RESPONSES TO COMMENTS ON THE DRAFT PARCELS E AND E-2 SHORELINE CHARACTERIZATION TECHNICAL MEMORANDUM, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA

This document presents the U.S. Department of the Navy's responses to comments from the regulatory agencies on the "Draft Parcels E and E-2 Shoreline Characterization Technical Memorandum, Hunters Point Shipyard, San Francisco, California" (hereafter referred to as the "Shoreline Tech Memo"), dated November 1, 2005. The comments addressed below were received from (1) the U.S. Environmental Protection Agency (EPA) on January 3, 2006; (2) the Department of Toxic Substances Control (DTSC), Human and Ecological Risk Division (HERD), on January 26, 2006; and (3) the San Francisco Bay Regional Water Quality Control Board (Water Board) on January 27, 2006.

RESPONSES TO COMMENTS FROM EPA

Overall Comment

1. Comment: We consider the analyses in this document as currently presented to be problematic because they do not incorporate information about Parcel F sedimentation rates. We believe that it is inappropriate to compare surface (0 to 0.2 foot depth) sediment results with the shoreline sample results because the 0 to 0.2 foot depth interval is primarily composed of recent sediments from the greater San Francisco Bay (i.e., Areas IX and X of Parcel F are a depositional environment).

Response: Evaluation of the sedimentation rates in the offshore area was not necessary to address the study questions developed for the shoreline standard data gaps investigation (SDGI). The first study question of the SDGI investigation was to evaluate whether contamination in the Parcels E and E-2 shoreline migrated, or has the potential to migrate, to sediments in adjacent Parcel F (offshore). The study question and therefore the field sampling design did not include an evaluation of what time period erosion occurred.

Comparing surface (0–to-0.2-foot depth interval) sediment results with shoreline sample results is appropriate for answering the study design question developed in the SDGI. While it is true that the South Basin is a net depositional area, the observed dispersal pattern of polychlorinated biphenyls (PCB) with higher concentrations nearshore and decreasing concentrations offshore is consistent with wave and tidally influenced sediment transport and the possible presence of an ongoing source of onshore contamination. Surface sediments can be resuspended and transported by waves or tidal currents and then redeposited in areas where current speeds are reduced. As in the case of the South Basin, this resuspension is infrequent and acts on the surficial sediments (1 to 5

centimeters). This results in deposition of cleaner background sediments which dilutes and buries the nearshore and offshore sediments. In other words, unlike terrestrial sites, the surface sediments are moving and dispersing. Therefore, the presence of a chemical concentration gradient suggests that the shoreline adjacent to those areas was a source of contamination and should not be discounted.

Consider that according to the Shoreline Tech Memo, erosion is not currently occurring from Parcels E and E-2.

Response: The Shoreline Tech Memo did not conclude that erosion is not currently occurring from Parcels E and E-2. The Shoreline Tech Memo concluded that, despite the shoreline's low potential for erosion, isolated areas along the shoreline can still erode and affect Parcel F (see Section 5.2.3 in the Shoreline Tech Memo). And, as stated in Section 6.0, Conclusions and Recommendations on page 24 "…contaminant distribution patterns in Parcel F are highly suggestive of contaminants originating from the shoreline along Area X of the South Basin."

Most of the erosion from Parcel E-2 probably occurred while the landfill was being filled in and before the rip rap was placed. Similarly, along the rest of the Parcels E and E-2 shoreline, most of the erosion probably occurred while the base was active (e.g., pre-1974) during fill placement and before shoreline protection was installed. The sedimentation rate analysis from the *Draft Technical Memorandum, Hunters Point Shipyard, Parcel F Feasibility Study Data Gaps Investigation* and aerial photographs could be used to estimate the appropriate depth at which contamination from on-shore erosion would likely be found; analytical results from samples collected from approximately this depth should then be compared to shoreline sample results.

Response: As noted by the reviewer, the Navy presented a comprehensive evaluation of sedimentation rates in the Draft Techncial Memorandum, Hunters Point Shipyard, Parcel F Feasibility Study Data Gaps (FSDG) Investigation (Battelle, Sea Engineering, Inc., and Neptune and Company 2005). The temporal evaluation of chemical sources of contamination to Parcel F presented in the FSDG report, is being used to develop remedial alternatives in the Parcel F FS, and to consider the likelihood of recontamination for each alternative.

In contrast, results of the Standard Data Gaps Investigation (SDGI) and the analysis presented in the Shoreline Tech Memo were used to assist the Navy in prioritizing source control removal actions along the shoreline (e.g., PCB Hot Spot removal action).

General Comments

1. **Comment:** **It is unclear why a single "shoreline remedial unit" was identified when Parcel E has been subdivided into Parcel E and E-2 and why a single screening level ecological risk assessment (SLERA) was done. Since Parcels E and E-2 are on separate schedules, it is assumed that each parcel will have a separate Feasibility Study (FS), Proposed Plan, and Record of Decision (ROD). Under the current Navy-proposed OUs [operable units], the shoreline should be divided into the Parcel E shoreline and the Parcel E-2 shoreline and separate SLERAs should be done for each piece.**

   Response: The entire shoreline is considered a potential source area for Parcel F (offshore) and the habitat along the entire shoreline warrants the shoreline being treated as one exposure unit. Dividing the shoreline into Parcels E and E-2 serves no functional purpose, and would reduce sample sizes below what is practicable for assessing risk.

2. **Comment:** **The evaluation of whether on-shore areas were a source to off-shore sediments needs additional thought. This evaluation is based on sediment samples collected from 0 to 0.2 feet below the sediment water interface, but most of the South Basin is a net depositional area (e.g., see Section 5.2.3). Since the digital elevation model indicated that erosion and transport from Parcels E and E-2 is minor compared to the sediment load from other parts of San Francisco Bay, the 0 to 0.2 foot depth interval, except in areas close to the shoreline where sediments are reworked, most likely represents Bay sediment that was deposited in this area and would not be representative of materials eroding from the shoreline or on-shore areas. Consider an alternative model: most of the erosion from Parcel E-2 probably occurred while the landfill was being filled in and before the rip rap was placed. Similarly, along the rest of the Parcels E and E-2 shoreline, most of the erosion probably occurred while the base was active (e.g., pre-1974) during fill placement and before shoreline protection was installed. Therefore, a comparison of surface and near-surface soil and sediment concentrations with subsurface sediment concentrations would be more meaningful. Part of this analysis should include an evaluation of depositional rates and the estimated period when the subsurface contamination could have been deposited; the *Technical Memorandum, Hunters Point Shipyard Parcel F Feasibility Study Data Gaps Investigation*, February 2005 (FS Data Gaps Tech Memo) included some of this information. Aerial photographs would also provide corroboration for placement of fill and rip rap in Parcels E and E-2. Sediment samples collected from the estimated depth could then be used for the correlation with shoreline samples. Please revise the approach to consider these alternatives and to include evaluation of deposition rates, estimated sediment age, and subsurface sediment concentrations.**

Response: The Navy agrees that it is likely that most of the erosion occurred during the creation of the Parcel E and E-2 shoreline**.** Please see the response to EPA Overall Comment 1.

3. Comment: The Draft Parcels E and E-2 Shoreline Characterization Technical Memorandum (the Tech Memo) lists four major source areas in several places (e.g., Section 1.3): the area bayward of the landfill sheet-pile wall, the black sand area, the kiln brick area, and the metal debris reef area. It is unclear why the metal slag area or the IR-03 Oil Ponds are not included in this list of major source areas, since they are identified as potential source areas in Appendix F. Please include both the metal slag area and the IR-03 oil ponds as potential major source areas of contamination, or explain why these areas are not considered major source areas.

Response: The four areas referenced by the reviewer were not cited as "major source areas" in the Tech Memo. The areas were cited as "suspected" or "potential" source areas and were identified during the development of the Sampling and Analysis Plan (SAP) for the SDGI (Tetra Tech 2002). The identification of these areas formed the basis of defining the biased sampling locations along the Parcel E and E-2 shoreline. The primary objective of the biased sampling design was to address the third study question: "Does contamination at suspected source areas along the shoreline pose an unacceptable risk to ecological receptors exposed to sediment at the shoreline area?" The identification of these four source areas were not the basis of defining potential major areas of contamination, as the reviewer suggests.

Areas identified as potential sources of contamination to Parcel F sediments were defined as the areas that sediment concentrations of copper, lead or PCBs exceeded San Francisco Bay ambient sediment concentrations. The evaluation considered any sampling location where copper, lead or PCBs were detected at concentrations above the ambient sediment concentrations as a potential source of contamination to the offshore sediments. The samples were collected every 100 feet along the entire Parcel E and E-2 shoreline and screened for copper, lead and PCBs.

The shoreline SDGI was developed as a result of the Draft Parcel F Validation Study (Battelle, Entrix, and Neptune and Company 2002). The validation study identified copper, lead and PCBs as the primary ecological risk drivers in the South Basin and hypothesized that metals and PCBs along the shoreline were a source of contamination to Parcel F sediments. Based on these results, the Navy decided to evaluate the shoreline as a potential source of copper, lead and PCB contamination to Parcel F.

Metals concentrations at most locations along the shoreline (including the metal slag area and IR-03 Former Oil Reclamation Ponds) exceeded ambient concentrations for San Francisco Bay sediments and therefore, these locations are considered to be a potential source of contamination to

Parcel F. Concentrations of copper exceeded the ambient sediment concentration in all areas except the Panhandle Area (excluding the metal slag area) and IR-02 Central. Concentrations of lead exceeded the ambient concentration in all areas except IR-02 Central. Concentrations of PCBs exceeded the ambient concentration in most locations of the Parcel E and E-2 shoreline. The highest concentrations of PCBs were found in the Landfill Area.

As stated in Section 5.1, page 15, "The highest concentrations of copper and PCBs were found in the landfill area, and the highest concentrations of lead were detected in samples collected from the Landfill Area and the metal slag area. These results suggest that these shoreline areas have the greatest potential for contaminating Parcel F sediments."

4. **Comment:** **The SLERA for benthic invertebrates focuses on the high-end of the risk range (effects range-median [ER-M]) without providing risk calculation for the low, conservative end of the risk range (effects range-low [ER-L]).**

Response: The reviewer is correct in recognizing that the toxicological benchmarks used in the Shoreline Tech Memo represented the high end of the risk range. The Shoreline Tech Memo is a supplemental document to both the Parcel E Ecological Risk Assessment (ERA) and the Parcel F Validation Study, and as such, does not conform to the conventions of a stand-alone screening-level ERA (SLERA) conducted as the initial step in a remedial investigation (RI). Sediment samples from the shoreline area were not included in the ERA conducted previously for Parcel E, and were evaluated as a separate unit in the Shoreline Tech Memo primarily for their role in contributing to offshore contamination. The effects range-median (ER-M) values were used to maintain consistency with the offshore evaluation of sediments in Parcel F.

Further, the SLERA emphasizes the risk estimates for birds and mammals that are based on the high toxicity reference value (TRV). U.S. EPA guidance directs that both a lower bound and an upper bound should be provided to establish the threshold for effects on assessment endpoints (Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. U.S. EPA Solid Waste and Emergency Response. June 1997). Keeping this in mind, please include an additional risk question for each bird and mammal assessment endpoint that evaluates the estimated ingested doses against the low Toxicity Reference Value (TRV). Similarly, please evaluate the exposure concentrations of chemicals in sediments against the ER-L for benthic invertebrates.

Both high and low toxicity reference values (TRV) were used to evaluate risk to birds and mammals, as shown in Section 4.0 of Appendix G. Doses exceeding the low TRV are considered to represent potential risk. Doses exceeding the high TRV are interpreted to indicate significant risk.

5. **Comment:** **Regarding the conclusions of the SLERA, the Navy states that certain areas do not pose significant risk. However, the EPC [exposure point concentrations] and the risk estimates do not appear to be area-specific. The transition from site-specific to area-specific risk assessment is not transparent and appears to come from Appendix F. Further, the preliminary remediation goals (PRGs) that are cited at the end of Appendix G are not consistent with those from the Parcel F document that are cited earlier in the SLERA. Please clarify the area-specific versus shoreline wide risk estimates in the SLERA and provide a transparent discussion of the methods used to estimate area-specific risks. Please also select a single set of PRGs, provide rationale for the selection, and use them consistently wherever PRGs are discussed in the SLERA.**

Response: The site-specific data used in the SLERA included the laboratory's chemical analysis of the sediment samples and the ecological surveys. For purposes of the SLERA, the entire shoreline (or area) was considered intertidal habitat.

The laboratory chemical analysis included sampling locations considered to be potential or known source areas. As a result, chemical concentrations from the laboratory analysis were expected to be "worst case" and the results of these samples for risk assessment purposes were applied to the entire shoreline area. As stated in Section 6.0, page 25, "Ecological risk to invertebrates, birds, and mammals in the shoreline warrants the evaluation of remedial alternatives for the intertidal sediments along the entire Parcels E and E-2 shoreline."

No Preliminary remediation goals (PRG) were cited in Appendix G. The Parcel F PRGs for copper, mercury and PCBs were presented in the Draft Parcel F Validation Study (Battelle, Entrix, and Neptune and Company 2002) and refined in the Final Parcel F Validation Study (Battelle, BBL, and Neptune and Company 2005).

Specific Comments

1. **Comment:** **<u>Section 1.3, Description of the Parcels E and E-2 Shoreline, Page 5</u>: The second bullet on this page describes the kiln brick area, but does not state why kiln bricks are of concern. Kiln bricks and incinerator debris are known to be contaminated with naturally occurring dioxins/furans and asbestos and may also contain natural occurring radioactive materials (NORM). In addition, although the text states that "kiln bricks were found in one small area of IR-02 Northwest, close to the black sand area described above," kiln bricks have been found all along the Parcel E Shoreline. Please expand this bullet by stating what contamination risks the kiln bricks may pose and provide an updated description of where kiln bricks have been found in Parcels E and E-2.**

Response: At the time of this field investigation, the SAP was based on the field observations, as described in Section 1.3 of the Shoreline Tech Memo. Subsequent to this investigation, kiln bricks were shown to be present at other areas along the Parcels E and E-2 shoreline.

Section 6.0, page 25 of the Shoreline Tech Memo states that "Ecological risk to invertebrates, birds, and mammals in the shoreline warrants the evaluation of remedial alternatives for the intertidal sediments along the entire Parcels E and E-2 shoreline."

Therefore, it should be noted that providing this additional, updated information will have no effect on the conclusions of the SLERA.

The Navy segregates and disposes of kiln bricks as per guidance from the Navy's Radiological Affairs Support Office.

2. Comment: **<u>Section 1.3.2, Geology of the Parcels E and E-2 Shoreline, Page 6:</u> The discussion of industrial waste disposal areas in Parcels E and E-2 is not complete. For example, a recent excavation along the shoreline just south of the former slough area uncovered a drum disposal area not characterized in this Tech Memo. Additionally, the disposal area in IR-04 and the Metal Slag Areas were not characterized. Please identify these areas and characterize the types of waste that may have been disposed of there.**

Response: As noted by the reviewer, a recent excavation along the shoreline south of the former slough uncovered a drum disposal area. This disposal area was found subsequent to the development of the Shoreline Tech Memo. This information will be incorporated in the Parcels E and E-2 RI/FS documents, and in the removal action closeout report.

3. Comment: **<u>Section 4.1.1, Systematic Sampling, Page 11:</u> Although the text states that step-out samples were collected, step-out samples were not always collected at the prescribed distance or direction from some of the locations with exceedances of copper, lead, and polychlorinated biphenyls (PCBs). For example, step-out samples were not collected in the vicinity of any of the panhandle samples (exceedances for copper) like IR01SH004, IR01SH005, IR01SH006, IR01SH007, IR01SH008, or IR01SH009. Please revise the text to state that step-out samples were not collected consistently and explain why these step-out samples were not collected consistently and explain why these step-out samples were not collected.**

Response: Step-out samples were not collected when two adjacent systematic samples had concentrations exceeding screening criteria (step seven of the DQOs). The locations discussed in the comment above were adjacent sampling locations; therefore, no step-out samples were collected and the entire area was considered a potential source area.

It should be noted that the Shoreline Tech Memo applied relatively conservative criteria for defining a "source area" by identifying any sampling location with concentrations exceeding San Francisco Bay sediment ambient values as a source area.

The text will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

4. Comment: **<u>Section 5.2.1, Metals and Total Aroclors, Page 16:</u> The first paragraph on page 16 indicates that there is "a strong positive correlation" between samples collected from the shoreline in IR-02 Northwest and offshore areas IX and X, but then states: "This co-occurrence could indicate that copper, lead, and PCBs in the offshore areas originated from the shoreline areas in IR-02 Northwest, although this is not considered likely"; however, there is no explanation for this apparent contradiction. Please expand this paragraph to explain why copper, lead, and PCBs are not likely to have originated from the shoreline areas in IR-02 Northwest or delete the quoted statement.**

Response: The first paragraph on page 16 of the Shoreline Tech Memo cited describes the most likely reason for the strong positive correlation is the high concentration of total organic carbon (TOC) in sediments at Areas IX and X. A high surface-to-volume ratio of fine-grained sediments and a high concentration of TOC would both contribute to higher concentrations of metals sorbed to sediments. The evaluation of metals and PCBs is discussed further in Appendix F, as stated in Section 5.2.1.

Section 5.2.1, page 16 states that "Another explanation is that the metals and PCBs co-occur in the offshore Areas IX and X because of the high concentrations of total organic carbon in sediments from these two areas. Area VIII has much lower concentrations of total organic carbon than Areas IX and X. (The relationship between total organic carbon, grain size, and contaminant load is discussed in Appendix F.) The positive correlation of metals and PCBs does not exist for samples collected in other areas of the Parcels E and E-2 shoreline or in offshore Area VIII.

5. Comment: **<u>Section 5.2.1, Metals and Total Aroclors, Page 16</u>: The fourth paragraph on page 16 states that concentrations of copper and lead in offshore sediments are significantly lower than in shoreline areas of Parcels E and E-2; however, Figure 7 shows that copper and lead concentrations in the Panhandle Area are similar to those in offshore Area X. Also, Figure 9 shows that copper and lead concentrations in IR-02 Central are similar to those in offshore Area IX.**

Response: The Navy acknowledges this comment and the text should refer to only Parcel E-2 (Landfill Area), the Metal Slag Area, and part of Installation Restoration (IR)-03 as having notably higher concentrations of metals than concentrations found in offshore sediments. The concentrations of metals in the Panhandle Area, IR-02 Central, and part of IR-03 are generally comparable to those in offshore sediments.

The text will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

In addition, sediments from 0 to 0.2 feet below the sediment-water interface most likely represent recent Bay sediments rather than erosion from Parcels E and E-2. Please revise the summary of box and whisker plots in Section 5.2.1 to more accurately reflect what the plots actually show. Please also revise the discussion about fine-grained materials in light of the refined analysis of the box and whisker plots and the influx of recent Bay sediments into this area.

Response: Please see the response to EPA Overall Comment 1. The statement as written in the text is correct regarding the nature of sorption and fine-grained sediments.

6. Comment: **<u>Section 5.2.4, Groundwater Pathway to Parcel F, Page 20</u>: The text concludes that if the groundwater pathway was transporting PCBs to sediments in the South Basin, PCBs would be expected to be found at higher concentrations with increasing depths, but the text does not specify the depth at which groundwater is believed to discharge. Since the maximum depth of core sampling appears to be about 1 meter (see the FS Data Gaps Tech Memo), it is possible that the depth at which groundwater discharge occurs was not sampled. Please specify the depth at which groundwater occurs, correlate this depth with the depths of PCB samples and revise the text as necessary.**

Response: Groundwater occurs in the A-aquifer adjacent to the South Basin. The A-aquifer is composed of artificial fill and bay sediments that overlie Bay Mud. Although variable, groundwater generally occurs at depths of 5 – 7 feet below ground surface near the shoreline. Groundwater moves horizontally above the bay mud and discharges to/mixes with the bay water at the sediment-bay water interface in response to tidal fluctuations. It may be reasonably assumed that less saline groundwater is present above deeper saltwater. Therefore, the sediment sample depths are adequate to evaluate the groundwater pathway.

The contaminant distribution of PCBs in the South Basin shows a peak of contamination at about 30 centimeters below the sediment mud line. This well-defined subsurface PCB concentration peak suggests that the *primary* release occurred over a specific period of time. The strongest evidence is

that the groundwater pathway is insignificant is the hydrophobic nature of PCBs and the subsequent very low concentration of PCBs in groundwater in comparison with the PCBs found in sediment, PCBs transported in groundwater is likely much less significant than PCBs carried via erosion.

7. Comment: **<u>Section 5.3, Evaluation of Study Question 3, Page 21</u>: The two spatial groups defined in this section do not include data from 0.5 to 2 feet below ground surface (ft bgs). It is unclear whether data were not available from any site for this depth range, or whether the spatial groups were defined with another rationale. Please revise the document to include data from 0.5 to 2 ft bgs if available, or explain the rationale for excluding these data. Please revise the parallel sections of Appendix G to be consistent with revisions to the main body of the report.**

Response: Data were not collected in the interval between 0.5 to 2.0 feet below ground surface (bgs). Exposure to subsurface sediment was considered so that any remedial decisions involving removing the top layers of sediment could be evaluated properly.

8. Comment: **<u>Section 5.3.2.2, Risk to Mammals, Page 23</u>: The exposure scenario for the house mouse burrowing to 2 ft bgs at the shoreline (which is likely influenced by tidal fluctuation) appears implausible without additional explanation. The house mouse is known to use buildings, debris, or vegetation for cover, rather than a burrow (CDFG, 1988 to 1990). The salt marsh harvest mouse (SMHM) also does not burrow (CDFG, 1988 to 1990) so the exposure scenario for the house mouse does not seem useful in assessing potential risk to this special status species, should suitable habitat be present. If the house mouse has been selected as a surrogate for burrowing omnivorous small mammals, please describe the mammals expected to be present in addition to the house mouse that do burrow. Please expand this section to provide additional rationale for the exposure scenarios assessed for the house mouse. Please revise the parallel sections of Appendix G to be consistent with revisions to the main body of the report.**

Response: The house mouse is not a burrower. However, this species was a surrogate for all terrestrial mammals potentially occurring in the shoreline habitat, as explained in Appendix G. The house mouse was the more frequently encountered mammal at the site. Additionally, the California ground squirrel may occur in the area. No suitable habitat exists for the salt marsh harvest mouse in Parcels E and E-2. Exposure to subsurface sediment was considered so that any remedial decisions involving removing the top layers of sediment could be evaluated properly.

9. Comment: **<u>Figure 3, Suspected Source Locations and Aerial Photograph:</u> The IR-03 Oil Ponds are not shown as a suspected source area. This area was capped within the past 10 years, but it may have served as a source area prior to the date when it was capped. In addition, it is unclear why the PCB Hot Spot area is not included as a suspected source area. Please include the IR-03 Oil Ponds and the PCB Hot Spot as suspected source locations on Figure 3.**

Response: Please see the response to EPA General Comment 3.

10. Comment: **<u>Figure 4, History of Shoreline Filling:</u> It is unlikely that extent of fill in the eastern portion of IR-01/21 was greater than it was in 1955 as shown on this figure. Please provide an explanation to justify this apparent discrepancy or correct the figure.**

Response: The figure was developed using aerial photographs and converting the 3-D image to the 2-D plane, as shown on the figure. There is an inherent location error in aerial photographs, which is confounded when geo-referencing the photograph.

It should be noted that the aerial photograph was included in the Tech Memo to illustrate the magnitude of the filling history over time and to complement the discussion pertaining to the geology of the Parcels E and E-2 shoreline (Section 1.3.2).

11. Comment: **<u>Figures 11 through 13:</u> Figures 11, 12, and 13 identify the metal Slag Area, PCB Hotspot Area, and the Metal Debris Reef as known areas of copper, lead and/or PCB contamination in soil that are currently being excavated. It is not clear why these figures do not also identify the area in IR-02 Northwest and Central that contains soil contaminated with copper, lead, and PCBs and is currently being excavated under a radiological removal action. Please also include the IR-02 Northwest and Central excavation area on these figures.**

Response: The Navy acknowledges the comment. Updated figures will be included in Parcels E and E-2 RI/FS.

12. Comment: **<u>Figure 12, Shoreline and Offshore Lead Results and Table 3, Comparison of Corrected Field Data to Screening Levels</u>: The figure indicates that the ER-M for lead (218 mg/kg [milligrams per kilogram]) was exceeded at IR03SH010; however, Table 3 indicates that it was not. In addition, there are numerous lead results that exceed the ER-M for lead (e.g., IR01SH003, IR02SH004, IR01SH006, IR01SH007, IR01SH008, IR01SH009). Please resolve these discrepancies and revise Figure 12 to depict all locations with lead results that exceed the ER-M.**

Response: Figure 12 and Table 3 will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

13. Comment: **<u>Figure 13, Shoreline and Offshore PCB Results</u>: Some symbols on this figure were not included in the legend. For example, the results for sample location IR01SH005 are depicted with a black dot (non-detect [<0.2]) inside a green dot (0.2 ppm [parts per million] < result < 1.0 ppm). Similarly, there is a black dot inside an orange dot (5.0 ppm < result < 50 ppm) on the shoreline adjacent to PCB Hotspot Area. Please define these symbols in the legend.**

Response: Figure 13 will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

14. Comment: **<u>Figure 13, Shoreline and Offshore PCB Results and Table 3, Comparison of Corrected Field Data to Screening Levels</u>: Some total Aroclor data presented on Figure 13 (e.g., IR01SH019, IR01SH022, IR03SH006) do not correlate with the results listed in Table 3. Please resolve these discrepancies.**

Response: Figure 13 will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

15. Comment: **<u>Figure 14, Drainage Patterns Along E and E-2 Shoreline and Section 5.2.3, Erosion and Overland Flow as a Transport Mechanism, Page 19</u>: The figure indicates that "fiber rolls, geotextile, and gravel or sand bags," exist in the former gully area, however, these storm water controls are not discussed in the text. The text states, "This gully was filled and regraded to prevent future transport of contaminants to the offshore." Please indicate in the text when the storm water controls identified in the figure were implemented. Also, please note that these controls are not currently present because the designated area is within the PCB Hot Spot Excavation Area.**

Response: The purpose of this section of the Shoreline Tech Memo was to provide the reader with a qualitative understanding of the current general erosion and overland flow patterns in this area. A description of the storm control and erosion control measures will be included in the Parcels E-2, and F FS reports.

16. Comment: **<u>Table 1, Sample Locations in Parcels E and E-2 Subareas and Table 2, Laboratory Data for Metals and Total Aroclors in Parcels E and E-2 Shoreline Samples Compared with Different Screening Criteria</u>: Table 1 indicates that IR03SH011 was analyzed in the laboratory; however, the lab results do not appear in Table 2. Please resolve this discrepancy.**

Response: Table 1 is correct. The laboratory only analyzed samples for total petroleum hydrocarbons (TPH) but did not analyze for metals and PCBs.

17. Comment: **<u>Table 3, Comparison of Field Data to Screening Levels and Appendix F, Section 2.2.1, Comparability of Immunoassay and Laboratory Data for Total Aroclors, Page F-4</u>: The text indicates that a correction factor was developed based on a linear regression analysis, but this resulted in negative data. Since PCB data cannot be negative, another approach is needed for low concentration data. Please revise the correction factor for low concentrations of PCBs so that there is no negative data.**

Response: The regression equation used to calibrate the rapid screening results for total PCBs had an r^2 of 0.94, a slope of 1.4649, and an intercept of -0.0626. Negative values for the laboratory-equivalent PCB concentrations are only possible when very low concentrations are reported for the rapid screening technique (i.e., less than 0.0427 mg/kg). This only affects a very small fraction of the rapid screening measurements, and has a negligible impact when the data are compared with screening levels. Constraining the regression model to ignore the intercept (that is, forcing the intercept to zero) would have eliminated this artifact, but this is not a recommended practice because the regression statistics (r^2, t-ratio for the slope) lose their usual meaning.

18. Comment: **<u>Appendix F, Section 3.1, Purpose of the Shoreline Investigation for Metals, Page F-7</u>: The text discusses three additional metals (chromium, nickel, and zinc) that were detected above ambient levels, but does not acknowledge that mercury was also detected above the ER-M in Area VIII. Please revise the text to include the detections of mercury above the ER-M in Area VIII.**

Response: Mercury was not detected at concentrations exceeding the ER-M value (0.71 mg/kg) in Area VIII. All concentrations were below the ER-M value in both surface and core samples from Area VIII, with mercury concentrations ranging from 0.055 to 0.292 mg/kg.

19. Comment: **<u>Appendix F, Section 3.1, Purpose of the Shoreline Investigation for Metals, Page F-8</u>: The text states that "both the scatter plots and trilinear diagrams contributed little to understanding the relationship between onshore sources and offshore contaminants," but the box and whisker plots were useful for identifying a relationship. Figure 7 in the Tech Memo shows that copper and lead concentrations in the Panhandle Area are similar to those in offshore Area X. Also, Figure 9 shows that copper and lead concentrations in IR-02 Central are similar to those in offshore Area IX. Please revise the text to discuss the use of the box and whisker plots to show correlations.**

Response: The statements as written in the text are accurate. Box and whisker plots provide a graphical comparison of the general relationships in the concentrations of sample populations, but do not show correlations between groups.

20. Comment: **<u>Appendix F, Section 3.3.1, Box and Whisker Plots, Pages F-12 and F-13 and Section 3.4.1, Shoreline Contributions of Metals to Sediments in Offshore Areas, Page F-15</u>: As discussed in the general comments, the comparison of shoreline results with off-shore results would be more meaningful if subsurface sediment samples were used. Since the comparison in the text is with surface sediments, which originated primarily as a recent contribution from San Francisco Bay, it is not surprising that there is not as much correlation as might be expected. Further, the lack of trends with depth is likely related to the limited amount of data that was collected at depth, but it is possible that onshore data may correlate with the mid-depth data. Please revise these analyses to compare shoreline concentrations with subsurface metal concentrations.**

Response: Please see the response to EPA Overall Comment 1 and EPA General Comment 2.

21. Comment: **<u>Appendix F, Section 3.3.2, Scatter Plots and Regression Analysis, Page F-13</u>: The text mentions a correlation between total Aroclors, copper, mercury, lead, and zinc, but does not associate this suite of analytes with antifouling paint. Copper, mercury and zinc were historic antifouling additives to paint, and lead and PCBs were common constituents of industrial paint, which was known to have been used by the Navy. Since this correlation is related to antifouling paint a correlation to aluminum or to percent fines. Please discuss the significance of the observed correlation with antifouling additives to paint. In addition, please revise Section 4.1 to include this information.**

Response: The Navy acknowledges that copper, mercury, and zinc were historic additives in antifouling paint, which is used below the waterline on marine vessels. Lead and PCBs are also constituents of paint used on naval vessels. Disposal of paint or paint chips is a possible source of this contamination.

22. Comment: **<u>Appendix F, Section 4.2, Recommendations, Pages F-18 and F-19 and Appendix G, Section 5.5, Conclusions and Recommendations (from Appendix F), Page G-51</u>: Some of the statements in this section are not accurate. For example, the text states that "approximately 75 percent of the samples for IR-02 Southeast and IR-03 contained concentrations of metals less than the ER-M values," but 50 percent of the samples from IR-02 Southeast exceeded the ER-M for copper and 29 percent of the samples from IR-02 Southeast exceeded the ER-M for lead. In addition, Appendix F only evaluated limited metals (e.g., the extent of mercury, and cadmium was not evaluated in most of the samples collected along the shoreline), so it is not appropriate to conclude that "the information collected for the characterization for the Parcels E and E-2 shoreline provides the basis for delineating the areas of greatest concern." It is possible that analysis of other metals would result in other areas of concern, since the laboratory data in Table 2 indicates that silver, cadmium, chromium, mercury, nickel, selenium, and zinc were also detected above the ER-M. Please revise the text to more accurately represent the data set and delete the statement that future investigations can focus on the areas identified here.**

Response: The statement in the text of the document is correct for copper and lead using laboratory and corrected field data (not just the data presented in Table 2) for all soil depths. Out of 79 samples (IR-02 Southeast and IR-03 combined), 20 samples (25 percent) exceeded the ER-M for copper and 20 (25 percent) exceeded the ER-M for lead.

Of the 24 samples shown in Table 2 for IR02-SE and IR03, 1 of 24 (4 percent) exceed the ERM for silver, 3 of 24 (12.5 percent) exceed the ERM for cadmium, 3 of 24 (12.5 percent) exceed the ERM for mercury, and 1 of 24 (4 percent) exceed the ERM for antimony. Nickel is a special case because the ambient value for sediment (112 mg/kg) is more than twice the ERM of 51.6 mg/kg. A total of 14 of 24 (58 percent) exceeded the ERM for nickel, but only 6 of 24 (25 percent) exceed the ambient value for nickel.

23. Comment: **<u>Appendix G, Section 2.1, General Approach to Screening-Level Evaluation, Page G-5</u>: The method used to calculate the 95 percent upper confidence limit (UCL) for surface and subsurface sediment samples appears to be incorrect. Current EPA guidance (EPA, 2002a) indicates that the Chebyshev inequality method (rather than the Land method) should be used for the sample sizes in this study; the guidance document states that the Land method can be**

impractical even for lognormal distributions when the sample size is less than 30. The Land method is recommended for lognormal distributions with low variance/skewness and sample size > 30, while the Chebyshev method is recommended for smaller sample sizes. Please revise Figures G-1 and G-2 to include the recommendations of the guidance document (specifically, the consideration of sample size in the selection of the appropriate UCL calculation method). Since the Parcel E SLERA and data should be separated from the Parcel E-2 SLERA and data (because the parcels will be subject to separate RODs), the number of samples for each depth range will be even lower than in the current SLERA. Please reevaluate the UCLs for all samples and, consequently, recalculate the ecological risk assessments for both benthic invertebrates and birds/mammals for each parcel. To determine the correct UCL calculation method, please refer to Exhibit 7 in EPA 2002a.

Response: EPA (2002b) provides general guidelines for selecting a method to calculate exposure point concentrations (EPC), and acknowledges that decisions should be made on a case-by-case basis in consultation with a statistician, using site knowledge and professional judgment. EPA (2002b) states "The ultimate responsibility for deciding how best to represent the concentration data for a site lies with the project team. Simply choosing a statistical method that yields a lower UCL is not always the best representation of the concentration data at a site." The title for Exhibit 7 cited by the reviewer states that the recommendations in this table address conditions that are likely to favor use of the MVUE Chebyshev inequality over Land's method. With certain configurations of the data (i.e., combinations of sample size and relative skewness), the MVUE Chebyshev estimates can actually be larger than the estimates provided by Land's method. However, using Land's method to calculate EPCs for lognormal distributions typically results in more conservative estimates for EPCs, so risk is overestimated. Therefore, reanalysis of the data using lower estimates for EPCs for the subset of constituents with lognormal distributions would only result in a reduction in the estimated risk. It is unlikely that this would appreciably affect the conclusions drawn from the risk assessment. However, future decisions or review of these results will acknowledge that the estimated risk for certain constituents may be lower than that reported in the Shoreline Tech Memo.

24. Comment: **Appendix G, Section 2.3, Identification of Complete Exposure Pathways and Generic Assessment Endpoints, Page G-6: Plants are not included as an assessment endpoint. Please consider including shoreline plants as an assessment endpoint, or include a brief explanation in Appendix G, Section 2.3, of why plants should not be considered as an assessment endpoint for this risk assessment.**

Response: The vegetation in the shoreline area is dominated by nonnative, ruderal plants. This area has been highly disturbed and does not contain any native plants of concern. The shoreline SLERA was an outgrowth of the Parcel E ERA, in which the agencies and Navy had agreed to focus the evaluation of risk on birds and mammals. The Navy included an evaluation of risk to benthic invertebrates because of their increased importance in the area near the bay relative to the rest of Parcel E. No such exception occurs for plants in this area.

25. Comment: **<u>Appendix G, Section 2.4.2, Selection of TRVs for Birds and Mammals, Pages G-8 and G-9</u>: The toxicity reference values (TRVs) used in this report are not the most recent TRVs recommended by the EPA Region IX Biological Technical Assistance Group (BTAG) (EPA, 2002b). For example, the report uses a low TRV for lead in mammals of 0.0015 mg-kg/day, while the most recent low TRV for lead in mammals is 1.0 mg-kg/day. Please revise the ecological risk assessment with the TRVs provided in EPA 2002b.**

Response: No risk to mammals from lead was shown using the lower TRV, so revising this value upward would cause no substantive change in the SLERA.

26. Comment: **<u>Appendix G, Section 3.0, Screening-Level Ecological Risk Assessment for Benthic Invertebrates, Pages G-10 and G-11</u>: Unlike the risk assessment on mammals, this section does not include a summary of the conceptual site model (CSM). Please expand the beginning of Section 3.0 with a discussion of the CSM as it applies to benthic invertebrates.**

Response: The conceptual site model for benthic invertebrates is straightforward—they are exposed directly to sediment—and standard sediment quality criteria were used in the evaluation.

27. Comment: **<u>Appendix G, Section 3.1.1, Benthic Invertebrates in Surface Sediments, Page G-11</u>: The first sentence of the last paragraph on page G-11 is unclear: "Detected organic chemicals for which no ER-M values were available were considered COPECs [contaminants of potential ecological concern] by default, but not COPECs for benthic invertebrates." Please clarify why these chemicals were not considered COPECs for benthic invertebrates (also, please note that this sentence occurs again on page G-12, as the first sentence in the fourth paragraph).**

Response: A COPEC is a "chemical of potential ecological concern" for a particular group of receptors, based on toxicological data. In the absence of toxicological data that support a screening value, the chemical cannot be said to be of concern for that group of receptors. The chemical remains on

a list of uncertainties, but is not specifically considered to pose a threat to any particular receptor group.

28. Comment: **<u>Appendix G, Section 5.5, Conclusions and Recommendations (from Appendix F), Page G-51</u>: It is unclear why conclusions from Appendix F should be considered relevant for the SLERA since Appendix F was not a risk assessment. Since the analysis in Appendix F compared concentrations of metals and PCBs in surface sediment that recently originated from San Francisco Bay with shoreline sample results, the conclusions from Appendix F should be used cautiously at best. In addition, the first sentence is not a conclusion from Appendix F and should be deleted. As noted in an earlier comment, the conclusion about concentrations of metals in IR-02 Southeast is incorrect. Please delete all of Section 5.5 or delete the first sentence in Section 5.5 and explain how the remainder of the information in this section is relevant for a SLERA.**

Response: Conclusions from Appendix F were included for supplemental information only.

The conclusions about metals in IR-02 Southeast and IR-03 (see EPA Specific Comment 22) are correct.

Minor Comments

1. Comment: **<u>Section 5.2.1, Metals and Total Aroclors, Page 16</u>: The second sentence of the third paragraph on page 16 is missing several words: "Therefore, only two examples of the trilinear diagrams are included in (see Figures F-32 and F-33)." Please revise this sentence.**

Response: The text will be revised to state "…in Appendix F (see Figures F-32 and F-33)." The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review. .

2. Comment: **<u>Figure 2</u>: Please show the location of the former Triple A Site 18 on Figure 2. Also, the pink dashed line shown as "Drainage Channel" in the figure legend is not shown on the figure; please add the drainage channel to the figure or remove the "Drainage Channel" note from the legend.**

Response: Comment acknowledged.

3. Comment: **<u>Figures 7-10</u>: Please add a line to the legend in these figures that describes the significance of the solid squares in the box and whisker plots.**

Response: The solid squares are also median values, but indicate data for samples of offshore sediment. This information will be added to the legend for use in future documents.

4. **Comment:** **<u>Appendix F, Section 2.3, Results of Data Evaluation for PCBs, Page F-5</u>: The text states that Aroclor-1254 was detected in 7 samples, but Table F-1 only indicates that this Aroclor was detected in 6 samples. Please resolve this discrepancy.**

Response: Table F-1 is correct. The table already includes the seven samples for Aroclor-1254, which is consistent with the text.

5. **Comment:** **<u>Appendix F, Attachment F-3, Figure F-3, Mercury</u>: It appears that the labels along the X-axis may be incorrect, since label DEEP_10 appears to the left of label MID_6_10. Please resolve this discrepancy.**

Response: This is an error in the placement of boxes showing data for mercury depth intervals DEEP_10 and MID6_10; however, the data shown are correct for each interval, as specified.

RESPONSES TO COMMENTS FROM DTSC HERD

General Comment

1. Comment: HERD agrees with the recommendation that assessment of terrestrial, intertidal, and subtidal chemical concentrations in soil and sediment indicate that remedial alternatives should be evaluated for intertidal sediments along the entire Parcel E and E-2 shoreline.

Response: Comment acknowledged.

Specific Comments

1. Comment: Areas identified as 'metal slag areas' are significant enough to be identified in maps and figures of Parcel E and E-2 (Figures 2 and 3) yet are not identified in the text (Section 1.3, page 4). Please include the 'metal slag areas' in the text description of major source areas or explain why the 'metal slag areas' are not a source significant enough to be listed in the text.

Response: Please see response to EPA General Comment 3. The metal slag area was included in the figures to show the areas in the panhandle area that are potential sources of contamination of copper and lead to Parcel F.

2. Comment: Zinc data from the X-ray fluorescence (XRF) analysis was not included in this investigation of shoreline patterns (Section 3.1, page 7). Please provide at least a minimal assessment of whether the areas of elevated zinc concentration agree with the areas of elevated copper and lead concentrations.

Response: The areas with elevated concentrations of copper and lead showed a generally similar pattern for zinc. This information will be incorporated in the Parcel E RI.

3. Comment: HERD agrees that the sediment PCB comparison concentration, for identification of nearshore areas with elevated PCB sediment concentrations, should be the San Francisco Regional Water Quality Control Board (SFRWQCB) nearshore ambient PCB concentration of 200 µg/kg (Section 3.1, page 8).

Response: Subsequent to the evaluation performed in the Shoreline Tech Memo, the sediment trap results from Parcel F indicated a potentially lower concentration of PCB-contaminated sediments entering the South Basin. This comment has no effect on the results of the Shoreline Tech Memo.

4. **Comment:** **The stated primary goal of the PCB congener analysis, to determine if contaminants in the offshore sediments are derived from shoreline sources (Section 5.2.2, page 17), is puzzling given the obvious PCB gradient from the area of the landfill and IR-02 northwest to Parcel F Area X (Battelle, 2005). Please clearly state whether the goal for the PCB evaluation is to attribute all the onshore PCB contribution to Parcel F to the intertidal Parcel E and E2 or rather determine whether intertidal PCB contribution to Parcel F exceeds onshore contribution.**

Response: The Navy agrees that contaminants in offshore sediments are derived from shoreline sources. The PCB congener analysis discussed in Section 5.2.2 was performed to identify whether a unique PCB signature or marker exists between the two locations. A unique PCB signature would indicate shoreline PCBs were the source of the offshore PCB contamination, regardless of the contamination gradient between the shoreline and offshore areas.

5. **Comment:** **The results of the inorganic element and PCB Aroclor and congener pattern analysis (Appendix F, Section 4.2, page F-19) "…provide the basis for delineating areas of the greatest concern". HERD does not agree that further analysis should concentrate solely on those 25 percent of the sample locations where the inorganic element concentrations exceed the NOAA ER-M concentrations as recommended. The remaining 75 percent of sample locations, less than the NOAA ER-M, should be further categorized as: 1) less than the NOAA ER-L; and, 2) greater than the NOAA ER-L, but less than the NOAA ER-M. Decisions regarding the area for further evaluation/investigation can then be made based on these summaries. Also, in addition to summarizing the PCB Aroclor concentrations greater than or less than 1.0 mg/kg, a comparison to the SFRWQCB nearshore ambient total PCB concentration of 200 µg/kg should also be provided.**

Response: The ER-M is 180 micrograms per kilogram (µg/kg) and the ambient value is 200 µg/kg. The ER-M was chosen as the ecological screening benchmark to be consistent with the approach taken in the ecological evaluation in Parcel F. Per Navy policy, chemical concentrations that fall below background are not investigated further.

6. **Comment:** **A subset of the sediment screening concentrations, including the National Oceanic and Atmospheric Administration (NOAA) Effects Range-Low (ER-L) and Effects Range-Median (ER-M) values were checked (Appendix G, Table G-4) and found to be numerically correct.**

Response: Comment acknowledged.

7. Comment: **There appears to be a typographic error in the discussion of the calculation of a sediment screening concentration for tributyltin (TBT) (Appendix G, Section 2.4.1, page G-8). The ending phrase of the penultimate sentence of the second paragraph should be the first portion of the last sentence to read: "Assuming 2 percent total organic carbon, this value is equivalent to 25.1 milligrams per kilogram (mg/kg) of tributyltin (dry weight) (EPA 1996)"**

Response: Comment acknowledged. The text will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

8. Comment: **The definition of the Biological Technical Assistance Group (BTAG) High Toxicity Reference Value (TRV_{high}) is incorrect (Section 2.4.2, page G-9). The TRV_{high} is not just "consistent with a LOAEL", but is defined as "The high TRV represents a level at which ecologically significant adverse effects are likely to occur." (EFA-WEST, Section 2.0, page 3, second paragraph). The important portion of the differing statements is that the TRV_{high} is considered representative of <u>significant</u> adverse effects, rather than representative of any observable adverse effect. Please amend the definition to include that these are <u>significant</u> adverse effects.**

Response: Comment acknowledged. The text will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

9. Comment: **There is a typographic error in the citation for the method used to estimate vertebrate ingestion rate (IR) (Appendix G, Section 4.2.3, page G-17). The citation should be Nagy, et al., 1999 rather than Nagy, et al., 2001 Further, the more recent body weight regressions should be used, and referenced, to estimate terrestrial IR. The detailed IR calculations for each species (e.g., Appendix G, Section 4.2.5.1, page G-18) indicate that the proper regression parameters (i.e., Nagy, et al., 2001) were used, therefore only the incorrect citation requires amendment.**

Response: Comment acknowledged. The text will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

10. Comment: **There is a typographic error in several tables (e.g., Table G-2 and G-3 and G-6) where the column heading 'sensored' occurs where 'censored' is the correct term. Please amend the column headings.**

Response: Comment acknowledged. The typographical error will be corrected. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

11. Comment: **Ingestion rates for the vertebrate receptors (Section 4.2.5, paged G-18 through G-27) which rely on body weight regression equations (e.g., surf scoter and willet) are based on estimates of required caloric intake. The total value estimated is required for normal metabolism and sediment intake should not be subtracted from the total intake rates estimated using these methods. While the difference will be arithmetically small, the total dose should be estimated as the intake of contaminants from total food ingestion (i.e., 100 percent of the Nagy, 2001 estimate) plus the intake of contaminants from sediment ingestion.**

Response: Comment acknowledged. However the Navy does not plan to issue another version of the Shoreline Tech Memo. Instead, relevant comments will be addressed in future RI and FS documents for Parcels E, E-2 and F.

12. Comment: **The table presenting the exposure parameters for calculating the willet dose (Section 4.2.5.2, page G-21) contains a typographic error in the comment section indicating that the ingestion rate for both prey items (IR_{macoma} and IR_{sbi}) are 98 percent of the total ingestion rate minus the sediment ingestion rate ($IR_{sediment}$). The $IR_{sediment}$ is, however, 3 percent and the prey ingestion rate values presented are calculated as 97 percent of the total ingestion rate. Please correct this typographic error.**

Response: Comment acknowledged. The table will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

13. Comment: **Various rounding errors (e.g., Table G-7, benzo(k)fluoranthene EPC) and references to cells containing no values (e.g., Table G-10, monobutyl tin HQ) in the spreadsheets should be corrected.**

Response: Comment acknowledged. The tables will be revised. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

14. Comment: **There appears to be an error in the Willet footnote 'd' (Table G-12) explaining the conversion from wet weight prey concentration to dry weight prey concentration using 1 percent water in the medium.**

Given the rest of the footnote, it would appear the number 1 should be removed from this portion of the footnote to indicate the percent moisture for each specific medium was used.

Response: Comment acknowledged. The footnote will be corrected. The revised Shoreline Tech Memo will be included as an appendix to the Parcel E RI. In addition, replacement pages to the Shoreline Tech Memo will be provided to the agencies when the Parcel E RI is released for review.

15. Comment: HERD agrees with the stated conclusions (Section 5.6, page G-51) that potential ecological hazards to benthic invertebrates, birds and mammals from several metals and PCBs in sediment in IR-02 Southeast and IR-03 cannot be ruled out.

Response: Comment acknowledged.

Conclusion

1. Comment: Based on the results presented in this technical memorandum, Human and Ecological Risk Division of DTSC agrees with the recommendations (Section 6.0, page 25) that:

1. **Source control measures are warranted along the Parcel E and E-2 shoreline; and,**
2. **Evaluation of remedial alternatives for intertidal sediments along the entire Parcel E and E-2 shoreline is appropriate based in estimates of ecological risk to invertebrates, birds and mammals.**

Response: Comment acknowledged. Interim source control measures have been implemented as removal actions. The feasibility studies for Parcels E, E-2, and F will address the need for remedial alternatives for intertidal sediment.

RESPONSES TO COMMENTS FROM WATER BOARD

General Comments

1. Comment **<u>Support of EPA Comments</u>: We support the January 3, 2006 comments provided by the United States Environmental Protection Agency on the Tech Memo, and expect that the Tech Memo will be revised to address their concerns.**

Response: Comment acknowledged. However, the Navy does not plan to issue another version of the Shoreline Tech Memo. Instead, relevant comments will be addressed in future RI and FS documents for Parcels E, E-2 and F.

2. Comment **<u>Integration of the Time Critical Removal Action (TCRA) Findings and Field Observations</u>: In light of the TCRA findings, field observations and reports, we cannot support the Tech Memo's finding that the groundwater pathway in Parcels E and E-2 is an unlikely contributor of metals and PCB contamination to offshore sediments and surface water.**

This statement is based on observations made during our visits to the TCRA sites, the nature and quantities of waste reported by the Navy for the TCRA sites, and the proximity of the waste to the shoreline and surface water. In the field we observed abundant buried metal debris and waste, evidence of free hydrocarbon product in soil, and hydrocarbon sheen/product on groundwater at locations where groundwater was exposed via excavation and potholing.

In summary, the PCB hot-spot and IR-02 TCRA findings serve to reinforce our view that contaminated groundwater has served as a contaminant source to Parcel F sediments and surface water.

Response: The Navy has evaluated the fate and transport mechanisms of contamination reaching Parcel F using multiple lines of evidence from data collected primarily during three field investigations summarized below. Additional details are explained more fully in the responses to the specific comments that follow.

Parcel F Validation Study. In 2001 the Navy undertook a field investigation in Parcel F as part of the Parcel F Validation Study. One objective of the Parcel F Validation study was to collect data regarding sediment characteristics and sediment dynamics to support the evaluation of remedial alternatives for Parcel F sediments. The report presented a preliminary conceptual site model (CSM) that identified suspected contaminant sources and transport mechanisms to Parcel F sediment. As described in the Validation Study "Contaminants from the landfill area may have been carried into the offshore area via erosion and transport of contaminated soils or fill material and groundwater discharge."(Battelle, BBL and Neptune and Company, 2005. pg 1-9). The validation study also

identified the former triple A drum storage area, metal debris and sandblast material as potential sources of contamination. The report recommended that the contamination in the shoreline in all areas should be evaluated and addressed as part of the Parcels B and E activities.

Standard Data Gaps Investigation (2002). In 2002, the Navy conducted the Parcel E standard data gaps investigation (SDGI) which included (1) an onshore and (2) a shoreline evaluation. The chemical results from the onshore and shoreline investigation subsequently led to the Navy performing the Time Critical Removal Actions (TCRA) at the PCB hot spot area and IR-02 (which are ongoing). The Shoreline Tech Memo documented the results of the shoreline portion of the investigation and built upon the previous work conducted during the Parcel F validation study to confirm and refine the CSM as developed in the validation study. The Tech memo concluded that the majority of the Parcels E and E-2 shoreline is a potential source of contamination and that the influx of metals from the shoreline to the offshore is likely from suspended materials transported into the bay by overland flow. The groundwater transport mechanism for copper, lead and PCBs was described as being limited by chemical and physical properties. The report also stated that while PCBs are more soluble in oils and organic solvents, the mobility of PCBs would be limited by the mobility of the free phase oils or solvents. It was suggested that the widespread distribution of PCBs in the shallow South Basin was not consistent with this transport mechanism.

As noted by the reviewer, field observations at the TCRA sites revealed the evidence of free hydrocarbon product in soil and sheen on groundwater in areas that groundwater was exposed. The full extent of contamination in the PCB hot spot area remains unknown. The close proximity of this removal action to the South Basin and the contamination in the offshore areas is evidence that this contamination served as a source of contamination to the offshore. The full extent of this area acting as an ongoing or historical source of contamination remains under evaluation and will be useful information for not only evaluating remedial alternatives but also for evaluating the potential for recontamination.

FS Data Gaps Investigation (2003). The Navy undertook a field investigation in Parcel F to collect data to support the development and evaluation of remedial alternatives for offshore sediments in the Parcel F FS.

The FS Data Gaps concluded that the most significant PCB releases in Area X appear to have coincided with periods when Parcel E-2 was being filled based on available information on sedimentation rates. This suggested that the fill material itself, or waste materials disposed with the fill, served as the primary sources of PCBs to South Basin. In addition, the report concluded that shoreline erosion and surface runoff from Parcel E-2 also probably transported contaminants to the basin. Groundwater discharge was evaluated as a potential transport pathway of PCBs to South Basin from Parcel E-2; however, the *magnitude* of PCB release via this

pathway is not likely to be significant given the limited extent of PCBs detected in groundwater and their extremely low solubility. The report also concluded that the lower surface sediment concentrations indicated that although the primary source of PCBs to the sediment has been reduced or controlled, some PCB sources appear to still be active. The FSDG report concluded that PCBs may have gradually migrated alongshore and offshore into South Basin from the mouth of the historical slough via sediment resuspension and transport.

In summary, these three investigations were implemented to support the development of a feasibility study for Parcel F. Identifying the major transport mechanisms of contaminants to the Parcel F sediments was important to evaluate the long-term effectiveness of remedial alternatives and to evaluate the potential of recontamination. According to Navy policy and EPA guidance, site managers should identify all direct and indirect continuing sources of significant contamination to sediments as early as possible and prior to the implementation of a remedial action (Navy 2002; EPA 2002a). This assessment should be followed by an evaluation of which continuing sources can be controlled. The Navy is currently addressing the major shoreline sources of contamination (identified in the SDGI) to Parcel F in the PCB hot spot area and IR-02.

Specific Comments

1. Comment

<u>Section 5.2.3, Erosion and Overland Flow as a Transport Mechanism</u>: We disagree with the conclusions drawn from the results of the erosion and overland flow model (the erosion potential model). We understand that the erosion potential model was based on recent (pre-2004 TCRA) topographic elevation data for Parcels E and E-2. We suspect that the ground surface erosion potential across Parcels E and E-2 were considerably different, and most-likely considerably higher, during the Shipyard's operational years (i.e., prior to the establishment of current site conditions, back in time when the landfill was active (including site tenants/lessees), prior to the establishment of a vegetated and graded landfill cap, installation and upkeep of storm water management and diversion controls, and placement of shoreline protection).

We believe that a more predictive erosion potential model for the site would incorporate a time-series of topographic maps/aerial photographs that capture the topographic evolution of the upland and shoreline reaches of Parcels E, E-2, and F.

Please:

a) Review the date of the topographic data input into your erosion potential model to verify if current topographic input data was indeed used in the model;

b) Evaluate running similar erosion potential models on a time-series set of topographic maps that are more representative of the

shoreline and upland conditions of Parcels E, E-2 and F over time (i.e., 1940's through present day); and,

c) Incorporate the findings of these models into the final version of the Tech Memo.

Response: The erosion potential model was used as a qualitative line of evidence to help prioritize the source control measures along the Parcels E and E-2 shoreline. Therefore, the intent was to evaluate the current erosion potential along the shoreline.

The Navy agrees that the ground surface erosion potential across Parcels E and E-2 was considerably different in years past. The Navy conducted an evaluation of the historical filling of the shoreline in a series of aerial photographs as noted by the reviewer in the FS Data Gaps Tech Memo (Battelle, Sea Engineering, Inc., and Neptune and Company 2005). This information was used in combination with the vertical core profiles in Parcel F and the radioisotope core data to better delineate how contamination in Parcel F occurred. This information is important for developing remedial alternatives in Parcel F and is also important when considering the potential for recontamination.

It is the Navy's intent to limit further erosion through the use of storm water BMPs at the removal action sites, and to address erosion as part of remedial alternatives evaluated in future FS reports.

2. Comment **<u>Groundwater Pathway to Parcel F Sediments</u>: We disagree with the conclusion reached in the Tech Memo that groundwater discharge is an unlikely contributor of metals and PCBs from Parcels E and E-2 to Parcel F. Our basis for disagreement centers on:**

1) The observations of waste, groundwater sheen, etc. described in General Comment No. 2. To paraphrase, it seems improbable, in light of the contamination unearthed during the TCRAs, and the proximity of the contaminated soil and groundwater to the shoreline, that historic sediment releases and groundwater discharge have not contaminated the Parcel F.

Response: Please refer to response to Water Board General Comment 2. As reported by the Navy in the FS Data Gaps Tech Memo (Battelle, Sea Engineering, Inc., and Neptune and Company 2005) the Navy agrees that historical sediment releases discharged and contaminated Parcel F. The relative contribution and magnitude of contamination transported by groundwater to Parcel F sediments remains under investigation while the TCRAs are completed.

2) Your finding, that states "… if the groundwater pathway were transporting PCBs to sediments in the South Basin, PCBs would be expected to be found at higher concentrations with increasing depth to be consistent with the groundwater flow path (Battelle, Neptune & Company, and Sea Engineering 2005)."

Response: Comment acknowledged.

3) The lack of inclusion of site specific groundwater data in the Tech Memo to lend support to the copper hydroxy carbonate and lead hydroxy carbonate hypotheses for copper and lead and the effects of Eh and pH on PCB transport; and,

Response: Data for groundwater samples from four near-shore wells in Parcel E-2 were reviewed for the Tech Memo, although these data were not included in the report. Concentrations of dissolved copper ranged from 1.7 to 4.2 micrograms per liter and concentrations of dissolved lead ranged from 0.9 to 9.3 micrograms per liter in samples collected from 1992 through 2004.

It is true that mercury has a generally more complex chemistry than copper or lead; however, the statement applied to copper and lead also applies to a number of trace metals that form cations and complex ions (excluding metals that form oxyanions). Many metals have limited solubility in oxidizing environments of near-neutral pH.

PCBs in groundwater will continue to monitored along the shoreline.

4) An apparent expansion of the copper and lead hydroxy hypothesis to include all metals, beyond copper and lead. The Tech Memo states, "groundwater in contact with contaminated soils at depth in Parcels El and E-2 is unlikely to contribute to metals contamination in offshore sediments."

Response: Data for pH measurements taken since 1996 in nearly 50 wells that lie within 400 feet of the shoreline in Parcels E and E-2 ranged from 6.32 to 8.89, with a median of 7.35. Although geochemical speciation models were not applied to the data, experience with similar situations, along with the data presented above, would argue that the assessment provided in the Tech Memo is indeed the likely scenario. In addition, because the adsorption edge for copper and lead is generally about pH 5, concentrations of dissolved metals will likely be less than those predicted using thermodynamic data (i.e., theoretical solubilities), due to adsorption of cations by aquifer materials. The data presented above support this contention. A more comprehensive evaluation of groundwater data for Parcels E and E-2 will be included in the Parcels E and E-2 RI/FS documents.

To facilitate this discussion with respect to Point 2 (above), I've attached an example of a hydrologic conceptual model for how groundwater may discharge to surface water along the Parcel E and E-2 shoreline. We believe that this model is applicable to the unconfined A-aquifer found in the E, E-2, and F study area. Although there are many conceptual models for how groundwater and saline surface waters interface, the concept of a "saline wedge" is common to most. The model is taken from the *Journal of Hydrology, July 2004, Interaction Between Shallow Groundwater, Saline Surface Water and*

Contaminant Discharge at a Seasonally and Tidally Forced Estuarine Boundary.

The model shows, that a saline wedge serves to under-ride the freshwater plume and deflect the freshwater discharge into the upper reaches of the unconfined aquifer. The dynamics of this model do not support the Tech Memo's line of reasoning that if the groundwater pathway were transporting PCBs to sediments, the PCBs would be found at higher concentrations with depth. Secondly, it is unclear whether there exist sufficient PCB-concentration with depth data to assess the PCB depth vs. concentration trends reported in Parcels E and E-2.

With respect to Point (3), we recommend adding a tabulation of site specific Eh, pH, and analytic groundwater data to lend support to your theory that groundwater in Parcels E and E-2 are unlikely to contribute copper and lead to Parcel F.

Lastly, with respect to Point (4), Section 5.2.4 the reader might interpret that the copper and lead hydroxy hypotheses have been expanded to include all <u>metals</u> (i.e., mercury, etc.) found in the soil and groundwater in Parcels E and E-2. As with Point 3, please amend the Tech Memo to include the relevant groundwater data collected in Parcels E and E-2 that supports your conclusion or amend the Tech Memo so that it is clear the theory only applies to lead and copper.

Response: The Navy acknowledges the hydrologic conceptual model and will incorporate the information in the Parcel E RI discussion of groundwater.

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