: The "significance of potential risk" is not being represented by these two receptor species alone. The statement "it should be noted, that the willet is widespread in the San Francisco area, and any potential adverse effects due to contamination at this location will not likely effect the population as a whole" somewhat oversimplifies the purpose of characterizing risk and hints at a risk management decision. Please see also Specific Comment #20.**

Response: Please see response to RWQCB Specific Comment No. 20, Section 5.2.2 above.

34.a. **Comment:** **Section 8.0, Conclusions: Groundwater contribution to sediment contamination is an important element that has been overlooked in this document.**

Response: Please see response to EPA General Comment No. 2.a, Section 2.1 above.

34.b. **Comment:** **Terrestrial sources (such as IR-21) groundwater monitoring, soils, and sediment data should be evaluated together (i.e. shore to offshore chemical contours);**

Response: Please see response to RWQCB General Comment No. 4, Section 5.1 above.

34.c. **Comment:** **Section 2.5.2.2 describes intertidal data collected by HLA in 1991 and 1992 for the IR-21 area. For some undisclosed reason this data has "not yet been analyzed."**

Response: Please see response to EPA Specific Comment No. 8, Section 2.3.1.1, above.

34.d. **Comment:** **Further this document states that this data is "presented" in Volume II, Appendix C. It is not.**

Response: The Navy acknowledges this error; the data was actually presented in Appendix A of Volume II.

35. **Comment:** **Page 8-1, second paragraph: This paragraph discusses the food web for Hunter's Point, which includes fish that prey on benthos and piscivorous birds, which may be prey for the peregrine falcon. This statement suggests that this portion of the food web was evaluated in the risk characterization,**

which it was not. The Navy should evaluate this part of the food web or provide a rationale for why it was not performed.

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

5.2.3 Volume II - Chemistry and Toxicity Test Results

This section presents specific comments from RWQCB concerning Volume II, Chemistry and Toxicity Test Results (PRC 1996c).

36. **Comment:** **Page 2-12, Section 2.5.2.1, Pore Water Extraction Procedure: RWQCB staff wish to receive a copy of the protocol and rationale used by the Navy to modify the centrifugation speeds and rates.**

Response: The protocol originally proposed may be found in Appendix F of the Phase 1B QAPP (PRC 1995e). A copy of the revised pore water extraction procedure may be found in Appendix F of Volume II as an attachment to the Navy laboratory audit report prepared by PRC.

As noted in Section 2.5.2.1 of Volume II, a initial centrifugation step was added to the pore water extraction process to remove most of the solids before processing the samples at 10,000 times the gravitational acceleration rate (g). The high-speed, 10,000-g centrifuges do not have sufficient capacity to extract the volume of sediment required (10 to 15 gallons) within a reasonable timeframe. The Navy selected 3,200 g for the initial centrifugation to match the maximum speed of the EPA Region 9 Laboratory high volume centrifuge. EPA collected sediment samples "split" from the Navy samples, and the Navy wanted the sample processing and analysis for the two sets of samples to be as similar as possible.

Because the final centrifugation step remained at 10,000-g as proposed, the Navy believes that the initial low-speed centrifugation did not significantly affect the ultimate pore water composition. Also contained in Appendix F was the EPA laboratory audit report, which states, "Overall, the pore water extraction procedure was well thought out, clearly documented in the Standard Operating Procedures (SOP) and carried out in a well organized and effective manner. The extraction procedure is consistent with the procedure followed by the staff at the Region 9 Laboratory."

37. **Comment:** **Page 3-2, Section 3.1, Total Metals In Whole Sediment: The Navy should provide a table outlining the specific analytes and stations where the detection limit exceeded the screening criteria.**

Response: The screening criteria for metals and other analytes may be found in Table 6-1 of Volume I, Part 1. These values may be compared to the data tables in Volume II. The Navy will evaluate including such a table in the Parcel F FS.

38. **Comment:** **Page 3-3, Section 3.3, Total Metals in Sediment Pore Water, last paragraph: The Navy calculated the arithmetic mean concentration for metals in pore water to compare to the Great Lakes Water Quality Initiative criteria. However, US EPA ECO Update - Ecotox Thresholds (January 1996) recommends comparison to the maximum chemical concentration. The Navy should modify their calculation or explain why they deviated from the guidance.**

Response: The comparison of mean metals concentrations to their various screening criteria as discussed in Section 3 was provided to help put the data set as a whole into perspective and was not intended to be an evaluation of potential ecological risk. The evaluation of the nature and extent of metals in whole sediment and pore water may be found in Section 8 of Volume I, Part 1.

39. **Comment:** **Page 8-1 and 8-2, Section 8.2, Sediment Pore Water Results: The stated screening value for tributyltin in water is 0.01 μg/l, however the stated detection limit was higher at 0.05 μg/l. The Navy should clarify the discrepancy or describe how they accounted for the ability to appropriately screen.**

Response: Please see response to EPA Specific Comment No. 24, Section 2.4 above.

40. **Comment:** **Appendix D, Field Variance Notifications: It is unclear that the agencies were ever notified of the modifications to the field work. RWQCB staff prefer to work together with the Navy when variances significantly affect the outcome of the risk assessment.**

Response: The Navy regrets that the agencies were not notified of the changes to the analytical program in a timely manner. It was our intention to inform the agencies formally, or informally when necessary, about any deviations from the work plan. Appendix D of Volume II included two field variance notification letters regarding invertebrate tissue sampling and analysis. The Navy modified the invertebrate tissue residue sampling scheme because the field ecologist observed that several of the original sampling locations were unsuitable based on the feeding patterns of shore birds. Analytical procedures specified for tissue residue samples were altered because a low density of invertebrates were encountered in the mud flats, and the analyses as proposed would have required the collection of an impractical quantity of tissue.

Field variances had to be implemented immediately to prevent further delays in the schedule and associated standby costs for the field team. The Navy feels that the modified tissue sampling and analysis program met or exceeded the technical criteria of the original plan and that high quality data was obtained.

The Navy is willing to discuss any concerns that RWQCB or others may have regarding the adequacy of the data.

6.0 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION COMMENTS

The following are the responses to comments on the Phase 1B ERA (PRC 1996a, b, c) from NOAA.

6.1 GENERAL COMMENTS

1. **Comment:** **The Department of Commerce/National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to comment on the "Phase 1B Ecological Risk Assessment (ERA)" for Hunters Point Shipyard, San Francisco, California. Through the Phase 1B process, considerable sediment data were collected, and a reasonable number of toxicity tests were performed to assist in the characterization of risk to the identified receptors. For these receptors, it is NOAA's view that sufficient information exists to make decisions with respect to feasibility studies.**

   Response: Comment acknowledged. The Navy intends to proceed to an FS in the near future.

2. **Comment:** **One serious flaw with the ERA is in its failure to characterize the risk to epibenthic invertebrates and fish and in its failure to select an avian receptor that would be exposed to contaminants at Hunter's Point through fish ingestion in addition to ingestion from infaunal invertebrates. Since a large proportion of the property (400 out of 955 acres) is subtidal, the omission of a significant component of the subtidal ecosystem in the risk assessment should be considered a data gap that still needs to be addressed.**

   Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above. Protection of the infauna should provide protection to the epifauna.

6.2 VOLUME 1, PART 1 - NATURE AND EXTENT OF CONTAMINATION

This section presents the responses to comments from NOAA for Volume I, Part 1 - Nature and Extent of Contamination (PRC 1996a).

1. **Comment:** **General: The document needs to clarify and define what is meant by "onshore," "offshore," "nearshore," and "farshore." These appear to be used sometimes interchangeably. Are these defined by depth?**

   Response: "Onshore" has been used in this document to refer to the terrestrial portion of HPS, and "offshore" refers to the aquatic environment, including the intertidal area. For an explanation of the use of the terms "nearshore" and "farshore" please see DTSC Specific Comment No. 11, Section 3.2 above. "Offshore"

has sometimes been used in same context as "farshore." These areas are not defined by depth.

2.a. **Comment:** **Section 3. Ecological Characteristics, Section 3.4. Other aquatic top predators include marine mammals (harbor seals and California sea lions).**

Response: The Navy acknowledges this statement. Marine mammals have not been observed within HPS facility boundaries.

2.b. **Comment:** **Also seems strange that in light of all the discussion of fish, none are selected as any kind of measurement endpoints.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

3. **Comment:** **Section 3.5.2. Choices of assessment endpoints completely leave out potential pathways that include fish, since the willet is primarily a benthic invertebrate feeder.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

4.a. **Comment:** **Figure 3-1. Why is this just intertidal? This should be the food web for Hunter's Point. Seaweed and algae are synonymous. Diatoms are a kind of phytoplankton. Many shorebirds certainly include bottom-associated fish (like gobies) in their diets. Web doesn't make much sense. You can do it in terms of epifauna, infauna, and pelagics, but you are doing it both ways.**

Response: This figure shows the food web for the offshore area of HPS. Seaweed and algae are synonymous, and diatoms are phytoplankton.

4.b. **Comment:** **Incorrectly labels piscivorous birds as assessment endpoints.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

5.a. **Comment:** **Figure 3-2. Why are bivalves and decapods combined? Bivalves in sediments are almost always infaunal, many decapods (such as crabs) are epifaunal and predatory, and so would also feed on gastropods, clams, and fish.**

Response: Comment acknowledged. Bivalves and decapods should be separated, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5.b **Comment:** **Includes piscivorous birds, pelagic fish, and the brown pelican as assessment endpoints, when in fact they are not.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

6. **Comment:** **Section 4: Identification and Prioritization of COPCs, Section 4.2. Why were intertidal samples grouped, while "offshore" samples were not? Why no distinctions between surface and 0.5 foot samples for intertidal stations?**

Response: Intertidal stations were grouped because they are situated close to onshore IR sites. Offshore stations are mostly subtidal and are not as near as the intertidal stations to the onshore IR sites. Only surface grab samples were collected for intertidal sites. The distinction between surface and 0.5 is a graphical error and should not have been included.

7. **Comment:** **Section 5: Offshore Sampling and Analysis, Section 5.1. Give more information on the purposes for the transects, since this appears to be a major analysis later. How were samples positioned, and for what reasons. Were the further offshore stations similar in terms of depth and disturbance? Were gradients chosen to account for currents and suspected directions of sediment transport?**

Response: Please see Section 6.3.2, Phase 1B ERA WP (PRC 1995b).

8. **Comment:** **Section 5.4. Workplan said that "Invertebrate species and if available, fish species will be collected from 12 selected intertidal areas and the tissues analyzed to determine the contaminant body burdens." The eco risk assessment should say why no fish were collected for tissue body burdens.**

Response: The Phase 1B WP (PRC 1995b) also states that "if a demersal fish with limited mobility cannot be identified for the intertidal area, then only invertebrates will be sampled." Please also see response to EPA Specific Comment No. 18, Part 2, Section 2.3.1.2 above.

9.a. **Comment:** **Section 7: Data Analysis and Interpretation. General: Statistics need to be explained more fully and carefully. For example, how were "nondetects" handled in correlation and regression analysis? What did the inclusion/exclusion of nondetects do to the robustness of the tests?**

Response: Regression analysis was never performed, but correlation analysis was. Please also see response to NOAA Specific Comment No. 13.b, Section 6.2 below.

One-half of the detection limit of the nondetects was used in the statistical analysis. The effect of the inclusion of the nondetects was not assessed. The Navy will evaluate potential impacts of nondetects on the statistical evaluation, which will provide a indication of test robustness, in the FS for Parcel F.

9.b. **Comment:** **There were no results presented for most of the analyses that were said to be performed. All statistical analyses should be presented in the appendix, not only those determined to be significant.**

Response: The Navy acknowledges this statement. Correlation information will be included in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

10. **Comment:** **Section 7.2.3. COPC concentrations reported as not detected should be carried through if the detection limits were below the lowest screening criteria.**

Response: The Navy acknowledges this statement which will be evaluated in the FS for Parcel F.

11. **Comment:** **Section 7.2.4. ER-L and ER-Ms are not regulatory. When using Long and Morgan guidelines, what served as your "regulatory benchmark" to decide whether or not a sample was retained-- ERLs or ERMs?**

Response: The ER-L served as the regulatory benchmark.

12.a. **Comment:** **Section 7.3. What is meant by Nearshore and Offshore?**

Response: Please see response to NOAA Comment No. 1, Section 6.1 above.

12.b. **Comment:** **If nearshore greater than offshore, then HPS is the source. If offshore > nearshore, then it isn't. This is a pretty big assumption.**

"Chemicals for which statistical analyses were performed were identified by discarding those chemicals for which no downward trend was obvious." What is meant by that? downward away from HPS?

Response: As stated in the text, it was the Navy's assumption that if COPC concentrations in the nearshore area were lower than farshore concentrations, then HPS would not be considered to be the source of these COPCs. The Navy's approach was to use a visual review of the plotted data to determine if there was an obvious trend that showed whether the nearshore concentration was less than the farshore concentration, or that there was no trend in concentrations between the two areas. Through this evaluation, the Navy was able to focus on those chemicals with a higher probability of showing that HPS could be the contaminant source.

12.c. **Comment:** **Why were t-tests used when it appears that 3 stations were used in gradients? Were these all lumped, and what was the justification for the transect station grouping in analysis? It appears that you are really testing 2 null hypotheses: one listed in 7.3, where Nearshore Xi = Offshore Xi. The second hypothesis has to do with HPS station = Reference station.**

Response: The Navy chose to group results into nearshore and farshore location groups to increase population sizes and thereby improve the sensitivity of statistical tests. The stations were grouped because in many cases the proximity of the samples was relatively close and did not provide adequate distance to perform a reasonable trend analysis. The Navy understands the shortcomings of this approach; however, it believes that the approach is a reasonable one given the inherent variability within any sediment habitat.

The second issue noted in the comments has to do with statistical evaluation of sediment groupings with the reference locations. The Navy acknowledges this comment. The Navy chose to perform this evaluation as a cross check for the comparison between nearshore and farshore groups. The Navy believes that even if a trend showing concentrations in the offshore area is related to HPS, it is important to know if the concentrations are within the range of background

concentrations for that COPC. Please also see response to DTSC Specific Comment No. 11, Section 3.2 above.

13.a. **Comment:** **Section 7.4.1. This section simply doesn't make sense. It would be more useful to get a list of the analyses performed with the input variables displayed. What exactly were you correlating? Why is a HI or HQ labeled an independent variable for correlations? Why were metals divided into high and low toxicity-- what kind of data analysis did you do?**

Response: The purpose of this section was to evaluate if any relationships exist between toxicity of COPCs and the physicochemical parameters. The list of analytes and physicochemical parameters were presented in Sections 4 and 5. The purpose of the correlations was to determine if toxicity COPC concentrations could be associated with specific physical parameters, such as percent fines or percent dry weight. Rather than look strictly at COPC concentrations, the Navy chose to look at HIs or HQs, which are a function of the COPC concentration. HIs and HQs should have been identified as dependent variables because the question was whether changes in toxicity are dependent of changes in the physical parameters. Metals were divided into two groups to focus on those with a higher probability of showing toxicity.

13.b **Comment:** **For the regression analysis, what was you independent and dependent variables? When you mention stepwise procedure, do you mean stepwise regression?**

Response: Stepwise regression was not conducted. Reference to conducting the analysis should have been deleted.

13.c. **Comment:** **This section appears to interchange correlation analysis and regression analysis. Although they are related, they are not the same thing.**

Response: Please see response to NOAA Specific Comment No. 13.b, Section 6.2 above.

14.a. **Comment:** **Section 7.4.2. This makes better sense, but it is still unclear whether regression and correlation are being mixed up. Regression analysis is supposed to be more of a predictive model, where the question is the prediction of the dependent variable from the independent variable(s). Correlation coefficients are measures of the linear relationship (how tight the line is). These are not supposed to be predictive. Are you trying to say that you performed a stepwise regression, starting with the variable with the highest correlation coefficient (with toxicity)?**

Response: Please see response to NOAA Specific Comment No. 13.b, Section 6.2 above.

14.b. **Comment:** **What is your criteria for "adequately explaining toxicity." Is it statistical significance? A Particular R-square value?**

Response: Please see response to NOAA Specific Comment No. 13.b, Section 6.2 above.

15. **Comment:** **Section 7.4.3. For the pore water variables. The echinoderm data should be in terms of % survival at the 100% concentration, not as the NOEC.**

Response: Please see response to EPA General Comment No. 5.a, Section 2.2 above.

16. **Comment:** **Section 7.4.4.1. What kinds of normality and homoscedasticity tests were done? How were nonnormal data transformed? Where data failed both tests, but the linear regression was performed anyway, is that documented?**

Response: Please see response to EPA Specific Comment No. 4.a, Section 2.4 above.

17. **Comment:** **Section 7.4.4.3. In the first paragraph, are those supposed to be p values instead of F values?**

Response: Please see response to NOAA Specific Comment No. 13.b, Section 6.2 above.

18.a. **Comment:** **Section 8: Nature and Extent of Contamination, Section 8.4. Regarding the pesticides and PCBs, this section appears to be inconsistent with section 7 of the Volume II analytical chemistry results. Section 8.4 of Volume I reports that PCBs and DDTs (and their derivatives) were detected in all surface sediment samples and in each core sample. Section 7 of Volume II (Analytical results) reports that pesticides were detected infrequently in sediment samples. Table 7-1 in Volume II shows that most of the samples were nondetects for PCBs, DDT and derivatives, but detection limits were well above both the "ambient" number and the NOAA ER-L.**

Response: As noted in the response to EPA Specific Comment No. 24, Section 2.3.1.1 above, detection frequency information in the tables in Section 8 of Volume I, Part 1 was inaccurate. The data as presented in Table 7-1 of Volume II is correct.

The arithmetic mean of detection limits for DDT (and its derivatives, DDD and DDE) and the PCB Aroclors was 3.6 and 36 µg/kg, respectively. The ER-Ls for DDT and its derivatives range from 1.0 to 2.2 µg/kg, and the ambient value for total DDT is 2.7. The total PCB ER-L and ambient values are 10.0 and 22.7 µg/kg, respectively. The Navy acknowledges that some DDT and PCB contamination at concentrations exceeding the ER-L or ambient values may not have been observed; however, concentrations of contaminants near the ambient value are not expected to be solely ascribable to activities at HPS.

18.b **Comment:** **AVS/SEM material is not presented in any usable fashion. The standard unit for reporting AVS is µmoles, yet it is portrayed as mg/kg in the Phase 1B Volume II document. Also, the calculation for the ratio is not presented making any verification of their analysis impossible.**

Response: AVS data was presented as specified in the Phase 1B QAPP (PRC 1995e). Data in Table 3-2 of Volume II may be divided by the gram molecular weight for sulfur (32.06 grams per mole) to convert to micromoles per kilogram.

SEM/AVS ratios presented in Section 8.1.2 of Volume I, Part 1 were based on moles per kilogram.

18.c. **Comment:** **Without usable AVS/SEM information, any analysis of the copper and mercury benchmark exceedances, relative to toxicity bioassay results at TX01 is speculation.**

Response: The Navy acknowledges this statement. Further analysis of the data relative to TX01 will be evaluated in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

19.a **Comment:** **Section 9: Toxicity Test Results. The section should briefly describe the justification for selecting these stations for toxicity testing.**

Response: Sampling locations for amphipod and echinoderm toxicity tests were placed so that there would be at least one sampling location per transect and two toxicity test sampling locations for longer transects, such as Transects A and E. Additional Microtox® sampling locations were placed to provide the coverage at more locations in a cost-effective manner. Also, see Section 6.3.1, Phase 1B WP (PRC 1995c).

19.b. **Comment:** **It's not clear where the statistics for toxicity data are presented, but any statistics presented as percentages should be arcsin transformed before doing parametric tests.**

Response: Toxicity test reports were not presented as part of this submission although a summary of the results are presented in Section 9.0, Volume I, Part 1.

20. **Comment:** **Section 9.4. Toxicity only if EC50 < 80 is not conservative.**

Response: Please see response to EPA General Comment No. 5.a, Section 2.2 above.

21. **Comment:** **Section 9.6.1. The amphipod reburial numbers appear to be presented incorrectly. These should be presented as reburial taking into account mortality.**

Response: The proportion of amphipods reburied was based on the combined parameters of survival and reburial as specified in EPA (1994).

22. **Comment:** **Section 9.6.2. The regression of contaminant concentration against EC50 doesn't make sense.**

Response: Contaminant concentrations were not regressed against EC_{50}s but were analyzed using correlation. The use of EC_{50} in the correlation analysis is a reasonable benchmark that will ensure the most comparable data points among a wide variety of results.

23. **Comment:** **Tables 9-14 vs. 9-18. Which set of data is correct for X03, or was this station really retested?**

Response: In Table 9-14 "X03" should be "X05." The sampling location was not retested.

24. **Comment:** **Tables 9-18 vs. 9-19. Which set of data is correct for Y01, or was this station really retested?**

Response: In Table 9-19 "Y01" should be "Z01." The sampling location was not retested.

25. **Comment:** **Section 10: Summary of Nature and Extent of Contamination. A list of the COPC carried through in the analyses should be given. A summary of those stations that exceed ER-Ls and "ambient" should be given.**

Response: Please see response to EPA Specific Comment No. 30, Section 2.3.1.1 above.

6.3 VOLUME I, PART 2 - RISK CHARACTERIZATION TO AQUATIC RECEPTORS

This section presents the responses to comments from NOAA for Volume I, Part 2 - Risk Characterization to Aquatic Receptors (PRC 1996d).

1.a. **Comment:** **Section 2: Chemistry and Toxicity Relationships. General: There are repeated statement regarding exceedances of sediment quality benchmarks or criteria, but appears to be only screening against ER-Ms. ER-Ms are not benchmarks or criteria. Volume I, Part 1 of this document stated that screening was to be against both "ambient" and ER-Ls as well. These data need to also be presented in this section.**

Response: Screening was done against both the ER-L and ER-M. Further presentation of data will be evaluated for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

1.b. **Comment:** **Although correlations are presented here, no mention is made of all the linear regressions and stepwise regressions that were to be performed (see Volume I, Part 1, Section 7).**

Response: Regression analysis was not performed as planned. The Navy will evaluate the use of regression analysis for inclusion in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b,c,d) will not be finalized.

2. **Comment:** **Section 2.1.1.1. The observations regarding presumed non-toxicity at TD01 are superfluous in as much as nickel is one analyte for which the ERM has low predictive power (as characterized by Ed Long), and, PCBs do not generally exhibit acute lethality in a 10 day amphipod test. Data should have also been presented in terms of ER-L and "ambient" exceedances.**

Response: Comment acknowledged. Reanalysis of the data will be included in the FS for Parcel F. The Navy understands, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

3. **Comment:** **Section 2.1.1.2 (and elsewhere). The statistics must be presented in a more understandable format (see our comments on statistical analysis for Volume I, Part 1, Section 7) so there is a thorough understanding of what tests were performed. (For all tests, the actual statistical test employed plus the number and r value must be stated at a minimum.) For instance, in this section a lack of "correlation" between bulk sediment chemistry and toxicity results is presented. However, if merely linear correlation was the only association tested, the apparent lack of correlation provides no definitive evidence that a concordance or relationship does not exist between these two sets of parameters. In this section, and elsewhere, correlation analysis is improperly presented to suggest that correlation = effect. All statistical analyses should be fully presented, in the appendices, even those for which statistics were not statistically significant.**

Response: The Navy acknowledges this statement. The Navy will evaluate the use of additional statistical tests for inclusion in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

4. **Comment:** **Section 2.1.2.1. Again, the attempted conclusions drawn from matching chemistry to toxicity results are flawed and insupportable. The claims of "nontoxic" echinoderm results are made against the calculated EC_{50} value. This calculated statistic censors a great deal of the information and performance of this test, and severely diminishes the power with which to make any conclusions. This is evidenced by the fact that out of the seven stations claimed to be "nontoxic," only one of them was in fact not significantly different from the control. Moreover, samples in which less than half the larvae developed normally (TBB03 @ 46%) were claimed to be "nontoxic."**

Response: The Navy acknowledges this statement. Reanalysis of the data will be evaluated for inclusion in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

5. **Comment:** **Section 2.1.2.2. Correlations should be done between the mortality at the 100% concentration, rather than on the EC_{50}. See also comments for section 2.1.1.2.**

Response: The Navy acknowledges this statement. Reanalysis of the data will be evaluated for inclusion in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

6.a. **Comment:** **Section 2.1.3.2. See general comment in this section about screening only against ER-M. For those stations showing toxicity, for example, TC05 exceeded ER-L and ambient for arsenic, copper, nickel, phenanthrene, pyrene and had detection limits exceeding ER-Ls for other SVOCs, PCBs, and pesticides; TG03 exceeded ER-Ls for arsenic, copper, mercury, nickel, and had detection limit problems with SVOCs, PCBs, and pesticides; TL03 exceeded for arsenic, copper, mercury, copper and had detection limit problems for SVOCs, PCBs and pesticides; TM01 exceeded ER-Ls for arsenic, copper, nickel and had detection limit problems for SVOCs, PCBs and pesticides; T003 exceeded ER-Ls for arsenic, chromium, copper, nickel and had detection limit problems for SVOCs, PCBs and pesticides;**

TT01 exceeded ER-Ls for arsenic, copper, nickel and had detection limit problems for SVOCs, PCBs and pesticides.

Response: The Navy also screened the data against the ER-L. Please see Section 8.0, Volume I, Part 1 and Tables 2-1 and 2-2 and Figure 2-7, Volume I, Part 2.

6.b. **Comment:** **Statistical results need to be shown, not just summarized. For percentage data, appropriate transformations need to be done.**

Response: The Navy acknowledges this statement. Presentation of all correlations and reanalyses will be evaluated for inclusion in the FS for Parcel F. For information concerning data transformations, see response to NOAA Specific Comment No 19.b, Section 6.2 above.

7. **Comment:** **Section 2.2. See comments regarding analysis of gradients. It is odd to refer to these as it "gradients" when there are only comparisons between 2 sets of data per test. "Nearshore," "offshore," and "farshore" needs to be better defined. T-tests seem odd, why not a regression function? Justification for different combinations needs to be given.**

Response: Please see response to DTSC Specific Comment No. 11, Section 3.2 above. The use of a t-test appears to be appropriate in evaluating the statistical difference between two sets of data. Division of sampling locations is arbitrary, but it was done to increase the power of the statistical test. It is not a gradient in the true sense; however, testing of the significant difference in contaminant concentration between each adjacent sampling location raises the question of sufficiency of data on both sides to determine a significant difference. The use of a regression function does not appear to be appropriate. Any reanalysis will be evaluated for inclusion in the FS for Parcel F.

8. **Comment:** **Section 2.3. The comparisons throughout this section should read that mean COC concentrations were *higher* in all transacts than the reference of offshore sets, not merely different.**

Response: The Navy agrees with the statement, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

9. **Comment:** **Table 2.2. What was the screen for PAHs? The class NAWQC guideline of 300 µg/L could have been used. Why wasn't the proposed chronic criterion of 0.92 µg/L used for silver? Where did the 300 µg/L for nickel come from? The chronic AWQC value is 8.3.**

Response: The screen for PAHs was 300 µg/L (see Table 6-1, Volume I, Part 1), but total PAHs above the detection limit were not found to occur at sampling locations listed in Table 2-2. The use of 300 µg/L for nickel was a graphical error, but the actual screening took place at 8.3 µg/L. The proposed chronic value for silver (0.92 µg/L) was not used because there are still questions concerning its validity in saltwater. The NAWQC for silver is still in the review process.

10. **Comment:** **Table 2.3. The value of this table is limited since it provides no indication whatsoever of the magnitude of screening number exceedances. A count of how many analytes which exceeded their respective benchmark would be useful.**

Response: The Navy agrees that there could be some additional information added to the table, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

11. **Comment:** **Table 2.4. See comments in Section 7 of Volume I, Part 1 regarding the gradient testing.**

Response: Please see response to DTSC Specific Comment No. 10, Section 3.2 above.

12. **Comment:** **Table 2.5. Why do the different sets have different COPCs? Did you only present the statistically significant ones? All data and analyses should be presented.**

Response: The Navy only presented those COPCs that showed a significant difference between the two groups; this allowed for a reduction in the information presented. The Navy understands the commentor's concern to be able to review all information; however, the Navy also wished to make the document as useful as possible. The data is available and will be evaluated for inclusion in the Parcel F FS.

13. **Comment:** **Section 3: Characterization of Exposure to Aquatic Receptors, Section 3.1. Much of the discussion is duplicative. It also mentions only those factors which tend to minimize exposure, and fails to acknowledge the interaction between sediment and pore water or the influence of dietary exposures. There is also no discussion of the temporal variations in those factors which at times may diminish bioavailability.**

Response: The Navy agrees that modification could be made to clarify the section, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

14. **Comment:** **Section 3.1.1. The claim that "HQs reflect the potential risk of COCs to very sensitive benthic receptors" simply is not substantiated when median toxicity values, *i.e.*, ER-Ms, are used. And as this section also notes, amphipods, as used in the toxicity bioassays, are only moderately sensitive; they are not characterized as the most sensitive test organism, therefore this cannot be characterized as "conservative assumptions" as stated in section 3.1.**

Response: ER-Ms were not used to derive an HQ; the ER-L value was used. Amphipods are highly sensitive (as stated in Section 3.1.1) and are the most sensitive test organisms for whole sediment toxicity tests.

15. **Comment:** **Section 3.1.2. This section appears to be mis-named since it is entirely a discussion of the availability of contaminants from pore water. As such, it should also note that pore water contamination is in steady-state, or more likely some flux level approaching steady state, with bulk sediment**

contamination as the major source. Since this section also discusses uptake pathways, references that indicate that ingestion of bulk sediment is a substantial pathway should also appear here.

Response: The Navy agrees that the section title could be changed. The Navy also realizes that there is a flux between bulk sediment and pore water contamination that is approaching steady state, the occurrence of which is probably transient at best. Placement of references to bulk sediment ingestion in this section do not appear to be appropriate.

16. **Comment:** **Section 3.1.3. The spatial extent for calculating 95th UCLs was not stated. This methodology requires further explanation as to which samples were included, *et cetera*. This section could simply be eliminated since Section 3.1.8 actually discusses some of the detail of UCL calculation. In that later section however, there is no explanation for the rationale of using a mean if there was less than five detects. If "the exposure point concentration is to represent a reasonable maximum concentration" (as stated in Section 5.2.1.1), there is little justification for choosing a mean. Since the number of samples per area varies, there is little rationale for a set number (i.e., 5) anyway. Per EPA guidance, upper 95th UCLs should be used unless that statistic exceeds the maximum value observed, in which case the maximum is used.**

Response: Please see response to DTSC HERD Specific Comment No. 6, Section 4.3.2 above.

17. **Comment:** **Section 3.1.9. The last bullet in this section should be eliminated. The toxicity of COCs is an inherent property that is determined in conjunction with the specific physiology of each species. Sediment features may influence bioavailability and chemical form.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

18. **Comment:** **Section 3.1.9.3 The assumption that benthic receptors are evenly distributed is to a large extent inaccurate. The actual assumption is more that given the mobility of COCs and receptors, there is equal probability of exposure across the entire offshore area.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized. Any references to this issue in the Parcel F FS will be restated as suggested.

19. **Comment:** **Section 3.2. See "General comments, above" regarding the selection of avian receptors.**

Response: Please see response to EPA Specific Comment No. 18, Section 2.3.1.2 above.

20. **Comment:** **Section 3.2.1.1. Since it is stated that "willets are most frequently associated with *Salicornia* marshes ... where their prey largely consist of the shore crab *(Hemigrapsus* spp.) ...", crabs should be included as prey species for tissue analysis.**

Response: A small *Salicornia* marsh is present at HPS along part of the Parcel E boundary with South Basin. Crabs were not obtained during sampling for tissue analysis because the Navy does not believe that crabs represent a significant part of the willet diet at HPS. According to the California Department of Fish and Game (Zeiner and others 1990), in estuarine habitats, the willet preferentially consumes both polychaetes and mollusks which is what was collected in the intertidal area of South Basin.

21. **Comment:** **Section 4: Ecological Effects Assessment to Aquatic Receptors. General: A major premise of the Ecological Effects Assessment has been missed by this section. The purpose of this element of a risk assessment is not just to determine lower thresholds of effects- i.e., magnitude- but also determine the nature or scope of toxic expression by the COCs. This assessment can then serve as a basis against which the assessment and measurement endpoints may be judged for adequacy of evaluation. In the case of HPS, for instance, PCBs and TBT are two classes of COCs which are not addressed by acute lethality bioassays. In as much as this intent was accurately portrayed in Section 5.2 (and referenced to EPA documents).**

Response: Reference to effects of PCBs and TBT not being assessed by acute toxicity tests could be discussed in this section but was included in Section 5.2.

22. **Comment.** **Section 4.1. The sediment quality values published by Long *et al.* are not "criteria." Not all AWQC are based on toxicity bioassays (e.g., PCBs). Although COCs may exert *systemic* toxic stress which can be expressed as *diminished* survival, weight gain, fecundity, and *reproductive* development, this ecological risk assessment does not have explicit endpoints- either assessment or especially measurement endpoints- for reproductive impairment or scope for growth of benthic receptors.**

Response: The Navy realizes that the Long and other data are not criteria but benchmarks. The use of the NAWQC for some COPCs inherently accounts for some of the effects that were not measured in this project.

23. **Comment:** **Section 4.1.1. The alleged assumption of basing benchmarks on "no effect" or "low effect" is flawed, when screening appeared to be only done for those contaminants exceeding ER-Ms, a number representing a median, not a "low effect."**

Response: Actual screening of all COPCs was done using both the ER-L and ER-M. The HQ used the ER-L, not the ER-M.

24. **Comment:** **Section 4.1.2. What did you do for those contaminants without benchmarks?**

Response: For sediment COPCs, manganese, molybdenum, and vanadium did not have benchmarks, but the entire data set was discussed in Section 8.0, Volume I, Part 1. HQs were not calculated, and the effects of these metals in sediment were not individually assessed. Manganese is poorly characterized with respect to its toxicity in whole sediments. As a direct-acting toxicant, manganese is probably relatively limited or if toxic, its activity is highly confounded by its

well characterized role in influencing dissolution of co-occurring metals and metalloids with well established toxicities (for example, zinc, copper, arsenic, and selenium). Manganese toxicity is probably best characterized by its concentration in sediment pore water although its relatively complex, aqueous-phase chemistry creates no less of a problem when interpreting its associated toxicity (Strumm and Morgan 1970).

Molybdenum and vanadium are both poorly characterized with respect to their toxicity in either whole sediments or sediment pore water; limited characterizations of the biological activity of either metal are included, for example, in geochemical characterizations of natural water (Hem 1992). molybdenum is generally considered to have a high geochemical mobility and tends to enter solution relatively easily; it is, however, a rather rare element and has a relatively complex chemistry in water, which confounds interpretations of toxicity associated with any particular molybdenum concentration in whole sediment and overlying water (Hem 1992). The most common valence states in either solid-phase or aqueous matrices are molybdenum (IV) or molybdedum (VI); however, the toxicity of either is poorly described. Molybdenum is an essential element to plant and animal nutrition. Molybdenum will bioaccumulate in vegetation (Marschner 1986), although this process is more clearly characterized in terrestrial settings than in shallow water habitats where bulk sediment concentrations are at issue.

Molybdenum presents a rich literature regarding its biological activity in sediments and surface waters relative to vanadium. vanadium is very poorly developed with respect to its toxicity in sediments (or any other matrix for that matter). At sediment/water interfaces, the biogeochemistry of vanadium is rather complicated; for example, the element occurs in three oxidation states (+3, +4, and +5), which may all be present under the same conditions. The vanadium (V) form, however, generally predominates as anionic complexes of oxygen and hydroxide in oxidizing environments. The forms present in reduced sediments would be much more difficult to characterize, however, and from a practical perspective, the toxicity of vanadium cannot be characterized because of a lack of information.

PAHs were grouped and not assessed individually. Aldrin, heptachlor, and heptachlor epoxide were all below detection limits and were not assessed (see Section 8.4.1, Volume I, Part 1).

For sediment pore water, the entire data set was presented for antimony in Section 8.1.3.1, Volume I, Part 1. HQ for antimony was not calculated, and the effect of antimony in sediment pore water was not assessed. Antimony concentrations in sediment pore water are poorly supported when its potential toxicity is being considered. Although its chemistry is similar to arsenic in many respects, its mechanisms of toxicity are poorly characterized. Potential associations between adverse biological effects and sediment pore water concentrations should be developed with caution, primarily because the existing environmental chemistry and ecotoxicology data are so poorly developed.

Antimony concentrations in natural waters can be expected to be very low, but few actual determinations have been made in any aquatic or terrestrial settings, and relatively scant information is available regarding its toxicity at any environmental concentration (Hem 1992, Jones and others 1990).

The total PAH NAWQC was used for all PAHs that were not evaluated individually.

25. **Comment:** **Section 4.1.3.2. The authors should refer to the Long *et al.* publications for a more accurate characterization of the derivation of ER-Ls and ER-Ms. The statement that "sediment concentrations that fell between the ER-L and ER-M were considered to possibly cause toxic effects and will be further evaluated" is not supported by the presentation of the data, which appeared to only screen against the ER-M.**

Response: COPC concentrations were screened against both the ER-Ls and ER-Ms (please see Section 8, Volume I, Part 1).

26.a. **Comment:** **Section 4.1.4. The only elements of uncertainty discussed are those which would tend to reduce toxicity or which diminish the applicability of any guideline. Even then, the discussion is inaccurate. Also, actual sources of uncertainty are truly not even stated.**

Response: Comment acknowledged. The Navy will reevaluate the uncertainty analysis in the Parcel F FS, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

26.b. **Comment:** **In the first bullet, it is claimed that benchmarks do "not account for variations in naturally occurring sediment features." In fact, ERLs/ERMs do incorporate such variations because of their dependence on field observations.**

Response: Not all studies used in compiling the data set were field studies; laboratory studies were also included.

26.c. **Comment:** **In the second bullet, the interaction of toxicants is introduced as an uncertainty, yet there is no mention that this ERA itself uses an analyte-by-analyte approach which similarly fails to explicitly address the various possible interactions of COCs. Additivity is only assumed. Moreover, it fails to acknowledge that some single analyte, spiked sediment bioassays are included on the ERL/ERM database.**

Response: The Navy acknowledges that the effects range data base contains some single-spiked analyte studies. The ERA only assumes additivity, which is simplistic. Any other discussion of interaction is speculative and not necessarily beneficial, given the many different COPCs that were found in any one sample.

26.d. **Comment:** **In the third bullet, ERLs/ERMs should not be mis-characterized as being based on the most sensitive fauna. ERLs/ERMs are determined by the *entire* data set, reflecting endpoints of varying sensitivity.**

Response: The Navy would agree that endpoints of varying sensitivity were used.

26.e. Comment: **Unless the authors have conducted an exhaustive survey of each and every study which comprises the bulk of toxicity assessment backing all AWQC (or provide reference to such a survey), their assertion in the fourth bullet that these studies were conducted in "pure water" must be removed as unsupported.**

Response: The Navy agrees that this bullet should be deleted, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

27. Comment: **Section 4.2. Although NOAA supports the process used to develop the TRVs, before any real consensus can be assumed, the results of the literature search needs to be made available for review by BTAG members. These results would include (1) complete references for the literature used to derive TRVs, which, surprisingly was not available from the contractor in November, 1996; (2) complete references for literature rejected at the Tier 3 level and the reasons for rejection.**

Response: Section 4.2.1.2, Literature and Data Extraction, will be revised for inclusion in the guidance document being prepared to present the Navy's regional approach to ERA at naval facilities in San Francisco Bay.

28. Comment: **Section 5: Characterization of Potential Adverse Effects on Endpoints and Receptors, Section 5.1. The purpose of a "weight of evidence" approach has been misinterpreted. Since ERAs at hazardous waste sites are not meant to be exhaustive and form "research projects," unequivocal data that provides firm, absolute causal factors is rarely generated in these evaluations. Therefore, other considerations can be included to form the weight of evidence regarding likely causal agents. The weight of evidence approach does *not* imply that a single endpoint is not sufficient to indicate adverse effects. In fact, the ERA design is inefficient if there are duplicative endpoints.**

Response: Comment acknowledged.

29.a. Comment: **Section 5.1.1. This section ends with the erroneous claim that another "disadvantage of the HI approach is that it is focused on the response of an individual organism." HQs are no more or no less protective than the level of protection represented by the value in the denominator. For instance, if the benchmark employed were a measure of benthic community health, such as one of the AETs developed in Puget Sound, then the degree of protection afforded would be applicable to that level of biological order. There is no intrinsic limitation to the HQ approach which restricts it application to individuals.**

Response: The Navy acknowledges this statement. No response appears to be necessary.

29.b. Comment: **This section does fail, however, to acknowledge one of the HQ's largest disadvantages - that of inadequately addressing joint action toxicity.**

Response: Joint action is addressed in Section 6.1.1.4, Volume I, Part 2.

30.a. **Comment:** **Section 5.1.2. The first paragraph ends with the claim that "toxicity tests can also provide information on whether the test organisms are more or less sensitive that the organism used to develop the criteria or standard." This is an unfounded claim, especially within the context of this ERA. Such a comparison could not be made without considerable ancillary data to normalize for all potential confounding factors between the two sets of organisms. It is important to note that the choice of benchmarks for this ERA - ERMs and AWQC - are based on multiple species.**

Response: The Navy agrees and would delete the sentence. The Navy is aware of the use of multiple species in development of effects range benchmarks and NAWQC. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

30.b. **Comment:** **The second paragraph states that the lack of statistically significant effects justify the conclusion that effects are unlikely. The issue of whether the toxicity tests were performed in such a manner as to have the statistical power to even detect differences is ignored. Likewise, the appropriateness of the bioassays to respond to the form of toxicity exerted by the specific COCs in question (and within the time frame of the test) is totally ignored. This statement is also inconsistent with earlier statement in the document which discussed the importance of biological significance.**

Response: The Navy acknowledges this statement, which will be included in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

31.a. **Comment:** **Section 5.2.1.1. The HQ approach is characterized as being suitable due to the large number of COCs present (item #3), when in reality, this factor is one of the principal weakness of the HQ approach.**

Response: The Navy acknowledges this statement. The Navy will to review other methods that may be proposed to characterize risk for inclusion in the Parcel F FS.

31.b **Comment:** **The second and third paragraph of this section should acknowledge the relationship of bulk sediments as the primary source of COCs to interstitial water. The distinction between these two matrices attempted - a difference in uptake routes- is artificial and unnecessary since bulk sediment benchmarks are irrespective of uptake routes (e.g., ingestion of sediment, ingestion of prey, dermal, respiration).**

Response: Whole sediments are the major source of chemicals of concern to sediment pore water. The Navy acknowledges that sediment benckmarks do not reflect the exposure route, but the Navy still considers that distinction between the two media to be valid.

31.c. **Comment:** **In the last paragraph, the word "lower" must be removed or clarified since median values were used for bulk sediment and AWQC are not lower thresholds. Also, as mentioned above, HQ values are only as protective or prescriptive as the benchmark employed, and therefore the final statement of this section that values less than one are indicative of an absence of risk**

is misleading and must be clarified. This section states that NOAA ER-Ls and ER-Ms were used as benchmarks. Which one was used for the HQ?

Response: The use of the term "lower" refers to an HQ of 1 as being the minimum threshold value that can be exceeded to indicate risk. An HQ of less than 1 indicates that the COPC in either whole sediments or sediment pore water poses no risk to the receptor of concern. Only NOAA ER-Ls were used to calculate HQs.

31.d. **Comment:** **This approach will also underestimate risk where you have many samples with detection limits exceeding the benchmark value. This section should describe how this problem will be addressed.**

Response: Using such data to calculate HQs provides an indication of where there might be a potential risk caused by that respective COPC.

32. **Comment:** **Section 5.2.1.2.1. The presentation of HQ values as "one way to characterize the relative magnitude of potential adverse effects posed" is both erroneous and contradictory to previous statements (bottom of page 5-2).**

Response: Section 5.2.1.2.1 presents the idea that the relative magnitude of the HQ implies the level of risk; that is, an HQ of 10 poses a lower risk than an HQ of 100. A reference is provided. The statement at the bottom of page 5-2 does not contradict that idea.

33. **Comment:** **Section 5.2.2.1. The claim that Table 2-1 "indicate[s] that of the metals, arsenic, chromium, copper, lead, mercury and zinc are responsible for most of the adverse effects" is unsubstantiated. Correlation analysis does not provide any evidence of causal factors and would not demonstrate which metals are "responsible" for adverse effects.**

Response: Table 2-1 presents those COPCs that exceeded a screening criterion. Most of the COPCs that exceeded the screening criteria probably caused most of the toxicity. The reference to Table 2-1 did not relate to the correlation analysis.

34. **Comment:** **Section 6: Characterization of Ecological Risk to Aquatic Receptors, Section 6.1. Risk estimates are based on the co-occurrence of receptors and contaminants and the results of this exposure to the receptors. Risk estimates need to answer whether receptors are exposed to contaminants and whether the contaminants are having adverse effects on receptors. The presence of benthos and elevated levels of contaminants in sediments indicates that exposure is occurring. Two major lines of evidence are available to evaluate whether effects are occurring: literature based thresholds and toxicity testing using sediment and pore water from the site. Site-specific toxicity testing should take precedence over literature-derived thresholds. The elements regarding spatial and temporal scales are only relevant to determining the significance and extent of any observed or predicted risk, not to determining whether risk is present. If "HQs were evaluated to identify risk drivers" (item #1 of this section). The entire COC Risk Driver analysis is superfluous.**

Response: The HQ process is a means to determine if a COPC poses risk to a receptor. The derivation of risk drivers attempts to identify those COPCs responsible for most of the risk that is evidenced in relation to all COPCs that exceed a threshold. The Navy believes that the derivation of risk drivers has utility.

35.a. Comment: **Section 6.1.1.1. The purpose for the statement "COPC HQ values alone were not used to identify risk drivers because the values did not account for exposure potential across areas" is unclear. It appears that this section is trying to derive an index for evaluating the extent of contamination, not necessarily the extent of risk. From the equation plus the three bullets on page 6-3, the suggestion appears to be that the probability a benthic receptor will be exposed to a COPC (*i.e.*, FD) that is above both the detection limit; the probability for adverse effects by having an exposure above an HQ, (*i.e.*, FHQ); and the severity of the effects as represented by the maximum HQ are the only components of risk. Appropriate application of this concept assumes that all detection levels are below toxicity thresholds; that the area has been adequately sampled and sampled in such a fashion as to determine area-weighted exposures; plus, that the toxicity thresholds apply to all risk from these sediments. These assumptions have not been established [in] the case of HPS. It should be kept in mind that PCBs exhibit their major effects through bioaccumulation, not direct toxicity, and therefore, most toxicity thresholds would underestimate PCB risk. As acknowledged elsewhere in this document, HQs do not represent quantitative measures of the magnitude of risk.**

Response: The Navy's use of the algorithm to develop risk drivers includes extent of contamination in an attempt to better define risk drivers. It is a valid method that is not without problems, and the Navy will review the comment for possible modification of its algorithm in the FS for Parcel F.

The Navy realizes that HQs are not quantitative measures of risk, but the process is an attempt to quantify the process to some degree (please also see response to NOAA Specific Comment No. 32, Section 6.3 above). The case for PCBs does not apply to all COPCs. The Navy acknowledges that the assumptions, such as those stated in this comment, were not included in the process but could be included in an uncertainty analysis.

35.b. Comment: **This equation conceptually weights the three equation elements equally, and also implicitly assumes a linear relationship among them and with "risk." Since the potential for adverse effects already incorporates the element of exposure, the first two factors in the calculation in reality are merely giving double preference to analytical detection. As for linear relationships, we know that risk is nonlinear with exposure just on the basis of the shape of a dose/response curve alone. Therefore, the notion that "risk drivers" could be linear is violated by this single consideration.**

Response: The Navy acknowledges this statement. Further modification of the algorithm will be evaluated for inclusion in the FS for Parcel F.

36. Comment: **Section 6.1.2. Why is the objective of the toxicity test different than presented earlier in the document? Here it is said to conclude whether a**

low, moderate, or high risk is present. Toxicity testing provides a "yes" or "no" answer. Also, what is the rationale for evaluating the amphipod data "within the context of [its] life history" versus the "sea urchins ... as surrogates"? This section fails to provide what the title suggests - the rationale for how the toxicity bioassay results were interpreted to determine "toxic."

Response: The objective is the same. Exposure to benthos is by ingestion of sediment and dermal exposure to sediment pore water. The amphipod whole sediment toxicity test provides information on the ingestion pathway, and the sea urchin toxicity test provides information on the dermal pathway. The statement concerning low, moderate, and high risk should be deleted.

37. **Comment:** **Section 6.1.2.1. What is the rationale for the distinction between "toxic" and "marginally toxic"? Particularly in light of the fact that 86% of all amphipod tests had significantly reduced survival from their controls.**

Response: Marginally toxic refers to the percent survival values between 76 to 85 percent as defined in Section 9.4, Volume I, Part 1.

38.a. **Comment:** **Sections 6.1.2.2. Since 41% of the non toxic samples exceeded the ammonia EC-50 value, and 12% of the non-toxic samples exceeded the sulfide EC-50, it is just as accurate to say that ammonia and sulfides are not responsible for toxicity in the majority of samples. (The same statement applies to and Section 6.1.4 and elsewhere.)**

Response: Percentages quoted do not imply that ammonia and sulfides are not responsible for toxicity to the sea urchin, but that they both may be responsible for some toxicity to the sea urchin. These two parameters did not appear to be a cause of toxicity to the amphipod.

38.b. **Comment:** **As mentioned elsewhere, the rationale for identification of "toxic" according to the sea urchin bioassay results used censored calculations and is essentially inaccurate. Any and all analyses using this bioassay data must be repeated using the original, raw results. We do not agree with the designation as "non-toxic."**

Response: Please see responses to response to EPA General Comment No. 5.a, Section 2.2 above.

39. **Comment:** **Section 6.1.3. As noted earlier; correlations can be useful, but have their limitations as well. It is often more useful to plot the chemistry vs. toxicity data and look for thresholds of toxicity. This is a more empirical approach that can provide more useful data and relationships.**

Response: The Navy acknowledges this statement. Creation of these plots will be evaluated for inclusion in the FS for Parcel F. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

40. **Comment:** **Section 6.1.5. No data is presented in section 6 to indicate that naturally occurring sediment features affect the survival of benthic receptors. The last bullet of this section must be removed.**

Response: Ammonia was measured in the sediments, and both ammonia and sulfides were measured in the sediment pore water (please see Sections 8.7.1.1, 8.7.2.1, and 8.7.2.5, Volume I, Part 1, respectively).

41.a. Comment: **Section 6.1.6. The claim that "lines of evidence to not converge very well on particular COCs as the principal stressors" is contradictory to other information presented in this document. Also, this statement actually has no bearing on the sources of uncertainty in the estimates of risk and should therefore be removed. The following statement "that naturally occurring non-COC stressors may have an a role in sediment toxicity" is inaccurate. Results of the amphipod test were not influenced by unionized ammonia, nor sulfides (Section 6.1.4), nor grain size. If this claim is being made relative to the echinoderm results, it must be qualified to indicate that it *potentially* applies only to a minority of samples. (This assertion requires further verification anyway.)**

Response: The statement refers to the fact that using an HQ to determine risk does not account directly for toxicity resulting from parameters, such as ammonia and sulfides. Both ammonia and sulfide appeared to affect some of the sea urchin tests, but none of the amphipod tests. Ammonia and sulfide toxicity is accounted for in the toxicity test results.

41.b. Comment: **The second bullet claims that the extent of co-occurrence between COC stressors and benthic receptors as an uncertainty in the assessment of risk. Because a completed exposure pathway would exist for any organism which comes in contact with contaminated sediment, in conjunction with the planktonic larval drift mode of reproduction for numerous benthic (and pelagic) species, the presence of risk is not uncertain.**

Response: The Navy acknowledges this statement. When larvae are planktonic, they will not be exposed to sediment COPCs. Where they settle may or may not expose the larvae to a COPC because of heterogeneous distribution.

41.c. Comment: **This section must acknowledge the many basic, fundamental uncertainties inherent in the HQ style of risk assessment approach e.g., joint action, unmeasured COCs, benchmarks, etc.).**

Response: The Navy believes that this information is incorporated into other areas of the document but could be incorporated into this section also. It is our understanding, however, that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

41.d. Comment: **Finally, the section on uncertainty should acknowledge that the endpoints selected are an incomplete picture of the benthic community, and limited to exposure of infaunal organisms. Predatory epibenthic invertebrates including crabs and some gastropod species are not addressed through this assessment.**

Response: Some crabs feed on infaunal organisms, such as polychaetes and clams, and some gastropods also feed on infaunal clams. As such, protecting infaunal organisms also protects some epifaunal species. Please also see response to NOAA General Comment No. 2, Section 6.1 above.

42. **Comment:** **Section 6.2.4. Uncertainties should include the prey species selected. The prey collected consisted of benthic infauna, yet the life history description of the willet indicated that a significant portion of their diet are crabs such as *Hemigrasus* spp.**

Response: Please see response to NOAA Specific Comment No. 20, Section 6.3 above.

43. **Comment:** **Section 7: Risk Description, Section 7.1.1.1. Although this section, by title, is supposed to deal with receptors, much of the discussion revolves around chemistry. The three bullets presented should be re-phrased in relative terms, such as "the highest" and "the lowest," as opposed to the absolute terms used of "high" and "low." This is because, as admitted earlier in Section 5, the HQ approach does not provide a quantified measure of the probability of predicted effects.**

Response: The Navy agrees to use the relative terms, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

44.a. **Comment:** **Section 7.1.1.2. This section correctly identifies receptors which are shown to be at risk due to exposure to pore water. However, it then attempts to claim that lack of risk by one uptake or exposure route (i.e., pore water) provides an indication of low risk by another route (i.e., sediment).**

Response: The idea behind the statement is that if the concentration of a COPC in sediment is low, then the concentration of that same COPC attached to sediment particles may not be bioavailable.

44.b. **Comment:** **The last sentence which claims that epifauna and infauna which are not in direct contact with pore water may have a low potential to be affected by sediments must be removed. This claim also ignores the fact that many of these species have larval forms which would in fact be impacted by pore water-only the adults would be less responsive to this route.**

Response: Many of the epifauna have the ability to move and not be impacted by contaminated sediments. Infauna in tubes are somewhat protected, therefore the risk may be reduced, because of oxidation of the sediment lining the burrow walls. Exposure to larval forms should be included.

45.a. **Comment:** **Section 7.1.3. Although this section is deal with the connection between measurement and assessment endpoints, it needs to identify which measurement endpoints are associated with which assessment endpoints. In fact, there is no listing of assessment endpoints in this section at all.**

Response: The Navy agrees that this section could better relate the measurement and assessment endpoints, but it is our understanding that the draft Phase 1B ERA (PRC 1996b, c, d) will not be finalized.

45.b. **Comment:** **In the second paragraph, there is no apparent reason for the distinction in item #1 of just amphipods, yet the mention of "organisms" in general in item #2 which dealt with pore water bioassays. Item 1 should read that any infaunal organism of similar sensitivity as amphipods is at risk.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA report (PRC 1996b, c, d) will not be finalized.

45.c. **Comment:** **Since medians were used for benchmarks, remove the word "sensitive" in the second sentence.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA report (PRC 1996b, c, d) will not be finalized.

45.d. **Comment:** **Laboratory bioassays do not respond to "poor circulation" or "areas of deposition" and therefore have absolutely no need or reason to discern these influences from other stressors, as implied here. Moreover, the impacts of ammonia and sulfide in the bioassays were shown to be negligible. This last sentence must be removed.**

Response: The Navy agrees to remove part of the sentence (please also see response to NOAA Specific Comment No. 41.a, Section 6.3 above).

46. **Comment:** **Section 7.1.4.1. Remove the word "potential" in the next to last line on 7-5. Clear risk was indicated by direct toxicity bioassays.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA report (PRC 1996b, c, d) will not be finalized.

47. **Comment:** **Section 7.1.4.2. Can't be evaluated until independent assessment of the data is performed.**

Response: The Navy stands by the data evaluation statement because the data validators used were experienced chemists who worked independent of the rest of the project team.

48. **Comment:** **Section 7.1.4.3. In spite of the fact that this ERA concludes there is a degree of risk to benthic organisms, the document should also acknowledge the possibility of relationship between demonstrated ecological risk from contamination and low benthic infaunal diversity. Instead, this document apparently concludes that the lack of diversity is evidence for nonrisk.**

Response: The Navy concurs, but it is our understanding that the draft Phase 1B ERA report (PRC 1996b, c, d) will not be finalized.

49. **Comment:** **Section 7.2. This section (p. 7-7 - 7-8) is simplistic and contradictory. Since this is largely a restatement of Sections 2 and 3 of Volume I, Part 1, we suggest deleting this section.**

Response: Please see response to EPA Specific Comment No. 34, Section 2.4 above.

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