



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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ALAMEDA POINT  
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June 4, 2007

Mr. Thomas Macchiarella, Code 06CA. TM  
Department of the Navy  
Base Realignment and Closure  
Program Management Office West  
1455 Frazee Road, Suite 900  
San Diego, CA 92108-4310

**Re: Review of the Draft Final Feasibility Study Report IR Site 2, West Beach  
Landfill and Wetlands, Alameda Point, Alameda, California, April 2007**

Dear Mr. Macchiarella:

The U.S. Environmental Protection Agency (EPA) Region 9 has received the Draft Final Feasibility Study (FS) Report IR Site 2, West Beach Landfill and Wetlands, Alameda Point, Alameda, California, dated April 4, 2007. We have reviewed the aforementioned document and the Navy's responses to our December 1, 2006 review comments on the September 2006 Draft FS Report. Our comments are enclosed. We would appreciate it if the additional comments from EPA Office of Regional Counsel (ORC) on the Draft FS Report be addressed along with the enclosed comments on the Draft Final FS Report. These additional comments from EPA ORC were sent to you via email on April 24, 2007.

In addition, the issues that have been discussed during the teleconference call on May 31, 2007 between the regulatory agencies and the Navy are summarized in some of the enclosed general comments. We are looking forward to work with you on the response-to-comments prior to the revision of the next version of the FS.

If there are any questions, please feel free to contact me at (415) 972-3002.

Sincerely,

A handwritten signature in black ink, appearing to read "Xuan Mai", with a large, sweeping flourish on the left side.

Xuan-Mai Tran  
Remedial Project Manager  
Federal Facilities and Site Cleanup Branch

Enclosure

cc: Andrew Baughman, BRAC PMO, West  
Erich Simon, SFRWQCB  
Dot Lofstrom, DTSC Sacramento  
George Humphreys, RAB Co-Chair  
Peter Russell, Russell Resources, Inc.  
Suzette Leith, EPA  
John Chesnutt, EPA

**Review of the Response to Comments on the Draft Feasibility Study Report,  
IR Site 2, West Beach Landfill and Wetlands; and the Draft Final  
Feasibility Study Report, IR Site 2, West Beach Landfill and Wetlands,  
Alameda Point, California, April 2007**

**General Comments**

1. The text describing the soil cover and engineered cap alternatives in the Draft Final Feasibility Study Report, IR Site 2, West Beach Landfill and Wetlands (the FS Report) indicates that locally-dredged materials could be used as soil cover or as fill in a cap, but many areas in San Francisco Bay have high levels of metals, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), pesticides, and other organic compounds, which could leach into groundwater if used as soil cover or capping materials. Please revise the text to indicate that only clean dredged materials can be used as soil cover or capping materials.
2. The multilayer soil cover thickness and construction need to be justified. Please revise the text to provide the justification to support the decision.
3. The approach used in the Groundwater Quality Evaluation (GQE) is based on a simplistic conceptual model of dissolved phase contaminant transport and does not consider facilitated transport by organics and colloids, the transport of specific metals present above California Toxics Rule (CTR) criteria, the seasonality of groundwater data, and the physical complexity of IR Site 2. Since there were many unknown factors that associated with the groundwater modeling, the regulatory agencies requested guard wells to be installed on the perimeter of IR Site 2 to monitor the migration of the contaminants into the San Francisco Bay to address the concern of the metals contamination. Please revise the FS to include guard wells as a component of the groundwater alternatives. The decision on the number, the locations, and the spacing of the guard wells must be approved by the RWQCB.
4. The Groundwater Quality Evaluation (GQE) lacks of information to support monitored natural attenuation (MNA). Please revise the FS to acknowledge that MNA is not appropriate without further evaluation.
5. The soil cover, capping, and excavation remedies do not include all areas with waste and with unacceptable risk. This is acknowledged to some extent in the text, but it is unclear why the Navy considers it acceptable to leave areas with unacceptable risk unaddressed. Averaging the risk is not acceptable. Please revise the FS to include the rationale for not including all areas with waste and with unacceptable risk or include these areas in the remedies.
6. The FS Report does not acknowledge the use of spent sandblast abrasive to construct roads and berms at IR Site. Since spent sandblast abrasive contains soluble forms of metals added to anti-fouling bottom paint, including arsenic, copper, mercury, and/or zinc; and many of the monitoring wells are located near or on these roads and berms, it is

likely that some of the elevated concentrations of these metals in groundwater are due to the disposal of and use of spent sandblast abrasive at IR Site 2. Please revise the FS Report to include this information.

### Specific Comments

1. **Section G1.3, Attenuation Analysis, Pages G-3 and G-4:** Since TDS values associated with samples collected from the same well may vary seasonally (i.e., if samples were collected after periods of significant precipitation) and may also depend on when sampling was done during the tidal cycle, it is not clear that averaging TDS values is appropriate. Please evaluate whether there are seasonal or tidal cycle variations in the TDS values for each well. If such variations are found, provide a justification for the use of average TDS values.
2. **Section G.1.4, Comparison to Most Current Groundwater Conditions:** An analysis of the number of times that a parameter exceeded its CTR criterion compared to the number of analyses for that parameter would be more useful than this comparison to the most current groundwater conditions, since it is not known whether the current samples were collected at the same tidal stage as the historic samples. Please revise the GQE to include the number of times each parameter exceeded its CTR criterion and the number of analyses for that parameter in each well.
3. **Section G1.5.1, Contaminant Trend Analysis, Page G-7:** The contaminant trend analysis should not exclude contaminants of concern based solely on recent low concentrations. The text indicates that the groundwater trend analysis excludes “any monitoring well/contaminant pairing where the most recently available data ... indicate no exceedence of CTR levels or an attenuation-corrected concentration below CTR thresholds, as this more recent data confirms a lack of surface water impact potential,” but this presumes the underlying assumption that groundwater samples were collected at the same tidal stage and that there are no seasonal variations. Since these assumptions should not be made without justification, trend analyses should be presented for each contaminant that exceeds its CTR criterion in each well. Please include trend analyses for each contaminant detected above its CTR criterion in each well.
4. **Section G1.5.1.1, FWBZ and Section G1.5.1.2, SWBZ:** Conclusions should not be drawn that maximum concentrations are anomalous or that concentrations are “sporadically elevated” without considering whether samples were collected at the same tidal stage or whether there are seasonal variations. Several of the graphs provided appear to indicate that there are seasonal variations (e.g., M017A Copper, M018A Dieldrin, M037A 4,4'-DDD). Please include an evaluation of whether samples were collected at the same tidal stage and whether there are seasonal variations in the trend analysis or delete statements that maximum concentrations are “anomalous” or that concentrations are “sporadically elevated” from the text.

In addition, some paragraphs include a comparison of the maximum concentration with the CTR values and others do not; the text should be revised to consistently present this

comparison. Also, attenuation-corrected values are not appropriate for wells in the TIZ; the graphs for wells in the TIZ should be revised to exclude attenuation-corrected values. Finally, the associated graphs do not include a legend; while it is assumed that the lower values represent the attenuation-corrected values, this should be clearly indicated on the figures. Please make these changes.

5. **Section G.1.9.6, Groundwater Concentrations and Constituent Fate and Transport, Page G-15:** There is no support for the statement that “the CTR values are generally extremely conservative.” CTR values were developed to be protective of human health and the environment, specifically aquatic life. Please delete the quoted statement from the text.
6. **Section G.1.9.7, Wetland Pond Surface Water Concentrations and Toxicity, Page G-17:** The text concludes that based on the observation that there were very few contaminants in pond surface water, “the unimpeded discharge of IR Site 2 groundwater to a surface water body” would result in low contaminant concentrations and “no increased potential for toxicity,” but there is no justification for this conclusion and it is not clear whether pond samples were collected at times when contaminant concentrations from discharge of groundwater were likely to be highest (e.g., during slack tide in the North Pond). Please clarify whether pond water samples were collected at times when contaminant concentrations from discharge of groundwater were likely to be highest and provide justification for the conclusions reached in this section.
7. **Section G.1.9.8, Mixing, Page G-17:** The primary issue is not mixing and whether it occurs, but mass loading and the discharge of contaminants like copper and mercury that are problematic in San Francisco Bay. Please revise the GQE to include an evaluation of mass loading to the Bay for constituents that exceed CTR criteria.
8. **Section G1.10.1, United States Environmental Protection Agency Guidance, Page G-19:** Since contaminated groundwater is discharged from Site 2 to the Bay (i.e., contamination impacts surface water, not Class III groundwater), it is not appropriate to recommend monitored natural attenuation (MNA) over active remediation. Since mass loading to the Bay has not been calculated and the evaluation presented in the GQE does not exclude wells in the TIZ from attenuation calculations or consider whether analytical data that was likely collected at different tidal stages is representative, it cannot be concluded that “the potential for IR Site 2 groundwater to impact surface water in the San Francisco Bay in a detrimental manner is negligible for a number of reasons.” Therefore, the statement that “active groundwater remediation at IR Site 2 is not warranted is fully substantiated,” is inaccurate. Please revise the text of the second paragraph to acknowledge the impact to surface water and delete the quoted statements.
9. **Section G1.10.1, United States Environmental Protection Agency Guidance, Page G-20:** It is not sufficient to consider MNA without also considering whether it is appropriate for the contaminants of concern (i.e., contaminants detected above CTR criteria) in the TIZ. MNA is not appropriate for metals, PCBs, and pesticides that are detected above CTR criteria in the TIZ because only dilution, rather than dilution and

degradation, would occur. Also, the fact that Site 2 groundwater discharges to surface water has not been considered. Further, a full containment remedy (like that implied in the last paragraph on page G-20) that would include slurry walls to contain the waste and groundwater has not been proposed. Therefore, the conclusions reached in this section, namely that an MNA groundwater remedy would be reasonable are not supported. Please revise the FS Report to discuss conditions under which MNA is not appropriate, including those listed above.

10. **Table G-2, Attenuation Factors for Individual Monitoring Wells at IR Site 2:** The footnote indicate that TDS values for the wells closest to temporary well or hydropunch locations were used, but the well identifiers of those wells have not been included in the table. Please revise this table to specify the well that was used for each temporary well or hydropunch location.

### Minor Comments

1. **Table 2-18:** The blue shading used in this table did not copy well, rendering portions of this table ambiguous. Please change the color or use a darker shade of blue and ensure that tables and figures supplied for the Final FS Report depict all necessary information.
2. **Section G1.8, Polychlorinated Biphenyls, Page G-12:** Section G1.8 states that, "PCBs have not been detected in any SWBZ permanent monitoring wells during any monitoring event." However, Section G1.1.1 (Basewide Groundwater Monitoring Program) states that SWBZ wells were not analyzed for PCBs. Please revise the FS Report to clarify this discrepancy.

### Comments on the Responses to Comments

Only the responses that do not appear adequate or which require further action are addressed below.

**Response to General Comment (GC) 2, Specific Comment (SC) 37 and Appendix G, Groundwater Quality Evaluation:** The response and modified text do not support the conclusion that active groundwater remediation is not necessary at IR Site 2. In addition, the response and modified text do not sufficiently address the issue of metals and PCBs above the CTR levels or how these constituents are poorly or not readily amenable to natural degradation.

According to Section G1.3 of the FS Report, an evaluation of salinity ratios in groundwater monitoring wells was utilized to estimate the likelihood of attenuation in an aquifer prior to discharge to surface water, but salinity data was not available for the IR Site 2 groundwater. As such, the FS Report utilizes TDS data as the geochemical characteristics are "generally characterized by a direct relationship." However, groundwater samples collected from hydropunch sampling locations during the Remedial Investigation (RI) were not analyzed for TDS. As a result, the FS Report utilized the closest permanent groundwater monitoring well. Thus, the factor of attenuation and attenuation-corrected constituents of potential concern

(COPC) concentrations may be based on permanent groundwater monitoring well results as much as 800 feet away from the hydropunch sampling location (e.g., HYP5 and MW36L). It is unclear how an attenuation analysis can be based upon data from wells located more than 100 feet from a hydropunch location, since salinity and TDS likely vary significantly over short distances. Further, since distance is required for attenuation to occur, attenuation factors should not be applied to wells within the tidal mixing zone or in proximity to the shoreline of a pond; in these areas, an attenuation factor should not be calculated. Finally, the timeframe for attenuation is unclear. Please revise the FS Report to provide an attenuation analysis that is based on properties of the actual groundwater samples collected rather than properties associated with a subset of the collected groundwater samples. In addition, please use 1 as the attenuation factor for all locations in the tidal mixing zone or within 100 feet of a pond and discuss the timeframe for natural attenuation.

The *Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites* (1988) raises the question, “Will natural attenuation result in contaminant levels below health-based or environmental-based levels at all wells?” According to Tables G-3 (Calculated Shoreline Concentrations for COPCs in FWBZ Groundwater) and G-4 (Calculated Shoreline Concentrations for COPCs in SWBZ Groundwater), metals and PCBs were detected above CTR levels in monitoring wells and hydropunch sampling locations at IR Site 2. It is unclear how metals and PCBs, constituents above CTR levels and poorly or not readily amenable to natural degradation, will be addressed by MNA. It is also unclear if natural degradation will occur in any type of reasonable time frame. Further, since the Record of Decision for IR Site 28 requires achieving remedial goals for metals in groundwater so that metals-contaminated groundwater is not discharged to the Oakland Inner Harbor, IR Site 2 will likely be subject to similar requirements. Please revise the FS Report to state that MNA is not appropriate for metals and PCBs or explain why MNA was considered appropriate for metals and PCBs and provide evidence to support this discussion. In addition, please revise the FS Report to provide a suitable remedy for groundwater which will address metal and PCB concentrations above CTR levels.

**Response to GC 3:** The response partially addresses the comment. Graphics in Appendix G of the FS Report depict the locations of monitoring wells and hydropunch sampling locations at IR Site 2. Attenuation-corrected groundwater contaminant concentrations have also been provided on the graphics. However, MNA does not address the issue of metals and PCBs detected above CTR levels in groundwater at IR Site 2, particularly when concentrations in the tidal mixing zone are already above the CTRs. Therefore, the graphics do not accurately represent the groundwater contaminant concentrations at IR Site 2 that exceed CTR levels. Please revise the graphics to more accurately present data above CTRs and do not apply an attenuation factor to wells located in the tidal mixing zone.

The response also states that, “Mechanisms active in the immediate mixing zone of San Francisco Bay are real and highly important in the ultimate potential for groundwater from IR Site 2 to impact surface water,” but, the response also states that the Navy’s longstanding position is that “CTR values apply to surface water and not to groundwater even if in communication with surface water.” It is unclear why CTR values are not used for groundwater in the tidal mixing zone as is being done at other Navy facilities. Please revise the FS Report to discuss the groundwater contaminant concentrations at the near-shore monitoring wells and

hydropunch sampling locations that exceed CTR levels. In addition, provide a suitable remedy for groundwater which will address groundwater contaminant concentrations above CTR levels.

**Response to GC 4:** The response does not address the comment. As mentioned in the Evaluation of Response to GC 2, the updated groundwater quality evaluation in Appendix G of the FS Report continues to rely on attenuation factors calculated for TDS ratios. While TDS values can be utilized for a rough first order approximate, it is not meant as a definite analysis. As such, a convincing argument that groundwater at IR Site 2 poses no risk has not been presented in Appendix G. In addition, the updated groundwater quality evaluation does not discuss where exceedences occur or if the contaminants are migrating. Please revise Appendix G to specify where exceedences occur and whether the contaminants are migrating.

The response regarding the detection limits for PCBs and pesticides partially addresses the comment. It provides information regarding the lower detection limits for PCBs and pesticides for samples from the monitoring wells than hydropunch sampling locations. However, the response also states that, “Both sets of detection limits are suitable to have resolved significant contaminant impacts in groundwater and the potential for impacts to San Francisco Bay and completed thorough risk assessments, and both generally afford the sample degree of comparability to the exceedingly low CTR values for certain organic constituents,” but it is unclear what this means (i.e., how the detection limits are suitable to have resolved significant contaminant impacts in groundwater and the potential for impacts to San Francisco Bay). Please revise the FS Report to provide a suitable remedy for groundwater supported by a detailed and concrete analysis. In addition, please clarify how the detection limits are suitable to have resolved significant contaminant impacts in groundwater and the potential for impacts to San Francisco Bay.

**Response to GC 5:** The response appears to contain some contradictions. While the site-specific bioassays conducted using IR Site 2 pond surface water and sediment may demonstrate the lack of site-toxicity and bioaccumulation potential, the site-toxicity, bioaccumulation, and concentrations of contaminants related to groundwater at IR Site 2 have not been addressed. According to the response, “The concentrations of contaminants in groundwater at IR Site 2 are consistently very low and do not suggest the presence of a significant ongoing source.” This statement appears to be contradicted by the numerous exceedences of CTR levels for metals, pesticides, and PCBs in groundwater. In addition, volatile organic compounds (VOCs) exceed MCLs in some cases. Further, it is unclear why the comment states that there is “a low potential for mixing/dilution” in the ponds, when the northern pond is in communication with San Francisco Bay and water levels change with the tides; this implies a high level of mixing. Please explain these contradictions.

It is also unclear why an estimate of actual recharge on the landfill site has not been provided or referenced in the response and modified text. Please revise the FS Report to address the potential of site-toxicity and bioaccumulation related to groundwater. In addition, please provide an estimate of actual recharge on the landfill site.

**Response to GC 6:** The justification provided in the response for not needing to complete a site-specific risk assessment for the interior margin and the former radioactive waste storage

shack should be clearly documented in the FS Report. Please revise the FS Report to include this information.

**Responses to GC 6, SC 1, SC 24, SC 26, and SC 33:** The responses partially address the comments. The FS Report includes revised extent of the remediation footprints that include a portion of the interior margin in the northeastern portion of the site. However, the remediation footprint has not been extended to include the former radiological storage shack area or the northern interior margin and it is not clear that the extension in the northeast includes all of the former drum disposal area or the area north of the berm where PCBs were allegedly used to control dust. Further, none of the remediation footprints include the oil pit northwest of the North Pond or the metals disposal area south of the South Pond (see Figure 2-12), where metal and other debris is visible on the surface during seasons when the vegetation is short; at a minimum, to minimize the hazard associated with debris on the surface, debris should be removed from this area and consolidated under the soil cover or cap. Although a time critical removal action (TCRA) has been proposed in Soil Alternatives 4 and 5 for the former radiological storage shack area, the northern interior margin has not been addressed in any soil alternative. In addition, the former radiological storage shack area and northern interior margin are not addressed in Soil Alternatives 2, 3, or 6. Each cover, cap, and excavation alternative should address all areas, including the radiological waste/PCB area, the area where PCBs were used to control dust north of the berm, the chemical drum area in the northeast, the oil pit northwest of the North Pond, and the metals disposal area south of the South Pond.

The response to SC 1 states that, “Throughout both the RI and FS Report, it is clearly acknowledged that subsurface waste is present in portions of the interior margin.” As such, the risk associated with the former radiological storage shack area and northern interior margin have not been thoroughly addressed. Please revise the FS Report to incorporate the former radiological storage shack area and northern interior margin into the remediation footprint or provide a site specific risk assessment and justification for excluding the former radiological storage area and northern interior margin. Also, please extend the remediation footprint to include the entire drum disposal area in the northeastern portion of the interior margin.

In addition, Soil Alternative 6, which specifies complete removal of wastes, does not include the radiological waste and PCB-impacted soil in the TCRA area, the full extent of the drum disposal area in the northeast, the area where PCBs were used to control dust north of the berm, the oil pit northwest of the North Pond the metal debris area, or the debris along the edges of the ponds (i.e., the engineered cap in Figure 5-4 extends further than the proposed area of excavation on Figure 5-5) and beneath the interior margin of the North Pond (see Site History, paragraph carrying over from page 2-1 to page 2-2 ) in the excavation footprint. Therefore, this alternative does not truly propose complete removal of wastes. Complete removal of wastes should be proposed and costed in this alternative or the description and title of the alternative should be revised to reflect the partial removal of wastes that is currently proposed. Please revise the footprint of Soil Alternative 6 to include all areas with known waste, including the radiological wastes/TCRA area, the PCB-contaminated soil, all drum disposal areas, the metal debris area, and debris extending to and into the North and South Ponds. Excavation of near-shore wastes beneath the North Pond can be implemented if excavation is done at low tide and a silt curtain is

used, so this should also be included. Also, please revise the cost estimate as necessary to account for the additional volume of wastes.

**Response to GC 8:** The response partially addresses the comment. While the response revisits the information and quantity of waste within the landfill berm area described in Section 5.2.1.6 (Soil Alternative 6), additional clarification on the known or presumed distribution of waste material at IR Site 2 has not been found in Section 2.2 (Site History), as stated in the response. In addition, the response and Sections 2.2 and 5.2.1.6 do not address the quantity of waste located in the interior margin. It is also important to note that Soil Alternative 6 does not provide a remedy to address waste found in the northern interior margin. Please revise the FS Report to provide additional clarification on the known or presumed distribution of waste material at IR Site 2 including the interior margin.

**Response to GC 9:** The response partially addresses the comment. The modified text found in Section 5.0 of the FS Report does not provide an adequate discussion regarding whether landfill gas is currently being produced or will necessitate a landfill gas venting system based on the selected soil remedy. The modified text states that, "Placement of a soil cover over existing landfill waste at IR Site 2 would potentially necessitate a landfill gas venting system if it were to result in a buildup of vapors in any location or if any non-residential structures were erected to support future land use (e.g., an office for site workers or a visitor center). Such a system would be evaluated during the detailed design stage and constructed if necessary." It is unclear how a buildup of vapors in any location will be detected at IR Site 2. It is also unclear how an evaluation of remedial alternatives and cost analysis can be completed without a detailed evaluation of landfill gas and the potential necessity for a landfill gas venting system. In addition, based on a review of Appendix D (Remedial Alternative Cost Estimates), it does not appear that a landfill gas venting system was included in the cost estimates for Soil Alternatives 2 or 3. Please revise the FS Report to include a detailed evaluation of landfill gas and the potential necessity for a landfill gas venting system. In addition, please revise Appendix D and the cost analysis to reflect the potential necessity for a landfill gas venting system.

**Response to SC 4:** The response does not address the comment. Section 2.3.8 is titled "Potential Sources of Contamination," so it is unclear why the subsection specifically summarizes only the potential *discrete* waste disposal areas that are shown on Figure 2-12 (Approximate Locations of Waste Disposal Areas Identified during the IAS) and not the tear gas powder, mercury, and oil/water separator sludge/grit mentioned as potential sources in Section 2.2 (Site History) of the FS Report. It is better to include a comprehensive list of wastes and disposal areas in one section, rather than to break this information up. Please revise Section 2.3.8 to include a comprehensive list of potential sources of contamination including those mentioned in Section 2.2 or rename the section to clarify this discrepancy.

**Response to SC 5:** The response does not address the comment. It states that, "The FS Report summarizes necessary background information and existing site data, but the purpose of the document is not to repeat the detailed information provided either historically or in the RI Report." The FS Report provides a thorough summary of historical investigations; however, an adequate discussion of existing site data has not been provided. Since the RI/FS Guidance indicates that the nature and extent of contamination should be summarized, a summary of the

nature and extent of contamination should be included in the FS Report. While it is understood that detailed investigation results are found in the RI Report, a brief discussion of the investigation results from each environmental investigation should be included to support the proposed alternatives; in part, this summary may also help readers understand the purpose of subsequent investigations.

For example, Section 2.4.3.2 (Sediment Investigations) states that, “During SWAT Phases 5 and 6 (1991), a total of 13 sediment samples were collected from the wetland ponds. PRC collected an additional 20 sediment samples from the wetland ponds in 1993. In 1996 and 1997, sediment samples also were collected by PRC during a follow-up ecological assessment investigation. In all, 39 sediment samples have been collected for the wetland ponds at IR Site 2.” It is unclear how this information summarizes the existing site data as it does not discuss the results of the investigations, specify the results that warranted the subsequent investigations, or discuss the reason the list of analytical parameters changed with each sampling event.

Without a summary of the nature and extent of contamination in the text, it is unclear how the goal stated in the response of summarizing “necessary background information and existing site data,” has been met. In addition, it is unclear why the text discusses sampling in detail when this information is summarized in a table. Please revise the text to include a brief discussion of the investigation results from each environmental investigation and remove information that has been provided in the tables and figures (i.e., list of parameters, number of samples, generalized sampling locations).

**Response to SC 6:** Similarly, it is unclear why the response states that, “The Navy believes the FS Report provides a suitable amount of information pertaining to the general nature and extent of contamination at IR Site 2, and that informed risk management decision can be made,” when a summary of the nature and extent of contamination (i.e., contaminant concentrations and locations of significantly elevated concentrations) has not been provided. While it is understood that details regarding the nature and extent of contamination are found in the RI Report, a brief discussion of the contaminant concentrations and locations of significantly elevated concentrations should be included to summarize the RI Report findings and support the site risk management decisions and scope of the alternatives. Please revise the FS Report to include a brief discussion of the contaminant concentrations and locations of significantly elevated concentrations.

It is understood that figures and contaminant bubble plots are provided in the RI Report. As a compromise to the request for their inclusion in the FS Report, please revise the text to reference specific figures and bubble plots in the RI Report that support the RI Report findings and site risk management decisions and include these figures on a CD that is included with the FS Report as an appendix.

**Response to SC 7:** The response does not address the concern raised in EPA’s original comment. The response states that, “available information about the installation of the slurry wall indicates that the wall extends to nearly the ground surface,” but the source of this information has not been provided. In addition, although Section 2.3.6.2 has been revised to include the discussion regarding the potential for groundwater to flow north and south of the

slurry wall and intersect the Bay described in the response, this information has not been included in Sections 2.6.1 and 2.6.3, which still describe the slurry wall as effective. Since groundwater flows around the north and south ends of the slurry wall, contamination can be transported to the Bay and it is unclear how the slurry wall can be considered effective in preventing contaminated groundwater from reaching the Bay. Please revise Sections 2.6.1 and 2.6.3 to state that since groundwater flows around the slurry wall contamination is not prevented from reaching the Bay.

**Response to SC 11:** The response partially addresses the comment. The response provides additional information regarding the conceptual footprint and TCRA but the text of the FS Report was not revised to include or reference the actual contaminant data that was used to develop the conceptual remediation footprint. In addition, the response does not adequately discuss the northern interior margin and associated risk. Although a TCRA has been proposed in Soil Alternatives 4 and 5 for the former radiological storage shack area, the northern interior margin has not been addressed in any soil alternative. In addition, the former radiological storage shack area and northern interior margin are not addressed in Soil Alternatives 2, 3, or 6. Further, the proposed footprint does not appear to include all of the drum disposal area in the northeastern portion of the interior margin. Please revise the FS Report to include or reference the actual contaminant data that was used to develop the conceptual remediation footprint. Also, discuss the northern interior margin and associated risk and explain why this area was not incorporated into the soil remedy alternatives or include this area. Finally, please extend the remediation footprint to include the full extent of the drum disposal area in the northeastern portion of IR Site 2.

**Responses to SC 12, SC 23, SC 27 and SC 30:** The responses partially address the comments. The responses state that a low permeable soil is not required at the site because “the majority of buried waste is already in continuous or nearly continuous contact with groundwater.” While a significant portion of waste can be found in continuous or nearly continuous contact with groundwater, a portion is not. It is unclear how active remediation is not necessary when “waste will continue to be in continuous or nearly continuous contact with groundwater,” as stated in the response. As such, it is unclear why a low permeability soil cover and active remediation of groundwater at IR Site 2 are not necessary. Please revise the FS Report to provide a suitable remedy for groundwater which includes a low permeability soil cover and active remediation.

SC 23 indicated that the degree of permeability of the proposed soil cover be evaluated and discussed, but this was not addressed. Please provide specifics regarding the degree of permeability for the soil cover alternatives to show that waste above the groundwater table and subsequent transport of contamination to the San Francisco Bay will not be impacted by infiltration through the soil cover.

**Response to SC 13:** The response partially addresses the comment. Language has been added to Section 4.3.2.2 (Engineered Alternative Cap) to discuss grading the surface to eliminate depressions and provide passive drainage from the entire landfill surface as an alternative to installing and operating high-maintenance electrical, pumping, and water transfer equipment. However, the additional language does not provide an analysis of whether minimal grading of

the surface would eliminate the need for sumps. Please revise the FS Report to include an analysis on whether minimal grading of the surface would eliminate the need for sumps.

**Response to SC 19:** The response partially addresses the comment. The revised effectiveness language for the containment/capping remedial option, found in Table 4-1, does not discuss the future liability associated with the untreated wastes disposed on site. The revised language only discusses the potential risk of future remedy failure. In addition, language found in the unrevised text (in the Draft FS Report) discussing landfill gas has been removed from the Draft Final FS Report. Please revise Table 4-1 to discuss the future liability associated with the untreated wastes disposed on site and include the potential need for control of landfill gas.

**Response to SC 20:** The response does not address EPA's underlying concern that the presentation of the limited number of alternatives that are evaluated in the detailed analysis of alternatives before the alternatives are actually presented is inappropriate. It is strongly recommended that the lists of soil and groundwater remedial alternatives evaluated in Section 5.3 be removed from Section 5.1.2 so that it does not appear that the alternatives that were eliminated from further consideration in Section 5.3 were not fully considered in Section 5.2. Please delete the specific lists of soil and groundwater remedial alternatives that are evaluated in Section 5.3 from Section 5.1.2; a general description of the process would be sufficient at this point.

**Response to SC 21:** The response partially addresses the comment. Language has been added to Section 5.2.1.2.1.1 (Multilayer Soil Cover) to regarding the grading of the approximately 3-acre constructed wetlands. However, language has not been added to address the grading of the remaining 57 acres of soil cover. Please revise Section 5.2.1.2.1.1 to include language regarding the need for preliminary site work on the 57 acres of soil cover to control erosion and surface water ponding or runoff.

**Response to SC 22 and SC 25:** The response only partially addresses the concern about munitions and explosives of concern (MEC); the sampling referenced in the response to SC 22 has only been done in limited areas and there is a minimal soil cover over much of the site, so MEC may not have been found or be visible on the surface. In addition, since the area may be used for recreational and educational uses, visitors and others could be exposed to MEC that has not been found to date. Please revise the FS Report to state that the proposed soil cover will also protect future site users from MEC.

**Response to SC 28:** The response partially addresses the comment. The modified text states that, "As part of the engineered cap system, some form of water collection or diversion would be required to address water infiltrating through the soil and cobble layers but prevented from infiltrating further by the HDPE liner. For costing purposes, it is assumed that this concern can be effectively addressed by grading per design slope elevations and compacting to 90% to allow effective drainage." While specific design elements will be considered during the detailed design stage, it is recommended that a geonet drainage system and associated costs be considered for the site and alternative selection. Please include costs for a geonet drainage system.

**Response to SC 32 and SC 36:** The response does not address the issue of costs involved with removal of 15,000 cubic yards of soil from the radiologically impacted area (Alternatives 4 and 5) or adequate sampling for Alternative 6. First, it is unclear why only 10 samples (for Alternatives 4 and 5) or 24 samples for Alternative 6 (note that 24 samples is one sample for every 2.33 acres of the proposed 56 acre excavation) have been proposed for radium 226 analysis; this does not comply with the requirements of the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). It is also unclear whether radium 226 is the only radioisotope for which analysis will be required. Second, it appears that costs for screening the excavation and materials removed from the excavation to remove radium dials and buttons or other radiological sources have not been included in the costs. Radium dials, buttons, and other radiological sources must be removed and disposed separately from soil that is radiologically contaminated. As a result, it does not appear that the Navy's Radiological Affairs Service Office (RASO) has been consulted to help develop the requirements and costs associated with this excavation and disposal. Please contact RASO and revise the cost estimates for Alternatives 4, 5, and 6 to include confirmation sampling that complies with the requirements of MARSSIM and revise Alternatives 4 and 5 to include the costs for screening the excavation and materials removed.

**Response to SC 37:** The response does not address the comment. Since metals are present in shoreline wells at concentrations that exceed the CTRs, metals are being discharged to San Francisco Bay at concentrations that exceed the CTRs. Therefore, it is unclear why the response does not acknowledge this, acknowledge that EPA is unlikely to approve MNA, or address the portion of the EPA comment that indicated that the groundwater analysis (and by implication, groundwater remedies) "focus on achieving CTR values at a reasonable point of compliance approved by the Water Board." MNA is not appropriate for metals, pesticides, and PCBs that are already present in the tidally influenced zone. Please revise the groundwater alternatives to include the guard wells to address the metals contamination in groundwater.

**Response to SC 38:** The response partially addresses the comment. The focus of the response is regarding debris removal during the excavation of a trench for a slurry wall. While the information provided is appropriate, further discussion should be provided regarding the removal of debris along the pond margins and the effectiveness of a slurry wall. Please revise the FS Report to include a discussion regarding the removal of debris along the pond margins and the effectiveness of a slurry wall. Also, please revise the cost estimates, as appropriate, to include appropriate radiological screening, sampling, and disposal for the pond margins.

**Response to SC 39:** The response addresses the comment. However, it is recommended that an estimated cost for the disposal of the sludge from the water treatment process as a radiological waste be included as a note in the cost estimate section of the FS Report.

**Appendix A, Response to SC 1:** The Navy cites the RI Report for IR Site 2 as rationale for not including a qualitative assessment of Site Ranger/Restoration Worker and Construction/Excavation Worker exposure to groundwater via the inhalation and incidental ingestion pathways for VOCs and non-VOCs, respectively. Section 6.3 of the RI Report presents conservative exposure assumptions as the basis for not evaluating vapor intrusion and subsequent inhalation of VOCs in indoor environments, and does not discuss incidental ingestion

of groundwater. Although these pathways may not be evaluated quantitatively in the human health risk assessment, please provide a qualitative assessment of their potential impact on total estimates of risk and hazard in the FS.

**Appendix A Response to SC 5:** The response to Appendix A SC 1 is cited to address EPA's request for the use of an updated inhalation cancer slope factor (CSF) to derive carcinogenic risk based concentrations (RBCs) associated with naphthalene inhalation exposure. Although the RI Report for IR Site 2 was accepted, updates to toxicity criteria should be considered when those parameters are used in subsequent calculations for the site. This ensures that each round of calculations incorporates the latest chemical toxicity research findings. Please implement the inhalation CSF of 0.12 milligram per kilogram per day (mg/kg-day) for naphthalene, derived by California EPA, in the RBC calculations.

**Appendix A, Response to SCs 6 and 7:** Based on an e-mail message from Andrew Baughman (Navy) to Xuan-Mai Tran (EPA), dated April 24, 2007, "there are no longer any attachments in Appendix A" due to the determination that "the example risk calculations that were presented in two attachments (A-1 and A-2) of the draft version of the FS did not add value to the document." Please revise the responses to these EPA comments to acknowledge the removal of these attachments, thereby rendering the comment moot.

**Response to SC 1 on Appendix D:** The response addresses the comment. However, "Cap drainage system installation" and "Cap drainage system O&M" have been removed from Table D-1 (Costs for Soil Remedial Alternatives). Please revise Table D-1 to include these costs or explain why they are not incorporated in the table.

**Response to Additional SC 1:** The requested revision has not been made to Section 3.2.2.3 (Ecological RBCs) as stated in the response. In addition, other language has not been included to support the technical validity of the mid RBC in the risk management framework as stated in the response. Please revise the FS Report to include the revisions stated in the response.