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MARE ISLAND
SSIC NO. 5090.3.A

18 August 2004

Mr. Chip Gribble
California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2737

Dear Mr. Gribble:

Weston Solutions, Inc. (WESTON®) is pleased to submit these responses to comments on the September 2002 Draft IA HI Soil, IR05, and Western Magazine Area Remedial Investigation, and the May 2002 Draft Final Groundwater Remedial Investigation, IA HI.

These documents were combined at the request of the regulatory agencies to form the July 2004 Draft Final Remedial Investigation, IA HI. Many of these comments and responses apply to this document.

If you should have any questions regarding the document please do not hesitate to contact me at 847-918-4042 or contact Dwight Gemar at our Vallejo office at 707-562-3352.

Very truly yours,

Weston Solutions, Inc.

William F. Karlovitz, P.E.
Senior Project Manager

WFK/kms

Enclosure

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RESPONSE TO COMMENTS
TABLE OF CONTENTS

1. John Christopher (DTSC) (June 3, 2002): Mare Island Naval Shipyard: Draft Final RI for Groundwater at Area H1

2. Emily Roth (U.S. EPA) (September 13, 2002): Review Comments, Mare Island Draft Remedial Investigation (Soil and Surface Water) Area H1, and Preliminary Comments on RI for IR05, and Western Magazine Area.

3. Norman Shopay (DTSC) (June 3, 2002): Review Comments on Draft Final Groundwater Remedial Investigation

4. Norman Shopay (DTSC) (January 22, 2003): Response to Draft Remedial Investigation Report, Investigation Area H1 Soil, IR05, and Western Magazine Area Remedial Investigation

5. Dr. Oberdorfer and Dr. Williamson (RAB) (February 15, 2003): Technical Interpretation of Draft Final Groundwater Remedial Investigation, Investigation Area H1.

6. Dr. Oberdorfer and Dr. Williamson (RAB) (February 15, 2003): Technical Interpretation of Draft Remedial Investigation, Investigation Area H1 Soil, IR05, and Western Magazine Remedial Investigation.

7. Connie Anderson-Morton (RAB) (March 17, 2003): Comments of Draft Remedial Investigation, Investigation Area H1 Soil RI and Groundwater RI

8. John Christopher (DTSC) (March 28, 2003): Mare Island: Draft RI Report. Investigation Area H1, IR05, Western Magazine Area

9. Myrna Hayes (RAB) (April 3, 2003): Draft Remedial Investigation, Investigation Area H1 Soil, dated September 13, 2002 and Draft Final Groundwater Remedial Investigation, Investigation Area H1, dated May 9, 2002

10. Chip Gribble (DTSC) (April 14, 2003): Navy Mare Island Draft Remedial Investigation, Investigation Area H1 Soil, Dated 9/13/2002

11. Jim Polisini (DTSC) (June 23, 2003): Mare Island Naval Shipyard Memorandum Outlining Methods to be used in Remedial Investigation Report for Investigation Area H1.

WESTON RESPONSES TO 3 JUNE 2002 DTSC (JOHN CHRISTOPHER) REVIEW COMMENTS
REVIEW COMMENTS ON DRAFT FINAL GROUNDWATER REMEDIAL INVESTIGATION
INVESTIGATION AREA H1 - 9 MAY 2002

COMMENTS

1. ***Absence of Written Responses to HERD Comments on Human Health Risk Assessment:*** *Although the current document contains responses to agency comments, including responses to comments offered by the DTSC project manager and the Geological Services Unit, the Navy does not present responses to HERD's comments on the human health risk assessment, which were presented in a memorandum dated 9 August 2001. However, we noted various changes in the current document indicating that the Navy made most of the changes we requested. The remainder of the Specific Comments below describe the adequacy of changes made by the Navy to the draft final document as responses to our earlier comments.*

   Response: Comment noted.

2. ***General Comment 2, Cumulative Risk:*** *In the draft document, the Navy assessed risks due to exposure to contaminants in groundwater but made no presentation regarding potential exposures to contaminants in soil. This has not changed in the current document. Eventually, some party must assess cumulative risks and hazards to all chemicals of potential concern in both soils and groundwater for all potential receptors. The lack of such a cumulative risk assessment in the current document is not a fatal flaw. We make this comment to note for the record that the current assessment is not comprehensive.*

   Response: The revised risk assessment contained in Appendix I presents a total risk estimate for all media (i.e., soil, groundwater, and surface water).

3. ***Specific Comments 1 & 2, Misspellings:*** *On pages ES-1 and 1-1, verbatim is still misspelled. The misspelling on page 3-22 has been corrected.*

   Response: Comment noted.

4. ***Specific Comment 3, Beneficial Uses of Water:*** *The Navy refers to three technical memoranda prepared by its consultants regarding the potability of the shallow groundwater at this site. We commented earlier and we re-iterate now that DTSC relies on the Regional Water Control Board to determine the beneficial uses of any body of water. We are noting this DTSC policy for the Navy's information; this is not a fatal flaw.*

Response: On 21 June 1995, the California Regional Water Quality Control Board adopted a Water Quality Control Plan for the San Francisco Bay Basin. This plan defines five beneficial uses for groundwater: (1) municipal and domestic water supply, (2) industrial process water supply, (3) industrial service water supply, (4) agricultural water supply, and (5) freshwater replenishment to surface water. These beneficial uses were identified in the California Regional Water Quality Control Board San Francisco Bay Region Order No. 00-132, "Site Cleanup Requirements for: United States Department of the Navy for property located at the former Mare Island Naval Shipyard, Vallejo, Solano County". Based on the TDS concentrations and the production capacity of groundwater within IA H1, a request was submitted to the RWQCB in support of an exemption of the municipal beneficial use. The RWQCB concurred with this exemption in a letter dated 17 March 2004.

5. ***Specific Comment 4, Residential Risk Estimates:*** *We asked the Navy for additional detail in their estimates of risk and hazard for the residential receptor. They have complied adequately in Appendix I.1.*

   Response: Comment noted.

6. ***Specific Comments 5, 6, 7 & 8, Risk Estimates for Future Workers:*** *In our previous memorandum, we noted several apparent overestimates risk or hazard to future workers due to intrusion of vapors into indoor air. We presented these comments for the benefit of the risk managers. No response was required from the Navy.*

   Response: Comment noted.

WESTON RESPONSES TO U.S. EPA (EMILY ROTH) REVIEW COMMENTS MARE ISLAND DRAFT REMEDIAL INVESTIGATION (SOIL AND SURFACE WATER) AREA H1, AND PRELIMINARY COMMENTS ON RI FOR IR05, AND WESTERN MAGAZINE AREA, 13 SEPTEMBER 2002

GENERAL COMMENTS

1. *The latest Region IX Industrial Soil Preliminary Remediation Goal (PRG) for benzo(a)pyrene is 0.21 mg/kg rather than the 0.29 mg/kg used to guide the remedial investigation (RI). The revisions to the Region IX PRGs may change the screening concentrations presented in the Remedial Investigation Report (RI Report). It is understood that the RI Report will not require revision every year as the PRGs evolve and that a change in the PRG would not require additional work after the RI is finalized. However, while the RI is a work in progress the most recent PRGs should be incorporated.*

   Response: WESTON has updated all screening criteria with updates and changes through December 2003.

2. *In many sections the RI Report indicates that the presence of various pesticides (DDT, dieldrin, et cetera) is likely due to the disposal of pesticide-impacted sediments. While that may be the case, the concentrations observed may also be due to the practice of pesticide application to control mosquitoes in the ponds and adjacent wetlands.*

   Response: The source of DDT and dieldrin is not clear. However, WESTON contacted the Solano County Mosquito Abatement District and found that they had never sprayed DDT or dieldrin in the wetlands or ponds. The abatement district started applying pesticides in 1979. DDT was banned in 1972. Therefore, the most likely source remains the disposal of pesticide-impacted sediments.

3. *In a number of locations, the depth of artificial fill is given as extending to some depth above mean sea level. As all of Investigation Area H1 (IA H1) was below sea level when Mare Island was first commissioned as a Navy Base, it seems that the depth of artificial fill in IA H1 should extend below mean sea level, though natural filling of the bay could have deposited sediments up to the high tide mark in theory. If bathymetry data is available from the nineteenth century for the IA H1 area, please present an isopach map showing the depth of filling since the date of the bathymetry data.*

   Response: Bathymetry data is not available. WESTON agrees that Mare Island grew as a result of increased sedimentation accretion caused by hydraulic mining activities in the late 1800s and early 1900s. The sediment originating from the mining operations could be considered "artificial" as human intervention is the cause of the increased sediment load in the Napa River; however, this sediment was not deposited by Navy activities or dredging operations and is not considered to be artificial fill at the site. Each of the cross sections

presented indicate that the artificial fill layer extends to depths above 0 MSL by a few feet. This may be explained in part by the fact that Carquinez Straight, Mare Island Straight, and San Pablo Bay are not at sea level. The surface water elevation in the vicinity of Mare Island is greater than MSL. Additionally, MSL (based on NGVD 29) is an average of water levels recorded through many years at select locations along the coasts of the United States, and is extrapolated between monitoring points. Therefore, additional error may be introduced by this extrapolation. This potential error is not expected to have a significant impact on the outcome of the remedial investigation.

4. *If field logs prepared by personnel who collected the hand auger data to support the hand auger efforts are available, please include them in the RI Report as an appendix.*

   Response: WESTON has contacted the Navy regarding the location of these logs. The Navy currently cannot locate any logs for the hand auger data.

5. *The text frequently refers to "EPA's risk management range of 10-4 to 10-6." Discussion of the risk management range within the risk assessment is inappropriate. The agency has clarified its position on the role of the risk assessor and risk manager in it's 1995 memorandum "Policy for Risk Characterization". In summary, risk assessors "are charged with (1) generating a credible, objective, realistic, and balanced analysis; (2) presenting information on hazard, dose-response, exposure and risks; and (3) explaining confidence in each assessment by clearly delineating uncertainties and assumptions along with the impacts of these factors...on the overall assessment. They do not make decisions on the acceptability of any risk level for protecting public health or selecting procedures for reducing risks." Accordingly, the risk assessment should be revised to eliminate references to acceptable or target risk ranges.*

   Response: The revised RI text, including the risk assessment, was changed to eliminate references to acceptable or target risk ranges. Risk estimates are presented without reference to acceptable risk ranges.

6. *The Chemical Characterization noted in Section 17 lists a number of chemicals that could, if detected, indicate the possible presence of double or triple base propellants in the soil and sediments of the site. However, no indication was noted in the section and its attachments that any single base propellant component was included in the sampling methodology. Since single base propellants used prior to 1905 generally consisted of nitrocellulose and approximately 1 to 5 percent residual solvent (ethyl ether and ethanol), the sampling for nitroglycerine, dinitrotoluene, or the inhibitors used after 1905 would not determine the presence of the older single base propellant. Please explain why sampling for nitrocellulose was not conducted to check for the presence of pre-1905 single base propellant.*

   Response: This comment refers to IR05 and will be addressed in a separate document as part of a RI for IR05.

7. *The Site Background information contained in Section 18 and with respect to dredge ponds 8 and 9 is confusing. For example, the Site Location subsection on page 18-1 states that "A*

portion of this area has been referred to as inactive Dredge Ponds 8 and 9, which are currently functioning as wetland areas. As will be discussed, it is likely that these ponds were never operated as dredge ponds or were only operated very briefly as dredge ponds." This is incongruent with the statement in the History subsection on page 18-3 which indicates that "Former Navy personnel suspect that Dredge Ponds 8 and 9 were not designed to be dredge ponds but were formerly wetlands/mud flat areas that were converted into an ammunition storage area." Both preceding statements differ from the statement in the History subsection that says that "During the OE removal action at the WMA, an outfall was discovered in the wetland just northeast of Pond 8. Secondly, an aerial photograph from 1949 shows two possible outfalls, one in the wetland east of Pond 8 (which was excavated during the WMA OE removal action) and one in the northern portion of Pond 8. Therefore, records indicate that Pond 8 and the wetland just northeast of Pond 8 may have been used on a limited basis as a dredge pond"

The discovery of an outfall in an area would appear to be conclusive proof that the location where it was found was/is a dredge pond. Also, either Pond 8 was or was not a dredge pond (the discovery of the outfall there would indicate that it was), and one of the two conclusions should be repeated throughout the discussion. As it is currently written, the document states, in effect, that it both was and was not a dredge pond. In addition, it is unclear as to whether the "outfall discovered in the wetland just northeast of Pond 8" and the "one in the wetland east of Pond 8" are two different outfalls or are one in the same. No statement as to whether or not the one (perhaps two) uninvestigated outfall(s) will be evaluated at a later date is provided in the section, although it is mentioned in Section 18.8.2 Ordnance and Explosives Characterization as a "may warrant further investigation."

Wouldn't sampling data reveal whether or not the pond functions as a dredge spoils ponds or not?

Please revise the Site Background subsection of Section 18 to eliminate the above noted inconsistencies and provide a clear statement as to whether or not Pond 8 is/was a dredge pond. Also, please indicate exactly how many outfalls were located/suspected to be in the area investigated and provide their locations and their recommended dispositions.

Response: This comment refers to the WMA and will be addressed in a separate document as part of a RI for the WMA.

8. *Both Sections 17 and 18 address the risks associated with the chemical contamination noted on the two sites. However, neither of the two sections address the risks associated with the ordnance and explosives that likely remain on the two sites. Section 18.8.2 Ordnance and Explosives Characterization states that "...no further action was warranted since site conditions no longer posed a threat to human health or the environment." In the next sentence it is noted that "A second possible outfall has been located in the northern portion of Pond 8 in an aerial photograph from 1949 and may warrant further investigation." These two sentences are inconsistent and the second sentence would appear to invalidate the "no further action" statement of the first.*

Please revise Section 18.8.2 to remove the referenced incongruency. Also, please revise the conclusions of Sections 17 and 18 to include an evaluation of the residual risk posed by any ordnance suspected to remain in the two sites.

Response: This comment refers to IR05 and the WMA and will be addressed in separate documents as part of RIs for IR05 and the WMA.

9. *Please add to the RI all data regarding the presence and concentrations of asbestos at the landfill.*

Response: As addressed in the Data Gaps Sampling Plan for IA H1 (WESTON, 2003), an asbestos investigation was conducted at areas of IA H1 in which asbestos debris may be present outside of the containment area. This included a survey of the West Subarea (Pond 1), and the Demolition Debris Subarea. Eight samples of suspected asbestos containing material (ACM) were collected from the West Subarea from test pits performed in January 2004, and six surface material samples were collected during a survey in March 2004 at the West Subarea.

Results from the eight test pit samples collected in the West Subarea found only a trace level (<1%) of asbestos in one sample. The remaining seven samples did not detect asbestos. Of the six samples collected in March 2004 at the West Subarea, three of them were determined to contain 90% asbestos.

The only potential ACM encountered in the Demolition Debris Subarea was transite pipe encountered at two locations. Samples were not collected because it was obvious that the material contained asbestos.

All of the above information will be incorporated into the final RI in Section 9, and all of the asbestos containing materials will be addressed in the feasibility study.

SPECIFIC COMMENTS

1. *Section 5, Figure 5-2: The legend indicates that the elevation contours should be present on the figure (as they are in Figure 5-5), however the elevation contours are not shown. Potentially, the contours were turned off because the figure had become too busy. Please either show the elevation contours on the figure or present a separate figure with the elevation contours.*

Response: The elevation contours have been added to the soil sampling location maps (Figures 6-4 through 6-9).

2. *Section 5, Figure 5-2: There are surface deposits of sandblast grit in the Waste Sump/Lead Oxide Area which are not called out on the figure. Please show the areas of sand blast grit on the figure.*

Response: Areas of sandblast abrasive that are visible at the ground surface are shown on Figures 6-4 through 6-9 as "greensand areas". An area of sandblast abrasive is not indicated within the Waste Sump/Lead Oxide Storage and Disposal Area. Surficial deposits of greensand are evident within the former Pond 1 and the Northwest Dump Road Subarea.

3. *Section 6, Demolition Debris Subarea, Page 6-1: The boring logs for this subarea indicate that, along with the demolition debris, industrial and other wastes (sand blast grit, plastic, paper, et cetera) were also disposed of at this site; essentially every single boring advanced into the mound area of the subarea either produced soil samples with petroleum concentrations in the 100s of parts per million or a "strong petroleum odor" was noted on the boring log or both. As the current title of the subarea may mislead the public into believing that the wastes disposed in this subarea are inert, please select a more descriptive title for this subarea, e.g., the Demolition Debris and Other Uncontrolled Waste Disposal Subarea.*

Response: A total of eleven soil boring logs indicated the presence of a petroleum odor, and a total of six sampling locations (IR01GB042, IR01GB044, IR01GB075, IR01GB076, IR01HA023, DD-SB06) had concentration of petroleum hydrocarbons where a screening criteria was exceeded. Additional characterization of the debris in this subarea was performed as proposed in the Data Gaps Sampling Plan for IA H1 (WESTON, 2003). The results of the Data Gaps Sampling were included in the revised RI in Section 9. The subarea name will not be altered this late into the RI process, as the name will not have any impact on the results presented, or any future actions to be taken within this subarea.

4. *Section 6, Demolition Debris Subarea, Page 6-1: The boring log for location 01W29X (well number B-23) indicates that free product was found at 10 feet below the ground surface at the boring location. Please revise Figure 5-5 to show the location of this well and please present any data collected from the well in the RI Report. In addition, please discuss the nature of the free product detected in this boring. If more legible copies of the boring log for this well are available, please include them in the revised RI Report.*

Response: Well 01W29X was located in the southern corner of the Demolition Debris Subarea near Wetland D. Its location was not added to the monitoring well sampling location map Figure 6-1, because data for this location does not exist, indicating that it was appently never sampled. This well was ultimately abandoned due to limited access. The log provided is the most legible and only copy available. The well installation record indicates that free product is located at 10 feet bgs, with odor to 12.5 feet bgs. The geologic log (the illegible one), appears to say "oil/grease staining," however, this is only an interpretation of the almost illegible text.

5. *Section 6, Demolition Debris Subarea, Page 6-1: As noted above, virtually every boring extended below 3 feet below the ground surface in the mound portion (elevation above 15 feet above mean sea level) of the Demolition Debris Subarea contained high concentrations of petroleum hydrocarbons. In addition, detectable concentrations of polychlorinated biphenyls (PCBs) were also detected in most of the borings extended to depth in the mound area. Hence, it appears that the mound area in the Demolition Debris Subarea is an oil*

sump that was filled with waste. Please revise the RI Report to list all aerial photographs showing the Demolition Debris Subarea, by date, and indicate if any of these aerial photographs contain indications that oil dumping occurred , or that an oil sump was ever present in the Demolition Debris Subarea.

Response: See response to Ms. Roth (U.S. EPA) Specific Comment 3. To determine whether an oil sump may be present beneath the mound, the boring logs and analytical results from the Demolition Debris were compared to the Waste Sump/Lead Oxide Storage and Disposal Area. Of the 21 borings advanced in the Demolition Debris Area, not including the hand augers, only five (IR01GB076, 01W29X, DD-SB02, DD-SB03, and DD-SB05) indicated the presence of oil and six (IR01GB041, IR01GB044, IR01GB045, IR01GB046, IR01GB075, and IR01GB090) indicated a slight to strong petroleum or hydrocarbon odor. Of the borings that indicated free product or odor, all but one, 01W29X, indicated the odor or free product to be present only under saturated or wet conditions. In the Waste Disposal Sump/Lead Oxide Storage and Disposal Area, petroleum odor and oil appeared to be present above and below the water table. In the Demolition Debris Area, only one boring, IR01GB041 indicated black staining that could be related to the presence of oil or petroleum. In the Waste Disposal Sump/Lead Oxide Storage and Disposal Area, most of the borings where petroleum oil or odor was present, black staining from oil was also noted. In the Demolition Debris Subarea, petroleum odor or oil was only detected in clay or silty clay under wet or saturated conditions. If a sump existed, it would be reasonable to expect most of the contamination to be present in a gravel or sand layer, and the layer would be saturated with oil, as is the case in the Waste Disposal Sump/Lead Oxide Storage and Disposal Area.

6. *Section 7.2.2.3, Extent of Contamination in Surface Soil, Page 7-12: The RI Report indicates that, "Thus it is likely that the elevated detections of metals in the Northwest Dump Road are associated with surface runoff from the Waste Sump Area." In its current configuration, it appears that surface water would flow from the Northwest Dump Road area toward the waste sumps. In addition, lead above 59 ppm is ubiquitous throughout the Northwest Dump Road area. Hence, it appears likely that the source of the ubiquitous lead contamination in the Northwest Dump Road area is the disposal of lead containing waste on the site. Please revise the RI Report to indicate that the most likely explanation of the lead present in site soils at the Northwest Dump Road area is the disposal of lead containing waste throughout the area or provide evidence that the lead got there through the surface water flow pathway.*

Response: WESTON agrees with the commenter that the source of elevated lead concentrations at sample IR02GB002 is likely not due to runoff from the Waste Sumps because the ground elevation at IR02GB002 is higher than that of the Waste Sump/Lead Oxide Storage and Disposal Area. Sample location IR02GB002 is located within the containment boundary and will be included with the remedy for the Landfill Area of IA H1. WESTON does not agree that lead above 59 ppm is ubiquitous in the surface soil throughout the Northwest Dump Road Subarea. Of the 6 samples where lead was detected in surface soil, none of the samples had concentrations greater than 59 ppm. WESTON agrees that concentrations of lead within the subsurface soils at the Northwest Dump Road are likely due to disposal of lead containing wastes throughout the area.

7. *Section 7.7.6, Decision Summary, Page 7-29: The RI Report indicates that the extent of contamination is adequately characterized. However, as shown on the attached Figure 1, there is a 6-acre parcel within Northwest Dump Road where no soil samples were collected for analysis for the constituents of concern. As this parcel is surrounded on all sides by soil samples containing lead in excess of ambient concentrations (Technical Memorandum, Estimation of Ambient Metal Concentrations in Soils, Mare Island Naval Shipyard, Vallejo, California, prepared by PRC Environmental Management, Inc., dated December 14, 1995, the ambient lead concentration in fill soils at Mare Island is 59 ppm), a concern exists that this unsampled 6-acre parcel is contaminated at unknown concentrations which could pose a threat to human health and the environment. Please revise the RI Report to include a recommendation that this area be further characterized for metals and polychlorinated biphenyls (PCBs) during, or before the FS. The samples should be collected on a grid and at every location where distressed vegetation is present within this 6-acre parcel.*

Response: WESTON prepared a Data Gaps Sampling Plan for IA H1 in September 2003 in response to the regulator comments on the RI report. Additional soil, surface water, sediment, and groundwater sampling within the upland and wetland areas surrounding the landfill was conducted based on the recommendations of this plan. A total of nine additional sampling locations at the Northwest Dump Road Subarea were included in the data gaps investigation. Five of these locations were intended to further characterize the fill in the area, and were sampled for VOCs, SVOCs, organochlorine pesticides, PCBs, metals, and TPH. One location was also sampled for explosives. All additional data collected was included in the revised chemical characterization discussion for the Northwest Dump Road Subarea as well as the HHRA for IA H1.

8. *Section 8, West Subarea, Page 8-1: The boring logs for borings IR01GB120-122 could not be located in the review copies of the RI Report forwarded to EPA or in any of the other RI documents available to EPA. These borings are key to understanding the source of the polynuclear aromatic hydrocarbon (PAH) contamination in the Dredge Pond 1 portion of the West Subarea. The PAH concentrations at these locations are the highest detected at any location at Mare Island and produce a risk to future construction workers that exceed the acceptable risk range (and which will thus require a remedial action). Because there were four extremely high benzo(a)pyrene (BaP) detections in soil samples collected from IR01GB120 and IR01GB121 (100 to 1000 times the residential preliminary remediation goal), it is unlikely that these detections are due to laboratory error. The BaP contamination may be related to the Dredge Pond 1 outfall, which is adjacent to the sample locations, or it may be the result of waste disposal - the boring logs may provide an indication of the source. Because the BaP concentrations detected in soil samples collected at IR01GB120 and 121 are so far in excess of any other BaP concentration detected in the hundreds of dredge spoils samples collected at Mare Island, it is unlikely that these concentrations represent contaminated dredge spoils. In addition, the groundwater beneath these locations is impacted by both petroleum hydrocarbons and aromatic compounds, further indication of waste disposal at this location. Please revise the RI Report to include the missing boring logs and provide a discussion of the potential sources of the PAHs detected in the Dredge Pond 1 portion of the West Subarea.*

Response: WESTON has located the boring logs for IR01GB120-122 and the boring logs show the presence of decaying wood chips, which is the most plausible source of elevated BaP concentrations in this area. BaP was determined to be a risk driver in this area for all human receptors analyzed. This area is a known historical disposal area and an evaluation of remedial alternatives will be conducted in an FS. These borings will be included in the final RI.

9. *Section 8, West Subarea, Page 8-1: The lateral extent of PAH contamination in the vicinity of IR01GB120 and IR01GB121 is poorly defined as no soil samples were collected in the dredge pond east, north, or south of their locations and the boring to the west (IR01GB122) was only extended to 4.5 feet below the ground surface; samples collected from the dredge pond berms are not useful for characterizing the extent of contamination in the dredge pond. Please revise the RI Report to provide a discussion of the extent of the PAHs detected in the Dredge Pond 1 portion of the West Subarea and include a recommendation that further soil samples be collected in the dredge pond to characterize the extent of PAH contamination.*

Response: As noted in the Response to Ms. Roth (U.S. EPA) Specific Comment No. 8, the source of BaP at sampling locations IR01GB120-122 is likely due to the presence of decaying wood chips at these locations. Of the three sample locations, the highest concentration of decaying wood chips, the suspected source of benzo(a)pyrene contamination, can be found in IR01GB120 at 3 ft bgs with wood chips present down to 10.5 ft bgs. Wood chips were also found to be present throughout borings IR01GB121 (boring depth: 11 ft) and 122 (boring depth 9.5 ft).

Soil borings and test pits were advanced in the vicinity of IR01GB120-122 during the data gaps sampling investigation in 2003 and were sampled for VOCs, SVOCs, TPH, PCBs, pesticides (OPP), and metals. The results from these samples indicate PAH concentrations were typically less than both the detection limits, and the screening levels. In the West Subarea, only one exceedance of a PAH, benzo(a)pyrene, was detected in sample WS-SB038 from 2.5 to 3 feet bgs.

10. *Section 10.2.4.2, Inorganic Compounds in Surface Water, Page 10-21: It appears that run-off from the adjacent Undeveloped Demolition Debris Subarea is impacting surface water in the Undeveloped North Wetlands Subarea. The two topographic low points in the Undeveloped North Wetlands Subarea (at sample locations WETDSW055 and WETDSW014, 15 and 56) have each produced surface water samples in which the nickel concentrations are well above ecological screening values (166 ug/l maximum versus the water quality criteria of 7.4 ug/l). It is likely that these concentrations are probably not the highest concentrations that ecological receptors (including potentially the federally-listed endangered species the Salt Marsh Harvest Mouse) will be exposed to in the Undeveloped North Wetlands Subarea as the nickel concentrations in these topographic lows will rise as the rainy season ends and the volume of the free water in the wetlands shrinks due to evaporation - the sodium concentrations in these samples were approaching that of open ocean water indicating that substantial concentration had already occurred. Please add to the RI Report a discussion of the impact the adjacent undeveloped demolition debris subarea is having on surface water in the Undeveloped North Wetlands Subarea and whether action is needed to abate this impact.*

Response: Many of the nontidal wetlands are shallow depressions that are characterized by standing water during the winter and spring and are dry during the summer and fall. For example, studies in Wetland B found that it is inundated for 7 months and dry for 5 months of the year. Metals concentrations in the sediment within the North Wetlands Subarea (Wetlands A and D) is likely due to runoff from neighboring subareas, including the Demolition Debris Subarea. High concentrations of metals in surface water may also be attributed to contact with sediment containing high concentrations of metals, either naturally occurring or from runoff from neighboring subareas, or contact with high TDS shallow groundwater.

Surface water exposure was evaluated in the ecological risk assessment. Food-chain modeling was performed for wetland receptors to quantify potential doses received by higher level receptors, including the Salt Marsh Harvest Mouse. No risk from intake of nickel in surface water was found for the Salt Marsh Harvest Mouse, even under the conservative assumption that the target species obtains 100% of its water from the wetland area.

11. *Section 13, Waste Disposal Sump/Lead Oxide Storage and Disposal Area, Page 13-1: A number of boring logs for this subarea appear to be missing from Appendix A (IR02GB043, IR01SB06, IR01SB07, IR01SS12, IR01SS13, IR01SS20, IR02TP004). If these boring logs (or trench logs) can be located, please include them in Appendix A.*

Response: Borings logs for IR02GB043, IR01SB05, and IR01SB07 have been located and will be included in the Final RI document. At this time, the Navy cannot locate any logs for IR01SS13, IR01SS20, or IR02TP004. However, since these were surface soil samples, it is likely that boring logs do not exist.

12. *Section 15, IWTP Area, Page 15-4: The RI Report indicates that lighter-than-water non-aqueous phase liquids (LNAPL) were detected in soil samples collected from a depth of 12 to 13 feet bgs in the boring for monitoring well 01W26. In addition to this detection, LNAPL was also detected in the two closest borings to this location (at 12.5 feet bgs in the boring for monitoring well 01W27X, 300 feet to the southeast and at 11.5 feet bgs in the boring for monitoring well 01W25, 170 feet to the southwest). This appears to indicate that there is a very large source of free product in the subsurface at 11 to 12 feet bgs in the vicinity of these wells. Please revise the RI Report to fully report the known extent of the free product and propose additional investigation and characterization studies to delineate the nature of the free product (there doesn't appear to be any characterization data so the oil could be contaminated with PCBs or pesticides) and it's extent to the north and northeast of the location of monitoring well 01W26.*

Response: A review of the boring logs indicated oil beneath the water level for 01W27X and 01W25. A review of the database indicated that groundwater samples were collected from 01W25X, 01W26, and 01W27. Soil samples were not collected from these three locations. Free standing oil was noted on the 01W26 boring log at 12 ft bgs. Soil borings were advanced at locations downgradient of 01W25 and 01W26 during the Data Gaps investigation to determine the extent of free product in this area. SSTP-SB01 is located downgradient of 01W26 and no oil was observed at this boring location. TPH constituents

were not detected above screening criteria at this location. SSTP-SB02 is located downgradient of 01W25 and a strong odor was noted between 10 and 11.5 feet bgs. No free product was observed at SSTP-SB02. TPH as diesel and motor oil were detected at concentrations exceeding screening criteria at sample location SSTP-SB02 at a depth of 10 to 11 feet bgs under saturated conditions.

13. *Section 16, Solid Waste Disposal/Lead Oxide Storage Area, Page 16-23: Reading the Ecological Risk Assessment portion of Section 16, one would never know that there were large areas in the Lead Oxide Storage Area (LOSA) with soil lead concentrations between 1 and 21% - these concentrations are characterized as "out-liers". It is also problematic that hazard quotients of around 1 are calculated for the LOSA when it is known that the portions of the site with lead concentrations measured in the percent range are sterile. It is likely that Weston has determined in advance that these areas are not characteristic of the remainder of the LOSA and has determined that they should be handled separately, which is an acceptable approach. However, please revise the RI Report to indicate the ecological and human health risks posed by these areas (subsites B1/B2 and B3/B5 and the Storage Area within the Undeveloped Area of IR01) so that the decision makers can determine what remedial action is required for them.*

Response: A significant portion of IR16 B3/B5 has been excavated of all soil with lead concentrations exceeding 750 mg/kg. The excavation has been backfilled with clean fill and the high-lead containing soil has been transported to the Landfill Area and will be included within the containment barrier and under the RCRA cap. This data from soil that was removed is no longer included in the revised risk assessments.

14. *Section 17.1 Site Background, Seventh Paragraph, page 17-3: It is stated here that "...the southeastern portion of the investigation area (lowland subarea) was established as an ordnance-burning, detonation and disposal area (Navy, 1953). Ordnance-burning and detonating sites and structures included (1) ovens for primer and tracer burning (near former Building A-281), detonation of ordnance, and lead melting; (2) high explosives and powder burning areas; and (3) pits for pyrotechnic burning and high explosives detonation (Navy 1951,1953; E&E, 1983; IT, 1992)." Three activities are noted to have been accomplished in the area in the first sentence: ordnance burning, detonation and disposal. The following sentences only list the detonation and burning activities and omit the disposal function (unless lead melting is intended as the disposal function). This would seem to possibly leave out the disposal operation, which is undefined and which could have been disposal by burying during the 1950s time frame.*

Samples were not taken directly in the Pb melt are, or powder burning areas. EPA recommends that soil samples be taken in these areas to determine if the soil in these areas constitute a "hot spot".

Please revise the paragraph to identify exactly what is included in the three terms used (ordnance-burning, detonation and disposal). If the term "disposal" is redundant, please remove it from the paragraph.

Response: This comment refers to IR05 and will be addressed in a separate document as part of a RI for IR05.

15. *Section 17.1 Site Background, Eighth Paragraph, page 17-3: This paragraph notes that "Surplus ordnance was detonated and buried before the site was turned over to the MINS (E&E, 1983; IT, 1992). As part of this project, a 100-foot-diameter, 10-foot-deep pit, referred to as the "round pit," was reportedly excavated southwest of the inert materials storage area and used to dispose of construction debris and surplus ordnance (Figure 1)." No details are provided concerning the final disposition of the ordnance disposed of in the "round hole."*

    Please provide the details of the ordnance and explosives removed from the "round hole," or, if no action was taken, provide a final recommendation as to the disposition of the ordnance therein or the risk presented if it is allowed to remain.

    Response: This comment refers to IR05 and will be addressed in a separate document as part of a RI for IR05.

16. *Section 17.1 Site Background, Ninth Paragraph, page 17-4: It is stated here that "The small arms range was reportedly not used." However, Section 17.2 Ordnance and Explosives Characterization, third paragraph, page 17-13, states that "Since the small arms range was never used, lead contamination of the berm soil was not considered to be a concern." Either the range was "reportedly not used" or it was 'never used." If there is some question as to whether or not it was used, then lead would be a concern with respect to the range backstop. Since the backstop was dismantled during the ordnance and explosives clearance of the area (see Unexploded Ordnance Time Critical Removal Action, IR Site 5 Final Summary Report, 1998), this should be stated in this paragraph of Section 17.1.*

    Please determine whether or not the range was ever used and so state in both of the paragraphs cited. Revise the subject paragraph to include the fact that the backstop was dismantled during the referenced clearance.

    Response: This comment refers to IR05 and will be addressed in a separate document as part of a RI for IR05.

17. *Section 17.1 Site Background, Geology Subsection, Third Paragraph, page 17-6: This paragraph notes that "BTEX compounds were not detected at the reportable limits in either sample, while TPH diesel was detected in the southwest sample at a concentration of 109mg/kg. Approximately 60 yards of additional soil was removed from the area surrounding the sample location, but no confirmation samples were taken." Please explain how it is known, or why it is assumed, that the referenced contaminants do not remain at unacceptable levels at the sampled location.*

    Response: This comment refers to IR05 and will be addressed in a separate document as part of a RI for IR05.

18. *Section 17.2 Ordnance and Explosives Characterization, First Paragraph, page 17-12: It is stated here that "Between 1995 and 1997, a removal action was conducted by SSPORTS in IR05 to remove all detected ordnance items and associated contaminated soil (SSPORTS 1998a). The entire upland and lowland subareas (over 35 acres) was cleared of UXO using....." However, Section 17.1 Site Background, Site Location Subsection, First Paragraph, page 17-1 notes that "IR05, the former ordnance disposal and burning area, occupies a small portion (approximately 59 acres) of the....." No statement is provided as to what action was/is to be taken with respect to the 24 acres not accounted for in Section 17-2. Please provide a statement as to what action was/is to be taken concerning the potential for ordnance to be located on the referenced 24 acres.*

Response: This comment refers to IR05 and will be addressed in a separate document as part of a RI for IR05.

RISK ASSESSMENT COMMENTS

1. *Section 1.1, Risk Assessment Objectives, Page H-2: The objectives of the risk assessment should be to estimate potential exposure to contaminants of potential concern and to quantify risks and hazards with the estimated exposures in the risk characterization, not to provide the bases for risk management decisions as stated. Risk management decisions are based on various factors, including cost, technical feasibility, and the acceptance of stakeholders. Risk characterization should not be viewed as the sole basis for risk management decisions.*

   Response: The text for the risk assessment objectives in Section 1 of Appendix I was updated accordingly.

2. *Section 2.1.2.2, Analysis of Ambient Conditions, Page H-9: EPA policy (EPA, 2002) no longer supports the elimination of contaminants of potential concern based on background. Instead, site-specific background issues should be addressed in the risk characterization phase of the risk assessment, where the contribution of background to site concentrations should be distinguished.*

   Response: Metals were not eliminated as contaminants of potential concern based on ambient levels in the revised HHRA. An estimate of total and ambient risk was presented separately in the revised HHRA.

3. *Section 2.2.7.1, Exposure Point Concentrations in Soil, Page H-14: The method described here for calculating the exposure point concentration (EPC) for the central tendency exposure (CTE) estimate does not conform to EPA guidance (EPA, 1992, 2001a), which states that use of a simple arithmetic mean for the CTE evaluation is not appropriate in that it may substantially underestimate the true site mean. Because it is not possible to know the true mean, EPA considers the 95 percent upper confidence limit (UCL) on the arithmetic mean as the average concentration at Superfund sites, and requires its use in both CTE and RME evaluations. CTE risk estimates should be revised to use the 95 percent upper confidence level on the arithmetic mean as the EPC. Alternately, at a minimum, the text here*

should note that the use of the arithmetic mean does not comply with EPA guidance in this area, and the use of the simple mean should be discussed in the uncertainty section.

Response: In the revised HHRA for IA H1, the CTE risk estimates were reevaluated using the same UCL as the RME case.

4. *Section 2.2.8, Chemical Estimation Estimates, Page H-16: The report referenced in the 2nd complete paragraph (EPA, 1999b) is not included in the references. In addition, the "draft dermal guidance document" has been superceded by EPA, 2001a, and exposure information provided in RAGS Part A has been superceded by the 1997 Exposure Factors Handbook.*

   Response: The references were updated and used accordingly in the revised HHRA for IA H1.

5. *Section 2.5.2, Uncertainty Assessment, Exposure Assessment, Sampling Strategy, Page H-29: For balance, the text in this section noting that judgmental samples were collected in areas of suspected or known contamination should note that while judgmental samples may identify contaminants of potential concern, the reasonable maximum exposure or upper confidence limit cannot be calculated from the results of a judgmental design.*

   Response: The text in the uncertainty assessment was revised accordingly. A Data Gaps Sampling Plan for IA H1 (WESTON, 2003) has been prepared to address some data gaps associated with the TtEMI sampling; this additional sampling effort should reduce the uncertainty associated with the sampling strategy.

6. *Table I-2.2a: The 50 mg per day (mg/day) soil ingestion rate shown is representative of indoor workers only, a soil ingestion rate of 100 mg/day should be used to characterize exposure to workers who spend most of their time outdoors. In addition, please provide references for EPA, 1991 and 1999 listed in this table.*

   Response: In the revised HHRA for IA H1, a soil ingestion rate of 100 mg/day was used to characterize exposure of workers who spend most of their time outdoors. The appropriate references were used and included in the revised document.

7. *Table I-2.2c: A soil ingestion rate of 330 mg/day should be used for the RME evaluation of the construction worker (EPA, 2001b) rather than the 100 mg/day shown here.*

   Response: In the revised HHRA for IA H1, a soil ingestion rate of 330 mg/day was used for the construction worker.

8. *Table I2.2e: EPA (1991) noted in the footnote to this table is not included in the references. Since this table presents dermal absorption factors, it would seem more logical to refer to the draft dermal guidance document noted in the text in Section 2.2.8. However, in any case, the Supplemental Guidance for Dermal Risk Assessment (EPA, 2001a) should be cited as the most current guidance.*

Response: All references have been updated in the revised HHRA for IA H1.

9. *Table I-2.3: An oral reference dose of 0.0003 milligrams per kilogram per day should be used for trichloroethene.*

Response: All current U.S. EPA and Cal EPA toxicity parameters have been included in the revised HHRA for IA H1 An oral RfD of 0.0003 mg/kg-day was used for trichloroethene in the risk calculations..

10. *Table I-2.4: An inhalation reference dose of 0.01 milligrams per kilogram per day should be used for trichloroethene.*

Response: All current U.S. EPA and Cal EPA toxicity parameters have been included in the revised HHRA for IA H1. An inhalation RfD of 0.01 mg/kg-day was used for trichloroethene in the risk calculations..

11. *Table I-2.6 and Table I-2.7: A cancer slope factor for trichloroethene of 4E-1 per milligram per kilogram per day should be used for both oral and inhalation exposures*

Response: All current U.S. EPA and Cal EPA toxicity parameters have been included in the revised HHRA for IA H1. An oral SF of 0.013 $(mg/kg\text{-}day)^{-1}$ was used for trichloroethene in the risk calculations. This value was obtained from the California Office of Environmental Health Hazard Assessment toxicity criteria database dated May 2004 and found at http://oehha.ca.gov/risk/ChemicalDB/index.asp.

12. *Attachment H2, Section 1.1.2, Tier 2 Approach, Page H2-4: The text in the 2nd paragraph which notes that the Tier 2 model "entailed a change from a model that accounts for source depletion and retardation to a steady-state model for which neither of those processes is assumed to occur" contradicts the text in Section 1.1.1.1, which states that the Jury infinite source model was used for the Tier 1 evaluation. Please resolve this discrepancy.*

Response: The difference between the Jury infinite source model and the Johnson and Ettinger steady-state model is that the Jury model accounts for source depletion over time and accounts for retardation. Over time, the source volatilizes, and source concentrations decline, beginning at the surface. The corresponding chemical emission rate at the surface also declines with time and is averaged over the estimated duration of exposure. In the revised HHRA for IA H1, the Johnson and Ettinger model was used to evaluate the subsurface vapor intrusion into building pathway.

13. *Attachment H2, Section 1.1.3, Tier 3 Approach, Page H2-6: The text in this section notes that the Farmer's model was used in the Tier 1 evaluation of outdoor air, while Section 1.1.1.1 states that the Jury model was used instead. Please resolve this discrepancy.*

Response: The Jury model, not the Farmer model, was used to evaluate outdoor air. In the revised HHRA for IA H1, volatilization factors, calculated using U.S. EPA Soil Screening Guidance methodology, were used to estimate outdoor air exposure.

ERRATA

1. *Figure 5-5: Miscellaneous is spelled incorrectly in at least two places.*

   Response: Comment noted, the text has been updated accordingly.

2. *Page 8-14: The maximum benzo(a)pyrene concentration detected in subsurface soil samples is given as 0.8 mg/kg. However, per the TetraTech database, benzo(a)pyrene was detected at a concentration of 40.2 mg/kg in the sample collected at 6.0 ft bgs in boring IR01GB121. Please check this value.*

   Response: The values have been updated accordingly in the revised HHRA.

3. *Page 10-21: There were actually six surface water samples analyzed for nickel. All four samples yielded detectable concentrations of nickel and the maximum concentration was 166 ug/l at WETDSW055. Please check these values.*

   Response: The text has been updated accordingly.

WESTON RESPONSES TO 3 JUNE 2002 DTSC (NORMAN SHOPAY) REVIEW COMMENTS
REVIEW COMMENTS ON DRAFT FINAL GROUNDWATER REMEDIAL INVESTIGATION
INVESTIGATION AREA H1 – 9 MAY 2002

GENERAL COMMENTS

1. *Figures that identify the boundary of Area HI do not appear to be consistent. (i.e. see Figures 1-2 and 2-2). Area HI boundaries should remain consistent on each figure. The property line boundary between current Navy owned property and adjacent property should also be clearly identified on all figures.*

   Response: Weston has revised the IA H1 boundaries and presented a revised site map to the agencies during the monthly agency meetings. As of the 9 October 2003, agency meeting, DTSC agreed to that the boundaries shown were correct. All maps and figures within the revised RI were changed to be consistent with the agreed upon boundaries.

2. *The Resource Conservation Recovery Act (RCRA) regulated units (landfill and surface impoundments) Solid Waste Management Units (SWMUs), Areas of Concern (AOCs) and Areas of Potential Concern (AOPCs) should be discussed in the text and identified on appropriate figures. The piping that was used to transport hazardous waste to the Industrial Waste Treatment Plant (IWTP) and Surface Impoundments should be described in the text and identified on maps. The IWTP piping is considered part of the RCRA-regulated units.*

   Response: The RCRA regulated units, including the IWTP pipeline has been identified on appropriate figures in the revised RI. AOCs have been identified as IR Sites and Group II/III Sites are shown on Figure 1-2 of the revised RI. The terms SWMU and AOPC are not used in this RI.

3. *The Navy has considered a presumptive remedy for the landfill area discussed in Section 12 of the Soil RFI Report, dated September 13, 2002. This presumptive remedy identifies and describes one remedy, a landfill cap. The Navy states in Section 12 that "Because groundwater in the vicinity of the landfill is unsuitable for potable water supplies and has no industrial or agricultural beneficial uses...there will be no exposure to contaminated groundwater within the landfill and its vicinity." GSU does not agree with the proposed presumptive remedy for the landfill area. The Navy's presumptive remedy may not provide adequate "containment" of the wastes in the landfill. A presumptive remedy that includes a RCRA and groundwater containment barrier and collection system is more appropriate to control the potential migration of contaminants in groundwater from the landfill area to adjacent non-impacted areas. In addition, in-situ soil stabilization and removal of free-floating petroleum product may be appropriate both inside and outside the boundaries of the groundwater containment system.*

   The Regional Water Quality Control Board (RWQCB) has not concluded that groundwater in each aquifer beneath and adjacent to the landfill has no beneficial uses of municipal and domestic water supply (drinking water source), agricultural supply, and

industrial process and service supply. Until the RWQCB has made such a determination and modified the Basin Plan, the groundwater beneath the site should be considered as a drinking water resource.

During construction or immediately upon completion of the approved groundwater containment system around the landfill, a sufficient number and distribution of groundwater monitoring wells will be required within each water-bearing zone. The monitoring wells should be placed at locations both inside and outside the containment system. Some of the existing monitoring wells may be suitable for this purpose provided that they are properly constructed and screened to yield representative groundwater samples from each water-bearing zone.

Response: First and second paragraphs: See response to Mr. Norman Shopay's (DTSC) 22 January 2003 (IA H1 Soil RI) General Comment No. 1.

Third paragraph: The Draft Water Quality Sampling and Analysis Plan (WQSAP), dated December 2003, includes the proposed monitoring well and piezometer array to be used as part of the remedy for the landfill and surrounding areas. This includes both existing and new wells and piezometers.

Main Text

4. *Section 3.2 (Geology). Geological cross sections are presented at different horizontal and vertical scales, as can be observed from Figures 3-3 and 3-6. Consistent horizontal and vertical scales should be maintained between geological cross sections. The geological cross sections do not identify the bedrock or additional water bearing zones beneath the landfill.*

   Response: The vertical scales of the cross-sections have been changed to be consistent throughout the figures. Based on the CPT investigation results performed in 2003, all of the cross sections have been revised. The depth to bedrock and additional sand lenses encountered at depths previously not investigated have been included on the cross sections as appropriate.

5. *Section 3.3.1 (Shallow Water Bearing Zone (SWBZ)). This section states that the direction of groundwater flow in the SWBZ is largely influenced by groundwater mounding in the area of the landfill (Figures 3-10, 3-11 and 3-12). The observed groundwater mounding on these figures appears to extend southeast over Pond 4N. GSU assumes that direction of groundwater flow would be radially outward in all directions from the highest point of the groundwater mound. However, there is insufficient information to construct a complete potentiometric surface map to the southeast, southwest and west of the landfill. Additional monitoring wells are required to determine the groundwater gradient in the SWBZ, in and around Pond 4N, in the southern portion of Pond 2N, between Pond 4N and Wetland C, and in the northern portion of Pond 2N. This is supported by the number of dashed lines on the figures and areas void of groundwater elevation contours. The groundwater flow directions and rates in the SWBZ must be properly determined.*

It has been suggested in discussions with the Navy that the IWBZ terminates to the west of the landfill. However, no supporting bases, documentation or discussion is provided in the Groundwater RI Report to support this theory. Geological Cross Sections (Figure 3-4) depicts the IWBZ as discharging to the western tidal wetland area.

Response: Despite the occurrence of dashed lines on the potentiometric surface maps, the direction and rate of groundwater flow can be accurately determined from the information gathered to date. Groundwater from the Landfill Area does flow from a mounded area in a radial pattern in virtually all compass directions across IA H1. However, based on the results of the CPT investigation, saturated conditions that could yield water to a well were not encountered. Therefore, new monitoring wells were not installed to the west or northwest of the Landfill Area.

CPT investigation results, and past soil borings from various locations west of the Landfill Area indicate that the IWBZ thins out and terminates. Revised cross section D-D', which runs through the Landfill Area, parallel to the shoreline, shows a relatively consistent IWBZ, that is not continuous to the north of IA H1. Revised cross section G-G', which is west of the Landfill Area and parallel to the shoreline, shows that the IWBZ was encountered only in two locations as thin, discontinuous sand lenses. This indicates that the IWBZ is pinching out to the west, and also indicates that the IWBZ does not directly discharge to the western tidal wetland area.

6. *Section 3.3.1 further states that the tidal marsh is not an area of groundwater discharge. Groundwater discharge is interpreted to occur further offshore as discussed in Section 6.3.4. The Navy concludes that wetlands to the north and northeast of the landfill are areas of groundwater recharge. It is GSU's opinion that there is insufficient information to support this conclusion.*

   Section 6.3.4 states that the SWBZ hydrographs presented in Appendix L, with one exception (PZ0I6 and PZ0I7), indicates a slight upward gradient. It should be noted that this represents two exceptions. Calculations used to form the basis for these conclusions were not provided. The groundwater gradient maps presented in Figures 3-10, 3-11 and 3-12 do not appear to support this conclusion. Based on GSU's review of the groundwater gradient maps appear to support the conclusion that the SWBZ groundwater discharges to the wetlands north and northeast of the landfill. The groundwater flow net appears to support convergence toward the wetlands, indicating that the SWBZ discharges to the wetlands. The Navy states that the hydrographs for the nearby SWBZ monitoring wells (01W49A and 01W54) indicate a seasonally fluctuating water table and in most cases, the water elevation also does not exceed that of the surrounding wetland surface elevation. Therefore, the Navy concludes that these hydrographs further demonstrate that the groundwater does not discharge to the non-tidal wetlands. GSU believes that this statement does not completely support the conclusion. There are a number of instances, as can be observed on the hydrographs, where the groundwater elevation is higher than the approximate wetland surface elevation indicating a potential discharge to the wetlands. The accuracy of the selected representation of the wetland surface elevation is a critical factor in this analysis. The Navy should provide additional information regarding how the wetland surface elevations were determined. In addition, the Navy should consider obtaining

groundwater and surface water elevations on a monthly basis to provide a more useful data set. Further investigation should be considered using flux chamber devices to evaluate the groundwater/surface water interaction in the wetlands.

Response: Appendix L contains data and discussion relative to the non-tidal wetlands evaluation. During this investigation, groundwater elevation measurements were measured on a monthly basis from a number of SWBZ monitoring wells within IA H1. Additionally, pressure transducers were used to record groundwater and surface water readings in monitoring wells and a stilling well, around Wetland B. The information gathered over a 16 month period was evaluated in the revised RI to determine the flow characteristics of groundwater in relation to surface water in the wetlands. The main conclusion from this investigation is that the wetlands can receive groundwater on a seasonal basis when groundwater elevations are as high as the surface water elevations, but through the majority of the year, the groundwater elevation is below the bottom of the wetlands. However, it is shown that 99.9% of the water that enters the wetlands is due to overland flow, and the groundwater contribution to the wetlands water is negligible.

7. *Section 3.3.1 states that the heterogeneity of the SWBZ is reflected in the highly variable recovery rates observed during well sampling and in-situ testing. The Navy states that most shallow wells recover immediately after purging, but approximately one-third of the shallow wells in IAH1 require 24 hours or more to fully recover. The Navy should identify the wells that are slow to recover and inspect the well construction records to determine if the cause of the slow recovery may be due to the design and construction of the well (i.e. inappropriate screen interval, mis-matched well screen and filter pack material). If this evaluation concludes that the monitoring well may not be adequately constructed, GSU recommends initially replacing one of the suspect monitoring wells with an adjacent newly constructed monitoring well to compare the performance of both wells prior to replacing the remaining wells.*

Response: Monitoring well installation logs of the wells that are slow to recharge were evaluated to determine if the wells were properly installed. A statement has been included in Appendix A that concludes that the poor recovery of the various monitoring wells is due to the clayey formation, not the construction of the wells.

8. *Section 3.3.2. There are an insufficient number of Intermediate Water-Bearing Zone (IWBZ) wells along the western boundary and downgradient of the landfill. Additional IWBZ groundwater monitoring wells are required downgradient of the surface impoundments and between the surface impoundment and the landfill. The current IWBZ groundwater monitoring network does not adequately determine the groundwater flow rate and direction in the IWBZ. The IWBZ groundwater monitoring network does not provide adequate downgradient monitoring wells to ensure the immediate detection of a release from the regulated units.*

Response: The data gaps investigation of 2003 used CPT to better determine the nature and extent of the IWBZ around the Landfill and surrounding areas. The results of the CPT investigation are included in the revised RI, and indicate that the IWBZ pinches out to the west and north of IA H1. A monitoring well array has been proposed in the *Draft Water Quality Sampling and Analysis Plan, RCRA/Facility Landfill Post-Closure*

Groundwater Monitoring, dated December 2003, to monitor downgradient points within the IWBZ zone for potential releases from the regulated units. As the surface impoundments will be located in the interior of the containment barrier, monitoring wells are not proposed between the surface impoundments and the Landfill Area.

9. *Section 5.4.2. Integration of Groundwater Monitoring data from Multiple Sources. This section states that "the groundwater characterization sections of this report include only filtered sample analysis for samples taken prior to 1999. Between 1997 and 1999 only filtered groundwater samples were collected because the unfiltered samples are not considered representative of in-situ groundwater conditions." Filtered samples are appropriate when being compared to drinking water standards. Filtered samples would not be appropriate for VOC analysis. Please provide additional discussion if VOC analyses were conducted on filtered sample. Unfiltered samples would also seem to be more appropriate when comparing to ecological standards. GSU recommends that both filtered and unfiltered laboratory results be presented. Please provide additional information if any low-flow sampling was conducted. If low-flow sampling was conducted, demonstrate that low-flow sampling procedures follow the specific procedures described in Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, by Robert Puls and Michael Barcelona, dated 1996. Low-flow sampling procedures that do not follow this specific procedure are not considered low-flow. Purging a monitoring well dry and then returning the next day to conduct low-flow sampling is not consistent with the referenced procedures.*

Response: VOC samples have not been filtered in any of the sampling events. Metals samples were filtered. As presented in Section 5.4.2 of the Revised RI, the only metals data presented is filtered data from monitoring wells purged using a "traditional" method, and unfiltered data from wells that were purged with a low-flow method (in accordance with Puls and Barcelona, 1996). This data represents the concentrations of metals in groundwater in the dissolved phase.

10. *Section 5.4.3, Characterization of Total Petroleum Hydrocarbons in Groundwater. The last paragraph of this section states that "The unidentified peaks or the remaining...were excluded from the totals because these compounds appeared to represent non-petroleum compounds." GSU is concerned that removing these peaks from the summation of Total Petroleum Hydrocarbons (TPH) as gasoline, diesel and motor oil will reduce the total concentrations reported. In addition, this practice is a deviation from Environmental Protection Agency (EPA) standard laboratory methods. The carbon ranges for TPH as gasoline, diesel and motor oil should be identified and discussed. All peaks within the specified carbon range should be summed and reported. Excluding unidentified peaks does not provide an accurate representation of the concentration of TPH as gas, diesel and motor oil. Therefore, TPH data that has excluded unidentified peaks should not be considered valid. Additional clarification is required regarding what the unidentified peaks are and why they are being eliminated and not carried forward and evaluated as Constituents of Concern (COCs).*

Response: Although it may be true that peaks were excluded from total TPH data, this would only have occurred prior to 2002, before WESTON was involved in data collection, and was a standard practice by the laboratories involved. Review of the

chromatograms has not and will not be performed. Data collected by WESTON did not exclude unidentified peaks from the TPH data.

11. *Section 5.4.4, Selection of Groundwater Screening Criteria. This section states that groundwater beneath Mare Island is not potable and that groundwater is also not considered beneficial use for agricultural uses. The RWQCB has not approved this determination regarding the beneficial use of groundwater at Mare Island. The issue of potential future beneficial use of groundwater and surface water will also require RWQCB evaluation. Therefore, it is premature that the Navy present this conclusion. Screening levels for groundwater should also include drinking water and Basin Plan objectives. In addition, if the RWQCB does designate the groundwater beneath Mare Island in all water bearing zones as having no beneficial use, it will only apply to land owned by the Navy where a deed restriction can be instituted. Adjacent non-owned Navy land and groundwater will remain as having beneficial use and drinking water and Basin Plan objectives would apply beyond Navy property boundaries.*

Response: See response to Mr. Norman Shopay's (DTSC) 22 January 2003 (IA H1 Soil RI) General Comment No. 1, second paragraph. The comment is noted that the beneficial uses exceptions will not pertain to adjacent, non-Navy owned land.

12. *Section 5.4.5, Tabular and Graphical Data Presentation. On Figure 5-2 only four wells are observed with Total Dissolved Solids (TDS) values for the SWBZ zone. On Figure 5-3 only one well is observed with a TDS value for the IWBZ zone and on Figure 5-4 only one well is observed with a TDS value for the deep water-bearing zone.*

    a. *Section 5.6, Beneficial Use of Groundwater, references wells listed on Table 5 and their locations shown on Figure 3-9. The wells identified on Table 5 do not appear to correspond to the wells identified on Figures 5-2 through 5-4. Average TDS concentrations were used in the evaluation of beneficial use. Minimum TDS concentration should be used rather than the average. Please provide additional discussion on how TDS concentrations were measured*

    b. *On Table 5-6, please indicate the well screen intervals for each well. Groundwater monitoring wells in known areas of contamination may not be reliable indicators of TDS concentrations and should be excluded from the evaluation. The elevated TDS concentrations can also be an indicator of groundwater contamination. GSU agrees with the statement in Section 5.6.1. "These areas of high dissolved solids in groundwater may be attributed to the fill materials used in creating portions of Mare Island". Therefore, the elevated TDS concentrations may be more a result of non-natural conditions as a result of the placement of fill material that is contributing to the elevated TDS concentrations.*

Response: See response to Mr. Norman Shopay's (DTSC) 22 January 2003 (IA H1 Soil RI) General Comment No. 1, second paragraph, regarding beneficial uses. Based on the recent RWQCB approval for exclusion of the domestic and municipal drinking water beneficial use (MUN), this section of the revised RI will be reworked to be more of a

summary, rather than a presentation of the TDS data. Table 5-11 includes well screen depth intervals in the revised RI.

13. *Section 5.5, Applicable or Relevant and Appropriate Requirements (ARARs). This section states that this is a CERCLA site. No discussion of RCRA is included. RCRA is also an ARAR. GSU believes that this is a RCRA site and therefore subject to RCRA requirements. Page 5-13 states that CERCLA 121(e)(I) states "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action selected and carried out in compliance with this section" GSU understands that a RCRA post-closure permit will be required for the landfill and surface impoundments and piping system. Please provide additional clarification on how the RCRA requirements are being considered.*

Response: Portions of IA H1 are considered RCRA-regulated units, as discussed in Section 6.2.1 (Landfill), and 6.2.3 (Sludge Treatment/Surface Impoundment), and the RCRA boundary (including the Landfill Area, Sludge Treatment/Surface Impoundment Area, and the IW Pipeline) is shown on most of the figures throughout the revised RI (for example, Figure 3-1). Additionally, Section 5.5 has been modified to include the following text (bottom of page 5-17):

> "Permits are considered to be administrative requirements; however, activities conducted under other federal programs, such as RCRA, will not be exempt from permit application."

14. *Section 5.6, Beneficial Use of Groundwater. The potential current and future beneficial use of groundwater requires additional evaluation and determination by the RWQCB. The shallow, intermediate and deep monitoring wells used in the assessment of groundwater beneficial use require specific evaluation by the RWQCB. Monitoring wells located within know areas of contamination should be evaluated to determine if the groundwater contamination is contributing to an increase in the TDS concentrations.*

Response: See response to Mr. Norman Shopay's (DTSC) 22 January 2003 (IA H1 Soil RI) General Comment No. 1, second paragraph.

15. *A comprehensive summary table is required with the following minimum information for each groundwater monitoring well and piezometer.*

- *Well Number*
- *Boring Number*
- *Well Type (i.e. Monitoring, piezometer)*
- *Water Bearing Zone Monitored (i.e. SWBZ)*
- *Regulated Unit Monitored (i.e., RCRA Landfill, Surface Impoundment)*
- *Type of Regulated Unit Monitoring Well (i.e. upgradient, downgradient, Point of Compliance)*
- *Status (i.e. abandoned, active)*
- *Drilling Method (i.e. Hollow-Stem Auger)*
- *Date Installed*
- *Northing*
- *Easting*
- *Last Survey Date*
- *Ground Level Elevation*
- *Top of Casing Elevation*

- *Total Depth of Boring*
- *Total Depth of Well*
- *Borehole Diameter*
- *Casing Material*
- *Casing Diameter*
- *Well Screen Material*
- *Screen Size*
- *Screen Interval*
- *Top of Screen Elevation*
- *Bottom of Screen Elevation*
- *Sand Pack Type*
- *Sand Pack Size*
- *Sand Pack Interval*
- *Bentonite Seal Type*
- *Bentonite Seal Interval*
- *Grout Mixture Type*
- *Grout Mixture Interval*
- *Well Completion Type*

Response: Table A-3 has been included in Appendix A, and includes all available monitoring well information.

16. *Historical groundwater elevation and analytical data should be presented graphically for each monitoring point. In addition, all graphs for a given constituent should be plotted at the same scale to facilitate visual comparison of monitoring data. The purpose of preparing graphical presentations is to provide a historical visual representation of all analytical data trends. Separate graphs may be appropriate to represent various parameters and groups of chemicals such that the spread of the y axis selected to best display the variability of the data will not be more than three times the range of the data. Adjustments to the horizontal time scale that considers a proportional time-based scale is preferred over a time scale which does not account for the time period between successive sampling events. The well screen interval should be included on each graph in order to determine if the groundwater elevations remain within the well screen interval and to evaluate the concentration trends when groundwater may be above the well screen interval.*

    Response: WESTON did not create time trend graphs for every constituent, at every monitoring point. Appendix M presents figures showing analytical data results for select constituents. The figures include a "call-out box" that lists the available data in chronological order.

17. *Section 5.7 (Fate and Transport Evaluation Approach). This section states that to narrow the focus of the contaminant fate and transport discussion to those contaminants considered most likely to have significant effect on the outcome of the RI, The Navy considers only inorganic constituents consistently detected at concentrations above the screening criteria ("consistently" indicates an analyte that was detected above the screening criteria in three of the last four samples collected from a well). The screening criteria are listed in Appendix G. GSU would like additional discussion regarding the basis for using these screening criteria.*

    Appendix G references five Mare Island ambient background wells that were used to estimate ambient metal background concentrations in groundwater. These wells include shallow wells BGW05; 01W07A; 01W40A; and 17W05. Intermediate and deep wells used in the data set included BGW0I: BGW02; 0IW40B; 0IW40C and 01W41. It is GSU's opinion that background wells 0IW40A, 01W40B, 01W40C, 01W4I, 0IW07A and BGW05

are not appropriate to be included in the background data analysis, because they are located in areas of elevated concentration of inorganics that do not represent background conditions. Wells 01W40A, 01W40B, 01W40C and 01W41 are located downgradient and have been impacted by a release from the RCRA landfill. Therefore, any statistical analysis using this data is not valid. GSU did not conduct an analysis of the remaining background wells. The Navy should identify existing background wells in areas that have not been impacted by site activities or construct new ambient background wells in the SWBZ, IWBZ and DWBZ.

Section 5.7 further states that organic compounds detected at concentrations greater than screening criteria ("consistently" indicates an analyte was detected above the screening criteria in three of the last four samples collected from a well) will be discussed. As previously stated, the basis for the use of these screening criteria should be discussed in greater detail. The Navy has stated that the use of these screening criteria is intended only to narrow the focus of discussion however, in Sections 6.5.1 and 6.5.3, the Navy further uses this screening criteria to define the Potential Constituents of Concern and COCs. The Navy should provide additional clarification. The total health risk should be presented to the public without screening out specific analytes based on a comparison to ambient concentrations. These ambient conditions are a result of Navy previous activities and should be considered in the total risk evaluation since they do not represent background conditions.

Response: First paragraph: Screening criteria have been revised to no longer include drinking water standards, based on the exception by the RWQCB to exclude the MUN beneficial use of groundwater. The screening criteria were developed with the opportunity for the regulating agencies to comment on them prior to submittal of the revised RI. A discussion of the screening criteria presented in the revised RI is included in Section 5.

Second paragraph: The screening criteria presented in Section 5 of the revised RI include the results of the calculations for ambient background levels for metals for the IWBZ and DWBZ. Wells 01W40B/C and 01W41 were not used in this evaluation. The methodology used for determining the IWBZ and DWBZ ambient levels was similar to that used for the SWBZ, which was approved by DTSC.

Third paragraph: The approach to use "consistently exceeding" criteria is not included in the revised RI. The risk assessment is completely independent from the nature and extent discussions of Chapter 6; the risk assessment considers each constituent, rather than focus on a set of constituents pared down using a screening approach. Additionally, the risk assessment does not subtract out ambient background concentrations prior to calculating risk; however, ambient and total risks are presented separately. Screening criteria were not used to define constituents of potential concern. All detected chemicals were considered constituents of potential concern except essential nutrients and infrequently detected chemicals as described in Appendix I.

18. *Section 6.4 (Chemical Characterization). No analysis for perchlorate, N-Nitrosodimethylamine, 1,2,3-Trichloropropane and Polybrominated Diphenyl Ether have been conducted.*

<u>Perchlorate</u> (ClO_4) originates as a contaminant in the environment from the inorganic salts of ammonium, potassium, magnesium or sodium perchlorate. This pollutant is exceedingly mobile in aquifer systems. It can persist for many decades under typical groundwater and surface water conditions, because of its low reactivity. Perchlorate is among a group of unregulated chemicals requiring monitoring pursuant to Title 22, California Code of Regulations § 64450. Perchlorate does not have to be regulated to require sampling under Article 6. California Code of Regulations, Title 22, Section 66265.93 requires monitoring for all constituents of concern and defines constituents of concern as "waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the regulated unit". There is a reasonable expectation that perchlorate may be present in groundwater because flares, tracer rounds or ordnance may have been disposed into the landfill. The GSU considers the Groundwater RI Report incomplete until adequate sampling and analysis for the perchlorate and the following has been completed:

<u>N-Nitrosodimethylamine</u>, also known as NDMA ($C_2H_6N_2O$) is a product from the decomposition of unsymmetrical dimethyl hydrazine, a component used in the production of rocket fuel (Aerozine 50). This chemical is used as an additive in liquid propellant fuel for rocket engines. NDMA is used primarily in research but it can also be formed inadvertently in a number of industrial processes. NDMA is identified as a carcinogen under California's Health and Safety Code Section 25249.5, et seq., and the Safe Drinking Water and Toxic Enforcement Act of 1986 ("Proposition 65"). In addition, the United States Environmental Protection Agency (USEPA) identifies NDMA as a "probable human carcinogen" (USEPA, 1997).

<u>1,2,3-Trichloropropane (TCP).</u> This chemical has been used primarily as a solvent and extractive agent. As a solvent, it has commonly been used as a paint and varnish remover, a cleaning and degreasing agent and a cleaning and maintenance solvent. TCP is not a naturally occurring chemical. Releases to the environment are likely to occur as a result of its manufacture, formulation, and use as a solvent and extractive agent, paint and varnish remover, cleaning and degreasing agent, cleaning and maintenance reagent, and chemical intermediate. TCP is reasonably anticipated to be a human carcinogen based on sufficient evidence of malignant tumor formation at multiple sites in multiple species of experimental animals.

<u>Polybrominated Diphenyl Ether (PBDE):</u> A family of flame-retardants used in polyurethane foam, textiles, and plastic electronic casings. This chemical bioaccumulates in marine mammals, birds, and humans.

<u>Response:</u> The data gaps investigation of 2003 included sampling for emergent chemicals. This included perchlorate, and 1,2,3-trichloropropane (TCP) as discussed in the Draft Data Gaps Sampling Plan dated 25 September 2003. Nitrosodimethylamine

(NDMA) is not included in the list of analytes because NDMA is a product used in the production of rocket fuel and the use of rocket fuel is not suspect within IA H1. Additionally, polybrominated diphenyl ether (PBDE) is not included because PBDE presence is not suspected at IA H1 and no U.S. laboratories are available to run the analysis for this constituent.

The results of perchlorate and TCP sampling are incorporated into the RI; however, these constituents were not found to exceed screening criteria.

19. *Section 6.4 states that to manage the discussion of the large amount of data from historic sampling of these wells, the data has been broken out and is presented by subareas and water bearing zones. These areas are as follows:*

- *Undeveloped Demolition Debris Subarea;*
- *Undeveloped Northwest Dump Road Subarea;*
- *West Sub area;*
- *South Dredge Pond Subarea;*
- *Undeveloped North Wetlands Subarea;*
- *Fire-fighting Training Subarea;*
- *Landfill Area;*
- *Waste Sump/Lead Oxide Storage and Disposal Area;*
- *Sludge Treatment/Surface Impoundment Area;*
- *Solid Waste Disposal/Lead Oxide Storage and Disposal Area;*
- *IWTP Area;*
- *IA I and J; and*
- *DRMO Scrapyard/IRI0/IRI3 Areas.*

GSU does not understand the purpose or objective in breaking out the groundwater discussion into multiple subsections and for each subsection discussing each individual water-bearing zone. It would seem that there may be some benefits to considering the area as one unit. Please provide additional clarification regarding the purpose and objective of using this approach. The Navy should consider reorganizing the Groundwater RI Report based on the intended use of the land.

Response: The presentation of data in the revised RI has been changed to address groundwater across water-bearing units, as opposed to delineated areas or subareas. The only exception to this is the containment area. The SWBZ inside the containment barrier will be contained by the containment barrier and hydraulic connection with the surrounding SWBZ groundwater will be eliminated.

20. *Section 6.4.1.1 (Undeveloped Demolition Debris Subarea)*

No groundwater monitoring wells are located in this area. Three groundwater grab samples were collected. No reference is provided that directs the reader to the location of the results for the grab groundwater samples. The Navy should reference Table 6-5 in this section. Section 4.14 states that the analytical results for groundwater samples were

intended to serve as qualitative indicators of contamination and were primarily used to select optimum locations for monitoring wells. In Table 6-5, a column heading is listed as "Constituents Exceeding Screening Criteria". This appears to be inconsistent with the intended use of grab groundwater data as stated in Section 4.14. It is not clear to the reader what the screening criteria is and how it is being applied and used in Table 6-5. It is also not clear what parameters were actually analyzed for in the grab groundwater samples. Please provide additional clarification regarding the footnotes on the table. Figure 6-7 reports a depth to oil in IR01GB076 at -2.5 feet indicating that floating product is present in this area. The limits of the floating product have not been determined.

It is further stated that grab groundwater samples were analyzed for Polychlorinated Biphenyls (PCBs), hexavalent chromium, Volatile Organic Compounds (VOCs) Semi-Volatile Organic Compounds (SVOCs), and Total Petroleum Hydrocarbons (TPH). These parameters were based on site history described in Section 6.1.1.1. It is not clear if all groundwater samples were analyzed for these parameters. GSU was unable to locate the laboratory results for the grab groundwater samples. It is stated that four constituents were detected: 1-4-dichlorobenzene, TPH as diesel, TPH as motor oil and TPH as gasoline.

Section 6.1.1.1 states that records pertaining to the exact type and volumes of demolition debris disposed in this area are not available. If the type of demolition debris was not able to be determined, then it would seem that additional laboratory analysis should have been conducted for metals. Because the groundwater grab samples were intended as a screening tool to select the location for future groundwater monitoring wells, the Navy should discuss the placement of monitoring wells based on the results obtained from the grab groundwater samples. In this case, it would seem that placement of additional monitoring wells would be appropriate based on the screening criteria. Additional groundwater investigation may be required in this area.

The various iso-contour maps for the SWBZ, IWBZ and DWBZ use the screening criteria as the minimum contour line. The contour maps should be prepared using a value which is significantly less than the screening criteria as a basis for establishing the minimum contour line. The iso-concentration contours maps should be prepared to demonstrate that the lateral extent of groundwater contamination has been defined. Data gaps should be identified and recommendations should be included to resolve data gaps. Based on GSU's review of the iso-concentration contour maps the lateral extent of TPH as motor oil, arsenic, barium, copper, lead, manganese, nickel and barium do not appear to be defined.

Response: This discussion has been re-worked, without relation to the Demolition Debris Subarea.

First Paragraph: The intended use of the grab groundwater sample results mentioned in this section was to guide the placement of monitoring wells, which was done. As listed in this section, a total of 16 monitoring wells were installed and sampled. Other grab

groundwater samples did not have the same purpose and were used to collect groundwater data to help delineate the nature and extent of contamination.

A review of the boring log of IR01GB076 indicates that the oil detected was described as "trace oil". This is not interpreted to be a measurable thickness of free product that would be floating atop the water table. As part of the data gaps investigation of 2003, a CPT boring (DD-CPT103) was advanced to the northeast, and downgradient, of IR01GB076 in order to determine if any contaminants may be migrating in this area. A shallow groundwater sample could not be obtained from the SWBZ at this location, due to a lack of yield from the silty clay. The groundwater sample from the IWBZ did not detect any TPH constituents, and did not detect VOCs above screening criteria. This indicates that contamination does not appear to be migrating from IR01GB076 toward Wetland A, or vertically downward.

Second Paragraph: Tables are included to identify the analytes for which each grab groundwater sample was analyzed. This is provided not only for the Demolition Debris Subarea, but for all of the grab groundwater samples within IA H1.

Third paragraph: Based on the results of the grab groundwater data, additional monitoring wells were not deemed necessary (by PRC). In an attempt to determine if groundwater contaminants are migrating from the Demolition Debris area, DD-CPT103 was advanced during the 2003 data gaps investigation. A SWBZ groundwater sample could not be collected, as the subsurface consists of fine-grained material, and would not yield water. This indicates that contaminant migration is not likely to be significant due to the type of material present, and its low hydraulic properties. Samples from the IWBZ and DWBZ were collected. A complete discussion of the data obtained in this area is incorporated into the revised RI.

Fourth Paragraph: With the revision of the SWBZ screening criteria to exclude the municipal and domestic drinking water beneficial use, many of the iso-concentration maps clearly define the lateral extent of constituents to levels less than the screening criteria. Additionally, more data were collected from all three water-bearing zones during the data gaps investigation of 2003. These data are incorporated into the figures in Appendix M, and were used to help delineate the extent of contamination.

21. *Section 6.4.1.2 (Undeveloped Northwest Dump Road Subarea)*

Figure 6-7 presents an isoconcentration contour line indicating the depth of oil/free product. The limits do not appear to be well defined westward of borings IR02GB004 and IR02GB005. Additional investigation related to the presence of oil/free product appears to be required. This section provides, a narrative of the chemicals detected in each water bearing zone with reference to the summary of detected constituents contained in Tables 6-6 through 6-8. However, no discussion is provided that demonstrates that the Navy has defined the lateral and vertical extent of groundwater contamination in each water bearing zone. This same comment applies to all remaining subareas. The subsurface IWTP pipeline is located in this area. Its location is not identified on a map. No

discussion is provided regarding the depth of the pipeline and the Navy's evaluation of the pipeline acting as a preferential pathway for migration of contaminated groundwater. Based on GSU's review of the isoconcentration contour maps, the lateral and vertical extent of TPH as diesel, TPH as motor oil, arsenic and barium do not appear to be defined.

Response: Groundwater data from the three water-bearing units in the Northwest Dump Road Subarea is discussed as part of IA H1 as a whole, and includes discussion of the lateral and vertical extent of contamination. As part of the data gaps investigation in 2003, two soil borings were advanced in the vicinity of IR02GB004 and IR02GB005 to delineate the lateral extent of the oil/free product at these locations (NDR-SB02, NDR-SB03). Free product was identified at NDR-SB02; furthermore, soil samples collected from NDR-SB02 exceeded screening criteria for TPH and several PAHs. The results of the data gaps investigation are incorporated into the revised RI.

The IWTP pipeline is considered a RCRA-regulated unit, and is identified on figures in the revised RI. Additionally, information pertaining to the construction of the pipeline, and its potential to act as a preferential pathway is discussed.

The extent of contaminants is addressed for each water bearing zone, not each area or subarea, in the revised RI.

22. *Section 6.4.1.3 (West Subarea)*

On various figures, the boundary of this subarea does not appear to extend to the property line to the west. A total of three monitoring wells are located within this subarea consisting of one three well cluster (01W39A, B and C). Additional groundwater monitoring wells are required upgradient, downgradient and along the western boundary of this subarea. Based on GSU's review of the iso-concentration contour maps, the lateral extent of TPH as motor oil, arsenic, barium, chromium, copper, lead, manganese, nickel and barium do not appear to be defined.

Response: See Mr. Norman Shopay's (DTSC) 15 May 2003 General Comment No. 1 (IA H1 Soil RI), regarding property lines and boundaries. As part of the 2003 data gaps investigation, WS-CPT102 was advanced along the western boundary of this subarea. Contamination was not encountered in this CPT location. Upgradient wells are located in the various other areas and subareas of IA H1. No new monitoring wells were installed within, or along the boundary of the West Subarea. Also note that groundwater contamination is discussed and evaluated on a site-wide basis in the revised RI, rather than a subarea-specific basis.

23. *Section 6.4.1.4 (South Dredge Pond Subarea)*

The distribution and frequency of groundwater monitoring wells in this subarea are not sufficient to evaluate a groundwater gradient and contaminant distribution in each water bearing zone. No DWBZ monitoring wells have been installed in this subarea. GSU

recommends that additional groundwater monitoring wells be installed along the northern, eastern, southern and western portions of the subarea.

Response: Two CPT locations were investigated during the 2003 data gaps investigation. SDP-CPT106 was located west of the South Dredge Pond Subarea, and SDP-CPT107 was located to the south. IWBZ and DWBZ groundwater samples were collected from these locations to better characterize and delineate the extent of contamination. SWBZ samples could not be collected due to insignificant yield to the CPT sampler, indicating that the areas consist of fine-grained material with low hydraulic properties. No new monitoring wells were installed in or around the South Dredge Pond Subarea. Also note that groundwater contamination is discussed and evaluated on a site-wide basis in the revised RI, rather than a subarea-specific basis.

24. *Section 6.4.1.5 (Undeveloped North Wetlands Subarea)*

The distribution and frequency of groundwater monitoring wells in this subarea are not sufficient to evaluate a groundwater gradient and contaminant distribution in each water-bearing zone. Based on GSU's review of the iso-concentration contour maps the lateral extent of arsenic, barium, chromium, copper, lead, manganese, nickel and barium do not appear to be defined.

Response: One CPT location was investigated during the 2003 data gaps investigation in this subarea. NW-CPT101 was located along the northwestern border of the North Wetlands Subarea. A SWBZ sample could not be collected due to insignificant yield to the CPT sampler, indicating that this area consists of fine-grained material with low hydraulic properties. IWBZ and DWBZ groundwater samples were collected from this location. This data supplements the data from existing monitoring wells and is incorporated into the revised RI. No new monitoring wells were installed in or around the North Wetlands Subarea. Also note that groundwater contamination is discussed and evaluated on a site-wide basis in the revised RI, rather than a subarea-specific basis.

25. *Section 6.4.1.6 (Fire-fighting Training Subarea)*

One monitoring well (01W13) is located in the SWBZ in this subarea. The distribution and frequency of groundwater monitoring wells in this subarea are not sufficient to evaluate a groundwater gradient and contaminant distribution in each water-bearing zone. Based on GSU's review of the iso-concentration maps the lateral extent of TPH as motor oil, arsenic, barium, chromium, copper, lead, manganese, nickel and barium do not appear to be defined.

Response: No new monitoring wells were installed in the Fire-Fighting Training Subarea. Monitoring well data from the surrounding subareas is used to evaluate gradient and contaminant distribution across this subarea. Groundwater contamination is discussed and evaluated on a site-wide basis in the revised RI, rather than a subarea-specific basis.

26. *Section 6.4.1.7 (Landfill Area)*

The distribution and frequency of groundwater monitoring wells appear to be sufficient for characterization purposed if this area's anticipated remedy is cap and containment with groundwater extraction. However, as can be observed on Figure 6-63 the extent of arsenic groundwater contamination has migrated beyond the landfill area to Ponds 4N, 4M and 2M. GSU recommends that Ponds 4N, 4M and 2M be included in Area H1 since it appears that contaminated groundwater has migrated from the landfill to these areas. Additional groundwater monitoring wells are recommended outside the landfill area to determine the extent of groundwater contamination.

Response: The comment correctly asserts that cap and containment with groundwater extraction will be the remedy for the Landfill Area. Area H1 boundaries will remain the same and will not include Ponds 4N, 4M, and 2M. These ponds are included as part of Area I and were discussed with the RI for Area I. The screening criteria for arsenic in the SWBZ is 78 ug/L, which is based on ambient background conditions. Therefore, the concentration observed in well 01W40A does not indicate that contamination is migrating across Pond 4N, rather, that the concentration is typical of background concentrations. No new monitoring wells, with the exception of wells associated with the future Dredge Pond operation, have been installed among the Dredge Ponds.

Additional monitoring wells along the perimeter of the Landfill Area (and other areas) will be installed as presented in the WQSAP for post closure sampling.

27. *Section 6.4.1.8 (Waste Sump/Lead Oxide Storage and Disposal Area)*

Seven SWBZ monitoring wells are located in this area. No IWBZ and DWBZ groundwater monitoring wells have been constructed in this area. As referenced in Section 6.1.2, historical activities reported that the surface area, adjacent to the sumps, was used for burning of miscellaneous wastes, using waste oil from the sumps. Additional groundwater monitoring wells are required to evaluated the IWBZ and DWBZ. Additional chemical analysis of dioxin/dibenzo furans is required in each water bearing zone. As presented on Table 6-21, only a limited number of analysis for explosive were conducted. Additional analysis of explosives is recommended. A limited number of hexavalent chromium analyses were conducted. Additional analysis of hexavalent chromium is recommended.

Response: The Waste Sump/Lead Oxide Storage and Disposal Area will be included in the interior of the slurry wall containment barrier. Therefore, new monitoring wells will not be constructed in this area. Furthermore, the area inside of the proposed containment barrier was not the focus of the 2003 data gap study. However, one CPT location was investigated during the 2003 data gaps investigation along the eastern perimeter of the Waste Sump Area, SDP-CPT105, and groundwater samples were collected from IWBZ and DWBZ. This data supplements the data from existing monitoring wells and is incorporated into the revised RI. The samples collected from SDP-CPT105 were not analyzed for hexavalent chromium, as monitoring wells were slated to be sampled for

these parameters during the data gaps investigation. A few explosives were detected in the groundwater in the Waste Sump/Lead Oxide Storage and Disposal Area, but there are no screening levels for the explosives and none of the explosives were detected in the soil. Therefore, explosives have not been considered chemicals of concern in this area. The Waste Sump/Lead Oxide Storage and Disposal Area is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. Finally, additional characterization of the area within the containment barrier for all chemicals is not considered necessary due to the nature of the proposed remedy.

28. *Section 6.4.1.9 (Sludge Treatment/Surface Impoundment Area)*

Seven SWBZ wells and one DWBZ well are located in this area. No IWBZ monitoring wells have been constructed in this area. Additional groundwater monitoring wells are required to evaluate the IWBZ and DWBZ. As presented on Table 6-21, only a limited number of hexavalent chromium analysis were conducted. Additional analysis of hexavalent chromium is recommended. Additional chemical analysis of dioxin/dibenzo furans is required in each water bearing zone.

Response: As the Sludge Treatment/Sludge Impoundment Area will be included within the slurry wall containment barrier, new monitoring wells will not be installed in this area. Furthermore, the area inside of the proposed containment barrier was not the focus of the 2003 data gap study. One CPT location was investigated during the 2003 data gaps investigation. SSTP-CPT108 was centrally located in this area and DWBZ groundwater samples were collected. The IWBZ was not present at this location, as shown on cross section A-A' (Figure 3-3). This data supplements the data from the existing monitoring wells and is incorporated into the revised RI. As noted in response to the previous comment, explosives are not considered a threat to human health, ecology, or groundwater in this area due to the lack of screening levels and lack of presence in the soil in these areas. Hexavalent chromium has been analyzed in many samples in the soil and groundwater in IA H1. Of over 70 soil sampling locations analyzed for hexavalent chromium throughout H1, it has only been detected in 4. Likewise, of over 80 groundwater sampling locations analyzed for hexavalent chromium throughout H1, it has only been detected in 3. Thus, hexavalent chromium is considered well characterized throughout IA H1, and is not considered a chemical of concern. The Sludge Treatment/Sludge Impoundment Area is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. Finally, further characterization of the area within the containment barrier for all chemicals, including hexavalent chromium and dioxins/dibenzo furans, is not considered necessary due to the nature of the proposed remedy.

29. *Section 6.4.1.10 (Industrial Wastewater (IW) Pipeline)*

No monitoring wells have been installed for the purpose of monitoring groundwater quality for the IWTP Pipeline. GSU recommends that additional SWBZ groundwater monitoring wells be installed to evaluate the groundwater quality beneath the pipeline.

Response: Additional wells were not installed along the IW pipeline. Based on grab groundwater sample results, contaminants exceeding screening criteria were only detected within the Solid Waste Disposal/Lead Oxide Storage and Disposal Area (IR16) along the length of the IW pipeline within IA H1. The TPH contamination within IR16 has been addressed as part of the excavation activities within this area, which occurred in winter 2003/2004.

Additionally, WESTON evaluated the results of chemical analyses from soil samples collected along the length of the pipeline. This evaluation was presented to DTSC in a letter to Chip Gribble, dated 9 October 2003. The evaluation indicated that "non-metals contamination along the pipeline is minimal... and the metals concentrations along IR14 are similar to the metals concentrations in the surrounding areas." This lead to the conclusion that it is not likely that the IW pipeline has contaminated the surrounding area.

30. *Section 6.4.1.11 (Solid Waste Disposal/Lead Oxide Storage and Disposal Area)*

Five SWBZ, two IWBZ and two DWBZ monitoring wells are located in this area. Based on GSU's review of the iso-concentration contour maps, the lateral extents of arsenic, lead, manganese and nickel do not appear to be defined. The extent of oil/free product as presented on Figure 6-7 does not appear to be defined in the direction of Wetland X and in the vicinity of Sumps 1 and 2.

Response: See response to Mr. Norman Shopay's (DTSC) 3 June 2002 comment No. 20, fourth paragraph, regarding isoconcentration maps.

A soil boring program was executed in spring 2003 along the perimeter of the proposed containment barrier. One objective of this program was to identify the extent of free product. If free product was identified in a boring, an additional boring was advanced 20 feet away from the landfill until a visually clean boring was achieved. Furthermore, the extent of oil/free product (now shown on Figure 9-8) will be addressed through several actions. The containment barrier will encompass waste sumps 1 and 2. Additionally, the trench will be equipped with oil separators to handle any free product which enters the trench. The contamination in the Solid Waste Disposal/Lead Oxide Storage and Disposal Area was removed during the IR16 removal action in winter 2003/2004.

31. *Section 6.4.1.12 (IWTP Area)*

Five SWBZ and three IWBZ monitoring wells are located in this area. No DWBZ monitoring wells have been installed in this area. Additional DWBZ monitoring wells are

recommended. As presented on Tables 6-27 and 6-28, only a limited number of analyses for explosive parameters and hexavalent chromium were conducted. Additional analysis of explosives and hexavalent chromium is recommended.

Response: As the IWTP Area will be included within the slurry wall containment barrier, new monitoring wells will not be installed in this area. Furthermore, the area inside of the proposed containment barrier was not the focus of the 2003 data gap study. One CPT location in the general vicinity of the IWTP Area was investigated during the 2003 data gaps investigation. SSTP-CPT108 is located downgradient of the IWTP Area and DWBZ groundwater samples were collected. The IWBZ was not present at this location. The data collected supplements the data from the existing monitoring wells and is incorporated into the revised RI. See response to Shopay June 2002 comments 27 and 28 for discussion on explosive parameters and hexavalent chromium as chemicals of concern in IA H1.

32 *Section 6.4.1.13 (IA I and J)*

The reader finds the organization of this section confusing. Areas IA I and J are not referenced to any figures. The relationship to Ponds 1, 2N, 4N and 3W and IA I and J should be clarified. It appears that no wells or piezometers are located in Area IA I. No discussion is provided that references the extent of contamination in each water bearing zone.

It is stated that Area J SWBZ piezometers were analyzed only for metals, with a total of only six metal constituents detected. GSU's review of Table 6-29 indicates that only seven metals were analyzed. Arsenic was not included in the analysis. This statement is misleading, and may lead some readers to conclude that more metals were analyzed than were actually analyzed. Significant deviations should be cited in the text to prevent potential misinterpretation of data. Only one SWBZ sampling event for explosives and hexavalent chromium occurred at Pond I. Seven metals were analyzed in three SWBZ sampling events at Pond 2N. Limited sampling for explosives, herbicides and hexavalent chromium in the IWBZ has occurred at Pond 2N. Additional analysis is recommended.

Response: The IA I and J data were presented only to provide a comprehensive discussion of all of the available data. For the purposes of the IA H1 RI, IA I and J are not covered. Additionally, the IA I and J RI, which covered both soil and groundwater, has been approved by the regulatory agencies. No further investigation in IA I and J has been performed and no future investigation is planned. This section has in large part been removed from the revised RI.

33. *Section 6.4.1.14 (DRMO Scrapyard/IRI0/IR13)*

No groundwater monitoring wells are located in this area. Thirty-six SWBZ grab groundwater samples have been collected in this area. This section stated that explosives, herbicides, pesticides, PCBs and SVOCs were not detected in SWBZ grab samples. Table

6-5 reports both pesticides and PCBs have been detected. It appears that additional groundwater monitoring wells are required in this area based on the results of the grab groundwater samples.

Response: Data presented in the Draft Final Groundwater RI for the DRMO Scrapyard/IR10/IR13 was only presented for informational completeness. These areas are not part of IA H1 and data for these areas is not presented in the revised RI.

34. *Section 6.5 (Nature and Extent of Groundwater Contamination)*

This section states that the significance of the chemicals identified as COPCs are further evaluated by determining whether they are "consistently detected" (defined in Section 5.4.5 as detected in at least three of the last four sample events at multiple locations), as opposed to low-level, random or anomalous occurrences. Finally, a series of graphic plume maps are presented to depict the horizontal and vertical extent of those constituents determined to be significant in the three water-bearing zones.

GSU does not agree with the Navy's "consistently detected" screening approach used as a screening method. The evaluation of the nature and extent of groundwater contamination in each water bearing zone should not be restricted to this screening evaluation. The Navy's approach may tend to under estimate the horizontal and vertical extent of groundwater contamination.

Response: The "consistently detected" approach is not used in the revised RI. The groundwater data is analyzed using a different methodology, as follows. To determine the extent of contamination, the latest four rounds of data from each monitoring point, not necessarily concurrent across all points, were evaluated. If a given constituent exceeded screening criteria in any of the latest four rounds, the nature and extent of contamination of that constituent was determined. The methodology/approach is thoroughly outlined in Section 5 of the revised RI.

35. *Section 6.5.1 (Groundwater Constituents of Concern)*

This section describes how the data is further screened after first applying the "consistently detected" criteria by secondary evaluation to groundwater aquatic screening criteria to determine "consistently exceeded" (when the detected analyte concentration exceeds the screening criteria in three of the four last sampling events) to develop a final list of COPCs. GSU does not agree with the Navy's screening approach to develop a list of COPCs. All detected constituents should be included as COPCs as well as other constituents that may be present which have not been sampled for (i.e. Perchlorate).

In addition, GSU does not agree with the estimation of ambient metal concentrations in groundwater as presented in Appendix G. As previously discussed, some monitoring wells used in the evaluation are located in impacted contaminated areas resulting in higher average background concentrations. In addition, Mare Island ambient

background groundwater concentrations should be established for the SWBZ, IWBZ and DWBZ. Therefore, comparison of metal concentrations to an ambient value for the purpose of excluding the metal as a COPC is not valid. The total human and ecological health risks should be presented to the public without screening out selected COPCs. The ambient metal evaluation conducted in Appendix G requires revision and submission to DTSC for review and approval. Revisions to the remaining discussion in Section 6.5 should be modified related to the terms "consistently detected" and "consistently exceeded" and iso-concentrations contour maps should be prepared based on un-screened data. The lateral and vertical extent of groundwater contamination is not adequately characterized to support conducting a human and ecological risk assessment.

Response: The "consistently exceeded" approach is not used in the revised RI. The groundwater data is screened using a different methodology, as described in the response to the previous comment above (No. 34).

WESTON does not agree with the DTSC position that "constituents that may be present which have not been sampled for" should be included as potential contaminants of concern. The sampling efforts conducted across IA H1 are more than adequate, and cover all of the potential contaminant classes. Justification is provided for not sampling various constituents, such as PBDE (see comment 18 above).

See response to Mr. Norman Shopay's (DTSC) 22 January 2003 General Comment No. 1 (Area H1 Soil RI), second paragraph, with regard to approval of SWBZ ambient background levels. The revised RI presents ambient background levels for the IWBZ and DWBZ, developed using the same approach as for the SWBZ.

The human and ecological risk assessments considered constituents without regard to their status as a potential contaminant. All detected chemicals were considered constituents of potential concern except essential nutrients and infrequently detected chemicals as described in Appendix I.

It is unclear what is meant by "un-screened" data. The iso-concentration maps were prepared using the data available for the time periods chosen. Data were not excluded from these maps. The lateral and vertical extent of groundwater contamination is presented in the revised RI, and is believed to be adequate to support a human and ecological risk assessment.

36. *On Figures 3-3 and 3-5 a separate new water bearing sand is identified below the DWBZ. Please provide additional discussion on this additional water bearing sand.*

Response: All of the cross sections have been revised. The "new" water-bearing zone is still referred to as the DWBZ, and is interpreted to consist of various sand lenses within a fine-grained clay and silt matrix.

37. *Radionuclides analysis of groundwater samples should be conducted at all Point-of-Compliance wells.*

Response: Radionuclide analysis will be included in the WQSAP for point of compliance wells.

WESTON RESPONSES TO 22 JANUARY 2003 DTSC (NORMAN SHOPAY) REVIEW COMMENTS
MARE ISLAND DRAFT REMEDIAL INVESTIGATION
INVESTIGATION AREA H1 SOIL, IR05, AND WESTERN MAGAZINE AREA,
13 SEPTEMBER 2002

GENERAL COMMENTS

1) *The Navy has considered a presumptive remedy for the landfill area discussed in Section 12 of the Soil Report. This presumptive remedy identifies and describes one remedy, a landfill cap. The Navy states in Section 12 that "Because groundwater in the vicinity of the landfill is unsuitable for potable water supplies and has no industrial or agricultural beneficial uses...there will be no exposure to contaminated groundwater within the landfill and its vicinity." GSU does not agree with the proposed presumptive remedy for the landfill area. The Navy's presumptive remedy may not provide adequate "containment" of the wastes in the landfill. A presumptive remedy that includes a Resource Conservation Recovery Act (RCRA) cap and a containment slurry wall with a groundwater interceptor trench may be more appropriate to control the potential migration of contaminants in groundwater from the landfill area to unimpacted areas. Also the Regional Water Quality Control Board (RWQCB) has not concluded that groundwater beneath and adjacent to the landfill area is not considered to be a potable drinking water resource or having no industrial or agricultural beneficial uses. Therefore, the Navy's statement regarding beneficial use is premature and the Navy should revise the statement that groundwater is unsuitable for potable water supplies.*

   Response: Since the date of this comment letter, WESTON has prepared an Interim Remedial Action Plan (IRAP), which outlines the remedy for the Landfill Area and surrounding areas. This remedy includes a slurry wall containment barrier, a groundwater extraction trench, and a RCRA cap. Currently WESTON is finalizing the Design Document and is planning to begin construction of the slurry wall in mid-spring 2004.

   WESTON submitted a letter, dated 29 July 2003, to the San Francisco Bay Regional Water Quality Control Board (RWQCB) requesting a beneficial use exemption for groundwater located within IA H1 of Mare Island. The letter included a summary of the available total dissolved solids (TDS) data for numerous wells within the shallow, intermediate and deep water-bearing zones, which indicated that a large majority of the results were greater than 3,000 mg/L TDS. Based on these results, the RWQCB concurred with WESTON that groundwater within IA H1 does not have a beneficial use as a municipal or domestic supply and approved the exemption. This is documented in a letter of 17 March 2004 from the RWQCB to the Navy. As a result, the revised RI only considers other beneficial uses for groundwater, and excludes MCLs and PRGs from screening criteria; however, MCLs and PRGs are still presented on the screening criteria table for reference.

2) *It is GSU's opinion that a broader presumptive remedy should be considered for the landfill area discussed in Section 12 as well as additional landfill areas outside the landfill boundary described in Section 12. This broader area should encompass additional historic*

landfill areas. It is GSU's opinion that the RCRA landfill is not limited to the 30 acres identified in the RCRA Part A Application but also includes the additional 100 acre historic landfill identified on the RCRA Part A Application and any additional abandoned or inactive landfill disposal sites that existed prior to 19 November 1980 that may be causing or contributing to an imminent and substantial endangerment to human health and the environment should be included in the RCRA landfill.

Response: The boundary of the RCRA Landfill has been defined in the *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003. WESTON has prepared an IRAP, which outlines the remedy for the Landfill Area and surrounding areas. This remedy includes a slurry wall containment barrier, a groundwater extraction trench, and a RCRA cap. Areas with risks outside of the proposed containment barrier will be assessed in a Feasibility Study (FS) for IA H1.

3) *The internal cover pages of the Soil Report indicates that soil and surface water are considered part of this report. GSU understands that this Soil Report is not intended to discuss surface water issues. The internal cover pages should be revised accordingly.*

Response: The revised RI Report includes all media within IA H1, and no longer single out individual media in the title.

4) *The executive summary states that the Soil Report addresses soil, sediment and surface water within Area H1. The reference to surface water should be removed.*

Response: The revised RI Report includes all media within IA H1. The executive summary is completely revised to reflect the changes to the report.

5) *The Soil Report states that activities will be performed as part of a wetland hydrology evaluation in IA H1 and Area IR-05. Figure 2-1 does not present a clear understanding of the boundaries of IA H1 and Area IR-05. The boundary of the RCRA-regulated units (landfill, surface impoundments, and historical landfill) as identified on the RCRA Part A application should be clearly indicated on all maps and figures. Previously identified Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) should be listed in a table and identified on appropriate site maps. In the future, a surveyed boundary of the RCRA-regulated units will be required. Please prepare a SWMU and AOC table, revise Figures 2-1, 2-4, and additional maps and figures as necessary.*

Response: The RCRA boundaries have been surveyed and defined in the *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003. These boundaries appear on all relevant maps and figures within the revised RI. This RI is organized on the basis of areas of concern as they pertain to the presumptive remedy for the landfill area. A conceptual site model has been developed for the area considering the remedy and containment area. All AOCs and SWMUs formerly identified have been taken into consideration for this RI; however, a list will not be provided as many of these units are obsolete.

6) *Various maps and figures present topographic and bathometric information with a contour interval of five-feet. Considering the relatively flat nature of the area, a more detailed topographic and bathometric map should be prepared. The more detailed maps will be useful in the evaluation of previous soil sampling locations relative to surface water runoff into the wetlands.*

Response: The larger figures showing the entire extent of IA H1 contain several details of the site. More detailed topography on these figures would cause certain site features to be unrecognizable. Any figures that show smaller areas or subareas of the site include 1-foot contours in the revised RI report.

7) *Additional review of all boring logs should be conducted to determine the lateral and vertical extent of the boundaries of the historic landfill area. A detailed map of the historical landfill boundary should be included. Figure 2-3 requires additional detail regarding the limits of the historic landfill area.*

Response: Figure 2-3 has been revised to include the RCRA boundaries of the RCRA Landfill, the IWTP area, and the IR14 pipeline, as defined in the *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003. The determination of the RCRA boundaries was based on review of existing documents including historical photographs.

8) *Page 1-6 states that "If potential cancer risk is within the target risk range (10^{-4} to 10^{-6}), then risk management decisions will be required to determine remedial action recommendations and the scope of the FS." It may be more appropriate to state that, "If potential cancer risk is greater than or equal to the maximum residential unrestricted target risk of 1×10^{-6}, then risk management decisions will be required to determine remedial recommendations and the scope of the Feasibility Study (FS)." Additional references to statements of target risk range in the Soil Report should also be modified.*

Response: The risk assessment has been revised to eliminate references to acceptable or target risk ranges. Areas of IA H1 were recommended to be evaluated in an FS if risk levels for chemicals exceeded a cancer risk estimate of 1×10^{-6} or a noncancer HQ of 1

9) *The investigation area boundary for Area H1 on Figure 1-2 is not clear to the reader. Figure 1-2 should be revised as necessary.*

Response: Weston has revised the boundary of Area H1 and presented a revised site map to the agencies during the monthly agency meetings. As of the 9 October 2003, agency meeting, DTSC agreed that the boundaries shown were correct. All maps and figures within the revised RI have been revised to be consistent with these agreed upon boundaries.

10) *Figure 2-1 should identify Area H1 on the map.*

Response: All appropriate boundaries are noted on this figure.

11) *Figure 2-2 appears to identify a larger area for Area H1 than described on previous maps. Each map or figure should identify and provide a consistent representation for Area H1 or other features or boundaries.*

Response: Comment noted. All figures and boundaries have been updated.

12) *In Section 3.2.1 it is stated that "The thickness of the fill material is difficult to estimate because the dredge materials are not readily distinguishable from natural deposits in many locations". Evaluation of historic topographic maps compared to current topographic maps may prove useful in determining the fill thickness. In addition, historic and current aerial photographs can be processed into topographic maps allowing historic fill material location areas to be identified and fill volumes to be calculated.*

Response: Historic maps and photographs were used to identify landfill areas and to aid in determining boundaries. However, historic topographic maps have not been located.

13) *Sediment, surface soil or subsurface soil samples collected and analyzed from gravel zones should be flagged accordingly and results of laboratory analyses should be considered as marginally useful.*

Response: Gravel zones, if encountered, are shown on the soil boring logs. A qualitative discussion of the data expected to be from coarse-grained materials is as follows. The sample distribution across coarse vs. fine grained materials is expected to closely mimic the actual ratio of these materials found in the subsurface. An examination of the available boring logs and cross sections indicates that the ratio of coarse-grained to fine-grained materials within IA H1 is low. Therefore, based on a uniform sample distribution, a low number of samples collected from coarse- grained material is expected. The small number of samples expected to be from coarse-grained material should not significantly skew the data.

AREA SPECIFIC COMMENTS

GSU has the following comments that pertain to specific subareas of IA H1. GSU has provided detailed comments for the Demolition Debris Subarea (Specific Comment 1). Most of these comments are also applicable to other subareas.

1) *The following comments are associated with Section 6, Demolition Debris Subarea (approximately 8 acres).*

   a) *On page 106 the Soil Report states in part that: Adequate characterization requires that the numbers of samples collected must provide sufficient data for the Human*

Health Risk Assessment (HHRA) statistical analysis. If the number of samples does not permit statistical analysis in the risk assessment, additional sampling may be required.

Response: WESTON prepared a Data Gaps Sampling Plan for IA H1 in September 2003. Additional soil, surface water, sediment, and groundwater sampling within the upland and wetland areas surrounding the landfill was conducted based on the recommendations of this plan. All additional data collected is included in a revised HHRA for IA H1 that evaluates three exposure areas: the area inside the containment barrier, uplands areas outside the containment cell, and non-tidal wetlands outside the containment cell. Based on review of data, additional sampling was performed in the Demolition Debris Subarea.

b) *Section 6.2 (Chemical Characterization) states that various surface soil (0.0 to 2.0 feet) and subsurface soil (greater that 2.0 feet) samples were analyzed for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), pesticides, Polychlorinated biphenyls (PCBs), inorganic elements and petroleum indicators. It should be stated in this section how many surface and subsurface soil samples were analyzed for each constituent. A table should be prepared that lists the sample numbers and the laboratory analytical analysis conducted on each sample. It appears from GSU's review of table 6-1 that approximately 11 surface soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganic elements. However, only 3 samples were analyzed for petroleum indicators. On Table 6.2, subsurface soil, it appears that only one sample was analyzed for VOCs and SVOCs. There is no discussion in Sections 6.2 (Chemical Characterization) or in Section 6.7 (Conclusions) that evaluates the requirement that the number of samples collected must provide an acceptable statistical basis for the HHRA. It is GSU's opinion, based on this example, that insufficient number of data points may have been obtained to form a basis for any future statistical significant evaluation in the HHRA.*

Response: The number of samples collected and analyzed for each constituent group is included in the revised RI. Regarding a need for additional data points, refer to response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

c) *Step 7 of the Data Quality Objective (DQO) process discusses the optimization of sampling design. Computer programs such as Visual Sampling Plan can assist in the determination of the minimum number of samples required for an investigation area in order to achieve a desired statistical sampling objective. It is GSU's opinion that the number of samples analyzed for the surface and subsurface soil as discussed in the above example, do not appear to meet the minimum number of samples required to statistically provide a representation of surface and subsurface conditions. In addition, the Navy should insure that laboratory detection limits that exceed soil screening levels are not used in any statistical evaluation.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

d) *U.S. Environmental Protection Agency (EPA) Region IX 2002 Preliminary Remediation Goals (PRGs) should be consulted and changes to soil screening levels should be made as appropriate.*

Response: WESTON has updated all screening criteria with updates and changes through March 2004. The RI and HHRA for IA H1 will be updated with the most current PRGs (as of December 2003). However, WESTON will not revise the report every year as the PRGs or other screening criteria change.

e) *Section 4.0 (Previous Investigations) does not discuss the February 9, 1999 technical memorandum related to ambient concentrations of inorganic elements in fill materials at Mare Island. Please provide additional discussion in Section 4.0 regarding this technical memorandum.*

Response: A summary of the technical memorandum mentioned in this comment is included by reference in Section 4.47 of the revised RI.

f) *While some of the Inorganic elements measured in Mare Island soil and rock as part of the determination of the range of naturally-occurring concentrations, others (e.g., arsenic, selenium, cyanide) are not metals per se. It is recommended that the term "metals" be replaced throughout this section by the term "inorganic elements".*

Response: The inorganic elements are referred to as metals throughout the text because laboratories methodology refers to analysis of these elements as metals. The text has not been changed.

g) *Provide clarification regarding DTSC approval of soil screening levels for inorganic elements. Separate soil screening levels for inorganic elements should be determined for each specific stratigraphic or lithologic unit (i.e. artificial fill, Younger Bay Mud, Older Bay Mud, late Pleistocene alluvium, Pleistocene alluvium). It is generally not appropriate to combine data from different populations to determine a single screening level for any compound or inorganic element of concern. Therefore, one set of soil screening levels for each specific stratigraphic or lithologic unit should be established.*

Response: A set of screening levels for surface soils (0 to 2 feet) and another for subsurface soils (>2 feet) are presented in the revised RI. While screening levels were not developed for each different subsurface stratum, the nature and extent of soil contamination was evaluated for the artificial and natural deposits separately.

h) *Provide information that verifies and identifies the outlier tests conducted for inorganic elements in order to determine any out of range values. GSU has concerns that the arsenic soil screening value of 36 mg/kg is elevated considering the toxicity and health risks that have been associated with much lower arsenic concentrations. GSU observed that concentrations of arsenic in 11 surface soil samples from this*

area ranged from 2.6 to 13.8 mg/kg. GSU believes that additional review of ambient background levels for inorganic elements should be conducted for the Demolition Debris Subarea.

Response: The Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, dated 19 April 2002, prepared by Tetra Tech EM, Inc. has been approved by DTSC. This documents the ambient (background) concentrations in fill, soil, and shallow groundwater, and concludes that arsenic levels at Mare Island are comparable to other Bay Area sites, and are not considered to be elevated. Thus, even though the concentration of 36 mg/kg exceeds the arsenic PRG, this value will be used as the screening level in fill soils in IA H1.

i) *The range of data distribution for all inorganic elements should be provided in addition to the associated probability plots.*

Response: As the Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, dated 19 April 2002, prepared by Tetra Tech EM, Inc. has been approved by DTSC, no further data presentation is planned.

j) *For non-detects provide verification that laboratory reporting levels for non-detects for inorganic elements were not elevated. Inclusion of arsenic non-detects at 50 mg/kg or even one-half of that value could significantly skew the results. Verify that non-detects with elevated detection limits were excluded from the statistical evaluation.*

Response: Non-detect values that are significantly high were excluded from statistical evaluation for the risk assessment. The data sets used for the risk assessments were adequately sized for to conduct the risk estimates while excluding elevated detection limits for nondetect sample results.

k) *Provide verification that areas of known contaminated soil were not included in the statistical analysis for inorganic elements. If the Navy imported contaminated fill material then it is not appropriate to use any portion of the contaminated fill material in the determination of ambient background soil concentration. Verify that no contaminated fill material was included in the statistical analysis.*

Response: Ambient background levels have been approved, as indicated in the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part h), and no further work is intended to be performed in relation to the ambient background soil concentrations.

l) *The soil screening levels identified on Table 6-1 apply to artificial fill only. From reviewing the sample depth interval, it is not clear whether the soil samples were obtained from the artificial fill or another stratigraphic or lithologic unit. Table 6-2 should be revised to include an additional column that identifies the stratigraphic or lithologic unit that the soil sample was obtained. If the soil sample was not obtained*

from the artificial fill then it would not be appropriate to use the artificial fill soil screening levels.

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part g) regarding screening levels. Separate summary tables are presented in the revised RI for soil samples collected from the artificial fill and natural deposits within each subarea.

m) *Section 6.1 (Background Geology) and Section 6.7.1 (Conclusions Geology). Additional discussion is required to differentiate the depth and thickness of the artificial fill from other lithologic units in the area. Section 6.7.1 states that "The artificial fill material/upper silty-clay unit in this sub area is approximately 25 to 30 feet thick." This statement may be misleading because the artificial fill in this area is actually only approximately 5 feet thick followed by a 20 foot younger bay mud sequence. The reference to an upper silty-clay unit is not consistent with previous geological discussions. Section 6.7.1 states that "Construction debris such as concrete, wood, paper, rubber and glass are present near borings 01GB092, 01GB044 and 01GB088." GSU's review of the boring logs provided in Volume II, Appendix A also identified trace wood fragments in boring 01GB042, wood fragments and plastic debris in boring 01GB045, decayed wood and glass fragments in boring 01GB046, brick and cinder fragments in boring 01GB075, glass, brick and wood fragments in boring 01GB076, construction debris, concrete and wood fragments in boring IR01GB092 and fiberglass in boring B-23. Additional review of the boring logs should be conducted and appropriate revisions to Figure 3-12 made. In addition, a more detailed iso-contour map and additional area specific geological cross section would be useful in defining the limits of the fill area and evaluating data gaps. Soil borings included on cross-sections should identify the location and depths of soil sample locations.*

Section 6.7.1 states that potential LNAPL was observed in boring 01GB076. GSU's review of the boring logs provided in Volume II, Appendix A also identified free standing oil in B-23. In addition, numerous additional borings report various degrees of petroleum/hydrocarbon odor and black staining. One boring (IR01GB090) reported a slight petroleum/solvent odor present. Additional review of the boring logs should be conducted to evaluate data gaps.

Response: New cross-sections through each of the subareas have been created and identify depths where debris and/or petroleum staining or free product was encountered. In creating the cross-sections, the boring logs were reviewed.

n) *Considering the presence of PCBs in soils, additional analysis of dioxin and dibenzofurans would seem appropriate. Additional clarification is required why laboratory analysis for asbestos, cyanide, herbicides and hexavalent chromium were not conducted.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t), with regard to dioxins and dibenzofurans. See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to asbestos. Two samples were collected for hexavalent chromium during the Data Gaps Investigation, with one detection at 0.09 mg/kg. This data is incorporated into the revised RI. Based on the history of this subarea, there is no reason to believe that cyanide or herbicides would be contaminants of concern in the Demolition Debris Subarea. Therefore, samples were not collected for these analytes.

o) *Section 6.2.1 (Results of Surface Soil Sampling) states that complete analytical results are presented in Appendix E. Considering the amount of information contained in Appendix E, it may be more useful to the reader to provide more detail as to the exact location of analytical results. (e.g., Appendix E Table E-11).*

Response: The tables in Appendix G (formerly Appendix E), are organized by depth (e.g., surface, subsurface), and by area. However, the text does not directly reference each table individually.

p) *Table E-11 in Appendix E presents a summary of complete analytical results for the Demolition Debris Subarea. The heading on Table E-11 presents laboratory results for sample depths (from left to right) as 0.0 to 0.5 feet, 10.5 to 11.0 feet 2.5 to 3.0 feet and 5.5 to 6.0 feet. Data should be presented in a column format where the shallowest samples proceed from left to right in increasing depth.*

Response: As the data is generated from a database, which returns data in alpha-numeric order, samples with depths are not presented in depth-increasing order, from left to right. To make all of the necessary changes and re-order each of the tables in Appendix G would not be a cost-conscious exercise and therefore, has not been done.

q) *Figure 5.5 indicates that sample number IR01HA022 is located approximately 200 feet from the western boundary of the Demolition Debris Subarea. No additional sampling was conducted from this point to the boundary of the subarea. Four soil samples were analyzed at boring IR01HA022 (0,5, 3.0, 6.0 and 11.0 feet). These soil samples were not analyzed for SVOCs or pesticides, all inorganic elements or PCB congeners, and were only analyzed for Total Petroleum Hydrocarbons (TPH). Benzene Toluene Ethyl-benzene and Xylenes (BTEX) were the only VOCs analyzed for 3 of the 4 samples. Based on this limited analysis a number of constituents were reported to exceed the Soil Screening Criteria. It is GSU's opinion that insufficient laboratory analysis was conducted at this location and that additional soil sampling is required along the western boundary.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

r) *Section 6.2.2 (Results of Subsurface Soil Sampling and Analyses) does not state how many samples were actually analyzed for VOCs. It is misleading to state that these samples were analyzed for VOCs when the samples were only analyzed for BTEX. This section also states that one subsurface soil sample was collected for SVOC*

analysis and that one subsurface soil sample was collected for pesticides analysis. It is also stated that Aroclor-1260 was the only PCB detected in the subsurface soil samples. This statement is misleading because not all PCB congeners were analyzed. All future analysis should include and report all VOCs and PCBs. When only a few samples are obtained for laboratory analysis, the sample number and depth of the sample should be included in the text. By example, the SVOC discussion in Section 6.2.2 should be rewritten as follows: "One subsurface soil sample (IR01GB040 at 3.8 feet) was collected for SVOC analysis". GSU review of the soil boring log in Volume II Appendix A indicates that this soil sample was obtained from a coarse to medium-grained gravel. The laboratory analysis of VOCs and SVOCs from gravel zones may not provide accurate and useful results and should be flagged accordingly. Some of the boring logs are unreadable (i.e., B-23). Legible copies of boring logs should be provided.

Response: Tables are provided in each of the applicable sections of the revised RI that indicate the analytes, or analyte categories, for each sample collected. Additionally, these tables summarize the number of samples collected for each analyte or analyte category. The borings logs included in the RI documents are the best copies available.

s) *Section 6.5 (Threat to Groundwater) states that "All constituents detected were compared to soil leaching screening levels that were based on either the RWQCB Region II Soil Leaching Screening Levels for Non-Drinking Water Resources and the U.S.EPA Region IX equations if the Regional II RWQCB value was unavailable for inorganics." GSU is unaware of any action by the RWQCB that has de-designated the groundwater beneath the site as a non-drinking water or non-beneficial groundwater resource. Therefore, drinking water screening levels should be used. GSU questions the use of RWQCB or EPA equations for the evaluation of threat to groundwater from contaminated soil since depth to first groundwater in this area may be only a few feet below the ground surface and some contaminants are in direct contact with the groundwater or below the groundwater table.*

Response: An exemption to the groundwater beneficial use for municipal or domestic purposes has been granted by the RWQCB on 17 March 2004. See response to Mr. Shopay (DTSC) general comment No. 1 for more detail regarding this decision. The identification of threats to groundwater will still use the RWQCB and EPA soil leaching screening criteria.

t) *No analysis for dioxins/dibenzofurans were conducted. Laboratory analysis for dioxins/dibenzofurans should be conducted on sediment, surface and subsurface soil.*

Response: The Demolition Debris Area is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. However, groundwater samples were collected and analyzed for these constituents at 20 monitoring wells in November 2003. This data is

incorporated into the revised RI. Additionally, as part of the Landfill Post-Closure monitoring, dioxins and furans will be analyzed on an annual basis. The details of this program are presented in the *Draft Water Quality Sampling and Analysis Plan, RCRA/Facility Landfill Post-Closure Groundwater Monitoring, Mare Island, Vallejo, California*, dated December 2003.

u) *No analysis of TNT and asbestos was conducted. Laboratory analysis for TNT and asbestos should be conducted on sediment, surface soil and subsurface soil.*

Response: A total of thirty eight (38) soil samples were collected for 2,4,6-trinitrotoluene (TNT) analysis within IA H1. All of these results were non-detects, with each of the detection limits significantly less than the screening criteria. Based on these results, TNT does not appear to be present in IA H1 and no further sampling for this constituent has been performed in IA H1.

As addressed in the Data Gaps Sampling Plan for IA H1 (WESTON, 2003), an asbestos investigation was conducted at areas of IA H1 in which asbestos debris may be present outside of the containment area. This included a survey of the West Subarea (Pond 1), and the Demolition Debris Subarea. The only potential asbestos containing material (ACM) encountered in the Demolition Debris Subarea was transite pipe encountered at two locations. Samples were not collected as it was obvious that the material contained asbestos.

v) *It is GSU's opinion that the extent of surface and subsurface soil contamination has not been adequately characterized and that additional soil investigation that includes a broader range of laboratory analyses is required for this subarea.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

2) *The following comments are associated with Section 7, Northwest Dump Road Subarea (approximately 14 acres). General comments provided in Specific Comment 1 would also apply to this area.*

a) *The wetland area along the western boundary is approximately 800 feet long by 40 feet wide. Two sediment samples collected from this area are insufficient to conduct an adequate characterization.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

b) *Provide a detailed topographic and bathometric map for this area.*

Response: Figure 6-5 in the revised RI shows sampling locations within this subarea. This figure presents the available topographic features of the subarea.

c) *Provide a more detailed iso-contour map and additional area-specific cross section to define the limits of the fill area. Soil borings included on cross-sections should indicate the location and depths of soil sample locations.*

Response: Additional cross-sections are included in the revised RI for areas outside of the containment boundary to show the extent and limits of fill within these areas.

d) *There are an insufficient number of inorganic element samples for surface soils. Only one sample was analyzed for hexavalent chromium. There are an insufficient number of samples that were analyzed for pesticides (4 samples) PCBs (2 Samples), VOCs (5 samples) and SVOCs (7 samples).*

Response: Sufficient data have been gathered in order to complete the RI and address the contaminants detected in the surface soils. No additional surface soil samples have been collected in the Northwest Dump Road Subarea.

e) *There are an insufficient number of some inorganic elements samples for subsurface soils. Only one sample was analyzed for hexavalent chromium. There are an insufficient number of samples that ere analyzed for pesticides (4 samples) VOCs (8 samples) and SVOCs (6 samples).*

Response: Samples were collected during the Data Gaps Investigations. A total of 12 samples, from 6 soil borings were analyzed for metals. A total of 9 samples, from 5 soil borings were analyzed for organophosphorous pesticides (OPP). A total of 11 samples, from 5 soil borings were analyzed for VOCs. A total of 19 samples, from 9 soil borings were analyzed for SVOCs. Additionally, samples were collected for PCBs and TPH analyses from 5 and 9 soil boring locations, respectively. This data is incorporated into the revised RI.

f) *No analysis for dioxins/dibenzofurans were conducted. Laboratory analysis for dioxins/dibenzofurans should be conducted on sediment, surface and subsurface soil.*

Response: The Northwest Dump Road Subarea is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t).

g) *No analysis of TNT and asbestos was conducted. Laboratory analysis for TNT and asbestos should be conducted on sediment, surface spoil and subsurface soil.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u). TNT and asbestos samples were not collected from the Northwest Dump Road Subarea because these are not suspected contaminants in this area.

h) *It is GSU's opinion that the extent of surface and subsurface soil contamination has not been adequately characterized and that additional soil investigation that includes a broader range of laboratory analyses is required for this sub area.*

Response: A total of nine additional soil borings were advanced within the Northwest Dump Road Subarea as part of the 2003 Data Gaps Investigation. Analytes included VOCs, SVOCs, pesticides, PCBs, inorganics, hexavalent chromium, TPH, and explosives. This new data is incorporated into the revised RI and helps characterize the Northwest Dump Road Subarea that is to remain outside of the containment barrier.

3) *The following comments are associated with Section 8, West Subarea (approximately 10 acres). General comments provided in Specific Comment 1 also apply to this subarea. The subarea consists of the levees and portions of inactive Dredge Ponds 1 and 2N, located west of the IWTP area and former Sludge Treatment Surface Impoundment.*

a) *One sediment sample collected from this area at a depth of 0.0 to 0.5 feet is insufficient to adequately characterize sediment.*

Response: Four additional sediment samples, from two soil boring locations, were collected during the 2003 Data Gaps Investigation and analyzed for SVOCs, pesticides, PCBs, inorganics, and TPH. One of the samples was also analyzed for VOCs, and two of the samples were analyzed for hexavalent chromium. The results from these samples are included in the revised RI.

b) *Provide a detailed topographic and bathometric map for this area.*

Response: Figure 6-5 in the revised RI shows sampling locations within this subarea. This figure presents the available topographic features of the subarea.

c) *Provide additional detail on a site map that identifies the limits of the fill area and provide additional cross sections.*

Response: Additional cross-sections are included for areas outside of the containment boundary to show the extent and limits of fill within these areas.

d) *No analysis for dioxins/dibenzofurans were conducted. Laboratory analysis for dioxins/dibenzofurans should be conducted on sediment, surface soil and subsurface soil.*

Response: The West Subarea is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t).

e) *No analysis of TNT and asbestos was conducted. Laboratory analysis for TNT should be conducted on sediment, surface soil and subsurface soil.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to TNT.

Eight samples of suspected asbestos containing material (ACM) were collected from the West Subarea from test pits performed in January 2004, and six samples were collected during a survey in March 2004.

Results from the eight test pit samples collected in the West Subarea found only a trace level (<1%) of asbestos in one sample. The remaining seven samples did not detect asbestos. Of the six samples collected in March 2004, three of them were determined to contain 90% asbestos.

f) *It is GSU's opinion that the extent of sediment contamination has not been adequately characterized.*

Response: Four additional sediment samples were collected from the West Subarea. The data from these samples is used to help characterize the sediment in this area.

4) *The following comments are associated with Section 9, South Dredge Pond Subarea (approximately 66 acres). General comments provided in Specific Comment 1 also apply to this subarea.*

a) *Provide a detailed topographic and/or bathometric map for this area. The location of all soil samples should be compared to these maps to evaluate if the previous soil samples adequately consider drainage and surface water in-flow areas.*

Response: A figure is provided showing sampling locations within this subarea. While the figures in Section 6 provide contours of IA H1, a detailed elevation survey of the South Dredge Pond Subarea has not been performed.

b) *This subarea is physically divided by a levee that separates Wetland B from Wetland C as identified on Figure 5-2. The greatest number of samples collected for laboratory analysis was obtained from Wetland B with very few samples obtained from Wetland C. Since Wetland B is physically separated from Wetland C each wetland should be discussed separately in the text. Individual summary analytical tables should also be provided for each wetland area. Figure 5-2 should be expanded to display the entire physical boundary of this subarea.*

Response: Wetlands B and C are discussed separately in the characterization section and presented separately in the summary tables. Figures, such as Figure 6-6, have been edited to present the entire subarea.

c) *Analysis of two sediment samples analyzed for PCBs is insufficient evaluate potential impacts of PCBs on sediments.*

Response: As part of the Onshore Ecological Risk Assessment, an abundance of samples were collected from Wetlands B and C. These were collected on a grid system and analyzed for numerous analytes. A total of 82 samples have been collected from the 0 to 2 ft bgs depth interval for PCB congeners, Aroclors, or Aroclor-1260 only. No further sampling has been conducted in the South Dredge Pond Subarea.

d) *The majority of soil samples have been collected from Wetland B with few soil samples obtained from Wetland C. There are an insufficient number of soil samples collected and analyzed to conduct an adequate characterization of Wetland C.*

Response: A total of 14 locations within or directly adjacent to Wetland C have been sampled as part of the RI investigations, including the Onshore Ecological Risk Assessment. The focus of these sample locations was the area of most likely impact, adjacent to the Waste Sump Area. Sufficient numbers of samples have been collected from Wetland C to characterize Wetland C.

e) *No analysis for dioxins/dibenzofurans was conducted. Laboratory analysis for dioxin/dibenzofurans should be conducted on sediment, surface soil and subsurface soil.*

Response: The South Dredge Pond Subarea is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t), with regard to dioxins and dibenzofurans.

f) *No analysis of TNT and asbestos was conducted. Laboratory analysis for TNT and asbestos should be conducted on sediment, surface soil; and subsurface soil.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to TNT and asbestos. As the South Dredge Pond Subarea is not associated with disposal activities, asbestos is not considered to be a contaminant in this subarea.

g) *It is GSU's opinion that additional characterization of Wetland A and C is required.*

Response: WESTON presumes that this comment refers to Wetland B and C (not A and C). Based on the number of sample locations in Wetland B (57), and in Wetland C (14), and the various analytical parameters analyzed, sufficient data have been gathered to characterize Wetlands B and C.

5) *The following comments are associated with Section 10, North Wetlands Sub Area (approximately 45 acres). General comments provided in Specific Comment 1 also apply to this subarea.*

a) *Provide a detailed topographic and/or bathometric map for this area. The location of all soil samples should be compared to these maps to evaluate if the previous soil samples adequately consider drainage and surface water in-flow areas.*

Response: A figure is provided showing sampling locations within this subarea. While the figures in Section 6 provide contours of IA H1, a detailed elevation survey of the North Wetlands Subarea has not been performed.

b) *Identify the complete boundary of this subarea on Figure 5-2 and 5-5.*

Response: Figures, such as Figure 6-5, have been modified to include the boundaries of the North Wetlands Subarea.

c) *Six inorganic element, two pesticide, two PCBs, four SVOCs, and zero VOC analyses of surface soil samples is insufficient to conduct an adequate surface soil characterization.*

Response: As part of the Onshore Ecological Risk Assessment, an abundance of samples were collected from Wetlands A and D. These were collected on a grid system and analyzed for numerous analytes. A total of 15 samples within Wetland A have been collected from the 0 to 2 ft bgs depth interval. Twelve of these were analyzed for SVOCs, 10 for pesticides, and 11 for PCB congeners. VOC data has not been collected from the 0 to 2 ft bgs depth interval in this subarea; however, 13 of these samples were analyzed for TPH. A total of 25 samples within Wetland D have been collected from the 0 to 2 ft bgs depth interval during the Onshore Ecological Risk Assessment. Each of these samples was analyzed for SVOC, pesticides, organotins, PCB congeners, inorganics, and TPH. This data is sufficient to characterize the subarea.

d) *Four pesticide, four PCBs, eight SVOCs, four VOCs subsurface soil samples is insufficient to conduct an adequate sub surface soil characterization.*

Response: Seven pesticide, seven PCB, eleven SVOC, and seven VOC samples have been collected from depths greater than 2 ft bgs in the North Wetlands Subarea. This data is adequate to characterize the subsurface soil in this subarea.

e) *No analysis for dioxins/dibenzofurans were conducted. Laboratory analysis for dioxins/dibenzofurans should be conducted on sediment, surface soil and subsurface soil.*

Response: The North Wetlands Subarea is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for

dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t).

f) *No analysis of TNT and asbestos was conducted. Laboratory analysis for TNT and asbestos should be conducted on sediment, surface soil and subsurface soil.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to TNT and asbestos. As the North Wetlands Subarea is not associated with disposal activities, asbestos is not considered to be a contaminant in this subarea.

g) *It is GSU's opinion that additional characterization of the North Wetland Sub Area is required.*

Response: Based on the number of sample locations in Wetland A (12), and in Wetland D (22), and the various analytical parameters analyzed, sufficient data have been gathered to characterize the North Wetlands Subarea.

6) *The following comments are associated with Section 11, Fire-Fighting Training Subarea (approximately 6.5 acres). General comments provided in Specific Comment 1 also apply to this area.*

a) *Section 11.2 states that "sediment samples were not collected because sediment is not present in this area". Figure 5-5 contradicts this statement because a wetland area is identified in the southern most portion of this subarea. Please provide additional clarification.*

Response: In 2003, the wetlands were surveyed by LSA in order to confirm the accuracy of the wetland boundaries. This boundary is present on several of the figures in the revised RI. A portion of the Fire-Fighting Training Subarea falls within the wetland boundary (see Figure 1-3 of revised RI), including what was depicted in Figure 5-5 of the Soil RI. All samples from within the LSA boundary were discussed in Section 10 of the revised RI (Wetland Areas). Portions of the Fire-Fighting Training Subarea are associated with Wetland D and the Northwest Dump Road Wetland. All samples collected from the top 2 feet within the LSA boundary are considered sediment.

b) *Provide a detailed topographic map for this area.*

Response: Figure 6-5 in the revised RI shows sampling locations within this subarea. This figure presents the available topographic features of the subarea.

c) *Two pesticide analyses of surface soil samples are insufficient to conduct an adequate surface soil characterization.*

Response: Based on the results of the samples analyzed for pesticides, no further pesticide analyses was deemed necessary.

d) *Three pesticide analyses of subsurface soil samples are insufficient to conduct an adequate subsurface surface soil characterization.*

Response: As part of the Data Gaps Investigation, three additional samples were collected for pesticide analysis. The results are incorporated into the revised RI.

e) *No analysis for dioxins/dibenzofurans was conducted. Laboratory analysis for dioxin/dibenzofurans should be conducted on sediment, surface soil and subsurface soil.*

Response: Three samples were collected and analyzed for dioxins/dibenzofurans within the Fire-Fighting Training Subarea during the data gaps investigation in 2003. The samples were collected near buildings and areas in which burning occurred.

f) *No analysis of TNT and asbestos was conducted. Laboratory analysis for TNT should be conducted on sediment, surface and subsurface soil.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to TNT and asbestos. As the Fire Fighting Training Subarea is not associated with disposal activities, asbestos is not considered to be a contaminant in this subarea.

g) *It is GSU's opinion that additional characterization of the Fire-Fighting Training Sub Area is required.*

Response: See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

7) *The following comments are associated with Section 12, Landfill Area (approximately 30 acres). General comments provided in Specific Comment 1 also apply to this subarea.*

a) *Section 12.2 states that the landfill occupies approximately 30 acres (of which the RCRA landfill portion occupies approximately 20 acres). Accurately identify the boundaries of the RCRA landfill as defined on the RCRA Part A Application. The RCRA Part A Application also identifies an additional 100 Acre Past Landfill Area. Accurately identify the boundaries of the Past Landfill Area.*

Response: All maps and figures within the revised RI were revised to be consistent with the correct boundaries.

b) *Section 12.1.1 discusses a containment presumptive remedy based on CERCLA municipal landfill sites. Presumptive CERCLA remedies may not be appropriate for RCRA landfills. Therefore, RCRA closure performance standards and regulations would apply. This section also states that the presumptive remedy would be a*

landfill cap only. GSU disagrees with the statement that " Because groundwater in the vicinity of the landfill is unsuitable for potable water supplies and has no industrial or agricultural beneficial uses...there will be no exposure to contaminated groundwater within the landfill and its vicinity." A presumptive remedy that included a RCRA cap and containment slurry wall with a groundwater interceptor trench would seem more appropriate.

Response: The presumptive remedy will includes a barrier in addition to the landfill cap to capture and contain contaminated groundwater. Please refer to the Draft Action Memorandum for the Time-Critical Removal Action (WESTON, 2003).

c) *Section 12.2 states that "in 1978, the landfill reached capacity, and the new landfill area was established on top of the western half of the facility landfill. This new landfill was referred to as the RCRA landfill because it accepted RCRA-type wastes after 19 November 1980. Although the new RCRA landfill was regulated by the 19 November 1980 RCRA regulations, additional portions of the historical landfill that may have received RCRA type wastes prior to 19 November 1980 would also be subject to the RCRA Interim Status Regulations. Therefore, additional clarification is required that identifies the entire extent of the RCRA landfill subject to RCRA closure requirements. It is GSU's opinion that both the RCRA landfill area referred to as the RCRA landfill operating after 19 November 1980 and any portion of the historical landfill which received RCRA type hazardous wastes prior to 19 November 1980 should be subject to RCRA closure requirements.*

Response: The boundary of the RCRA Landfill has been defined in the *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003. The Landfill Area is subject to RCRA closure requirements.

d) *No analysis for dioxins/dibenzofurans were conducted. The presence of dioxins/dibenzofurans in surface and subsurface soil should be considered in the presumptive remedy.*

Response: The presumptive remedy includes containing and capping the landfill; therefore, no additional sampling was performed. No exposure routes to contamination will remain upon implementing the presumptive remedy.

e) *No analysis of asbestos was conducted. The presence of asbestos in surface soil and subsurface soil should be considered in the presumptive remedy.*

Response: See response to Mr. Shopay (DTSC) Specific Comment 7 (part d).

f) *Due to the limited sampling and analysis conducted of surface and subsurface soil, additional compounds that exceed screening levels are most likely present in surface soil and subsurface soil in addition the compounds identified in Section 12.8.*

Response: See response to Mr. Shopay (DTSC) Specific Comment 7 (part d).

8) *The following comments are associated with Section 13, Waste Disposal Sump/Lead Oxide Storage Disposal Area (approximately 25 acres). The area includes the former waste oil disposal sumps and battery storage and disposal area. General comments provided in Specific Comment 1 also apply to this subarea.*

a) *Provide a detailed topographic and/or bathometric map for this area. The location of all soil samples should be compared to these maps to evaluate if the previous soil samples appropriately consider drainage and surface water in-flow areas.*

Response: Figure 6-6 in the revised RI shows sampling locations within this subarea. This figure presents the available topographic features of the subarea.

b) *There were an insufficient number of sediment samples analyzed for inorganic elements (six samples), pesticides (six samples), PCBs (six samples), VOCs (no samples) and SVOCs (six samples).*

Response: The presumptive remedy includes containing and capping the Waste Sump Area; therefore, no additional sampling was performed. No exposure routes to contamination will remain upon implementing the presumptive remedy.

9) *The following comments are associated with Section 14, Sludge Treatment Surface Impoundment Area (approximately 14 acres). General comments provided in Specific Comment 1 also apply to this subarea. The area includes the former process building of the IWTP and four former surface impoundments used for the treatment of industrial sewage and the drying of industrial sewage sludges from the IWTP. The four surface impoundments are RCRA regulated units.*

a) *GSU disagrees with the statement in Section 14.1 "Because this site handled RCRA type wastes, it was included in the Navy RCRA Part B permit application, which was not approved. As a result, this site has RCRA interim status, and its closure under CERCLA is required to meet the requirements of RCRA." As a RCRA interim status facility closure under RCRA is required rather than CERCLA. The surface impoundments were also not clean closed.*

Response: Comment noted. The Sludge Treatment Surface Impoundment Area regulated under RCRA is described in the *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003. This area is subject to RCRA closure requirements.

10) *The following comments are associated with Section 15, IWTP Area (approximately 8.5 acres). General comments provided in Specific Comment 1 also apply.*

a) *Section 15.1 states that industrial wastes generated between 1956 and 1972 were discharged into either the sanitary sewer or storm sewer. Therefore it is GSU's opinion that the overflow pond constructed in 1957 and the former industrial sludge*

drying pond (if not co-located) would be considered to be RCRA regulated surface impoundments because they may have received hazardous waste. Please identify the final outfall locations of the sanitary and storm sewer systems that received industrial wastes. Identify the sampling and analysis conducted at the outfalls. It is also stated that prior to 1956, industrial wastes were discharged directly into Mare Island Strait. Please identify the location or locations of all discharge points of industrial waste prior to 1956 and identify the sampling and analysis conducted at the discharge points.

Response: The *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003, provides a description of the various IWTP units. This document also identifies the units that are included within the RCRA Regulated Units Surveyed Boundary. The overflow pond (also referred to as the sludge drying pond) is not included as a RCRA regulated unit. However, the equalization ponds/impoundments and sludge drying impoundments within IR06 are within the IWTP Area RCRA Surveyed Boundary.

The outfalls referred to in this comment are not part of IA H1 and are not discussed or investigated in the revised RI.

b) *Section 15.1 discusses a IWTP overflow pond. Figure 5-5 identifies a former industrial waste sludge drying pond. Please provide additional clarification if the two ponds discussed are the same pond.*

Response: Figure 6-3 presents the site features, and identifies the various ponds.

c) *Section 15.1 states that "There is no record of receipt or treatment of hazardous wastes at the IWTP. However, Table 2-1 lists a number of wastes discharged into the IW Pipeline and treated at the IWTP." It is GSU's opinion upon review of Table 2-1 that there is a high probability that a number of the wastes treated at the IWTP should be considered to be hazardous based on the waste generated and the amount and source of the waste material.*

Response: This comment is noted, and the language has been stricken from the text. This does not, however, indicate that hazardous wastes were delivered to the IWTP.

d) *Identify all IW collection system piping used to transport industrial waste to the IWTP. It is GSU's opinion that the IW collection system piping should be considered to be part of the RCRA regulated units for the surface impoundments and therefore subject to RCRA closure.*

Response: The IW pipeline (IR14) is currently being treated as a separate RCRA regulated unit. A summary report, dated 9 October 2003, was submitted to DTSC, and recommended that a pressure test be performed on the pipeline within IA H1. Based on the results of a pressure test, a decision would be made on how to close the unit. If the pressure test is favorable, clean closure in place will be suggested. The

entire IW collection system piping has been included as Figure 4 in the *Description of RCRA Regulated Units, Investigation Area H1, Mare Island, Vallejo, California*, dated May 7, 2003.

e) *Section 15.1 states that in 1991, sanitary wastewater contaminated with fuel oil (resulting from a spill at Berth 10) was stored in the overflow pond. Review of boring logs contained in Appendix A9 indicated significant amount of petroleum soil staining, hydrocarbon odor and landfill debris is present in this area. This initial evaluation is based on limited number and distribution of surface and subsurface soil samples were obtained from the former industrial waste sludge drying pond. It is GSU's opinion that additional sampling and laboratory analysis of surface and subsurface soil is required to obtain a more statistically significant sample distribution.*

Response: As mentioned in the response to Mr. Shopay (DTSC) general comment No. 1, this area will be enclosed within the slurry wall and extraction trench system, and will be covered with a RCRA cap. No further sampling is to occur in this area.

f) *GSU's review of boring logs in Appendix A9 indicated that landfill material is located beneath the former industrial waste sludge pond. A map that identifies the lateral and vertical extent of the historic landfill would be useful.*

Response: WESTON and the Navy are not aware of any map that shows the extent of landfilling in the IWTP area. As this area is to be enclosed and capped, as mentioned in the response to Mr. Shopay (DTSC) general comment No. 1, no further investigation will be performed for this area.

g) *No analysis for dioxins/dibenzofurans, VOCs, organotins and asbestos were conducted in sediment and surface soil. No analysis of asbestos was conducted in subsurface soil. Additional soil sampling and analysis of these constituents is recommended.*

Response: The presumptive remedy includes containing and capping the IWTP Area; therefore, no additional sampling is required. No exposure routes to contamination will remain upon implementing the presumptive remedy. See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part a).

11) *The following comments are associated with Section 16, Solid Waste Disposal/Lead Oxide Storage Area (approximately 16 acres). General comments provided in Specific Comment 1 apply to this subarea. The area received waste between 1942 and 1966. The area was a battery disposal area in addition in addition to other materials identified on Table 2-3.*

Note: The Solid Waste Disposal/Lead Oxide Storage Area has undergone a removal action to excavate an area found to be high in lead concentrations. The purpose of this was to remove contaminated soils and place them within the area to be contained and capped as part of the presumptive remedy, prior to construction of the slurry

wall. Confirmation sampling for lead was conducted at each excavation grid center, with 20% of the confirmation samples also receiving PAH analyses. The confirmation sampling results will not be incorporated into this revised RI, but will be provided in a separate future submittal.

a) *Provide a detailed topographic map for this area and determine the drainage pattern from this area into the two wetlands. Confirm that the locations of sediment samples were selected in the areas that would have received surface water runoff. Four sediment samples may not be sufficient to adequately characterize the two wetland areas.*

Response: A figure will be provided showing sampling locations within this subarea, and will be updated to account for the samples removed during the removal action. This figure will present the topographic features of the subarea.

b) *No analysis for dioxins/dibenzofurans, VOCs, cyanide, organotin and asbestos were conducted in sediment.*

Response: Note that all sediment samples in the Solid Waste Disposal/Lead Oxide Storage and Disposal Area have been re-grouped so that they are associated with either Wetland A or B. As a whole, several samples collected from Wetlands B and A were analyzed for VOCs and organotins. These chemical groups are sufficiently characterized. Throughout IA H1, several samples have been analyzed for cyanide. Several samples have been analyzed for cyanide throughout IA H1. Cyanide was detected in very few samples, and was never detected above screening criteria. There does not appear to be reason to be concerned about cyanide in this area.

Furthermore, the Solid Waste Disposal/Lead Oxide Storage Area is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, sediment samples were not analyzed for dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t).

See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to asbestos. As the Solid Waste Disposal/Lead Oxide Storage Area is not associated with disposal activities that would include things such as construction debris, asbestos is not considered to be a contaminant in this subarea.

c) *Only two surface soil samples were analyzed for cyanide. No analysis for dioxins/dibenzofurans, organotins and asbestos were conducted*

Response: The Solid Waste Disposal/Lead Oxide Storage Area is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t).

See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to asbestos. As the Solid Waste Disposal/Lead Oxide Storage Area is not associated with disposal activities that would include things such as construction debris, asbestos is not considered to be a contaminant in this subarea.

In general, where samples are analyzed for cyanide and organotins in IA H1, they are not detected. There does not appear to be reason to collect additional samples for these compounds in this area.

d) *No analysis for dioxins/dibenzofurans, organotins, cyanide and asbestos were conducted in subsurface soil*

Response: The Solid Waste Disposal/Lead Oxide Storage Area is not an area where activities associated with incineration occurred, and is therefore not suspected to contain the dioxin/dibenzofuran by-products. As such, soil samples were not analyzed for dioxins/dibenzofurans. See also the response to Mr. Shopay (DTSC) Specific Comment No. 1 (part t).

See response to Mr. Shopay (DTSC) Specific Comment No. 1 (part u), with regard to asbestos. As the Solid Waste Disposal/Lead Oxide Storage Area is not associated with disposal activities that would include things such as construction debris, asbestos is not considered to be a contaminant in this subarea.

In general, where samples are analyzed for cyanide and organotins in IA H1, they are not detected. There does not appear to be reason to collect additional samples for these compounds in this area.

WESTON RESPONSES TO 15 FEBRUARY 2003 (DR. JUNE A. OBERDORFER AND DR. RHEA L. WILLIAMSON) REVIEW COMMENTS ON DRAFT FINAL GROUNDWATER REMEDIAL INVESTIGATION INVESTIGATION AREA H1 – 9 MAY 2002

GENERAL COMMENTS

1. ***Report Omissions and Inconsistencies.*** *There are numerous examples of report data omissions and inconsistencies from one section to another. For example, Section 4.45 differs from Section 6 (pages 6-1 and 6-2) in describing the number of USTs (7 or 8) and their status (requests for closure vs. tank not found). Section 5 states that grab samples collected from uncased Geoprobe borings were "intended to serve as qualitative indicators of contamination and were primarily used in selecting optimum locations for monitoring wells". In Chapter 8, however, grab sample data were used to justify the omission of a fate and transport assessment for inorganics in the Demolition Debris and Industrial Wastewater Pipeline areas and for organics in the North Wetlands. In addition, grab sample data are used to explain whether or not migration is occurring between water bearing zones and within subareas.*

   Response: Inconsistencies between sections of the report have been addressed in the revised RI. Section 4.53 of the revised RI indicates that 7 UST investigations were performed, and that one other tank, for a total of 8, was removed. Grab samples were collected for various reasons from different areas of IA H1. In many instances, grab groundwater samples were used to select optimum locations of monitoring wells and to determine if step-out sampling was required. Grab groundwater samples were also collected from various soil boring locations in areas in which no monitoring wells exist (i.e., the Demolition Debris Subarea) for purposes of a fate and transport assessment and migration of soil contamination to groundwater.

2. ***Definition of Contaminants of Concern.*** *Contaminants of Concern (COCs) are discussed in two contexts: distribution of contaminants in Section 6 and the Baseline Risk Assessment in Section 8. There are distinct definitions in these two sections that lead to confusion. In Section 6, the contaminants are narrowed down to a short list for more intense discussion based on a series of criteria reflecting their persistence, number of wells in which they're present, and their concentration relative to screening criteria. Only those that are persistent (present above detection limits in three out of the last four sampling events), present in two or more wells in a given water-bearing zone, and present above the screening concentration are focused on in the discussion of contaminant fate and transport. In the risk assessment in Section 8, a different set of contaminants, termed Potential Contaminants of Concern (COPCs, following the standard risk assessment nomenclature) are identified based on standard EPA human health risk assessment approaches (ex., upper 95% confidence limit on worst case exposure point concentrations, using one half of the detection limit as the concentration for samples reported as "non-detect"). The majority of contaminants are identified as being of concern in one chapter but not in the other, leading to confusion about what constitutes a contaminant of concern.*

Response: The chemicals of potential concern (COPCs) have been identified in the revised risk assessment following the standard risk assessment nomenclature. COPCs are defined as all chemicals detected except essential nutrients and infrequently detected chemicals, as defined in Appendix I. Chemicals of concern (COCs) have been identified as those COPCs exhibiting a cancer risk greater than 1×10^{-6} or a noncancer hazard quotient greater than 1. The revised RI only uses the terms COPCs and COCs in the context of the risk assessment. All detected chemicals are discussed in the RI in sections 7 (groundwater), 8 (containment area), 9 (upland area), and 10 (wetland area) in order to characterize the contamination, but use of the terms COPCs and COCs has been eliminated outside of the risk assessment.

3. *The approach used in the risk assessment in Section 8 for selecting COPCs is appropriate. The approach used in Section 6 for reducing the list of contaminants to discuss is often misleading, discarding contaminants for invalid reasons. Some of the problems with the approach are:*

Response: The approach used in Section 6 of the Draft Groundwater RI to characterize the contamination in groundwater has been modified. Section 7 of the revised RI discusses groundwater contamination. All contaminants detected are presented in Section 7.2. The nature and extent of groundwater contamination, based on the last four groundwater sampling events (per well), no matter over what period of time that occurred, is presented in Section 7.3. Figures are presented in Appendix M for contaminants in which at least 10 percent of the concentrations exceeded screening criteria.

a) ***Sparse Data.*** *The contaminant concentration data are sparse and unevenly spread out through time. Chemical analytical data appear to have been acquired in late 1992 to early 1994 and again in mid-1999 to mid-2000. Because of the lack of data over the intervening five-year period, it is not possible to evaluate long-term contaminant persistence or contaminant concentration trends.*

Response: Monitoring wells were sampled for a number of consecutive quarters in the early 1990s, and then again in the late 1990s, and in the early part of this century. Although a 5 year gap of data exists between these sampling events, the data is still useful in trend analysis. Some of the monitoring wells have not been sampled recently as they have been utilized primarily for other RIs, such as the IA I and J RI. Quarterly groundwater monitoring is conducted at select monitoring points throughout IA H1 as part of the RCRA Landfill monitoring program. This data can be evaluated for long-term contaminant persistence and trends in contaminant concentration levels. Sampling points in which contaminants were not detected and/or detected at concentrations below contaminant screening criteria may not have been included in all subsequent monitoring events. Additionally, certain contaminant groups may not have been reevaluated at sampling points in which no detections or low detections of contaminant concentrations. In general, the data set collected in support of the IA H1 RI is quite extensive and contains data collected over a longer period of time than most RIs prior to making a remedy decision.

b) ***Data Application.*** *There is problem with the designation of an analyte as "consistently" detected or "consistently exceeded" being based on three of the four last (most recent) sampling events when a) collection methods changed, and b) only filtered sample data for metals were considered or analyzed.*

Response: Comment noted; these terms are no longer used to describe the extent of contamination in the revised RI.

c) ***High Detection Levels.*** *The detection limits for many of the contaminants were much higher than their respective screening criteria. This means they were reported as not detected when lower detection limits might have identified them as being present at concentrations of major concern. An example is the PCB Aroclor-1260. The aquatic screening level for this compound is 0.03 ug/L. The minimum detection limit identified in 0.2 ug/L, an order of magnitude above the screening criterion. The maximum detection limit was 2 ug/L. This PCB was detected in only two out of 38 analyses in the shallow aquifer, both in the early 1990's (Table 6-6 of the RI). Similar screening criterion and detection limits are reported for the other PCBs. The interpretation presented in the text is that PCBs do not constitute a COC, but with such high detection limits and such a low screening criterion (reflecting the toxicity of PCBs) it is impossible to know if PCBs are a COC. PCBs are extremely hydrophobic (they are strongly adsorbed onto the mineral surfaces), and their presence dissolved in groundwater is unusual. PCBs will only be detected in the groundwater when there are a great deal present in the subsurface. Similar examples of high detection limits and low screening criterion could be made for pesticides (ex., heptachlor, DDT) and metals (ex., copper, silver, nickel, aluminum). Of the 16 metal analytes (with aquatic screening levels) that were detected in the SWBZ in the Northwest Dump Road Area, the minimum detection limit exceeded the aquatic screening level in 2 analytes, and the maximum detection limit exceeded the aquatic screening level in 13 analytes. The analytes include those known to biomagnify in aquatic and terrestrial biota (e.g., mercury and selenium). A number of contaminants were eliminated from the list of COCs because the detection limits were above the screening criterion. Just because a chemical did not make it onto Weston's list of Contaminants of Concern doesn't mean that that chemical does not pose a threat at the site.*

Response: Weston acknowledges that there were historically many instances where the detection limit is greater than the screening level, and believes that this is largely a function of the sample analysis methods that are not capable of achieving detection limits less than the screening criteria. In some instances, it is no doubt related to elevated concentrations of constituents that could "mask or hide" lesser concentrations of similar constituents. In the instance of PCBs, for example, the detection limits are typically 1 ug/L or greater, and the screening criteria is 0.014 ug/L. In the case of PCBs, they were only detected in the SWBZ inside the containment barrier, and in one anomalous sample in the IWBZ. This indicates that PCBs are not likely to be migrating from the area inside the containment barrier (above detectable concentrations). Additionally, as stated above, PCBs adsorb strongly to soil and organic matter and are not likely to migrate in the first place.

Similarly for pesticides 4,4-DDT and heptachlor, the detection limits cannot achieve levels less than the screening criteria. For the metals in the SWBZ outside the containment barrier, a total of 16 have maximum detection limits greater than the screening criteria, and none of the metals have minimum detection limits greater than the screening criteria. Despite the elevated detection limits in groundwater, WESTON believes that the groundwater is sufficiently characterized. Additionally, groundwater was not considered an exposure pathway in the risk assessment; therefore, even if the detection limits could have been achieved, the data would not have been included in the risk assessment, regardless of contaminant concentrations.

d) ***Background Concentrations Ill-defined.*** *In the discussion of metals, particularly for the intermediate and deep aquifers, the concentrations detected are compared to ambient background concentrations. The explanation of how background concentrations were established is in Appendix G of the report. The statistical methodology used to calculate background skews the determined ambient values to very high numbers, usually higher than the mean plus one standard deviation. This bias is particularly true for those metals that were detected infrequently (presumably because of high detection limits). In those cases, the lowest detected value was used as the value for all of the non-detects, skewing the statistics towards a high background value. This is a very non-conservative approach which has eliminated a number of contaminants (clearly related to disposal activities at the site) from being COCs. Note that Table G-l for calculation of the ambient level of contaminants in shallow groundwater contains calculation errors (e.g., the ambient level for arsenic). It is also unclear from the document where the background wells were located, so it was not possible to determine if they were in areas away from activities that could have contributed contaminants.*

Response: The Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, dated 19 April 2002, prepared by Tetra Tech EM, Inc. has been approved by DTSC. This documents the ambient (background) concentrations in fill, soil, and shallow groundwater. Therefore, the SWBZ background concentrations presented in Appendix G in the previous groundwater RI will not be included in the revised RI. In addition, WESTON developed ambient groundwater concentrations within the IWBZ and DWBZ. The calculations are presented in Appendix F, and use the same general approach and calculations as were accepted by DTSC in the above-referenced document.

e) ***Lack of Data for Radiological Constituents.*** *There were no analyses performed for radiological constituents, therefore, those potential contaminants could not have been identified as COCs. The text acknowledges that nuclear submarines were built and maintained at the shipyards. It also states that radium-contaminated objects had been identified in surveys of the area. Radium generally adsorbs onto the geologic materials in freshwater environments but desorbs and is much more mobile in saline groundwater environments such as those found in the aquifers at the site. Based on the use of radium paints in the shipyards and the presence of other nuclear materials, the groundwater should be analyzed for radionuclides.*

Response: As stated in the *Draft Water Quality Sampling and Analysis Plan, RCRA/Facility Landfill Post-Closure Groundwater Monitoring, Mare Island, Vallejo, California*, dated December 2003, sampling for radiological constituents will be conducted on an annual basis. Analytes included are gross beta, gross alpha, radium-226 and radium-228. Results through 2003 are included in the revised RI.

f) ***Filtered vs. Non-filtered Analyses.*** *Data collected between 1993 and 1997 were analyzed for unfiltered (total) and filtered (dissolved) analyte concentrations. Post 1997, in-line filtration methods were used to remove most particulates, including metal colloids greater than 0.45 micron diameter. Post 1999, the sampling method was changed to a low flow purge method that enables low turbidity water to be sampled without filtration, although for some sampling locations, a modified collection method requiring filtration was necessary. The early data show that the metals concentrations in unfiltered samples were significantly greater than concentrations measured in filtered samples. Despite this, the consultants assume that filtered samples are more representative of groundwater because "naturally flowing groundwater does not typically contain particulate matter". For this reason, ONLY filtered sample data were collected after 1999, and the report discussion is limited to filtered data, even during time periods when unfiltered data were collected. The text states in Section 5 that when comparing unfiltered to filtered data, significant differences were measured. The change in methodology is also an issue. This type of inconsistent data collection wreaks havoc on trend analysis, which the text (Section 5) states is considered the more reliable indicator of groundwater conditions. Filtration affects some constituents (ions with solid phases) and has no effect on others (stable dissolved ions).*

Response: The comment is noted, and WESTON agrees that the change in methodology creates difficulties in data analysis. The RI focused only on data collected with consistent sampling methodology. The consistent methodologies include unfiltered samples collected using low-flow methods, and filtered samples from other, conventional purging methods. However, this only pertains to metals samples, and has the intent of only evaluating the dissolved metals fractions. No other samples were filtered. A complete discussion is presented in Section 5.4.2 of the revised RI.

g) ***The data for determination of COPCs and for baseline risk assessment comparisons*** *are questioned given the use of filtration for samples analyzed for metals. According to J. Donohue of the USEPA Office of Ground Water and the Division of Standards and Risk Management (pers. comm. July 1998), water quality data used in risk assessment or for determining nutrition-based risk criteria have to be based on total concentration not the dissolved component. This is of particular importance for ingestion of untreated water (e.g., grazing animals, ecological indicators) in that the acidic gut will mobilize sorbed metals. Jeff Kempic, an environmental engineer working with drinking water regulations for the last 10 years in the USEPA Office of Ground Water and the Division of Standards and Risk Management, stated that drinking water standards are based on total metals. While it is acknowledged that groundwater from Mare Island is not expected to be used as a*

drinking water source, the EPA mandatory methods modification for the measurement of metal contaminants in drinking water samples requires use of total metal determination (EPA/600/R-94/l 73, 1994).

Response: Weston agrees that unfiltered metals data is more appropriate to address ingestion of untreated water for the ecological risk assessment. However, the hydrologic evaluation (presented in Appendix L of the revised RI) indicates that the majority (99.9%) of the water in the non-tidal wetlands is attributed to stormwater runoff, with a negligible quantity contributed by groundwater. Therefore, the IA H1 groundwater is not considered to replenish any freshwater surface water bodies and does not provide a beneficial use as a freshwater replenishment source. Additionally, the proposed future reuse of IA H1 is recreational/open space. Future grazing land is not a realistic future reuse of IA H1. Direct exposure to groundwater through ingestion is not considered in the ERAs, though inhalation of vapors released from groundwater is evaluatied.

4. ***Discharge in Non-Tidal Wetlands.*** *Weston states, based on an interpretation by a prior consultant, that shallow groundwater does not discharge to the non-tidal wetlands and so there is no complete pathway for ecological exposure to contaminated groundwater. This position is contradicted by the water level contours (Figure 3 above and additional water level contour plots in Section 3 of the RI) which show water table depressions at Wetland A and Wetland B. Arrows drawn at right angles to the water level contours (indicating the directions of groundwater flow) would converge on the wetlands, indicating that they are regions of discharge. It is unclear if this is direct water discharge to the surface or reflects high evapotranspiration rates by plants in the topographic lows of the wetlands where the depth to the water table would be minimal. In addition, the text acknowledges that at the end of a wet winter, the water table rises enough so that groundwater (and any contaminants it might contain) would commingle with surface water in the ponds. Either scenario could provide a pathway for plants or wildlife to be exposed to groundwater contaminants, thus constituting an ecological risk. An ecological risk assessment needs to be performed for this exposure pathway.*

Response: The results of this investigation are included in the revised RI in Appendix L, and indicate that negligible quantities of groundwater flow into the wetlands, and that most (99.9%) of the water in the wetlands is due to stormwater runoff. Additionally, although vertically upward hydraulic gradients are noted in the vicinity of the wetlands, these gradients were observed during times when the wetlands were not inundated, and groundwater could not discharge to the surface. Based on the negligible quantity of groundwater that enters the wetlands, the exposure pathway is not considered complete, and exposure to groundwater is not evaluated in the ecological risk assessment. However, surface water samples have been collected from the wetlands and ingestion of surface water by wetland receptors is evaluated in the ecological risk assessment.

5. ***Discharge in Tidal Wetlands.*** *The water level data for the shallow water-bearing zone in the region near the tidal wetlands are very limited. There are two sets of piezometers at the tidal wetlands. One is IROIPZOO7 to 009 on the inland edge of the wetlands, and the other is IR01PZ10 to 012 in the middle of the wetlands. Both show upwards vertical*

hydraulic gradients which are in contrast to the predominantly downward vertical hydraulic gradients elsewhere at the site. The water level data for these piezometers are shown in Figure 5. Since upward hydraulic gradients are indicative of discharge zones, the shallow aquifer discharges to the tidal wetlands, providing a second exposure pathway for contaminants in the highly contaminated shallow aquifer to reach plants and wildlife. An ecological risk assessment needs to be carried out to evaluate this complete exposure pathway.

Response: WESTON agrees that an upward hydraulic gradient exists within the tidal wetlands and that this is indicative of a discharge zone. However, WESTON does not concur with the notion that this is a complete exposure pathway that can be accurately quantified and evaluated. The rate of groundwater migration through the SWBZ, from IA H1 to the tidal wetlands is extremely slow. A flow velocity calculation resulted in an estimated travel time of 106 years for groundwater to flow from the western edge of the Landfill Area to the edge of the tidal wetlands. This is due solely to the fact that between IA H1 and the tidal wetland, the shallow subsurface consists of fine-grained, clayey soils derived primarily from dredge materials, including clay dikes constructed to contain dredge spoils in the various dredge ponds. The volume of discharge to the tidal wetlands, based on this travel time, is negligible, indicating that the predominance of any water and sediment located in the tidal wetlands is not associated with IA H1. Rainfall and stormwater runoff that accumulates in the former dredge ponds will recharge the SWBZ and discharge to the tidal wetlands and could contribute most of the water that recharges directly to the tidal wetlands. This indicates that results from any samples collected in the tidal wetlands would not be directly linked back to IA H1, as other sources in and around San Pablo Bay could be responsible for contaminants that have migrated to the tidal wetlands. For these reasons, WESTON does not intend to perform a human health or ecological risk assessment for this exposure pathway.

6. ***Source of High-salinity Water in Deep Aquifers.*** *The deep aquifer is not suitable for beneficial uses, such as water supply, at present because of high total dissolved solids. The salinity may reflect the area's past as tidal wetland and the more recent history of highly fluid, saline dredge spoils. Saline water discharged with the slurried dredge spoils would sink by density difference to the deeper aquifers. With time once the dredge-disposal activities terminate, the salinity of the deep aquifer may be flushed out by recharge of fresh water. This would make the deep aquifer a potential source of drinking water in the future. If this aquifer were used for potable water, human beings could be exposed to contaminants pulled down from the shallow water-bearing zone by deeper extraction. This could constitute a reasonable future exposure pathway for human health risk.*

Response: WESTON submitted a letter, dated 29 July 2003, to the San Francisco Bay Regional Water Quality Control Board (RWQCB) requesting a beneficial use exemption for groundwater located within IA H1 of Mare Island. The letter included a summary of the available total dissolved solids (TDS) data for numerous wells within the shallow, intermediate and deep water-bearing zones, which indicated that a large majority of the results were greater than 3,000 mg/L TDS. Based on these results, the RWQCB concurred with WESTON that groundwater in all three water-bearing zones within IA H1 does not have a beneficial use as a municipal or domestic supply and approved the exemption. This is documented in a letter of 17 March 2004 from the RWQCB to the Navy. As a result, the revised RI will only consider other beneficial uses for groundwater and the risk assessment will not consider the deeper aquifers as future exposure pathways.

7. ***No Wells Near Shore to Determine Migration.*** *There are no monitoring wells (only small diameter piezometers) between the highly contaminated region of the RCRA landfill and the tidal wetlands to use to monitor shallow migration of contaminants to the shore. There is no way to determine whether the calculated travel time of 190 years for contaminants to shore is contradicted by the current distribution of contaminants. There is no way of detecting future contaminant migration in that direction. Additional monitoring wells need to be installed in the vicinity of the shoreline to fill this data gap.*

Response: Attempts to install monitoring wells in the SWBZ along the shoreline and a good distance inland, have resulted in failed monitoring wells that have been subsequently abandoned, and field judgment calls to not install the well in the first place. In all instances, the reason for not leaving or installing a well is that the shallow subsurface does not yield water to the wells at a rate sufficient enough for sampling. Additionally, attempts to collect groundwater samples from three locations west of the Landfill Area, failed due to the impermeable nature of the subsurface. Therefore, although monitoring wells may be required as point of compliance wells west of the Landfill Area, there is no reason to believe that contaminants could have migrated any significant distance from the landfill source area.

8. ***Lateral Migration or Widespread Disposal of Contaminants.*** *The text acknowledges that contaminants are migrating from source sub-areas into adjacent sub-areas. Some of this contaminant migration (ex., petroleum hydrocarbons, arsenic) would appear to be occurring at a rate faster than the rate of 10 ft/yr determined for the shallow water-bearing zone. Conversely, because waste was disposed of over such a large area, it may be that the contaminants have their origin in those adjacent sub-areas and the sources of contaminants are not limited to the three sub-areas identified by Weston. This will have implications for the areas that will need to be evaluated for remedial action in the FS since source containment is the likely remedial approach.*

Response: Most of IA H1 sub-areas outside of the containment barrier should also be considered source sub-areas, including the Northwest Dump Road Subarea, the Fire Fighting-Training Subarea, the Solid Waste Disposal/Lead Oxide Storage and Disposal Area, and the West Subarea. All of these sub-areas contain a significant amount of artificial fill, which could potentially contain materials with harmful levels of

contaminants. These areas also tend to have higher hydraulic conductivities due to the more granular fill material in the artificial fill. The hydraulic gradient is also much greater in areas closer to the Landfill Area, where the mounded SWBZ conditions create a greater driving force for groundwater flow. Based on these factors, the travel times for groundwater and contaminants in groundwater would be less than in other parts of IA H1 that are dominated by silty clay material, and contaminants such as arsenic could be distributed more readily in these areas. However, the revised RI points out that although areas of fill may have greater hydraulic conductivities, these areas are surrounded by low-permeability silty clay that acts as a wall to contaminant transport.

9. ***Concentrations in soils/waste in the Soils Remedial Investigation*** *should be compared to concentrations in the groundwater for the "adjacent subareas" to determine whether groundwater contaminants are migrating from the three specific subareas identified by Weston as source areas or if there might be local sources in other areas. Figure 6-7 identifies areas where waste was encountered in boreholes. These regions should also be compared to groundwater concentrations to see if these identified waste locations are acting as sources for groundwater contaminants.*

Response: The revised RI includes an evaluation of the Threat to Groundwater based on concentrations in soil. This evaluation was performed for the areas outside of the containment barrier. The Threat to Groundwater evaluation initially used soil concentrations to determine if a constituent could leach to the groundwater. Additionally, concentrations of the constituents in groundwater were reviewed to determine if such leaching has already occurred.

10. ***Shallow Water-bearing Zone as Source of Contamination for Deeper Aquifers.*** *The text states that the two lower aquifers are not contaminated and that the shallow water-bearing zone is not the source of elevated concentrations of some COCs found in deeper zones. The text actually contradicts itself in different sections. The Executive Summary and Conclusions in Section 9 state that only the shallow aquifer is contaminated. Elsewhere in the body of the text, the authors state that the shallow aquifer is the source for the occurrence of anthropogenic contaminants in the deeper aquifers. The high levels of contamination in the shallow water-bearing zone are the most reasonable (and in some cases the only possible) source of deeper contamination. The deeper aquifers may pose an ecological risk when they discharge contaminants offshore to the southwest of IR H1.*

Response: Although contaminants have been detected in the intermediate and deep water-bearing zones, these contaminants have been detected only sporadically, and are not considered contaminants of concern. The revised RI indicates that metals, tributyltin, and TPH are the only contaminants above screening criteria in the IWBZ. The revised RI concludes that the detections of tributyltin and TPH are associated with incorrectly constructed monitoring wells that created a conduit from the SWBZ to the IWBZ, and that this contamination is not representative of the conditions in the IWBZ. These wells have been properly abandoned to eliminate any future migration of contaminants. The only "contaminants" in the DWBZ are metals detected at concentrations exceeding screening criteria. The metals in the IWBZ and the DWBZ are likely naturally occurring

and are not attributable to the waste in the SWBZ. Additionally, the shallow geology of IA H1 is such that natural clay barriers are preventing vertical migration of contaminants. This was shown in a study of the salinity, stable isotopes, and tritium concentrations in the SWBZ. The conclusions of this study indicate that groundwater in the clay-rich portions of the SWBZ has not migrated to deeper portions of IA H1 (IWBZ or DWBZ). Based on this information, the ecological risk assessment did not include discharge from the IWBZ and DWBZ to the Bay

11. ***No Soil Vapor Sampling.*** *There has been no soil vapor sampling performed at the site, in spite of the inhalation of volatilized VOCs being identified as the primary source of human health risk from groundwater. The exposure point concentrations for the human health risk assessment were based on volatilization model calculations. It would be good to perform some passive soil vapor monitoring to determine whether the modeling provides a conservative estimate of VOCs that could be inhaled by a worker.*

    Response: The calculation of vapor phase concentrations of VOCs from concentrations detected in either soil or groundwater is a practice commonly used and accepted by regulating agencies. The Johnson and Ettinger model, with all applicable updates, was used to model vapor phase concentrations of VOCs in the upcoming risk assessment. Soil vapor sampling was not performed as part of the Data Gaps work.

12. ***Fate and Transport Limitations.*** *The fate and transport of contaminated water from the IWBZ and the DWBZ to the offshore environment has not been addressed.*

    Response: As mentioned in the response to Comment No. 10, above, only metals and anomalous organics were considered contaminants in the IWBZ or DWBZ. As the metals are believed to be naturally occurring, and the organics related to migration of SWBZ groundwater through incorrectly constructed monitoring wells, WESTON still concludes in the revised RI that the IWBZ and the DWBZ are not contaminated. Therefore, fate and transport of groundwater in these zones has not been addressed.

13. ***Baseline Risk Assessment Limitations.***

    a) ***The ecological risk assessment and the human health risk assessment*** *do not address the exposure pathways related to surface water contact because of the conclusion that groundwater does not discharge to the surface. This conclusion is not yet justified; in several places in the text, the potential for or presence of discharge from the groundwater to the wetlands during wet periods is described.*

    Response: As described in the response to Comment 4, above, an ecological risk assessment for direct exposure to groundwater was not performed, as the groundwater to surface water pathway is not considered to be complete. However, inhalation of vapors released from groundwater and ingestion of surface water is evaluated in the revised ERA.

    b) ***Ecological Risk.*** *The methodology for assessing the inhalation pathway for ecological receptors is flawed. The contaminant concentration in air that is used in*

exposure calculations for burrowing animals (fossorial birds and mammals) is based on a model that calculates outdoor and indoor air concentrations following the flux of vapors from the soil. The concentrations used in the model (and applied to ecological receptors) reduces the soil vapor concentration (which is the appropriate concentration to use) due to wind, volume of a building, height of an outdoor mixing zone and other factors. The model also uses default values for adult humans in the calculations. The end result is that the risk is significantly underestimated. An appropriate ecological risk assessment should be completed.

Response: The inhalation pathway was reevaulated and is included as Appendix J of the IA H1 RI report. While inhalation can contribute significant constituent uptake to a receptor's total intake, limited information exists for quantifying this exposure route when compared to the current availability of information for quantifying ingestion. Inhalation of volatile contaminants released from soil and groundwater was evaluated for the Salt Marsh Harvest Mouse. Ambient air concentrations of volatile chemicals that a receptor may be exposed to were estimated from groundwater and soil concentrations. For groundwater contamination, the concentration in air was estimated assuming that the vapor and aqueous-phases are in local equilibrium according to Henry's law. For soil, vapor concentrations were also estimated using the Henry's law constant and the absorptive capacity of the soil. Mammalian reference concentrations from EPA's Integrated Risk Information System (IRIS) were used for inhalation TRVs.

c) ***Human Risk.*** *The human health risk assessment (HHRA) does not consider direct exposure (e.g., accidental ingestion and dermal contact) with groundwater due to incidental or recreational use following groundwater discharge to wetlands or during construction/excavation work onsite. The omission has resulted in a limited HHRA. The only exposure pathway considered complete is that of VOC release to air followed by inhalation. Ambient air concentrations of VOCs were NOT measured; air concentrations of VOCs were based on model calculations that assumed soil porosity numbers for sand. This assumption may underestimate VOC concentrations in air above areas of fill and refuse debris or more coarse sediments.*

Response: The HHRA does not consider ingestion and dermal contact with groundwater because of the incomplete exposure pathway, as stated in response to Comment No. 4, above. Evaluation of the ingestion and dermal contact pathways is unnecessary. The RWQCB has concurred with WESTON that groundwater within IA H1 does not have a beneficial use as a municipal or domestic supply and approved the exemption. A groundwater remedy for highly contaminated groundwater surrounding the landfill and waste sump areas is in progress and consists of containment via a slurry wall and collection trench. Outdoor and indoor air exposure to volatiles is included in the revised HHRA. The indoor air model uses several assumptions that may over or underestimate risk to vapors in indoor air. The proposed future use for IA H1 includes recreational open space and buildings are not expected to be built at the property. In the event that buildings are included within the reuse plans for IA H1, an additional evaluation using site-specific data should be conducted for indoor inhalation of vapors.

d) ***The potential exposed populations*** *at IA HI include adult and child recreators, park and recreation workers, and construction workers. The HHRA, however, limits characterization of potential exposures to the commercial/industrial worker receptor. The text states that the use of a commercial/industrial worker receptor is a conservative approach for the adult and child recreator, and for workers at the site in that it~ overestimates the time spent onsite. Concerns about the application of this receptor to children are raised in that default values specific to skin area, inhalation rates, body weight and other parameters used in the intake and exposure calculations are quite different for a child relative to an adult. The intake for all COPCs would likely be substantially higher for a child receptor. In the chemical intake equation, when the inhalation rate and the body weight for a child are used, the chemical intake for a child is 2.3 times higher than that for an adult for the same exposure frequency, exposure duration and averaging time (as used in this the HHRA). It is unlikely that a child would be exposed to the chemicals for the exposure time and frequency of a commercial/industrial worker unless the site is used for residential purposes in the future. Nonetheless, risk assessment specific to children is recommended.*

Response: A revised HHRA has been prepared for IA H1 evaluating three exposure areas: the area inside the vertical and horizontal containment cell, uplands areas outside the containment cell, and non-tidal wetlands outside the containment cell as agreed to by the regulatory agencies. Since recreation is the principal future land use for IA H1, risks to a child recreator (aged 1 to 17 years) were quantified for the upland and wetland habitat areas. A screening level risk evaluation (SLRE) was conducted for the area within the containment boundary using Region IX preliminary remediation goals for a commercial/industrial worker. This approach was verbally agreed upon by the regulatory agencies during the 20 May 2003 bimonthly meeting and documented in the final meeting minutes. The exposure assumptions used in the HHRA were agreed upon by the regulatory agencies through a series of electronic discussions and monthly regulatory meetings with the final correspondence dated 01 August 2003.

e) ***A single exposure point concentration (EPC)*** *was determined for each area or subarea for use in the HHRA. Given the size of some areas (acres), the lack of sample collection in large sections of some subareas, and the variability of the data within an area, this process seems somewhat simplistic. EPCs were not directly measured but were estimated using models that assume consistent soil characteristics laterally and horizontally, and non-fluctuating soil water levels. DTSC (1999) states that the "maximum contaminant value which was found from sampling" should be used as the EPC. If models for estimating ambient air concentrations are used, DTSC (1999) states that the maximum soil value measured should be used.*

Response: Consistent with U.S. EPA guidelines, the EPCs used in the HHRA are the lesser of the maximum detected concentration and the UCL of the mean. The analytical data and the U.S. EPA ProUCL Software Version 3.0 were used to estimate the UCL for each chemical at each exposure point. Soil analytical results

were applied to both direct contact and air EPC estimates. The recommended UCL from ProUCL was used as the EPC for both the RME and CTE case for soil, groundwater, and surface water at all three agency approved exposure areas. If the UCL exceeded the maximum detected concentration, the maximum concentration was used as the EPC.

f) ***The chemical intake estimates use an exposure duration (ED) of 25 years for noncarcinogens*** *(Table 1-2 a), however the DTSC (1999) guidance manual recommends use of a 6 year ED for both non-cancer and cancer risk calculations in order to be consistent. Thus, "all noncarcinogenic exposures are estimated for a child, which are the receptors with the greatest estimated exposures". Use of 25 years instead of 6 years effectively reduces the chemical intake amount 4-fold. In addition, the overall risk is the sum of the risk to an adult plus the risk to a child. Risk estimates for construction workers were calculated using the default ED of 1 year. This may be an underestimate of the actual period of exposure for a receptor who may be exposed to higher VOC concentrations while working in a trench or excavated area. Calculations for the excavation worker receptor are also questioned. The exposure duration of one year assumes an exposure frequency of only 9 days in the entire year. In addition, the inhalation rate (15.2 m^3/d) is lower than the default adult inhalation rate of 20 m^3/d. An adult worker in a trench performing excavation activities would likely have a higher inhalation rate than the average adult. Also, the volatilization factor for groundwater in the trench was assumed to be the same as that for tap water to indoor air. This is a faulty assumption based on surface area availability, pressure effects and other factors. Reassessment of risk associated with working in trenches should be evaluated.*

Response: The chemical intake calculations for the Uplands and Wetlands Areas of IA H1 outside of the containment barrier include evaluation of a 1 to 17 year old child. Therefore, the ED considered for the reasonable recreational receptor at IA H1 is 17 years. The revised HHRA considers an exposure frequency for a construction worker includes 250 days of the year for one year. Additionally, the inhalation rate is 20 m^3/day. These assumptions were agreed upon by the regulatory agencies through a series of electronic discussions and monthly regulatory meetings with the final correspondence dated 01 August 2003.

14. ***Recommendations*** *- The following activities are recommended to be carried out at the site over the next half year. Based on the findings of these additional activities, it may be necessary to revise the upcoming FS in an addendum.*

a) Analyze for radiological contaminants.

Response: Recent groundwater samples were analyzed for radiological contaminants. See response to comment No. 3e.

b) Install shallow monitoring wells near the shoreline.

Response: See response to comment No. 7 above.

c) *Perform passive soil vapor sampling.*

Response: See response to comment No. 11 above.

d) *Evaluate ecological risk from shallow discharge to both tidal and non-tidal wetlands.*

Response: See response to comments 4 and 13a above.

e) *Include total metals data in the analysis.*

Response: See response to comments 3g above.

f) *Evaluate soil contamination and waste outside of the three identified source areas as a source of groundwater contamination.*

Response: See response to Comment 8. Additional sampling has been performed as part of the 2003 data gaps investigation.

g) *Complete a HHRA specific to child receptors.*

Response: Children are considered to be the maximally exposed individual under the recreational scenario. A 1- to 17- year old child is used to characterize current exposures in the revised HHRA.

h) *Reevaluate risk assessments to verify proper assumptions are made.*

Response: All exposure factor assumptions were agreed upon by the regulatory agencies through a series of electronic discussions with the final correspondence dated 01 August 2003.

WESTON RESPONSES TO 15 FEBRUARY 2003 MARE ISLAND NAVAL SHIPYARD RESTORATION ADVISORY BOARD DR. JUNE A. OBERDORFER AND DR. RHEA L. WILLIAMSON REVIEW COMMENTS MARE ISLAND DRAFT REMEDIAL INVESTIGATION INVESTIGATION AREA H1 SOIL

GENERAL COMMENTS

1. ***Definition of Contaminants of Concern for Groundwater for 1R05.*** *The selection of Contaminants of Concern for in-depth discussion and for the elimination of some risks suffers from the same short-comings as were discussed in our review of the Groundwater RI (Weston, 2002). Only those that are persistent (present above detection limits in three out of the last four sampling events), present in two or more wells in a given water-bearing zone, and present above the screening concentration are focused on in the discussion of contaminant fate and transport. The approach used is often misleading, discarding contaminants for invalid reasons. Some of the problems with the approach are:*

   a. *Sparse Data. The contaminant concentration data are sparse and unevenly spread out through time. Chemical analytical data appear to have been acquired in late 1992 to early 1994 and again in mid-1999 to mid-2000. Because of the lack of data over the intervening five-year period, it is not possible to evaluate long-term contaminant persistence or contaminant concentration trends.*

   b. *High Detection Levels. The detection limits for many of the contaminants were much higher than their respective screening criteria. Contaminant categories include metals, PCBs, TPHs and others. This means they were reported as not detected when lower detection limits might have identified them as being present at concentrations of major concern. Just because a chemical did not make it onto Weston's list of Contaminants of Concern doesn't mean that that chemical does not pose a threat at the site.*

   c. *Non-conservative Background Concentrations for Groundwater. In the discussion of metals, the concentrations detected are compared to ambient background concentrations. Background concentrations for groundwater in IR05 were taken from those established in the Groundwater RI. The statistical methodology used to calculate background skews the determined ambient values to very high numbers, usually higher than the mean plus one standard deviation. This bias is particularly true for those metals that were detected infrequently (presumably because of high detection limits). In those cases, the lowest detected value was used as the value for all of the non-detects, skewing the statistics towards a high background value. This is a very non-conservative approach and the conclusions have been used in the discussion in the text to downplay the importance of metals contamination in*

groundwater and to reduce the risk by subtracting away the presumed risk associated with background concentrations.

d. *Radiological Constituents. There were no analyses performed for radiological constituents, therefore, those potential contaminants could not have been identified as COCs. Radium-contaminated objects have been found in IA HI and radioactive substances were used at MINS, therefore it is likely that additional radioactive contamination is present.*

Response: These comments refer to IR05 and will be addressed in a separate IR05 RI.

SPECIFIC COMMENTS

1. ***No Sampling in WMA. Groundwater was not sampled in the WMA so there is no way of knowing the extent of contamination.*** *Weston dismisses the possibility of contamination by comparing the WMA to the IA I Dredge Ponds. This is invalid, however, since the activities in the two areas were dissimilar. Because there are no groundwater data, Weston does not evaluate the threat of soil contamination leaching to groundwater in this area nor of contaminated groundwater discharging to surface water. Thus, the RI does not evaluate three potential drivers for remediation in the FS: groundwater contamination, soil contamination leaching to groundwater, and contaminated groundwater discharging to surface water. Since these threats are not evaluated and are dismissed by analogy to IA I, there will be nothing proposed in the FS to address them.*

Response: This comment refers to the WMA and will be addressed in a separate WMA RI.

2. ***Leaching from Soils.***

a. *Metals Leaching. The threat of soil contamination by metals leaching to groundwater was evaluated with a leaching model (App. F, Sec. 4) to establish threshold soil concentrations that posed a threat. The leaching calculation used a pH-specific value for the partitioning of metals between water and soil. Since it was not stated what pH-values or partitioning coefficients were used for each subarea, it is impossible to evaluate the accuracy of the calculations, some metals had the same values for each subarea, while other metals had values that varied by a factor of 100 from one area to another. These differences cast doubt on the accuracy of the calculations. Furthermore, the groundwater concentrations that were used as the target leaching concentrations were the ambient/background concentrations for groundwater. As noted above, these background concentrations were set unreasonably high thus minimizing the calculated threat to groundwater.*

Response: The entire threat to groundwater analysis was revised. The revised process is outlined in Attachments 1 and 2 (excerpted from the revised RI).

Specifically, an average pH of 6.9 was found from the most recent groundwater sampling event (as stated on page 4-2 of Appendix F) and was used to calculate the soil leaching screening criteria for metals as shown in Table 5-16. Separate screening criteria were not calculated for each subarea. Weston also noted the extreme sensitivity in the leaching potential of some metals to pH value in these calculations, but does not attribute the variability to calculation errors.

The target groundwater concentrations were based on the groundwater screening criteria presented for the SWBZ in Table 5-4. The SWBZ screening criterion for any particular constituent was the lowest screening criterion from any of the approved sources, unless the ambient concentration was higher. Both the ambient soil and groundwater concentrations were reviewed and approved by DTSC (Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, Tetra Tech, 2002) and the IWBZ and DWBZ ambient groundwater concentrations were developed based on DTSC-approved methodology.

b. *Dismissal of Threat. If a soil contaminant was found to exceed its leaching criterion, it was evaluated for its presence in groundwater above the screening criterion for groundwater. This is an erroneous approach because the groundwater was not always sampled adjacent to the areas of high soils contamination. Even if the soil contaminant was present in groundwater above the groundwater screening criterion, the contaminant was frequently dismissed because the groundwater contaminant was not detected consistently, according to the Weston's criteria for COCs. This again raises all the inadequacies of their approach to defining COCs: high detection limits, sporadic sampling, unreasonably high background concentrations, as discussed above.*

Response: As noted in response to comment 2a, see Attachments 1 and 2 for the revised threat to groundwater identification process. Note that contaminants of potential concern (COPCs) and contaminants of concern (COCs) are now used only in the context of the risk assessment. However, soil data is still compared to the soil leaching screening criteria in order to identify contaminants that may be leaching to the groundwater.

While screening levels are generally considered a useful first step in exploring nature and extent of the contamination, they may or may not reflect the level at which a threat is posed to human health, ecology, and groundwater after consideration of site-specific characteristics. The threat to groundwater identification process attempts to apply site-specific characteristics to a screening process in order to arrive at a list of contaminants posing an actual threat to groundwater.

In addition, based on site history, it is assumed that the contaminants have been in place for a considerable amount of time already. If the contaminants have not migrated into the groundwater at levels that are consistently above groundwater screening levels (at least two out of the last four sampling events), and have not

migrated to the nearest downgradient wells at these levels, it can be assumed that these contaminants are not posing any tangible threat to the groundwater.

c. *Limitation of the 95% UCL for contaminants in soils to samples collected from 0-10 feet bgs is unclear and could lead to underestimates of the UCL. Disposal trenches were typically up to 20 feet deep, and some contaminants may have migrated deeper than 10 feet, depending on the soil structure. Likewise, limitation of the analysis of organic constituents in soil to those found to "consistently exceed" the groundwater screening criteria is not conservative. Organic constituents found to exceed the soil screening criteria are removed from further evaluation unless they also were found to "consistently exceed" allowable levels in groundwater samples. This neglects the fact that they may leach to the groundwater in the future.*

Response: An upper confidence limit (UCL) is used to ensure that realistic concentrations are used for comparison purposes. The UCL used in the revised process (see Attachments 1 and 2) is no longer necessarily the 95% UCL. The analytical data and the U.S. EPA ProUCL Software Version 3.0 were used to estimate the UCL for each chemical. For sparse data, a more conservative UCL is used (for example, the 99% UCL) based on ProUCL Software recommendations.

The 10 foot interval is used for screening purposes only, and is based on the tendency for most of the debris (source material) to be most contaminated within ten feet of the surface. If a contaminant is identified as a potential threat to groundwater, data from the entire soil column in each subarea is used to identify actual threats to groundwater.

As noted in response to comment 2b, if the contaminants have not migrated into the groundwater at levels that are consistently above groundwater screening levels (at least two out of the last four sampling events), and have not migrated to the nearest downgradient wells at these levels, it can be assumed that these contaminants are not posing any tangible threat to the groundwater.

3. ***Migration of Groundwater to Surface Water.*** *For 1R05, the text identifies the likelihood of the migration of contaminated groundwater to adjacent surface water but it does not discuss this migration quantitatively or include it in any calculation of human health or ecological risk.*

Response: The comment refers to IR05 and will be discussed in a separate IR05 RI.

4. *Surface Water Issues*

a. *Sparse Data. The surface water data are very sparse. They are lumped together from different areas in order to get a sufficiently large data set to evaluate (e.g., wetland samples from the waste disposal sump/lead oxide area). The RI did not provide a summary table (as done for other environmental media) for surface water listing maximum detects, detections limits, etc., so it is not possible to understand what was*

done with the data that do exist. Of the three areas containing surface water, surface water samples from one were not addressed. The remaining two areas included the North Wetlands and South Dredge Pond Subareas. Sampling in both wetland subareas was very limited. In the South Dredge Pond subarea, wetland C, which adjoins residential areas, was not sampled for soil, subsurface soils, or sediment over most of its area. Surface water analyses were limited in the South Dredge Pond subarea to only 4 surface water samples collected during the entire RI.

Response: In order to address the surface water data gap, an additional round of surface water samples were collected in May 2003 from Non-tidal Wetlands A, B, C, and D. A draft sampling plan was submitted to the agencies on 28 April 2003, and the final sampling plan (which incorporated comments from Norman Shopay) was included in a letter to the agencies dated 6 May 2003. Weston proceeded with sampling after receiving verbal approval from the regulators that same day. Samples were collected from three locations in each wetland in order to obtain a representative sampling set from each wetland. Three samples were proposed to be collected from Wetland C during this sampling event, but the sample farthest to the northwest was dry at the time of sampling. The results from this additional sampling have been incorporated into the revised RI, and all surface water sampling locations are shown on Figure 6-11 of the revised RI. Summary tables are provided for each wetland as follows:

- Table 10-1h includes a summary of surface water data from Wetland B (11 total samples)
- Table 10-2d includes a summary of surface water data from Wetland C (2 total samples)
- Table 10-3g includes a summary of surface water data from Wetland A (3 total samples)
- Table 10-4e includes a summary of surface water data from Wetland D (11 total samples)

The distribution of sampling locations in the Wetlands was generally weighted toward the historical sources of contamination (i.e., the Waste Sump Area, Northwest Dump Road Subarea, Solid Waste Disposal/Lead Oxide Storage and Disposal Area) in order to determine how far chemical contamination from these source areas has migrated. Furthermore, sampling of surface water, sediment, subsurface soil, and perimeter surface soil has been performed at Wetland C (see Section 10.2 of the revised RI). In general, some contamination of the sediment and surface water is present, and very few contaminants exceed screening criteria in subsurface soil. Overall, Wetland C appears to contain much less contamination than the adjacent Wetland B.

b. *Limited Chemical Analyses. In the South Dredge Pond Area, surface water was only analyzed for dibutyltin instead of the long list of contaminants analyzed for elsewhere. Reasons for analysis of this compound are unknown; it was not found in the sediments or surface soils. Nonetheless, the concentrations found exceed the ambient Aquatic Life Water Quality Criteria for tributyltin (TBT) outlined in the Federal Register, 2002 (NOTE that an equivalent criteria for dibutyltin has not been established). Risk was found from other contaminants in other surface water samples, but that risk cannot be evaluated here since a broad range of contaminants was not analyzed for.*

Response: Prior to the May 2003 sampling of non-tidal wetlands B and C (in the South Dredge Pond Subarea), 6 samples were collected from 5 sampling locations within the South Dredge Pond Subarea, including WETBSW050, WETBSW051, WETBSW052, WETBSW053, and WETBSW054. These samples were analyzed for metals, pesticides, PCBs, SVOCs, and TPH, in addition to organotins. An additional round of surface water samples were collected in 2003 from each of the wetlands areas. Analytes included organotins as well as metals, pesticides, PCBs, SVOCs, and TPH. Weston identified an error in the data from Tetra Tech EMI included in the soil RI, and concluded that organotins were never detected in any of the wetlands. Of 26 total samples analyzed for organotins within Wetlands A, B, C, and D, none of them returned detectable levels of organotins. A broad range of contaminants were analyzed within each Wetland and all data was included in the revised risk assessment.

5. ***Sediment Issues***

a. *Uncertainty of Screening Levels Used. Definitions for soil, subsurface soil, and sediment are confusing in that they do not agree with USEPA guidance for delineating between the terms. In soil screening guidance documents, surface soils are defined as the upper 2 centimeters of soil. Soil screening levels used in the RI are actually not for soil, but for sediments, which the USEPA defines as particulate matter covered by water. The Weston RI used sediment screening values from the Florida Department of Environmental Protection for coastal water sediment assessment. These SSLs are provided in an EPA website (http://www.epa.aov/waterscience/cs/voll/appdx_d.pdf) that provides several alternative sediment screening guidelines. These include low and medium range effects levels. More appropriate SSLs should be used when available. In addition, sediments are defined as being covered by water, yet sediment toxicity is addressed using surface water analyses in some of the subareas. Sediment screening levels for a number of contaminants were based on ambient metal concentrations determined by methods that are disputed above.*

Response: The screening levels have been updated in the revised RI for IA H1. Definitions for each media are as follows:

- Surface soil is considered to include soil from 0 to 2 feet bgs

- Sediment is considered to include media from 0 to 2 feet bgs within the surveyed wetland boundaries

- Subsurface soil is considered to be soil at depths greater than 2 ft bgs

While surface soil is usually the top 2 cm (about 1 inch), soils to a depth of two feet (24 inches) is considered surface soil in the risk assessment since site activities could redistribute soil within the top 2 feet to the top 2 cm.

Sediment screening criteria currently include the following sources (as listed in Appendix F, part 3:

1. U.S. EPA. 2002. Region IX Preliminary Remediation Goals Table 2002 Update. Letter from Stanford J. Smucker, PhD, Regional Toxicologist (SFD-8-B), to PRGs Table Users. 1 October 2002. (For evaluating human exposure.)

2. Effects Range-low (ER-L). Long, Edward R., Donald D. Macdonald, Sherri L. Smith, and Fred D. Calder. 1995. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management 19:1. Pp. 81-97.

3. Effects Range-median (ER-M). Long, Edward R., Donald D. Macdonald, Sherri L. Smith, and Fred D. Calder. 1995. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management 19:1. Pp. 81-97.

4. Interim sediment quality guideline (ISQG). Canadian Council of Ministers of the Environment (CCME). 1999. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life Summary Tables. In: Canadian Environmental Quality Guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.

5. Probable effect level (PEL). Long, Edward R., Donald D. Macdonald, Sherri L. Smith, and Fred D. Calder. 1995. Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environmental Management 19:1. Pp. 81-97.

6. Wetland cover/ non cover values. San Francisco Bay Regional Water Quality Control Board. 2000. "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines". May.

7. Mare Island Artificial Fill Soils. PRC. 1995. 'Technical Memorandum Estimation of Ambient Metal Concentrations in Soils, MINS, Vallejo, California.' December 14.

8. RWQCB. 2003. "Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater." Interim-Final. July 2003, updated 4 September 2003.

All of the soil, sediment, groundwater, and surface water screening criteria were initially submitted to the Agencies on 2 February 2004. Comments were received from Emily Roth on 25 February 2004, and a final draft of the screening criteria was redistributed on 24 March 2004. Also, the ambient levels in the soil and shallow groundwater were approved by the agencies in a separate document (Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, Tetra Tech, 2002). Furthermore, screening criteria are presented in the RI to aid in understanding and discussion of the nature and extent of contamination. Site-specific screening criteria will be developed and presented in a feasibility study and will have a greater bearing on the remedial actions in IA H1. No chemicals were omitted from the risk assessment based on comparison to these screening levels.

b. *VOC Analysis. VOCs were only analyzed for in the sediment in IR05, not in the other subareas of the report. Without the analysis of VOCs, it is not possible to evaluate the risk they pose.*

Response: This comment refers to IR05 and will be discussed in a separate IR05 RI.

c. *WMA Sampling. There are four wetlands in the WMA. The sediment in the wetlands to the north and to the east was not sampled at all. The wetland to the east was only sampled very intensively in one small area, not elsewhere. These wetland samples were labeled as soil samples, not sediment samples. The motivation for this very intense sampling is never explained, although it is likely that there was a great deal of concern about contamination in this area. The reason for this intense sampling should be discussed.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

d. *Two areas are omitted from review in the WMA: the equine stables and Magazine A-180. No justification is provided. Assessment of these areas is recommended.*

Response: These areas are not part of Weston's environmental responsibility. The Navy is currently conducting the remedial investigations and necessary remedial actions in these areas.

6. ***Soils Issues***

a. *Non-conservative Background Concentrations for Soils. Background concentrations for metals in soils were not established in this document but rather in the Technical Memorandum "Estimation of Ambient Metal Concentrations in Soils, MINS, Vallejo, California" (PRC, 1995). We did not have the opportunity to review the Ambient Metal Concentrations document, however, the Soils RI indicates that the background concentrations are upper limits. This means that many cases of contamination were discarded as being below ambient background because the ambient background was*

set unreasonably high. We believe that the ambient background concentrations were probably calculated using techniques that set them artificially high. For example, RMEs (reasonable maximum exposure in the Risk Assessment) for many metals based on the field sampling in contaminated areas are lower than ambient background exposure. In some of the risk calculations, the risk associated with ambient background is several times greater than the risk associated with metals found in areas that experienced heavy use while MINS was active. This is illogical. It would make sense to calculate the background exposure using the same mathematical approach as used for the RME calculation so that comparisons could be made. A likely example of the underestimation of risk would be for the zinc in the WMA. In spite of finding 30,000 lb of zinc batteries and zinc everywhere in soil in the WMA, the risk due to zinc was discarded since concentrations were not over ambient. Background concentrations for metals should have been calculated with a conservative approach because of the role they play in the risk assessment. The ambient/background concentration is very important because the risk associated with background exposure is subtracted from total risk to calculate the incremental risk. In most cases, the incremental risk went to zero or a very low number because the background concentration was higher or close to the value for the contaminated areas. According to http://www.epa.gov/superfund/resources/soil/ssg496.ixlf~ local (State) background soils data should be compared to established soil screening levels to determine if the background levels at a site are anthropogenically elevated.

Response: The Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, dated 19 April 2002, prepared by Tetra Tech EMI has been approved by DTSC. This document spells out the approach used to calculate background concentrations for fill soils, soils, and shallow groundwater.

In addition, none of the data was discarded in the risk assessment in either the soil (draft) RI or the revised (draft final) RI. All data was used in the risk assessment, regardless of whether the concentration was below a screening criterion or non-detect (in which case half of the detection limit was used). Finally, in the revised risk assessment, the ambient risk is no longer subtracted from the total risk (see Appendix I).

b. *Radiological Constituents. There were no analyses performed for radiological constituents, therefore, those potential contaminants could not have been identified as COCs. Radium-contaminated objects have been found in IA HI and radioactive substances were used at MINS, therefore it is likely that additional radioactive contamination is present.*

Response: A base wide radiological survey was conducted under the Naval Nuclear Propulsion Program (Navy Radiological Engineering Division, 1996) and General Radioactive Materials Program. The DTSC, the RWQCB, and the Department of Health Services had agreed that no further action was required for general radioactive material radiological areas to be in compliance with unrestricted use criteria (DTSC,

1996 and 1997), including IA H1. Radiological items in these areas have either been removed or not identified in the different areas of IA H1. However, as acknowledged in sections 9.9.5 and 10.8.5 of the revised RI, there may still be a low potential threat from OE or radiological items. This potential threat will be addressed in the feasibility study.

c. *Uncertainty of Screening Levels Used. A review of established soil screening levels (SSLs) set by the EPA for assessing contaminant migration to groundwater and for health risk assessments (http://www.epa.govfsuperfund/resources/soil/alpd_a.pdf), indicates that most constituents have EPA generic SSLs considerably lower than the levels used in this report. It is recommended that more appropriate SSLs be used, either by calculation using the guidelines set by the EPA (http://www.epa.gov/superfund/resources/soil) or by use of established SSLs. Note that guidelines indicate that soil surface and subsurface SSLs are calculated separately, based on soil and chemical characteristics. In this report, the same SSLs were applied to surface and subsurface soils, and to sediments. Elevated SSLs are an issue in that the SSL is used to determine those chemicals for which an associated human health or environmental risk may exist.*

Response: As noted in response to Specific Comment 5a, all of the soil, sediment, groundwater, and surface water screening criteria were approved by the agencies prior to issuance of this revised RI. Soil screening criteria included the following (see Appendix F, section 2):

1. United States Environmental Protection Agency (U.S. EPA). 2002. Region IX Preliminary Remediation Goals Table 2002 Update. Letter from Stanford J. Smucker, PhD, Regional Toxicologist (SFD-8-B), to PRGs Table Users. 1 October 2002.

2. Oak Ridge National Laboratory (ORNL) – earthworms. Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. ORNL. ES/ER/TM-126/R2. November.

3. ORNL – soil microorganisms. Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. ORNL. ES/ER/TM-126/R2. November.

4. ORNL – plants. Efroymson, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten. 1997. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. ORNL. ES/ER/TM-85/R3. November.

5. ORNL – wildlife PRG. Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones. 1997. Preliminary Remediation Goals for Ecological Endpoints. ORNL. ES/ER/TM-162/R2. August.

6. Eco-SSL plants. U.S. EPA. 2003. Ecological Soil Screening Levels. Office of Solid Waste and Emergency Response.

7. Eco-SSL invertebrates. U.S. EPA. 2003. Ecological Soil Screening Levels. Office of Solid Waste and Emergency Response.

8. Eco-SSL avian. U.S. EPA. 2003. Ecological Soil Screening Levels. Office of Solid Waste and Emergency Response.

9. Eco-SSL mammal. U.S. EOA. 2003. Ecological Soil Screening Levels. Office of Solid Waste and Emergency Response.

10. Mare Island Artificial Fill Soils. PRC. 1995. 'Technical Memorandum Estimation of Ambient Metal Concentrations in Soils, MINS, Vallejo, California.' December 14.

11. RWQCB. 2003. "Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater." Interim-Final. July 2003, updated 4 September 2003.

12. U.S. EPA Region IX BTAG Recommended Toxicity Reference Values for Birds (Revision Date 21 November 2002).

13. U.S. EPA Region IX BTAG Recommended Toxicity Reference Values for Mammals (Revision Date 21 November 2002).

Region VI U.S. EPA, RWQCB, and standard ecological screening criteria form the basis of the soil screening criteria. These local criteria are more specific to the California site than generic SSLs. Furthermore, screening criteria are presented in the RI to aid in understanding and discussion of the nature and extent of contamination. Site-specific screening criteria will be developed and presented in a feasibility study and will have a greater bearing on the remedial actions in IA H1.

d. *Low Detection Levels. In Sections 6-18, for many contaminants monitored in the subareas of IR Hl, the minimum and maximum detection levels exceeded the soil screening level, resulting in NON-DETECT lab codes. Since the HHRA and ERA were limited to contaminants detected, these risk assessments may underestimate risk.*

Response: Weston acknowledges that there were historically many instances where the detection limit is greater than the screening level, and believes that this is largely a function of older sample analysis methods being subjected to newer screening criteria. This method detection limit problem was taken into account when identifying data gaps in the 2003 Data Gaps Sampling Plan, and when useable data was sparse, additional samples were collected and analyzed. Since the risk assessment used the three large exposure areas (Containment, Uplands, and Wetlands Areas) of IA H1, the sample set size was adequate to provide valid risk estimates for all chemicals. Non-detect samples were handled as recommended in the Risk

Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A. When calculating descriptive statistics (including upper confidence limits on means [UCL]), one-half of the sample quantitative limit was used as a proxy value for nondetected results. However, in cases of elevated detection limits, any sample with a non-detect qualifier in which one-half of the non-detect concentration exceeded the maximum detected concentration, was eliminated from the risk assessment calculations.

e. *Limited Soil Samples. Section 5.2 describes justifications for why additional soil sampling did not occur despite some constituents exceeding applicable criteria. Concerns exist about decisions to not complete "step-out sampling" to complete site characterization exist. The first reason for not completing such sampling was if the soil constituent was "attributed" to an off-site source investigated as a separate site. How is it determined that a source is off-site? If it is assumed to be so, with the source an adjoining IR site, what mechanism is in place to ensure that the adjoining site sampling strategy results in soil samples from the area "attributed" to be the source area? The second reason(s) was related to contaminants that were non site-related, from a spatially isolated sample, or of a magnitude that did not "appear to warrant further investigation". This is confusing in that the reasons for not completing the "step-out sampling" pertain to samples that already "exceeded applicable criteria". A sample designated as such DOES warrant further investigation in a sampling program that is supposed to be conservative.*

Response: The sampling program in question was conducted by previous consultants involved with IA H1, and this text is no longer included in the RI. WESTON conducted additional sampling during the data gaps investigation in 2003 in order to supplement the investigation approach of prior consultants. The soil samples collected were used to provide further characterization to an area and to delineate potential hot spots. Groundwater sampling was performed to delineate the extent of contamination, to characterize the potentiometric surface, to determine groundwater flow in various areas, and to determine the presence or absence of the IWBZ along the western side of IA H1. CPT was conducted in various areas to further characterize the stratigraphy of the subsurface in these areas. Additional surface water samples were also collected during a supplemental investigation in 2003.

7. ***Risk Assessment Issues***

a. *Sufficient Data. The text states the importance of having sufficient data for statistical analysis and of having all contaminated regions bounded by regions of low concentrations. The type of in-depth review required to determine whether these two goals have been achieved is beyond the scope of the time allotment of our review. Both are crucial issues. It is important to ask the regulators if they have evaluated these two issues.*

Response: In addition to a step-out approach used during the first two phases of the RI, a data gaps investigation was performed. Data gaps were identified in

consultation with the regulators. The goals of the data gaps sampling were to determine if hot spots were adequately characterized to make informed remediation and risk management decisions and to determine if the extent of contamination in soil, sediment, and groundwater was adequately characterized. The results from the data gaps investigation are included in the revised RI.

b. *Elimination of COCs That May Pose a Risk. The approach used to eliminate COCs from further consideration is questioned. The process used is as follows:*

   i. *When the maximum detected concentration exceeds the soil leaching screening level for a constituent, then Weston compares the 95% UCL for samples collected from 0-10 feet bgs to the soil leaching screening level.*

   ii. *If the 95% UCL for the constituent also exceeds the soil leaching screening level, the constituent is compared to the list of constituents identified by Weston in the groundwater RI as posing a risk or threat in the groundwater. If the constituent is not considered a threat to groundwater, it is omitted from further consideration. If the constituent is considered a threat to groundwater, only then is the constituent deemed a risk to groundwater. There are several problems with this approach:*

   - *Soil constituents can exceed the soil leaching screening level and not be further addressed.*

   - *The approach assumes that the soil contaminants have already migrated into the groundwater at levels of risk or threat to groundwater.*

   - *The approach assumes that all constituents that currently and in the future will pose a risk to groundwater were retained in the groundwater RI.*

   - *The procedure does not account for the variability in sampling location for the groundwater and soil sampling plans. Groundwater samples were not always taken in areas of elevated soil contamination. In addition, the analysis of groundwater samples often omitted contaminants found in elevated concentrations in soil.*

Response: A revised threat to groundwater identification process is included in the revised RI and summarized in Attachments 1 and 2 to this response. This process still includes several of the steps described above. Refer to response to Oberdorfer/Williamson (soil) Comment 2b regarding screening levels and 2c for discussion on the UCL.

As stated in response to Oberdorfer/Williamson (soil) Comment 2b, based on site history, it is assumed that the contaminants have been in place for a considerable amount of time already. If the contaminants have not migrated into the groundwater at levels that are above groundwater screening levels, and have not migrated to the nearest downgradient wells at these levels, it can be assumed that these contaminants

are not posing any tangible threat to the groundwater. Furthermore, an extensive groundwater monitoring program is presently being designed for long-term monitoring at the site. Any threats to groundwater that are not currently identified will likely be detected in future sampling in the proposed network of monitoring wells.

c. *Incomplete Assessment of Exposure Pathways. Dredge ponds in IR HI at Mare Island do not always contain water, and are often dry, meaning the soil on the surface can be transported via wind erosion and dust. The risk assessment for the dredge ponds needs to address the risk due to inhalation.*

Response: This pathway was taken into consideration in the risk assessment. As presented in the Draft and Draft Final RI, sediment data was combined with surface soil data and assumed to be dry for the inhalation of soil particles pathway. Unlike soil, sediment is usually submerged under water. As a result, exposure to sediment is typically evaluated separately from exposure to soil. However, at the Wetlands Area of IA H1, both sediment and soil are located in unexposed (unsubmerged) areas. Exposures to both soil and sediment are therefore expected to be identical. For this reason, data from both media (sediment and soil) were combined and treated as one soils dataset.

d. *Invalid Assumptions Related to Beneficial Use. Several decisions on the screening levels used in assessing risk are based on assumptions and decisions that are not yet approved or agreed on by the regulatory agencies. For example, it is assumed that groundwater is not a viable drinking water source now or in the future. It is also assumed that the site will not be used in the future for residential purposes. The risk assessments should include screening for risk associated with MCLs for potable water and for other potential land use scenarios.*

Response: WESTON submitted a letter, dated 29 July 2003, to the San Francisco Bay Regional Water Quality Control Board (RWQCB) requesting a beneficial use exemption for groundwater located within IA H1 of Mare Island. The letter included a summary of the available total dissolved solids (TDS) data for numerous wells within the shallow, intermediate and deep water-bearing zones, which indicated that a large majority of the results were greater than 3,000 mg/L TDS. Based on these results, the RWQCB concurred with WESTON that groundwater within IA H1 does not have a beneficial use as a municipal or domestic supply and approved the exemption. This is documented in a letter of 17 March 2004 from the RWQCB to the Navy. As a result, the revised RI only consider other beneficial uses for groundwater, and will exclude MCLs and PRGs from screening criteria; however, MCLs and PRGs will still be presented on the screening criteria table for reference.

e. *Risk to Children. The Executive Summary discusses an evaluation of Health Risk to Recreating Children, but that discussion does not appear anywhere in the main body of the text. The risk to children, generally a much more sensitive population, should be evaluated.*

Response: The revised HHRA contained in Appendix I evaluated three exposure areas: the area inside the vertical and horizontal containment cell, uplands areas outside the containment cell, and non-tidal wetlands outside the containment cell as agreed to by the regulatory agencies during monthly meetings. Since recreation is the principal future land use for IA H1, risks to a child recreator (assumes ages 1 to 17 years old) were quantified.

f. *WMA Risk Evaluation. For the WMA, a Screening Level Risk Evaluation was performed rather than the more in-depth Human Health Risk Assessment. The text does not make clear why this lower level of rigor was chosen for this area. In the absence of a compelling reason, a Human Health Risk Assessment should be performed.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

g. *Risk Calculations for WMA.*

i. *Lead above its screening criterion was found widespread in surface soils and was also present at elevated concentrations in subsurface soils. Since EPA does not provide toxicity factors for lead, no risk associated with lead could be calculated. EPA's risk assessment database (IRIS, http://www.epa.gov/iris/) states "By comparison to most other environmental toxicants, the degree of uncertainty about the health effects of lead is quite low. It appears that some of these effects, particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood lead levels so low as to be essentially without a threshold." This latter means that even very low concentrations can be hazardous to children. Just because no risk is calculated for lead does not mean that there is no risk associated with it. That risk needs to be addressed.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

ii. *In the risk calculations in Table 18-5, why is there no ambient cancer risk for chromium when there is an ambient level? Because there is no entry in that column, there is no entry in the Cancer Risk (Excluding Ambient) column. This risk should be quantified.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

iii. *There is no ambient background concentration for selenium. This is unusual since selenium is of significant ecological concern. The lack of an ambient value means that there is no entry in the Hazardous Index (Excluding Ambient) column.*

Response: All tables and risk calculations for the WMA will be updated accordingly and addressed in a separate RI document.

iv. *The values in the summary Table 18-29 do not match those in Table 18-4. Which are correct? The construction scenario is also missing from Table 18-29; it should be included.*

Response: All tables and risk calculations for the WMA will be updated accordingly and addressed in a separate RI document.

v. *No organics were analyzed for in subsurface soil, thus the risk associated with them cannot be evaluated.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

vi. *VOCs were not analyzed for in surface or subsurface soil, thus the risk from these compounds cannot be quantified.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

h. *Limited Ecological Risk Evaluation. The conclusion of no ecological risk does not seem logical. The text describes the presence of pesticides, metals, and PCBs above the screening criteria in several environmental media including surface water. The text reports the bioaccumulation of toxins and calculates Hazard Quotients indicating potential risk. Adverse effects were noted in biological tests. With all these positive indicators of environmental risk, the conclusion of no risk does not seem supported. Several specific issues with the ERA follow:*

Response: There are two components of risk characterization - risk estimation and risk description. Food-chain modeling and the hazard quotient method was used to estimate risk in the revised ERA for IA H1. At the conclusion of the risk characterization, contaminants are described in qualitative terms as posing (1) little or no risk, (2) significant and immediate risk, or (3) potential risk. If significant risk is present, the feasibility of conducting removal actions should be evaluated. For contaminants posing potential risk, either additional data should be collected or a risk management decision should be made to refine the conclusions and to focus risk management decisions.

i. *The Ecological Risk Assessment (ERA) is presented without providing enough details on the assessment. There are several places in the section where the text refers to plants and animals assayed, but does not identify the organisms.*

Response: Site-specific baseline ERAs were prepared for the upland and wetland habitats within IA H1, and are included in Appendix J of the RI report. The site-specific ERAs rely heavily on information in the Navy Revised Draft Final July 2002 Base-wide Onshore Ecological Assessment, and are supplemented with environmental data collected from IA H1 since the performance of the Onshore ERA. Numerous technical comments about the Onshore ERA were made by various state, federal, and local agencies (i.e., U.S. EPA, USFWS, DTSC, RAB, and RWQCB); these have been incorporated into the ERA methodology.

Food-chain modeling is used to evaluate exposure and risk to ecological receptors in the upland and wetland habitats. Three vertebrate species (two birds and one mammal) were chosen as representative receptors for food-chain analysis to evaluate risk to passerine birds, raptors, and large carnivorous mammals in the Upland Area. Four vertebrate species (three birds and one mammal) were chosen as representative receptors for food-chain analysis to evaluate risks to small mammals, shorebirds, waterfowl, and wading birds in the Non-tidal Wetland Area.

ii. *The ERA summary indicates that the ERA does not include the dredge pond subarea and the West subarea along the pond 1 overlap in IR01. This is an important omission given the DDT contamination noted in the dredge ponds (as noted on pages 5-13 to 5-14). The dredge ponds need to be evaluated for ecological risk.*

Response: Three separate ERAs were prepared for IA H1, one for each of the exposure areas of IA H1. A screening-level ecological risk assessment was conducted for the Containment Area, while a baseline ERA was conducted for the Upland Area outside of the containment boundary and the Non-tidal Wetland Area (i.e., Pond 1, Wetlands A, B, C, and D, and other small wetland areas within IA H1) outside of the containment boundary. Thus, Pond 1 is included in the revised ERA. However, only the portions of dredge ponds located within the boundaries of IA H1 will be included in the revised RI. Refer to the RI for IA I for further information on the ecological risk associated with the dredge ponds.

iii. *The statement that inhalation and dermal contact are relatively insignificant routes of exposure for wildlife is questioned. The USEPA ECOTOX evaluation tools provide inhalation data for a wide variety of chemicals and for a number of wildlife species; the program is available at http://www.oehha.ca.gov/ecotox.html. In addition, the State of California (OEHHA) manages an ecological risk database through UC-Davis. These tools should be accessed and used to better evaluate ecological risk at Mare Island.*

Response: While dermal contact and inhalation can contribute to a receptor's total intake, limited information exists for quantifying these exposure routes when compared to the current availability of information for quantifying ingestion. The majority of the chemicals of concern (COCs) are unlikely to be absorbed through

skin. Feathers of birds and fur of mammals further reduce the likelihood of significant dermal exposure by limiting the contact of skin with contaminated media. Exposure through inhalation is also assumed to be negligible because most of the COCs are not volatile, and those that are will dissipate readily into the air. Therefore, the majority of exposure must be attributed to oral exposure pathway, and only the ingestion pathway is evaluated for the food web. However, inhalation exposure to VOCs in soil and groundwater is evaluated for the salt marsh harvest mouse.

iv. *A quick review of the Onshore Ecological Risk Assessment (2001) indicates that inaccurate assumptions were made (e.g., with respect to organism body weight and inhalation rate). Typically, receptor body weights used to calculate contaminant dose were greater than that provided in the CalEPA California Wildlife Exposure Factor and Toxicity Database (http://www.oehha.ca.gov/oehhascripts/ca1_ecotox/species.as~.) This results in a reduced contaminant dose per day determination.*

Response: Body weights for the receptor species were revised to use values from the CalEPA Wildlife Exposure Factor and Toxicity Database where available.

v. *In the toxicity assessment, phytotoxicity of upland habitat was assessed using lettuce as the test plant. The method of assessing phytotoxicity by measuring seed germination and root elongation (ASTM E47.li.05) is a discontinued method (http:I/www.dtsc.ca.gov/ScienceTechnologv/bioassavfE4705.html). Lettuce data were then used in the food-chain modeling. This selection of plant species is inappropriate, particularly since data are available for a variety of grasses, upland plants, and pickleweed, the species present at the site and utilized as a food source by the wildlife species included in the food-chain model. If the method is going to be used, a more appropriate plant should be used per USEPA guidelines for selecting test species.*

Response: A variety of bioassays were performed as part of the Onshore ERA prepared by TtEMI (2002). All bioassays followed ASTM standards. Lettuce is a test species used in plant seedling emergence and growth bioassays; bioassays were also performed with marsh grass. Bioassays were used to evaluate direct exposure of plants, aquatic and benthic invertebrates, and amphibian species to chemicals in the wetland habitats. Bioassays were also used to evaluate direct exposure of plants and terrestrial invertebrate species to chemicals in the upland habitat. Tissues of plants, invertebrates, and vertebrates were analyzed for chemical residues.

In addition to the tissue samples harvested as a result of the laboratory bioaccumulation tests, wildlife prey tissue samples were collected in the field for plants, pickleweed, invertebrates, amphibians, and mammals. The results of the tissue sampling were used in food-chain analysis of ecological risks. No

additional bioassays or tissue sampling is proposed for the H1 wetlands or uplands.

vi. *In the ERA, it is assumed that bioaccumulation is limited to a few constituents and that the effects are limited. These assumptions are based on bioassay results for the growth of lettuce and earthworms in soil from the site. Lettuce growth was poor, and was attributed to soil conditions. This is very probable in that lettuce is not found growing in the area naturally. A more appropriate plant should be used in assessing ecological risk.*

Response: A variety of bioassays were performed as part of the Onshore ERA prepared by TtEMI (2002). All bioassays followed ASTM standards. Lettuce is a test species used in plant seedling emergence and growth bioassays; bioassays were also performed with marsh grass. Bioassays were used to evaluate direct exposure of plants, aquatic and benthic invertebrates, and amphibian species to chemicals in the wetland habitats. Bioassays were also used to evaluate direct exposure of plants and terrestrial invertebrate species to chemicals in the upland habitat. Tissues of plants, invertebrates, and vertebrates were analyzed for chemical residues.

In addition to the tissue samples harvested as a result of the laboratory bioaccumulation tests, wildlife prey tissue samples were collected in the field for plants, pickleweed, invertebrates, amphibians, and mammals. The results of the tissue sampling were used in food-chain analysis of ecological risks. No additional bioassays or tissue sampling is proposed for the H1 wetlands or uplands.

vii. *Sediment samples assayed in 1997 resulted in biological effects. The Weston RI states that these adverse effects were not representative of adverse effects in the sediments, and the analyses were explained as "worst case" and omitted from consideration. Bioassays were run in 1999 using surface water in place of sediment elutriates with an explanation that the results were more representative. These results are NOT representative of sediment conditions, and should not be used to assess potential ecological effects of sediment toxicity.*

Response: The site-specific ERAs rely heavily on total sediment, surface water, and tissue data provided in the Navy Revised Draft Final July 2002 Base-wide Onshore Ecological Assessment, and are supplemented with environmental data collected from IA H1 since the performance of the Onshore ERA. No bioassay results were evaluated.

8. ***Additional Issues***

a. *Ordnance. Because ordnance was not removed from IA H1 and so much live ordnance was found in those areas that were cleared (WMA and 1R05), live ordnance is likely to continue to pose a hazard to workers and recreational users. In the WMA,*

the search for ordnance was terminated at the break in slope on roadways and adjacent to wetlands. This means that any ordnance that rolled or was thrown off the edge of the roads was not removed.

Response: Ordnance is recognized as a low potential risk to human health and the environment and will be addressed in a feasibility study.

The remainder of this comment refers to IR05 and the WMA and will be discussed in a separate WMA RI.

b. *Stable Area. This area appears to be a source of metallic and possibly other contaminants. It was not included in the RI because insufficient investigation had been performed there. This area needs to be evaluated expeditiously to because the conclusions of that investigation can affect the evaluation of V/MA remedial approaches discussed in its respective FS.*

Response: This site was excluded from Weston's Environmental Services Cooperative Agreement and is currently being addressed by the Navy.

9. ***Recommendations*** *- The following activities are recommended to be carried out at the site over the next half year. Based on the findings of these additional activities, it may be necessary to revise the upcoming FS in an addendum.*

a. *Evaluate the risk of live ordnance in IA HI and the off-roadway portions of the WMA.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

b. *Recalculate background concentrations for metals in a manner consistent with how the RMEs were calculated.*

Response: The Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, dated 19 April 2002, prepared by Tetra Tech EMI has been approved by DTSC. This documents the ambient (background) concentrations in fill, soil, and shallow groundwater. Background concentrations will not be recalculated. Weston also calculated ambient levels for the IWBZ and DWBZ, which are presented in the revised RI, consistent with the DTSC-approved methodology and in consulation with DTSC HERD during the development of the ambient values.

c. *Evaluate the risk of radiological substances. This may require sampling and analysis in multiple environmental media.*

Response: See response to Oberdorfer/Williamson (soil) Comment 6b.

d. *Complete the investigation of the equine stable area and evaluate its impact on the WMA.*

Response: This site was excluded from Weston's Environmental Services Cooperative Agreement and is currently being address by the Navy.

e. *Evaluate groundwater contamination and potential leaching to groundwater in the WMA.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

f. *Evaluate the risk associated with contaminated groundwater seeping into surface water.*

Response: Based on the subsurface geology of non-tidal Wetlands A, B, C, and D and the presence of perimeter levees, these non-tidal wetlands act as clay-lined stormwater detention basins. A study of the groundwater elevations of the SWBZ in IA H1 and the surface water elevations in Wetland B (presented in Appendix L of the revised RI) shows that Wetland B acts as a zone of recharge, not a zone of discharge. This conclusion is based on data collected from data loggers installed in three monitoring wells (01W50, 01W54, and 01W56) and a stilling well in Wetland B. A water balance, also presented in Appendix L, reveals that approximately 99.9 percent of the water inflow to the wetlands is attributable to storm water/surface water runoff. This study serves as a model for the physical characteristics expected in Wetlands A, C, and D.

During the wet portions of the year (approximately October to April), increased precipitation, stormwater from adjacent areas, and lower evapotranspiration rates result in ponded water. This ponded water slowly discharges to the underlying SWBZ or slowly evaporates. This was demonstrated in a piezometer cluster (IR01PZ019/20) located at the edge of Wetland B.

During the dry portions of the year (approximately May to September), when the water table is lower, a precipitation event can accumulate in these wetlands, but will likely return to the atmosphere by evapotranspiration processes or slowly recharge the groundwater. The vertical hydraulic gradient in the vicinity of the wetlands transitions from downward to upward, as shown in a piezometer cluster adjacent to Wetland B. However, the water levels in these piezometers, as well as in other close by monitoring wells, show that the water levels are below the bottom of the wetland and groundwater does not discharge above ground surface.

Based on this conceptual model, WESTON believes that the non-tidal wetlands recharge the SWBZ, and the groundwater to non-tidal wetland surface water exposure pathway is not complete. Based on an incomplete pathway, a risk assessment is not warranted.

g. *Reevaluate the conclusions of the ecological risk assessment.*

Response: The ecological risk assessment was revised as indicated in previous comments. Appendix J contains the revised ERA.

h. *Reevaluate the threat to groundwater based on the revised background concentrations and without eliminating those contaminants that don't meet Weston's criteria for COCs.*

Response: Agency-approved background comparison criteria were used throughout the RI. Refer to response to comment No. 7b regarding the updated threat to groundwater identification process.

i. *Perform additional sampling and thorough analysis of surface water and sediment.*

Response: See Response to General Comments No. 1 (part b). Additional surface water samples were collected from Wetlands A, B, C, and D in May 2003. All additional data were included in the revised RI and risk assessments. Additional sediment samples were not collected from the South Dredge Pond Subarea and the North Wetlands Subarea. The contamination in these areas was determined to be adequately characterized (i.e., sufficient data for the HHRA statistical analysis, vertical delineation of contamination, and determination of contaminant migration from surrounding subareas and to groundwater). This decision is documented in the Draft Data Gaps Sampling Plan (September 2003). However, sediment samples were collected from Former Dredge Pond 1 as part of the Data Gaps Sampling Plan and have been incorporated in the revised RI.

j. *Quantify the Health Risk to Recreating Children.*

Response: Outside the containment area, Weston will conduct a baseline risk assessment for the two exposure areas. The receptors considered included recreational user (child/adolescent), residential user (for no action comparison), and the construction worker. The risk assessments will identify hot spots that pose human health and/or ecological risk. Hot spots are defined as areas with a COPC at a concentration found at greater than 10 times the screening level for that constituent.

k. *Perform a Human Health Risk Assessment for the WMA.*

Response: This comment refers to the WMA and will be discussed in a separate WMA RI.

WESTON RESPONSES TO 17 MARCH 2003 MARE ISLAND NAVAL SHIPYARD RESTORATION ADVISORY BOARD (CONNIE ANDERSON) REVIEW COMMENTS ON DRAFT REMEDIAL INVESTIGATION INVESTIGATION AREA H1 SOIL - 13 SEPTEMBER 2002 AND DRAFT FINAL GROUNDWATER REMEDIAL INVESTIGATION INVESTIGATION AREA H1 – 9 MAY 2002

RISK ASSESSMENT COMMENTS

1. *After careful review of the information set forth in the Draft Remedial Investigations for the Soil and Groundwater of Area H1and related sub-areas, I believe that the full evaluation of risks have not been adequately assessed. There is inadequate and lack of sufficient recent sampling data both in quantity and quality of samples obtained and for existing contaminants within the soil, groundwater, surface water and sediments.*

   Response: WESTON prepared a Data Gaps Sampling Plan for IA H1 in September 2003. Additional soil, surface water, sediment, and groundwater sampling within the upland and wetland areas surrounding the landfill was conducted based on the recommendations of this plan. All additional data collected was included in the revised HHRA for IA H1 that evaluated three exposure areas: the area inside the vertical and horizontal containment cell, uplands areas outside the containment cell, and non-tidal wetlands outside the containment cell.

2. *Also, it is apparent that there exist at least two complete exposure pathways for highly contaminated groundwater to affect significant human and ecological receptors. The highly contaminated groundwater of the "shallow groundwater zone" which exists just beneath the ground surface provides a direct hydrogeologic connection to the environment, allowing for both an offsite and onsite transport of contaminates.*

   One complete exposure pathway for the offsite migration of contaminates is the discharging of the groundwater directly into the tidal wetlands and San Pablo Bay. Contaminates transported via this shallow groundwater zone flow outward and discharge into the tidal wetlands and San Pablo Bay. This complete exposure pathway to human and ecological receptors calls for a thorough and rigorous sampling investigation in order to fully understand the extent of contamination, and fully evaluate risks associated with human and ecological receptors of these contaminants.

   Response: The SWBZ, while prevalent within IA H1, is not considered to represent a complete pathway with discharge to the tidal wetlands and San Pablo Bay. Within IA H1, the SWBZ consists within both artificial fill, including silty clay dredge material, and naturally deposited silty clay sediments. The artificial fill includes areas of higher hydraulic conductivity where the fill is composed of mostly granular material. In contrast, the hydraulic conductivity of the silty clay dredge material, as well as the natural sediments, is low, on the order of 1e-6 to 1e-7 cm/sec. As the silty clay material surrounds all of the higher hydraulic conductivity material, it creates a nearly impermeable boundary to groundwater flow. While groundwater can still flow through the silty clay, the rate at which this occurs is extremely slow, and any discharge to the tidal wetlands or San Pablo Bay is considered negligible, and this exposure pathway is

not considered complete. The only complete groundwater to surface water pathway is considered to include the groundwater from the DWBZ, which does not pose any risk.

3. *Another complete exposure pathway exists for the onsite migration of contaminants. It is evident that a hydrogeologic connection exists whereby the highly contaminated groundwater may either discharge directly into the sites' non-tidal Wetlands A and B or when wet weather conditions warrant, the water table may rise high enough allowing for a direct mixing of the wetlands surface water and the contaminated groundwater. This pathway to human and ecological receptors must also be rigorously sampled and evaluated for shallow groundwater zone contaminates discharging into the non-tidal wetlands A and B.*

   Response: See response to Ms. Anderson (RAB) Comment No. 1. The groundwater to surface water discharge pathway is discussed in Section 5.11 (Conceptual Site Model) of the revised RI, and supporting documentation is presented in Appendix L. Appendix L presents the results of a wetland hydrology evaluation, and concludes that most (99.9%) of the water that enters Wetland B can be attributed to stormwater runoff, with only a negligible quantity contributed by groundwater that co-mingles with the surface water in the wetland. Therefore, the shallow groundwater to non-tidal surface water pathway is not significant. Actual surface water data was used to evaluate the risks posed to human and ecological receptors.

4. *Not only should an appropriate sampling regimen be performed for soil, groundwater, surface water and sediment contaminants but clearly what is alarmingly lacking in the Draft Remedial Investigation, is the utilization of current modern scientific sampling techniques and analysis. When investigating and characterizing a site, standard thorough sampling for wildlife and wildlife prey items are typically performed. Weston presents a phytotoxicity analysis performed for "lettuce," which clearly does not represent current, nor adequate science or is representative of site specific ecological species present and site specific suite of existing conditions within soil, groundwater, sediment and surface water.*

   Response: Considerable effort has been expended by the Navy to evaluate the chemical contamination at IA H1. The Navy has worked closely with the DTSC, U.S. EPA, and the USFWS throughout the Remedial Investigation process to ensure that the investigation followed standard sampling techniques and analyses. All investigations were conducted in accordance with agency-approved quality assurance project plans (QAPPs).

   A variety of bioassays were performed as part of the Onshore ERA prepared by TtEMI (2002). All bioassays followed ASTM standards. Lettuce is a test species used in plant seedling emergence and growth bioassays; bioassays were also performed with marsh grass. Bioassays were used to evaluate direct exposure of plants, aquatic and benthic invertebrates, and amphibian species to chemicals in the wetland habitats. Bioassays were also used to evaluate direct exposure of plants and terrestrial invertebrate species to chemicals in the upland habitat. Tissues of plants, invertebrates, and vertebrates were analyzed for chemical residues.

In addition to the tissue samples harvested as a result of the laboratory bioaccumulation tests (lettuce and earthworms), tissue samples were collected in the field for plants, invertebrates, amphibians, and mammals. The results of the tissue sampling were used in food-chain analysis. No additional bioassays or tissue sampling is proposed for the H1 wetlands or uplands.

5. *An appropriate sampling regimen includes tissue samples obtained, and include aquatic invertebrates, fish, terrestrial invertebrate, plants (most notably pickleweed), bird eggs and mice. These samples should then be examined for contaminants. Site specific field studies and sampling serve as risk estimation techniques and provide empirical evidence linking contamination exposure to effects of those contaminants on the receptors. These appropriate field investigations will provide a compilation of data which can measure biological changes within the natural setting through a collection of exposure and effects data for these site specific ecological entities.*

   Response: See response to Ms. Anderson (RAB) Comment No. 4.

6. *A major advantage of field surveys is that they can be used to evaluate multiple stressors and complex ecosystem relationships that cannot be replicated in the laboratory. Field surveys are designed to delineate both exposures and effect including secondary effects found in natural systems, where as estimates generated from laboratory studies generally delineate either exposures or effect under controlled or prescribed conditions. How does Weston's presentation of the phytotoxicity test that was performed for "lettuce" provide us with this information? Field studies best represent reality, and when applied over several points in time they can describe effects associated with exposure scenarios for past and existing conditions and may allow for a prediction of future values.*

   Response: See response to Ms. Anderson (RAB) Comment No. 4.

7. *The Draft Remedial Investigation presents a lack of appropriate sampling sites and lack of consideration of the existing suite of contaminants and their potential effects to human and ecological receptors. In addition to more sampling, additional laboratory testing should be performed to determine which contaminants or suite of contaminants existing on the site cause toxic effects and bioaccumulate. This can be achieved by exposing aquatic invertebrates or fish to these samples. Doing so, will bring to light site specific information which can then be used to evaluate how dangerous onsite contaminants are to wildlife health, and determine concentrations to cause risk or adverse chronic, or lethal impacts to plant, invertebrates, fish or wildlife.*

   Response: See response to Ms. Anderson (RAB) Comment Nos. 1 and 4.

8. *Once appropriate data has been assembled, it is important to consider the nature and intensity of effects that a contaminant or suite of contaminants has on the receptor. For example, for an assessment endpoint involving survival, growth and reproduction of a species, do predicted effects involve survival and reproduction or only growth? If survival of offspring will be affected, by what percentage will it diminish? Any evaluation of adversity should examine all relevant criteria, since none are considered*

singularly determinative. Have existing site specific contaminate conditions been considered and evaluated for adverse ecological effects? Then when these are considered, how are other factors such as the economic, legal or social consequences of adverse human or ecological effects or ecological damage considered? Compared with a larger area of interest, and the role or use of the affected area within the landscape of Mare Island the function of an area within the landscape may be more important than the absolute area defined. Small but unique areas such as Wetlands A and B may have important effects on local and regional wildlife populations especially since the San Pablo Bay National Wildlife Refuge is immediately adjacent to Investigation Area H1 and related subareas, but also that recreation such as hunting and fishing which occur within the immediate tidal zone and Bay, are affected.

Response: In selecting toxicity endpoints for ecological receptors, reproduction and survival are the primary endpoints, since evaluating impacts on the community/population level is the objective (except for threatened and endangered species where protection of an individual organism is the objective). Assessing natural resource damages is not the goal of a risk assessment.

9. *When looking at the Draft Remedial Investigation's hypothesized source area for contamination, it assumes a very limited scope and defined space both for source of contamination and transport and migration of said contamination, when in fact adjacent subareas have not been assessed, such as the Waste Sump Lead Oxide Storage and Disposal Areas, where no samples were obtained. This limited scope and narrowly defined source contaminate boundaries does not represent the reality of natural laws. Because ecosystems are dynamic and, even under natural conditions constantly change in response to changes in the physical environment, such as weather or natural disturbance, it is unrealistic to expect that a system or any ecosystem will remain static at some level. Weston's hypothesized source area of contamination presented in the Remedial Investigation, assumes a narrow focal point of source contamination, and that the focal point is static. Common sense tells us that current discussions underway for the Remedial Approach for a proposed vertical or horizontal containment remedy for this source contamination are not appropriate at this time.*

Response: The Waste Sump/Lead Oxide Storage and Disposal Area is an obvious source area which contains large amounts of free product, as well as other contaminants associated with waste oil dumping. As part of the design work to determine the location of the containment barrier, soil borings were advanced along the proposed containment barrier alignment in order to properly site the containment barrier. Aerial photographs were evaluated for the same purpose, and additional cone penetrometer testing and soil borings were advanced during the data gaps investigation to ensure that the limits of certain waste areas are included within the containment boundary. Based on the extent of the source areas, as well as groundwater flow directions, a vertical containment barrier, groundwater extraction system, and RCRA cap were proposed and approved as an applicable remedy. The design document was finalized in June 2004.

10. *In summary, I recommend that; 1) a rigorous and thorough sampling regimen be performed in a systematic and organized fashion for soil, sediment, groundwater and surface water, including obtaining samples from standard sampling depth of 25 ft. bgs*

utilizing current scientific laboratory standards for analysis; 2) monitoring wells be installed in a systematic and organized fashion which will provide data for proper assessment and analysis of at least the two known complete contaminant exposure pathways, for shallow groundwater zone discharge into both the tidal and non-tidal wetlands; 3) A rigorous and thorough field sampling regimen be performed for site specific ecological receptors to include aquatic invertebrates, fish, terrestrial invertebrates, and plants such as pickleweed, bird eggs and mice and the effect of existing contaminants and suite of contaminants and resulting bioaccumulation of said contaminants; 4) evaluate adverse impacts of all the above and upon other factors such as the legal, socioeconomic impacts within the context of the larger landscape and timeframe.

Response: (1) A sampling and analysis plan was developed and executed to address data gaps across IA H1. Additional soil, surface water, sediment, and groundwater sampling within the upland and wetland areas surrounding the landfill was conducted. All sampling was performed according to the DTSC-approved Quality Assurance Project Plan (QAPP) for the MINS RI. (2) The distribution of monitoring wells from which data have been collected is sufficient in coverage and in analytical data for conducting the risk assessments. Based on the data that was developed, the step-out procedures followed for installation of groundwater wells, and the subsequent data gaps sampling plan, a systematic approach was used in locating monitoring wells. As such, no new monitoring wells were installed prior to conducting the human health and ecological risk assessments. (3) A rigorous field sampling regime was performed for the Onshore Ecological Risk Assessment. No additional bioassays or tissue sampling is proposed for the H1 wetlands or uplands. (4) Assessing natural resource damages is not the goal of a risk assessment.

WESTON RESPONSES TO 28 MARCH 2003 DTSC (JOHN P. CHRISTOPHER, Ph.D.) REVIEW COMMENTS MARE ISLAND DRAFT REMEDIAL INVESTIGATION INVESTIGATION AREA H1 SOIL, IR05, AND WESTERN MAGAZINE AREA, 13 SEPTEMBER 2002

GENERAL COMMENTS

1. ***Overall:*** *The risk assessments for sites in Area H1 have major deficiencies and must be re-worked. Those presented for Subareas of IR-05 and the Western Magazine Area are much better; these can become acceptable upon adequate responses to our specific comments below. We agree with the Navy that most sites should proceed to feasibility studies for identification of remedial alternatives to reduce risks to human health. The commercial/industrial exposure setting is not ideal as the principal setting upon which to make risk management decisions. Exposure point concentrations for sites in Area H1 are apparently systematically underestimated, leading to consequent underestimation of risks and hazards. Hot spots of risk and hazard due to very high concentrations of contaminants are ignored across all sites. Site characterization is generally adequate for metals, polycyclic aromatic hydrocarbons (PAH), and PCBs; but it is generally inadequate for other organic chemicals.*

   Response: This risk assessment was revised in the Draft Final IA H1 RI. WESTON prepared a Data Gaps Sampling Plan for IA H1 in September 2003 to address additional characterization of IA H1. Additional soil, surface water, sediment, and groundwater sampling within the upland and wetland areas surrounding the landfill was conducted based on the recommendations of this plan. Data collection focused on gathering additional characterization data and extent of contamination data as well as ensuring a statistically significant number samples were collected and analyzed for the wide range of analytes in order to ensure a statistically valid HHRA. All additional data collected was included in the revised HHRA for IA H1 that evaluated three exposure areas: the area inside the vertical and horizontal containment boundary, upland habitat areas outside of the containment boundary, and non-tidal wetland habitat areas outside of the containment boundary. WESTON developed a risk assessment in accordance with U.S. EPA's presumptive remedy guidance for the containment area within the containment boundary. Outside the containment boundary, WESTON conducted a baseline risk assessment for the two exposure areas (Uplands and Wetlands Areas). The receptors considered include a recreational user (child), residential user (for no action comparison), and the construction worker. Total risk estimates are presented in the HHRA using all data across the exposure areas of IA H1. All three exposure areas (Containment, Uplands, and Wetlands Areas) had chemicals presenting unacceptable risk levels that will be further evaluated in a Feasibility Study. Hot spots that pose human health and/or ecological risk will be evaluated in the forthcoming Feasibility Study for IA H1. The revised HHRA is contained in Appendix I.

2. ***Exposure Settings:*** *Although recreation is the principal future use for the parcels described in the report, the Navy proposes to make its recommendations based on estimates of risk and hazard for the commercial/industrial setting and a future*

construction worker. We are not convinced this treatment is adequate for two reasons. First, as stated on page H-12, this exposure setting probably overestimates risk and hazard for recreation. The commercial/industrial setting uses exposures of 5 days per week for 25 years, whereas recreational exposures are typically a few hours per day for 1-3 days per week. Thus, using the commercial/industrial setting can create overestimates of risk for recreation by two- to tenfold. Second and more importantly, both the commercial/industrial setting and the construction worker scenario probably underestimate risk and hazard for a hypothetical future maintenance/utility worker who works in trenches in areas of shallow groundwater contaminated with volatile, carcinogenic solvents. We have seen cleanups driven by the estimates of cancer risk to the maintenance/utility worker when such volatile chemicals are present in shallow groundwater. Analytical data indicate that vinyl chloride, benzene, and other volatile carcinogens are present at part per million levels in shallow groundwater in many of the areas covered in this report. The Navy does not present any estimates of risk or hazard for this exposure setting for the sites in Area H1, but it is included for Site IR-05 and the Western Magazine Area.

Even though the Navy recommends proceeding to feasibility studies for most of the sites covered in this report, we feel that such feasibility studies must be able to show the magnitude of risk reduction for each remedial alternative under consideration. Risks have not been properly estimated in this draft of the baseline risk assessment, so the feasibility study cannot present proper consideration of protection of human health in the screening and ultimate selection of remedies.

Response: The revised risk assessment (included in the Draft Final RI) evaluated a recreational user (child), residential user (for no action comparison), and the construction worker as receptors. A maintenance/utility worker working in a trench was also be evaluated using the same approach as IR05 and the WMA.

Assumptions for a 1- to 17-year-old child recreational user were considered representing an exposure duration of 17 years. A conservative estimate of 72 days/yr was used as the exposure frequency. An ingestion rate of 200 mg/day was used as the soil intake rate for the recreational receptor. The exposed surface area for the child recreator is estimated at 4,590 cm^2. The average body weight of a 1- to 17- year old (male and female) is 36.1 kg. The average inhalation rate of the age group was calculated as 11.1 m^3/day, which was used as the inhalation rate for the recreational receptor. These assumptions were agreed upon by the regulatory agencies through a series of electronic discussions with the final correspondence dated 01 August 2003.

Hot spots that pose human health and/or ecological risk will be evaluated in the forthcoming Feasibility Study for IA H1. If remediation is required in a particular area, concentrations of chemicals in those areas will be eliminated and the risk assessment will be reevaluated. Residual risk estimates will be included in the FS.

3. ***Hot Spots of Contamination:*** *In its construction of exposure point concentrations, the Navy has essentially ignored the presence of a very large number of hot spots of contamination with metals, PAH, and volatile solvents. In various cases, concentrations of thousands of parts per million of contamination are averaged with non-detect values to*

achieve exposure point concentrations less than a benchmark, such a reference dose or a 1 E-6 cancer risk. This is completely unacceptable. The use of an average concentration for an area of a site implies that a receptor can be approximately equally exposed anywhere within the area over which the average is taken. This assumption is violated when detected concentrations cover several orders of magnitude. The presence of hot spots requires that sites be subdivided into areas of somewhat similar concentrations, so that risks and hazards will be neither understated for the hot spot nor overstated for the cleaner areas. If it occurs that future land use changes, then hot spots must be assessed for the information of risk managers.

Response: The risk assessments were conducted using all data collected at IA H1. Most of the hot spots where concentrations were orders of magnitude greater are included within the containment area, which was subject to a screening level human health risk assessment. The uplands and wetland areas outside the containment excluding the IR16 removal action area did not have large difference in contaminant concentrations that would dilute the risk. Therefore, all the data for the uplands and wetlands were included in the risk assessment.

The data was analyzed and chemicals for which concentrations at one or several sampling locations exceeded an order of magnitude or higher than the average were identified as risk drivers and will be further evaluated in the Feasibility Study for IA H1. The risk estimates presented in the RI may be overestimated considering potential hot spot concentrations were averaged into the risk calculations. In cases where the data set was highly skewed due to elevated concentrations, a 97th or 99th percentile UCL on the mean was used as the exposure point concentration to compensate for the skewed data set.

4. ***Site Characterization:*** *In general, we find that the sites described in this report are reasonably well characterized for metals, PAH, and PCBs. Some sites are fairly well characterized for volatile organic chemicals (VOC) in groundwater. Characterization for other organic chemicals is spotty or absent, but generally inadequate for purposes of risk assessment. We do not consider characterization adequate when we see dozens of samples collected and analyzed for metals, PAH, and PCBs at a site, then just three or four for other organic chemicals. It appears highly probable to us that risks and hazards have been underestimated by failure to seek out potential releases of toxic materials into environmental media.*

Response: See response to Mr. Christopher, Ph.D. (DTSC) General Comment No. 1.

5. ***Benzo(a)pyrene Equivalents:*** *DTSC requires that cancer risk due to carcinogenic PAH be combined into estimates of Benzo(a)pyrene Equivalents (BAPeq). Two of the customarily identified carcinogenic PAHs, Benzo(a)pyrene and diben(a,h)anthracene have cancer potency factors published in the Integrated Risk Information System (IRIS) of USEPA (http://www.epa.gov/iris/subst/index.html) and the Toxicity Criteria Database published by the Office of Environmental Health Hazard Assessment (OEHHA) of Cal/EPA (http://oehha.ca.gov/risk/ChemicalDB/index.asp). Carcinogenicity of other carcinogenic PAH are estimated by multiplying their concentrations first by carcinogenic potencies relative to benzo(a)pyrene, then by the potency of benzo(a)pyrene itself. This practice of collapsing similar carcinogens through use of a surrogate chemical simplifies*

the presentation of cancer risk, especially for purposes of selecting remedial alternatives. Because several sites described in this report are highly contaminated with carcinogenic PAH, this addition will be extremely helpful to risk managers.

Response: The cancer risk due to carcinogenic PAHs were presented for each individual chemical. The toxicity criteria (carcinogenic slope factors) were adjusted to account for carcinogenic potencies relative to benzo(a)pyrene.

6. ***Polychlorinated Biphenyls (PCBs):*** *The Navy has assessed the potential carcinogenic effects of PCBs; indeed, by assuming all PCBs to have carcinogenic potency equal to Aroclor-1260, they have made very cautious estimates. Notwithstanding this, we require that the non-carcinogenic effects of PCBs be assessed also. Selecting remedies for these sites might call for a more realistic assessment of PCBs, along the lines recommended in USEPA's Integrated Risk Information System (IRIS). If that is done and the lower chlorinated Aroclors and PCB congeners will be taken to non-carcinogenic, then the immunotoxic and dioxin-like effects of the various congeners can become drivers.*

   Response: The non-carcinogenic effects of PCBs (Aroclors and congeners) were included in the revised HHRA for IA H1.

7. ***Subtraction of Background:*** *At several sites the Navy characterizes site-related non-carcinogenic hazard by subtracting a hazard index for background. This is misleading and should be removed wherever it has been included. First, the Navy estimates the hazard index for chemicals of concern at the site. Next, the Navy estimates a hazard index for the same suite of chemicals from the various ambient sets. Finally, the second is subtracted from the first to arrive at a "site-specific hazard index". This procedure is toxicologically unsound, because the toxicity criteria which enter calculation of the hazard index include an assumption that the toxic effects have thresholds. The concept of a threshold for a toxic effect means that doses above the threshold can have deleterious effects, while the organism can adapt by repair or other mechanisms to doses below the threshold. Thus, the figure of merit is the total hazard index, not where it comes from. If a receptor is exposed to a dose higher than the threshold for toxicity, the source of the toxic material is irrelevant with respect to the health of the organism. What matters is whether the threshold is exceeded. Thus, subtraction of a "background dose" is misleading and must be removed.*

   Response: The total and ambient risk estimates are presented separately. Ambient risk estimates are not subtracted from total risk estimates in the revised HHRA.

8. ***Assessment of Lead:*** *DTSC has agreed with USEPA Region 9 to use its Preliminary Remediation Goal (PRG) of 750 mg/kg as a screening value for toxic effects of Pb for the commercial/industrial setting. The Navy should note that a screening value should not be taken directly as a remediation goal if site-specific information indicates otherwise. We continue to recommend LeadSpread for such uses, because of its flexibility for making use of site-specific information. Download LeadSpread from http://www.dtsc.ca.gov/ScienceTechnology/ledspred.html.*

Response: The PRG of 750 mg/kg was only used as a screening value. DTSC LeadSpread will be used to quantify a remediation goal for areas of lead contamination. It should be noted that 750 mg/kg was accepted by DTSC as the lead cleanup level in IR16 B3/B5 during the implementation of the Action Memorandum/Time Critical Removal Action associated with the Containment Barrier and Extraction Trench in IA H1

9. *For their information, the Navy should note several developments on the near-term horizon with respect to modeling exposure to Pb. DTSC is in the process of updating LeadSpread; we expect to release the new version later in 2003. USEPA's Adult Lead Model, which is the basis for the USEPA Region 9 Preliminary Remediation Goals of 750 mg/kg, is very sensitive to the values used for baseline blood Pb level and geometric standard deviation. USEPA now recommends a lower value for the former and a higher value for the latter (http://www.epa.gov/superfund/programs/lead/products/nhanes.pdf). Also, USEPA recently announced the availability for review of the "All Ages Lead Model". This model will apparently replace the Adult Lead Model eventually.*

Response: Comment noted. The most recent publications were used when developing the revised risk assessment for IA H1.

SPECIFIC COMMENTS

A. Appendix H – Sites in Area H1

1. ***Table Designations:*** *Apparently, all the tables in Appendix H should begin with the letter "H", not the letter "I". This is confusing, because Appendix H has many tables with the same designations as tables in Appendix I.*

Response: The tables in question were hardcopy reports generated by Tetra Tech. The tables are labeled correctly in the revised HHRA.

2. ***Exposure Point Concentrations:*** *In the right-hand side of tables showing the selection of the exposure point concentrations for each medium at each site, the value selected often does not match either the 95% upper confidence limit on the mean or the C_{MAX} shown on the left-had side of the same table. For instance, in Table I-9.2a, C_{MAX} for vinyl chloride in groundwater at Sites IR-02 and IR-06 is 1,300 µg/L, the arithmetic mean is 31 µg/L, and the 95% UCL on the mean (normal? lognormal?) is given 60 µg/L (normal? lognormal?). However, the Navy selected an exposure point concentration of 13 µg/L, supposedly based on the 95% UCL on the mean of log-transformed data. If the correct UCL to use is 61 µg/L, then risks due to vinyl chloride are underestimated by a factor of about 4.5; this is important, because vinyl chloride in shallow groundwater at >1 mg/L will often be the principal risk driver due to penetration of vapors into indoor air. Similar tables in Appendices I and J are consistent, in that the exposure point concentration selected is always equal to the 95% UCL shown or the C_{MAX} shown on the left-hand side of the tables. Incorrect values have apparently been selected as the exposure point concentrations for all chemicals of potential concern not found to be normally distributed. These values are not only incorrect but also systematically*

underestimated. Thus, risks and hazards are underestimated for all sites in Area H1 and must be re-calculated.

Response: The HHRA was revised for the Containment, Uplands, and Wetlands Areas of IA H1. The exposure point concentration for each chemical was selected as the UCL or C_{max} for all data distributions. The means are not used as exposure point concentrations in the revised HHRA.

3. ***Cal/EPA Toxicity Criteria:*** *Sites in Area H1 were not assessed using toxicity criteria published by the Office of Environmental Health Hazard Assessment (OEHHA) of California EPA. We require this for all risk assessments; indeed, Cal/EPA toxicity criteria were applied for subareas in Site IR-05 and the Western Magazine Area. For the Navy's information, these criteria may be found at the following websites:*

   http://oehha.ca.gov/risk/ChemicalDB/index.asp, "Toxicity Criteria Database" contains cancer slope factors and unit risks. Also contains some criteria for non-carcinogenic toxic effects.

   http://oehha.ca.gov/air/chronic_rels/AllChrels.html, "Chronic Reference Exposure Levels (REL)" contains criteria for non-cancer endpoints via the inhalation pathway of exposure.

   Response: Comment noted. The Cal/EPA toxicity criteria was applied to the revised risk assessment for IA H1 where available and more stringent that federal criteria.

4. ***Vapor Modeling, Attachment H2:*** *Please indicate whether the latest modifications of the Johnson and Ettinger Model were used for indoor air calculations, given by USEPA: http://www.epa.gov/oerrpage/superfund/programs/risk/airmodel/johnson_ettinger.htm. In the description of the tiered approach, it seems the Navy chose to use different tiers for different chemicals of potential concern at the same site. This is not acceptable. Tiers are applied by site. These calculations must be re-done. Values in Appendices I and J are apparently correctly calculated.*

   Response: The indoor air calculations were reevaluated in the revised HHRA using the most recent version of the Johnson and Ettinger Model dated 19 July 2003.

5. ***Demolition Debris Subarea, Section H-3, pp. H-34 ff.:*** *This site is heavily contaminated with metals. Table I1-3.1b shows present the top 10 ft of soil contains high concentrations of Sb, Cr, Cu, Pb, and Zn. The co-occurrence of high levels of Cr, Cu, and Zn suggests that plating materials might have been disposed here. The Navy estimates the exposure point concentration for Pb at this site to be lower than the PRG of 750 mg/kg. However, concentrations of Pb in soil as high as 2,000 mg/kg are present. DTSC normally requires remedial action for protection of health when such hot spots of Pb are present.*

   The Navy estimates that the area-wide non-cancer hazard index is 0.23, which is less than the benchmark value of 1.0. However, some hot spots of metal-contaminated soil presented hazard quotients for individual metals as much as 10 times that level. This risk

assessment does not address the presence of hot spots of contamination at this site. We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.

Response: Lead has been identified as a risk driver for the Demolition Debris Subarea and will be addressed in the forthcoming FS for IA H1. Although, Sb, Cr, Cu, and Zn were not identified as risk drivers from the risk assessment, the highest concentrations of these metals are located at the same sample locations as other risk drivers such as lead and Aroclor-1260. Therefore, hot spots for other chemicals will also be addressed in the FS. For example, Sb, Cd, Cr, and Zn were detected at high concentrations at sample location IR01GB044. High concentrations of Pb and Aroclor-1260 (risk drivers) were also identified at this location and will be addressed in the FS.

6. ***Northwest Dump Road Subarea, Sec. H-4, pp. H-37 ff.:*** *This site is not well enough characterized for any more than the barest of screening risk assessments. The frequency of detection for metals in soil is too low to attempt testing distributions. We found as many as 12 samples analyzed for Pb and no more than 9 for any other metals. Characterization for organic contamination other than PAH is almost non-existent. Hot spots are apparently present for Sb, Cu, Cr, Ni, Pb, and Zn (Table I-4.1b). The co-occurrence of Cr, Cu, Ni, and Zn once again suggest that plating wastes might have been disposed here. Carcinogenic PAH should be characterized with an estimate of BAPeq. Risks and hazards are generally underestimated, because the method of identifying the exposure point concentration is not valid for few samples or low frequency of detection. We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.*

Response: A data gaps sampling and analysis plan was developed and executed in 2003 to address data gaps across IA H1. Additional soil, surface water, sediment, and groundwater samples within the upland and wetland areas surrounding the landfill were collected. Within the Northwest Dump Road Subarea a total of 6 soil samples were collected at four locations and analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and TPH to further characterize this subarea. Also, a total of 7 samples were collected at three locations and analyzed for PAHs and TPH in areas with high levels of TPH or where oil and free product was observed on the boring log. Two of the samples were also analyzed for explosives and three of the samples were analyzed for hexavalent chromium. All of the additional data was included in the RI and risk assessments. See response to Mr. Christopher, Ph.D. (DTSC) General Comment No. 5 regarding BAPeq. Exposure point concentrations were reevaluated in the revised HHRA. Additionally, a significant portion of this subarea will be included within the slurry wall containment barrier.

7. ***West Subarea, Sec. H-5, pp. H-40 ff.:*** *This site is adequately characterized for metals, PAH, and PCBs, but poorly characterized for other organic chemicals. Very high concentrations in soil were observed for As, Cr, Hg, Pb, and Zn. Carcinogenic risks are driven mainly by carcinogenic PAH, where concentrations in soil range from 10-50 mg/kg. Risks due to PAH at this site would be better characterized by using BAPeq. Table I-5.1c shows a C_{MAX} for trivalent Cr of 157 μg/L; this value is high enough that one would suspect the presence of hexavalent Cr rather than trivalent. Risks and hazards*

are probably underestimated by the method of selecting the exposure point concentration. The concept of an incremental hazard index (p. H-41) is invalid; background for non-cancer effects cannot be subtracted from the hazard index for the site. We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.

Response: See response to Mr. Christopher, Ph.D. (DTSC) General Comment No. 5 regarding BAPeq. A data gaps sampling and analysis plan was developed and executed in September 2003 to address data gaps across IA H1. Samples were collected at six locations and analyzed for one or more of the following: VOCs, SVOCs, pesticides, PCBs, metals, and TPH. The results of the additional sampling have been included in the revised RI. Additional sampling was not proposed for the southern portion of this subarea that is to be included within the containment boundary. Additional analyses for sampling locations within Pond 1 included organics and inorganics including hexavalent chromium.

8. ***South Dredge Spoils Subarea, Sec. H-6, pp. H-43 ff.:*** *Soils at this site are apparently not as contaminated as neighboring parcels described above, although only PCBs are characterized well enough to draw firm conclusions. If the site characterization is deemed adequate in identifying Aroclor 1260 as the only significant risk driver, then health risks at this site probably fall within the risk management range of 1 E-6 to 1 E-4. Groundwater presents a different picture. Table I-6.1c shows that ethylbenzene, toluene and xylene(s) are present at concentrations greater than 100 µg/L, with benzene at 23 µg/L, suggesting the presence of contamination with fuels. Analyses of groundwater at this site for semi-volatile organic chemicals (SVOC), especially phenol and alkylated phenols, might be useful in determining the age of the release. Table I-6.1c also indicates that at least one sample of groundwater at this site had about 2% Na by weight. Is this hypersaline value correct? We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.*

Response: As part of the 2003 data gaps investigation, grab groundwater samples were collected using a cone penetrometer testing (CPT) approach. Several CPT locations were advanced in and around the South Dredge Spoils Subarea. The results from this investigation were incorporated into the revised RI and aided in delineating the extent of contamination, as well as the nature of the contamination. The BTEX concentrations noted were collected at IR01-MW01 in April 1991. The April 1991 sampling was the only sampling event conducted for groundwater collected at IR01-MW01. A new SWBZ monitoring well, DPW-76, was installed near former monitoring well IR01-MW01 in 2003. BTEX concentrations were non-detect at DPW-76 in October 2003 and January 2004.

The value for Na at 01W54 is correct for sampling conducted in 1992.

9. ***North Wetlands Subarea, Sec. H-7, pp. H-46 ff.:*** *This site is apparently adequately characterized for metals and PAH, but few other analyses are reported. Estimates of cancer risk and non-cancer hazard for the future commercial/industrial worker exceed their respective benchmarks of 1 E-4 and 1.0. Principal risk drivers are PAH and As. Presentation of BAPeq would be helpful here. Groundwater at this site is heavily*

contaminated with metals. Table I-7.1c shows the following, very striking maximum concentrations: Sb - 789 µg/L; Cr– 311 µg/L (is it really trivalent?); Cu – 273 µg/L; Se – 22 µg/L; and Na up to 1.4%. We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.

Response: See response to Mr. Christopher Ph.D. (DTSC) General Comment Nos. 1 and 5. Metals in groundwater were not evaluated in the revised HHRA. Complete exposure pathways only exist for inhalation of volatile chemicals for groundwater. The extent of metals contamination in groundwater is discussed in Section 7 of the RI. Additionally, a threat to groundwater evaluation was conducted and included in Sections 9 and 10 of the RI.

10. ***Firefighting Training Subarea, Sec. H-8, pp. H-49 ff.:*** *This site seems to be characterized adequately for metals, Aroclor 1260, and PAH; however, it is poorly characterized for other organic chemicals. Cd cannot be eliminated as a COPC, because it is present in soil at 20 mg/kg in at least one sample. The evaluation of Pb makes no allowance for a hot spot of 3,000 mg/kg. Therefore, hazards for Cd and Pb are underestimated for this site. We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.*

Response: See response to Mr. Christopher Ph.D. (DTSC) General Comment No. 1. A total of three samples were collected at two locations and analyzed for VOCs, SVOCs, pesticides, PCBs, metals, and TPH to further characterize the subarea. Additionally, one other sample was collected and analyzed for VOCs and TPH, and three others for dioxins/furans. Two of the samples were anlo analyzed for hexavalent chromium. Lead has been identified as a risk driver for the Fire-Fighting Training Subarea and will be addressed in the forthcoming FS for IA H1. Although several of the other metals were not identified as risk drivers, the locations of the highest concentrations of these metals correspond with high concentrations of the risk drivers. Therefore, hot spots for other chemicals will also be addressed in the FS. For example, cadmium was detected at a concentration of 19.6 mg/kg at sampling location IR01HA025. This sampling location also had high concentrations of Aroclor-1260 and lead which were identified as risk drivers at the Fire-Fighting Training Subarea.

11. ***Waste Sump/Lead Oxide Disposal Area (IR-02 and IR-16), Sec. H-9, pp. H-52 ff.:*** *These sites are the best characterized of all the subareas of Area H1. Soils are very heavily contaminated with PCBs and metals. Hot spots exist for Sb, As, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Ag, Th, and Zn. At least one soil sample was >44% Pb (Table I-9.1b). Elevated concentrations of Cd, Cr, Cu, Ni, and Zn in soil suggest that plating waste might have been released here. Groundwater is highly contaminated with metals. No assessment of separate hot spots is presented. Elevated concentrations are present for* Cr^{+3}, Cr^{+6}, *Cu, Pb, Ni, Ag, Zn. In Table I-10.1c, we note two distinctly different entries for concentrations in Zn groundwater. Which is correct? Groundwater also shows significant levels of nitroaromatic explosives and their by-products, vinyl chloride and other chlorinated solvents, and monoaromatics from fuels, i.e. benzene, toluene, ethylbenzene, and xylene. Estimated cancer risks for the industrial worker are given as 1.4 E-4, but correction of the exposure point concentrations as mentioned above will drive this value higher. We estimate cancer risk from BAPeq to be about the same as*

total PCBs; each is about 5 E-5 for the industrial setting. We agree with the Navy that potential risks to future industrial workers justify sending this site forward into a feasibility study.

Response: These areas are included within the containment boundary and will be carried forth as part of the presumptive remedy process. Several risk drivers were identified within the soil and groundwater within the Containment Area. Hot spots will not be assessed for this area since vertical and horizontal containment of the source areas is the reasonable anticipated remedial action for these areas.

12. ***Sludge Treatment/Surface Impoundment Area (Site IR-06), Sec. H-10, pp. H-55 ff.:*** *Soils at this site are well characterized for metals and PCBs but poorly characterized for semi-volatile and volatile organic chemicals. Groundwater is well characterized. Elevated concentrations of Cd, Cr, Cu, Ni, and Zn in soil and groundwater suggest that plating waste might have been released here. Pb levels in soil are said to exceed the USEPA Region 9 Preliminary Remediation Goal of 750 mg/kg for the industrial worker; however, values range from 8 to over 6,000 mg/kg, indicating that some areas of the site probably do not require remediation for Pb, while other areas, possibly hot spots, might well require a removal of soil to protect human health. Elevated levels of benzene, ethylbenzene, toluene, xylene, and their corresponding phenolic degradation products in groundwater indicate the release of fuel materials which has weathered for a considerable period. The Navy concludes that human health risks at this site are within the risk management range of 1 E-6 to 1 E-4; however, we believe these risks are underestimated and should be re-calculated.*

Response: This area is included within the containment boundary and will be carried forth as part of the presumptive remedy process. Several risk drivers were identified within the soil and groundwater within the Containment Area. Hot spots will not be assessed for this area since vertical and horizontal containment of the source areas is the reasonable anticipated remedial action for these areas

13. ***Industrial Wastewater Pipeline (Site IR-14), Sec. H-11, pp. H-58 ff.:*** *Metals in soil at this site are well characterized, but very few soil samples were analyzed for other chemicals and groundwater was apparently analyzed for volatile organic chemicals only. This characterization is incomplete at best. Trivalent Cr and Zn are elevated in soil (Table I-11-1b). The Navy estimates low risks and hazard for this site. We are not able to agree with this conclusion, because of the paucity of analytical data.*

Response: See response to Mr. Christopher Ph.D. (DTSC) General Comment No. 1. The Industrial Wastewater Pipeline was not evaluated as its own subarea of IA H1. Since it traverses several sub-areas, data from samples associated with the pipeline were included in the subarea surrounding the IWTP at that point. Data collected along the pipeline was included within the Containment, Uplands, and Wetlands Areas in the HHRA as appropriate.

14. ***Solid Waste Disposal/Lead Oxide Disposal Area (Site IR-16), Sec. H-12, pp. H-60 ff.:*** *Soils and groundwater at this site are well characterized. Soils are heavily contaminated with metals. The five metals characteristic of plating waste are elevated in soil: Cd, Cr, Cu, Ni, and Zn (Table I-12-1b). Extremely high hits were encountered for Sb (1,250 mg/kg) and Pb (262,000 mg/kg), but no analysis of hot spots is presented. Groundwater shows elevated levels of Sb, As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ag, and Zn (Table I-12-1c). The Navy estimates cancer risk for the industrial setting to be as high as 1.3 E-4; however, but we believe this is an underestimate, because hot spots have been averaged in with less contaminated areas. We note on page H-61 that the Navy calculated a hazard index for non-cancer effects of site-related chemicals by "excluded ambient concentrations". We were not able to determine exactly how this calculation was made. However, if it included subtracting one hazard quotient from another for the same metal, then we will not accept it. Such subtracting is acceptable for carcinogens, where no threshold is thought to exist. Hazards for non-cancer endpoint are not necessarily linear below their various thresholds, so subtraction cannot be permitted. For toxic effects which exhibit a threshold, exceeding the threshold is the important event for the receptor, not determining what percent portion came from the site of interest.*

Response: A large portion of the Solid Waste Disposal/Lead Oxide Disposal Area has been excavated for lead hot spots and in preparation for installing the slurry wall. All soil samples that exceeded 750 mg/kg of lead were removed from the site and backfilled with material from Dredge Pond 4N or off site material. Therefore, many of the sample locations have been removed and the risk calculations for this area will be drastically different. The risk assessment in the revised RI will not include sample results from locations that have been excavated.

15. ***Industrial Wastewater Treatment Plant (Site IR-24), Sec. H-13, pp. H-63 ff.:*** *Soils and groundwater are well characterized with respect to risk assessment. Both are contaminated with metals, notably Sb, Pb, Ag, and Zn. Cancer risks are for the current and future industrial are estimated to fall between 1 E-5 and 1 E-6. Correction of the exposure point concentrations might not push these risks to exceed the benchmark of 1 E-4. Although exposure point concentrations must be re-calculated, this site might remain within the risk management range of 1 E-6 to 1 E-4.*

Response: A portion of the IWTP subarea will be fully enclosed within the slurry wall and collection trench containment area, and will be covered with a RCRA cap. Sampling points within this area were included in the screening level risk assessment for points within the Containment Area.

16. ***Summary for Area H1, Sec. H-14, p. H-66:*** *We disagree with the Navy's conclusions shown on this page, principally because hot spots of contamination have not been identified or assessed at any of the sites in Area H1.*

Response: Hot spots that pose human health and/or ecological risk will be evaluated in the forthcoming Feasibility Study for IA H1. If remediation is required in a particular area, concentrations of chemicals in those areas will be eliminated and the risk assessment will be reevaluated.

B. Appendix I – Subareas of Site IR-05

17. ***Hexavalent Chromium, Sec. I-2.3.5, p. I-24:*** *We agree with the Navy that assessing Cr in soil as the non-carcinogenic Cr^{+3} is not unreasonable, provided the levels encountered are on the same order as ambient concentrations, perhaps <200 mg/kg. High levels of Cr in soil are usually indicative of the presence of Cr^{+6} and should be assessed as such.*

    Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

18. ***Risks in Surface Water, p. I-34 and Elsewhere:*** *We note in Appendices I and J that the Navy has presented estimates of risk and hazard for human exposure to surface water. We are unable to evaluate these estimates, because we found no data on concentrations of chemicals in surface water. Table I-21 does not identify surface water as a complete exposure pathway for the receptors studies. Why is this here?*

    Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

19. ***Upland Subarea, Sec. I-3.2, pp. I-23 ff.:*** *Soils in this subarea are well characterized; the main contaminants are Cu and Zn. Footnote Groundwater was apparently sampled for volatile organic chemicals only. 2 in Tables I-3.1a, b, and c states that a statistical test was used to identify chemicals of potential concern according to a guidance document from USEPA, but the test is not identified or described. Was this a Wilcoxon Rank Sum test? Please elaborate. We agree with the Navy that site-related risks and hazards are less than their respective benchmarks of 1 E-6 and 1.0.*

    Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

20. ***Lowland Subarea, Sec. I-3.3, pp. I-37 ff.:*** *Soils in this subarea are well characterized; the main contaminants are Cu, Pb, and Zn. Groundwater is well characterized for semi-volatile and volatile organic compounds but no data are presented for metals. We agree with the Navy that site-related risks and hazards for soils are less than their respective benchmarks of 1 E-6 and 1.0, but we can make no statements about groundwater. The pervasive contamination of shallow groundwater with metals throughout the western portion of Mare Island makes it a virtual certainty that contamination would have been found had samples of groundwater been analyzed for metals. Therefore, we believe risks and hazards for this site are underestimated. The table on page I-38 makes reference to risk for the park worker due to exposure to surface water on the order of 2 E-2 for "Total Metals". Although we do not understand what is meant by "Total Metals", it seems evident that the risk value is a misprint and ought to be 2 E-5. This typographical error is repeated throughout the remainder of Appendix I.*

    Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

21. ***Volatile Organic Compound Area (Subarea IA 1), Sec. I-3.4, pp. I-39 ff.:*** *Shallow groundwater in this sub-area is heavily contaminated with chlorinated solvents, including chlorobenzene, 1,2-dichlorobenzene, trichloroethylene, and vinyl chloride,. Vinyl chloride is present at levels as high as 20,000 µg/L. With this degree of contamination, we find it extremely surprising that only seven samples of groundwater were analyzed. We agree with the Navy that this site should proceed to a feasibility study. At that time, we strongly recommend a much larger sampling program to determine the extent of contamination of the groundwater in this vicinity. We note that the summary tables for risk shown on pages I-40 and I-41 do not seem to include an inhalation pathway. This is apparently an error, because we expect that volatile solvents in shallow groundwater would present the greatest risks due to exposure to vapors. This is especially true for the construction worker. We were not able to track the entries for cancer risk and non-cancer hazard in the Tables on pages I-40 and I-41 back to the tables in Appendix I (Site IR-05) and Attachment I2 (Ambient Evaluation). For instance, we could not locate the "Site-Related" hazard index for the future park worker. The value shown on page I-41 is 0.005, but we found only hazard indices on the order of 0.02. Please re-present these tables with references to indicate the sources for each entry.*

Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

22. ***Tidal Wetlands Subarea, Sec. I-3.5, pp. H-42 ff.:*** *Soils at this site are well characterized. Principal contaminants are metals and PCBs. Groundwater was tested for volatile organic chemicals only and none were detected. The Navy estimates very low risk and hazards for current and future receptors at this site. Provided groundwater has been adequately characterized, we concur.*

Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

C. Appendix J – Western Magazine Area

23. ***Western Magazine Area and Dredge Pong 1, Secs. J-4.1 and J-4.2, pp. J-23 ff.:*** *Site characterization is adequate for a screening assessment. Because these are screening assessments based on maximum concentrations detected, rather than baseline risk assessments based on reasonable maximum exposures, the "risk management range" of 1 E-6 to 1 E-4 cannot be applied. Screening estimates of cancer risk for the Western Magazine Area range from 6 E-6 to 1 E-5, depending on the depth of soil chosen, as shown in Table J-4 to J-6. The main risk driver is As in all cases. The non-cancer hazard indices are negligible. Cancer risks and hazard indices for Dredge Pond 1 are below their respective benchmarks of 1 E-6 and 1.0. Because the screening estimate exceeds the benchmark of 1 E-6, a more detailed risk assessment should be undertaken, including subtracting ambient cancer risk for As. This should result in a cancer risk estimate no higher than the screening estimate, and perhaps lower than 1 E-6. The very low hazard quotients and hazard indices in Tables J5 to J-8 and J-14 to J-17 should be expressed using scientific notation to make them easier to read.*

Response: This comment refers to the WMA and will be addressed as part of a separate RI for the WMA.

24. ***Evaluation of Lead, p. J-27:*** *We thank the Navy for using DTSC's LeadSpread and it is adequate for the current use. For screening risk assessments at Federal facilities in California, we recommend comparing maximum detected concentrations to the applicable Preliminary Remediation Goals (PRG) published by USEPA Region 9. In future, please use comparisons to PRGs for screening.*

    Response: This comment refers to the WMA and will be addressed as part of a separate RI for the WMA.

Conclusions and Recommendations

1. *The risk assessments for sites in Area H1 are not acceptable. Exposure point concentrations are incorrectly calculated. Hot spots are not assessed. Site characterization for substances other than metals is often inadequate. Cal/EPA toxicity criteria were not used. This baseline risk assessment will require major changes to become acceptable. We agree with the Navy that virtually all sites in Area H1 should proceed to feasibility studies.*

    Response: See response to Mr. Christopher, Ph.D. (DTSC) General Comments Nos. 1 and 3.

2. *The risk assessments for the subareas of Site IR-05 can be made acceptable upon adequate responses to our specific comments. Site characterization was generally adequate, although we do not understand why groundwater was not analyzed for metals.*

    Response: This comment refers to IR05 and will be addressed as part of a separate RI for IR05.

3. *The screening risk assessments for the Western Magazine Area are acceptable. We concur that Dredge Pond 1 presents negligible risk and hazard, but soils at the Western Magazine Area gave screening cancer risk estimates greater than 1 E-6. therefore, a more detailed assessment is needed.*

    Response: This comment refers to the WMA and will be addressed as part of a separate RI for the WMA.

WESTON RESPONSES TO 3 APRIL 2003 MARE ISLAND NAVAL SHIPYARD RESTORATION ADVISORY BOARD (MYRNA HAYES) REVIEW COMMENTS ON DRAFT REMEDIAL INVESTIGATION INVESTIGATION AREA H1 SOIL - 13 SEPTEMBER 2002 AND DRAFT FINAL GROUNDWATER REMEDIAL INVESTIGATION INVESTIGATION AREA H1 – 9 MAY 2002

RISK ASSESSMENT COMMENTS

1. *While complete removal of the landfill wastes from Mare Island may be seen as the ideal solution by some, we realize that the health risks and exorbitant costs associated with such an action would most likely outweigh the benefits. With this in mind, it is our goal to ensure that the chosen remedy will provide the highest degree of protection to human health and the environment for generations to come. In order to achieve the level of confidence needed to reach this decision, we feel that a response to all of the issues raised by our consultants is necessary. Thus, we are submitting their comments and suggestions as our own, highlighting a few areas of major concern:*

   While we acknowledge the need for vertical and lateral containment of the landfill, the exact footprint of the cap and containment wall cannot yet be determined as the current data set is inadequate and the extent of contamination is not well delineated. In order to ensure the most conservative remedy, we feel that better characterization is needed in the areas surrounding the landfill, specifically the Fire Fighting Training Subarea, the Northwest Dump Road Subarea, the Waste Sump/Lead Oxide Storage and Disposal Areas, and the wetlands that lie to the N and E of the dump.

   Response: WESTON prepared an Action Memorandum to undertake a Time-Critical Removal Action (TCRA) at IA H1 involving constructing a vertical groundwater barrier and a groundwater collection trench around a portion of the perimeter of the landfill. WESTON conducted an investigation in 2003 in areas surrounding the IA H1 landfill. The objectives of this investigation were to further delineate potential source material that should be contained within the vertical barrier.

   Additional characterization was also proposed in a Data Gaps Sampling Plan for IA H1. This plan was prepared by WESTON in September 2003 in response to the comments of the regulators and consultants. Additional soil, surface water, sediment, and groundwater sampling within the upland and wetland areas surrounding the landfill was conducted based on the recommendations of this plan. Additional data collected was included in the revised HHRA and ERA for IA H1 that evaluated three exposure areas: the area inside the vertical and horizontal containment boundary, upland habitat areas outside of the containment boundary, and non-tidal wetland habitat outside of the containment boundary.

2. *We urge you to evaluate the risk to recreators and children. The risk assessments for each subarea need to be summed over the entire area, as well, rather than just looked at individually.*

Response: The revised HHRA was prepared for IA H1 evaluating three exposure areas: the area inside the vertical and horizontal containment boundary, upland habitat areas outside of the containment boundary, and non-tidal wetland habitat outside of the containment boundary. Since recreation is the principal future land use for IA H1, risks to a child recreator were quantified for the upland and wetland habitat areas. A screening level risk evaluation (SLRE) was conducted for the area within the containment boundary using Region IX preliminary remediation goals for a commercial/industrial worker. This approach was verbally agreed upon by the regulatory agencies during the 20 May 2003 bimonthly meeting and documented in the final meeting minutes. The HHRA presents a total risk for all media within the exposure area. A risk assessment was also completed for a residential user and is included as Attachment I-1 to Appendix I.

3. *We are greatly concerned with the methodology used to develop background concentrations in both the soil and groundwater. Sampling locations used to determine background must be clearly shown in the report and calculation methods should be consistent with those used to calculate Reasonable Maximum Exposures.*

Response: The Final Compilation of Technical Memoranda on Ambient Analyses in Soils and Groundwater, Mare Island, California, dated 19 April 2002, prepared by Tetra Tech EM, Inc. has been approved by DTSC. This document spells out the approach used to calculate background concentrations for ambient soil, and shallow groundwater. Weston developed the ambient groundwater levels for the intermediate and deep water-bearing zones using the same approach that was used and approved for the shallow water-bearing zone. This information is included in Appendix F.

4. *We disagree with the approach used to define Contaminants of Concerns (COCs) and are concerned that there are contaminants on the site that pose a risk and have been overlooked. At the very least, the list of potential COCs should be reevaluated against the corrected background concentrations.*

Response: All detected organic constituents were considered COPCs in the revised HHRA with the exception of infrequently detected chemicals as described in Section 2.1.2 of Appendix I. All inorganic constituents detected, excluding essential elements, were considered COPCs. Ambient risk estimates were presented separately from the total risk estimate for all exposure media.

5. *Radiological contamination and the risk it poses needs to be analyzed in both soil and groundwater.*

Response: No radiological contamination has been found in IA H1. A base-wide radiological survey was conducted under the Naval Nuclear Propulsion Program (Navy Radiological Engineering Division, 1996) and General Radioactive Materials Program. The DTSC, the RWQCB, and the Department of Health Services had agreed that no further action was required for general radioactive material areas to be in compliance with unrestricted use criteria (DTSC, 1996 and 1997). Based on this determination, soil and groundwater samples have not been analyzed as part of the RI and risk for radiological constituents was not assessed.

As a general precaution, all intrusive activities within IA H1 are actively monitored for radiological constituents. Additionally, as stated in the Draft Water Quality Sampling and Analysis Plan, RCRA/Facility Landfill Post-Closure Groundwater Monitoring, Mare Island, Vallejo, California, dated December 2003, annual sampling for radiological constituents will be conducted as part of post-closure activities. Analytes included are gross beta, Radium-226 and radium-228.

6. *The potential for groundwater discharge to the non-tidal wetlands needs to be reevaluated. Currently, wetlands A and B are full of water, which cannot only be due to rain, judging by how little rain we have had this winter. It should be noted that these wetlands are highly used by both divering and dabbling waterfowl.*

   Response: Appendix L presents the results from a wetland hydrology evaluation performed in Wetland B. Data were collected from piezometers and a stilling well using pressure transducers over a period of 16 months, as well as monthly groundwater elevation readings from nearby SWBZ monitoring wells. The data indicated that most (99.9%) of the water can be attributed to rainfall and stormwater runoff with a negligible quantity contributed by groundwater that co-mingles with the surface water.

7. *Groundwater wells need to be installed along the shoreline. The potential for groundwater discharge to the tidal wetlands can only be analyzed once samples from these wells have been taken.*

   Response: Currently wells 01W12A, 01W62B, 01W63B, and 01W59C through 01W63C exist along the shoreline between the dredge ponds and the tidal wetlands of IA J. These include 1 SWBZ, and 7 DWBZ monitoring wells. These wells have been sampled from 6 to 8 times each, and the data are included in the revised RI. These wells were by previous consultants, presumably into the uppermost water-bearing unit at these locations, which in most cases has turned out to be the DWBZ. The SWBZ in this area does not readily yield groundwater, and the IWBZ is not present this far west of IA H1. Weston advanced four CPT holes west of IA H1, and found that the SWBZ did not yield water to collect groundwater samples. This bolsters the fact that the subsurface to the west of IA H1 consists of highly impermeable material, consisting of dredge material as wells as natural clay deposits (Young Bay Mud).

   The remedial action for the RCRA Landfill and the various adjacent areas includes a slurry wall and extraction trench to control groundwater migration within the SWBZ. As part of the monitoring program and closure of the landfill, Point of Compliance (POC) wells will be sampled and monitored on a regular basis. These POC wells will be provided in each of the water bearing zones along each side of the slurry wall, including the west side. These points will be used to monitor any contaminant migration from the contained area toward San Pablo Bay.

8. *Bearing in mind the presumptive remedy of a cap over the landfill area, we are only asking for further characterization of areas surrounding the landfill area which is planned to be contained and capped. For areas known to fall within the containment area, please explain how the proposed remedial action will address the concerns raised by our consultants.*

Response: Several investigations were performed in order to ensure that the containment barrier and cap are constructed to include all of the area which is heavily impacted by historical disposal activities and is considered a source of contamination. Over 50 soil borings were performed along the perimeter of the disposal areas in order to ensure that the containment area includes the landfill material that is a contaminant source, and that the subsurface material was compatible with a slurry wall. A review of aerial photographs was also performed to delineate the extent of the landfill areas. Cone penetrometer testing and additional soil borings were performed as part of the data gaps investigation to better delineate contaminants.

Please refer to responses to comments from Dr. Oberdorfer and Dr. Williamson in reference to the concerns raised by the consultants.

WESTON RESPONSES TO 14 APRIL 2003 DTSC (CHIP GRIBBLE) REVIEW COMMENTS MARE ISLAND DRAFT REMEDIAL INVESTIGATION INVESTIGATION AREA H1 SOIL

GENERAL COMMENTS

1. *As discussed in project management meetings with representatives from Weston, a subsequent and revised RI report is expected to be prepared by Weston, and written to include all media for IA-H1. The western magazine area and IR-5 are to be presented in a separate RI report at a later date.*

   Response: The RI has been revised to only include the media within IA H1. A separate RI will be prepared for the Western Magazine Area and IR05 as noted in the comment.

2. *Please provide a replacement binder for volume III, as the one received is damaged.*

   Response: Weston will provide a replacement binder for Volume III of the Soil RI.

3. *The conclusions and recommendations subsections presented for each area/subarea should include the same for OE risks to humans and the environment.*

   Response: The revised RI includes qualitative conclusions regarding OE risks to humans and the environment. The OE risks are discussed in Sections 9 and 10 for those areas outside the containment barrier.

4. *None of the referenced documents fully addressed the OE question for the historical dredge disposal areas. The Navy did address this question for some historical dredge disposal areas, namely Farragut Village, though not within IA-H1. That document was titled "Final Technical Memorandum, Clarification to the Ordnance Preliminary Assessment (dated 9/1995): Fill History at Farragut Village Area", TtEMI 11/28/2001. An equivalent analyses needs to be done for the remainder of IA-H1.*

   Response: The revised RI includes a brief assessment of OE within IA H1. Radiological surveys have been performed and have either removed or not identified any radiological items. However, as acknowledged in sections 9.9.5 and 10.8.5 of the revised RI, there may still be a low potential threat from OE or radiological items. This potential threat will be addressed in the feasibility study.

5. *Page ES-4: The 5 areas and 7 sub-areas listed do not correspond to that shown in Figure ES-1. Please revise with consistent titles and clearly identified delineations.*

   Response: The figures in the revised RI have consistent titles and clear definitions of the subareas within IA H1. The figure will be modified again in the Final RI to specifically include the IR designations.

6. *Page ES-4, last para.: The risk assessment must include an unrestricted use scenario. Other scenarios based on planned reuse may be submitted in addition.*

Response: The revised HHRA for IA H1 includes three exposure areas: the area inside the vertical and horizontal containment cell, uplands areas outside the containment cell, and non-tidal wetlands outside the containment cell. Inside the containment cell, Weston has developed a risk assessment as recommended by U.S. EPA's presumptive remedy guidance. Outside the containment cell, Weston has developed a baseline risk assessment for the two exposure areas. The receptors considered include recreational user, residential user (for no action comparison), and the construction worker.

7. *Figure 1-2: The boundary shown for Investigation Area H1 is significantly in error along several margins. It appears that a strip of land west of Farragut Village that is within the WETP is included, per Figure 1-2; The western side of the southern half of Pond 1 is not included per Figure 1-2 but should be part of IA-H1; The southeastern boundary should agree with the EETP boundary; The southern, western, and northern boundaries should be consistent with current Navy property boundaries reflecting the WETP and EETP boundaries.*

Response: Weston has revised the boundaries identified above and presented a revised site map to the agencies during the monthly agency meetings. As of the 9 October 2003, agency meeting, DTSC agreed that the boundaries shown were correct. All maps and figures within the revised RI were revised to be consistent with the correct boundaries.

8. *Page 4-1, section 4: The radiological survey report is a relevant environmental report and should be discussed in section 4. Although this report was approved by all the regulatory agencies, the Navy study for the landfill area, unlike all other radiological studies done elsewhere on Mare Island for base closure, was intended to investigate the site only for elevated radioactivity near the surface and in groundwater. Investigating the entire contents of the landfill was considered impractical and unnecessary, especially given that the anticipated proposed remedy would be containment. Since the study resulted in no elevated readings suggesting anything greater than background, further investigation (as opposed to ongoing monitoring) was not required.*

Response: A brief description of the Basewide Radiological Survey Report is referenced in Section 4.23 of the revised RI.

9. *Page 4-1, para. 2: Please provide us a copy of the Metcalf & Eddy 1976 referenced document.*

Response: Numerous comments from DTSC request copies of various historical documents. Weston recommends that Weston personnel review DTSC files to determine if these documents are present in the document storage areas. In the event the documents are not in storage at the DTSC office, Weston will attempt to obtain a copy. However, Weston does not believe that approval of the RI should depend on whether a copy of the historical documents are located or provided to DTSC.

10. *Page 4-1, para. 4: Ecology and Environment, Inc. prepared the March 1983 Initial Assessment Study, not Earth and Ecology. Please correct.*

Response: Weston has revised the reference.

11. *Page 4-4, para.4 : Please provide us a copy of the ERM-West 1987 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

12. *Page 4-5, para. 3: Please provide us a copy of the IT 1988 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

13. *Page 4-6, section 4.14: I have a document titled "Site Characterization Summary for Mare Island Naval Shipyard" dated 1/92 from IT. Is this what you are discussing here?*

Response: The title has been changed from "... Characterization Study..." to "...Characterization Summary..."

14. *Page 4-7, section 4.16: Please provide us a copy of the PRC 1992 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

15. *Page 4-11, section 4.23: Please provide us a copy of the PRC 1996 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

16. *Page 4-12, section 4.27: Please provide us a copy of the TtEMI 6/1997 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

17. *Page 4-13, section 4.28: Please provide us a copy of the PRC 11/1997 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

18. *Page 4-13, section 4.29: Please use the final document dated 1/26/99.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

19. *Page 4-14, section 4.32: The reference section has the corresponding draft, not the final.*

Response: The corresponding reference will be updated in the final RI.

20. *Page 4-15, section 4.33: We do not have this document. Further, this document is not listed in the references section. We do, however, have a 4/5/99 "Work Plan for Three-Dimensional Distribution of Residual Petroleum Hydrocarbons at the Former Waste Oil Disposal Sumps (IR02)" document that proposes using a LIF probe with CPT system. We do not, however, have the corresponding report for this workplan. Please provide us with a copy of the corresponding report. Please reconcile the aforementioned workplan with whatever document you discussed in section 4.33. Please include the appropriate workplan and corresponding report in subsections of section 4, such as 4.33.*

Response: Weston will update the final RI so that the final workplan is the only workplan referenced. The final report for this workplan was not released by the Navy. Weston will request authorization from the Navy to release the document to DTSC. A summary of this document entitled "Site Characterization Report: IR02, Former Waste Disposal Sumps" from June 2000 is included in section 4.39 of the revised RI.

21. *Page 4-16, section 4.35: There is no word "Draft" on the title page of this document.*

Response: The title of this report has been updated accordingly (see 4.36 in the revised RI).

22. *Page 4-17, section 4.36: The draft document is dated 6/28/99; the revised document is dated 10/27/99. Please discuss the 10/27/99 document and not the draft. Please correct here and in the reference section.*

Response: The revised document will be included in the final RI.

23. *Page 4-22, section 4.43: The building closure program, which is no longer ongoing, was part of the base closure work done in the years around 1996. The relevancy of the building closure program to this Remedial Investigation should be any information that was generated that might suggest hazardous waste or hazardous substance release issues or related information. The PCB program was an outgrowth of the building closure program, and is very relevant to all RI reports addressing parts of Mare Island.*

Response: Comment noted. The results of the building closure program have been reviewed and pertinent information has been included in the revised RI. Details can be found in "Site Background and History" subsections of Section 6, and PCB sites have been identified on Figure 6-3.

24. *Page 4-22, section 4.44: The title of this program was simply the UST Program. Delete the word "Compliance" from the title.*

Response: The word compliance has been omitted from the title (now section 4.53).

25. *Page 4-22, section 4.44: All UST sites are potential hazardous substances hazardous waste release sites, until determined by the RWQCB and DTSC to be otherwise. From the text, it appears that such a determination has not been made for any of the UST sites within IA-H1. Thus, all these sites must be fully discussed in this RI report.*

Response: The UST sites have been discussed in detail within this revised RI. As agreed during agency progress meetings, since the USTs are within historical disposal areas, the USTs would be incorporated into the RI/FS/RAP process. The remediation of the historical disposal areas would also address the USTs. Once the areas have been remediated, Weston would officially request closure from the RWQCB and DTSC. Details can be found in "Site Background and History" subsections of Section 6, and UST sites have been identified on Figure 6-3.

26. *Page 4-23, section 4.45: The title of this program was simply the PCB Program. Delete the word "Compliance" from the title and text. Also, delete the sentence about a 10ppm action level as this has no context and no meaning here. None of the regulatory agencies has ever concurred with this 10ppm action or screening level at Mare Island.*

Response: The word compliance has been omitted from the title of this report (now section 4.54). References to a 10 ppm action level has been removed from the summary.

27. *Page 4-23, section 4.45: Please state here what subsections the various PCB program sites are located in. Also, these sites should be addressed in the corresponding sections of this report.*

Response: Details about specific PCB program sites are now included in the "Site Background and History" subsections of Section 6. PCB program sites have also been identified on Figure 6-3.

28. *Page 5-1, para. 1: Assumptions and site conceptual models should be supported with a rationale basis, not because of consultation with regulatory agencies. Please revise accordingly.*

Response: The assumptions and conventions for the RI were developed based on a rationale basis. These assumptions and site conceptual models were discussed in detail with the regulatory agencies in order to gain general acceptance prior to the issuance of the document. Page 5-1 of the final RI will be modified to clarify this point.

29. *Page 5-9, section 5.4.3: The screening criteria used by the Navy and the prior consultant TtEMI had been the basis for significant disagreement in past reports. It is our understanding that this Weston RI report for IA-H1 used a previous drafted report prepared by TtEMI as the starting point to prepare the Weston draft report. We are concerned that Weston may have used previously prepared screened data in tables, figures, and analyses in this report.*

Response: The screening criteria were updated for the revised RI. Sources of the various screening criteria were generally agreed upon by all parties prior to issuance of this document.

30. *Page 5-15, section 5.7: S/A comment number 29.*

Response: The revised risk assessment incorporates updated screening criteria.

31. *Page 11-1, section 11: The PCB program site that is located within this subarea must be included in this remedial investigation report.*

Response: The PCB program site within this subarea has been included (see page 6-35 of revised RI).

32. *Page 12-7, para. 3: Please describe the cap that exists currently and is a temporary cap. When and why was it constructed? What is the cap material? How thick is it? Was it compacted, and if so, to what specifications?*

Response: A total of 14 soil borings completed in November 2003 indicate that the existing landfill cover consists of varying thicknesses of a lean, dark gray-brown, stiff clay with medium plasticity. This cover was found to be up to 5 feet thick, and absent at two of the soil borings. No further information about the cover is available. The locations of the soil borings and the boring logs have been included as part of the revised RI.

33. *Page 14-3, para. 3: Please describe the cap that exists currently and is a temporary cap. When and why was it constructed? What is the cap material? How thick is it? Was it compacted, and if so, to what specifications?*

Response: See response to Mr. Gribble's (DTSC) Comment No. 32.

34. *Page 16-1, section 16: The PCB program site that is located within this subarea must be included in this remedial investigation report.*

Response: The PCB program site within this subarea has been included (see page 6-47 of revised RI).

35. *Page R-1, 1st and 2nd listings: Please provide us a copy of the Ace Pacific 1992 referenced document and the Aqua Terra 1986 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

36. *Page R-3, 12th listing: Please provide us a copy of the Harris and Associates 1987 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

37. *Page R-4, last listing: Please provide us a copy of the MINS 1989 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

38. *Page R-7, 2nd listing: Please use the corresponding final dated 5/21/97.*

Response: The reference will be updated accordingly in the final RI.

39. *Page R-7, last 2 listings: Please provide us a copy of the SCI 2001a referenced document and the SCI 2001b reference document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

40. *Page R-8, 3rd listing: What is the Mare Island Checklist?*

Response: This reference has been omitted from the revised RI.

41. *Page R-8, 5th listing: Please use the final document dated 9/11/98.*

Response: The reference will be updated accordingly in the final RI.

42. *Page R-8, 8th listing: Please provide us a copy of the SSPORTS 1998e referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

43. *Page R-8, 12th listing: Please provide us a copy of the Tetra Tech 1997 referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

44. *Page R-8, 13th listing: Why is this here and how was this used in this RI report? This document was rejected by all regulatory agencies.*

Response: Any reference to this report will be omitted from the revised RI.

45. *Page R-8, 14th listing: Please provide us a copy of the TtEMI 1998e referenced document.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9

46. *Page R-8, last listing: The date should be August 5, 1997.*

Response: This document is no longer referenced in the revised RI.

47. *Page R-9, 3rd and 4th listings: These documents should be titled "Draft".*

Response: The titles of these documents include "Draft."

48. *Page R-9, 7th listing: We do not have this revised preliminary draft RI report. We do have a 2/17/99 draft from TtEMI.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

49. *Page R-9, 8th listing: The 2001 IA-I RI report has the word "draft" in the title.*

Response: This document is no longer referenced in the revised RI.

50. *Page R-9, 10th listing: Please use the 1/26/99 final document.*

Response: The reference will be updated accordingly in the final RI.

51. *Page R-10: Please provide us with a copy of all listings on this page except for the 1st listing.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

52. *Page R-11: Please provide us with a copy of the first 4 listings on this page.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 9.

53. *Page F-1, para. 2: All risk assessments are required to include an assessment for unrestricted use, using residential PRGs and background criteria. Other scenario risk assessments are appropriate in addition to the unrestricted use assessment, given that the planned reuse is other than residential.*

Response: See response to Mr. Gribble's (DTSC) General Comment No. 6.

WESTON RESPONSES TO 23 JUNE 2003
DEPARTMENT OF TOXIC SUBSTANCES CONTROL
(JAMES M. POLISINI, PhD)
REVIEW COMMENTS REGARDING MEMORANDUM
OUTLINING METHODS TO BE USED IN REMEDIAL INVESTIGATION REPORT
FOR INVESTIGATION AREA H1

GENERAL COMMENTS

1. *Statements that Hazard Quotients (HQs) for site-specific concentrations are 'close' to HQs based on Mare Island ambient concentrations is insufficient for risk management evaluation of potential remedial action. Statements of this type are made throughout the memorandum under review. Similar qualitative statements of close-to-ambient HQs in the ERA for IA H1 will result in a similar comment from HERD. Graphic presentation of HQs as well as graphic comparison of site-specific and ambient soil concentrations are frequently helpful.*

   Response: Qualitative statements were not included in the Revised IA H1 ERA. The ERA evaluates site-specific risks through food web analysis separately from ambient risks. Ambient HQs were calculated separately from site-related HQs, and the impact of ambient HQs on site-related HQs will be discussed in the Uncertainty Analysis.

   Graphic presentations are not included in the IA H1 ERA. Though graphic presentations are a good way to depict site risks, we would like to defer such presentations to the Feasibility Study. We feel that such presentations would aid in determining specific locations within the wetland and upland habitats that require remediation. Upon agency review and approval of the IA H1 ERA, we trust that agreement on contaminants of concern and the critical exposure pathways and receptors could be reached, and our graphic presentations in the FS would be focused solely on these rather than all contaminants, receptors, and exposure pathways that are evaluated in the ERA.

2. *There are several cases in which the food web analysis indicates potential hazard (i.e., HQ>1) but these are dismissed as unimportant because the majority of the intake is from food items rather than directly from the soil. Plant food items and animal prey items develop their tissue concentrations from the soil. The rationale applied to remove these elements and compounds is flawed and should not be applied in the IA H1 ERA.*

   Response: The rationale to remove elements whose HQ exceeds one for food items rather than directly from soil will not be included in the revised IA H1 ERA. HQs will be calculated for cumulative exposure to prey and soil/sediment. Initially, we propose that constituents with a cumulative HQ less than one based on the maximum detected soil/sediment concentration and the high TRV will not pose a population level effect. Those constituents that exceed one will be evaluated further by adjusting exposure point concentrations to an average (95UCL) concentration and exposure parameters to site-specific values (e.g., reduced site use factor). We propose that constituents with a HQ less than one based on the 95% UCL, site-specific exposure parameters, and the low TRV will not pose a population level effect to all receptor groups except protected species.

Impacts to protected species could occur if the HQ exceeds one for the high TRV and the adjusted parameters.

SPECIFIC COMMENTS

1. *The description of the IR sites within IA H1 states that IR14, the underground IW collection system, is 'considered part of IA H1' (Section 1, page 1). HERD recently reviewed the Final Remedial Investigation Report for IA H2. IR14 was addressed in the Final Report, with an indication that an interim removal action was planned for IR14. Please explain this apparent contradiction. If the rationale is that IR 14 lies on the boundary of IA H1 and IA H2 that is sufficient response. Please also indicate when the planned interim removal action is planned.*

   Response: The Industrial Wastewater (IW) Pipeline, IR14, is a RCRA regulated unit that crosses through both IA H1 and H2. The IW Pipeline traverses a number of areas in IA H1 including the SSTP, Northwest Dump Road Subarea, and the Solid Waste Disposal/Lead Oxide Storage and Disposal Area. Closure of the IR14 within the H1 boundary with adjacent soil will be included as part of the remedial action associated with uplands outside of the containment area.

2. *The California Department of Fish and Game and the U.S. Fish and Wildlife should be consulted for concurrence regarding the planned filling of Wetland X (Section II, page 2).*

   Response: Weston has initiated contact with the various trustees including the California Department of Fish and Game, U.S. Fish and Wildlife, California EPA Regional Water Quality Control Board, California Department of Toxic Substances Control, and the U.S. EPA. The mitigation will be done under the CERCLA process and thus a Corps permit will not be required, but the intent is to meet the substantive requirements of the permit.

   Based on initial meetings, Weston will prepare a technical memorandum identifying the proposed mitigation plans for Wetland X. This will be presented to the above identified trustees for comment. The agreed upon concept would then be incorporated in the proposed plan and the Remedial Action Plan for Investigation Area H1.

3. *The food web modeling for the Mallard was performed for both nonbreeding and breeding diets. Potential hazard for the Mallard breeding season was estimated only in Wetlands B and D (Section IV, page 7) because site-specific invertebrate tissue concentrations were available only for these two wetlands. Some presentation of the range of sediment/soil concentrations in all wetlands (i.e., A, B, C and D) must be made to allow evaluation of the generalization of the potential hazard to the Mallard in Wetlands B and D to the other wetlands.*

   Response: The IA H1 ERA evaluates risks to a breeding and non-breeding mallard for the non-tidal wetland as a whole, using invertebrate tissue concentrations from Wetlands B and D. The sediment exposure point concentrations used were the maximum detected concentrations in all wetlands and the 95% UCL concentration for all wetlands.

4. *HERD never agreed that a Bioaccumulation Factor (BAF) of 1.0 was an appropriate criterion for selection Contaminants of Ecological Concern (COCs) from an initial list of Contaminants of Potential Ecological Concern (COPECs) (Section V, page 9). In fact, HERD requested and the Navy contractor's provided an additional assessment using BAFs lower than 1.0 for the Onshore Ecological Risk Assessment. HERD directed the Navy and Navy contractors not to use a BAF of 1.0 in any future ERAs submitted for review. As this is an inclusive criterion which brings COPECs into the group of COECs which might not be included based on other criteria HERD is willing to consider some BAF criterion other than 1.0. Please provide the proposed BAF criterion with rationale prior to preparation of the IA H1 ERA.*

Response: No screening of COPECs to select COECs based on BAFs was performed in the revised IA H1 ERA. Analytical data was screened using data reduction methodology common to both ecological and human health assessments as follows:

- A constituent is excluded from a medium if it was not detected in any sample from that medium. In cases where the method detection limit for a constituent exceeded their respective screening benchmark values, the constituent is identified and is discussed in the risk characterization.
- A constituent is also screened from a particular medium if it was detected at a frequency of less than 5 percent of the total samples for that constituent.
- Essential nutrients (i.e., calcium, magnesium, potassium, and sodium) were excluded.

5. *As any conclusion regarding population level effects (Section VI, page 10) is a best scientific judgment decision please provide an informal submittal of the rationale and proposed conclusions regarding population level effects at IA H1 for HERD review prior to completion of the ERA for IA H1.*

Response: The revised IA H1 ERA uses data from the Onshore ERA to perform a food chain analysis of risk to higher level organisms inhabiting the upland and non-tidal wetland habitats of IA H1. Initially, we propose that constituents with a HQ less than one based on the maximum detected soil/sediment concentration and the high TRV will not pose a population level effect. Those constituents that exceed one will be evaluated further by adjusting exposure point concentrations to an average (95UCL) concentration and exposure parameters to site-specific values (e.g., reduced site use factor). We propose that constituents with a HQ less than one based on the 95% UCL, site-specific exposure parameters, and the low TRV will not pose a population level effect to all receptor groups except protected species. Impacts to protected species could occur if the HQ exceeds one for the high TRV and the adjusted parameters.

6. *The memorandum under review provided an example calculation where IR16 sampling data was removed prior to calculating an ecological hazard. In the event that the ERA for IA H1 removes the sampling data from IR16 to develop the upland data set to assess ecological hazard (Section VI, page 12) as performed in this memorandum, some proposed remedial action must be indicated in the ERA which would sever the exposure pathway for the IR16 sites. Later sections of this memorandum (Section VI, page 13)*

indicate that locations within IR16 'are being evaluated for cleanup under the RI/FS process'. Some remediation is required in the event the IR16 samples are excluded from the ERA.

Response: A significant portion of IR16 B3/B5 has been excavated of all soil with lead concentrations exceeding 750 mg/kg. The excavation has been backfilled with clean fill and the high-lead containing soil has been transported to the Landfill Area and will be included within the containment barrier and likely under an engineered cover system following approval of the RAP. This data is no longer included in the revised ERA.

7. *Potential hazard to the Western Meadowlark was indicated for cadmium, mercury and total DDTs (Section VI, page 13). The argument is then advanced that cadmium and mercury Hazard Quotients (HQs) are 'close' to HQs from ambient concentrations. Cadmium and mercury are threshold toxicants where a small increase in intake can cause adverse effects. Demonstration that HQs are 'close' to ambient HQs is insufficient. Some type of graphical presentation of the HQs (e.g., histograms) as well as box and whisker plots of the IA H1 soil concentrations and ambient soil concentrations should be provided for the risk manager.*

   Response: Qualitative demonstration that HQs are 'close" to ambient HQs were not used in the IA H1 ERA. Ambient HQs were calculated separately from site-related HQs, and the impact of ambient HQs on site-related HQs will be discussed in the Uncertainty Analysis. Graphical presentations are deferred to the FS; see General Comment 1.

8. *The final sentence of this same paragraph (Section VI, page 13) seems to contain a conclusion that because the DDT intake from prey items of the Western Meadowlark exceeds direct DDT intake from the soil that the soil DDT concentrations are not a problem. This is obviously untrue as the prey items are exposed to DDT in the soil and then transfer the DDT through the food web to the Western Meadowlark. It this statement is meant to indicate that DDT in upland soil should not be further evaluated, HERD strongly disagrees. Some other rationale must be included in the IA H1 ERA.*

   Response: The rationale to remove elements whose HQ exceeds one for food items rather than directly from soil will not be included in the revised IA H1 ERA. HQs will be calculated for cumulative exposure to prey and soil/sediment.

   For constituents that pose a ecological risk in the IA H1 ERA, soil/sediment remediation objectives based on ecological effects from cumulative soil/sediment intake and prey intake will be developed in the FS.

9. *The food web discussions regarding the Mallard and Great Blue Heron for Wetland A (Section VI, page 15) contain the same qualitative statements regard HQs being 'close' to ambient. Please see comment number 7 regarding the material required for risk manager consideration.*

   Response: Discussion of HQs being 'close' to ambient HQs was not included in the IA H1 ERA. Ambient HQs were calculated separately from site-related HQs, and the impact of ambient HQs on site-related HQs was discussed in the Uncertainty Analysis.

10. *The assessment of Wetland B hazard to the salt marsh harvest mouse (Section VI, page 16) and Wetland C (Section VI, page 18) employ the same 'close' to ambient HQs argument as well as the fact that food intake is greater than direct soil intake to dismiss multiple COECs. The intake argument is particularly troubling for the salt marsh harvest mouse, a protected species. The presentation of salt marsh harvest mouse intake and HQs based on an upper bound estimate of the arithmetic average of sample concentrations within a wetland is a valid approach and HERD would support that approach as long as sample locations with extremely elevated concentrations are not ignored.*

Response: The "close" to ambient argument was not included in the IA H1 ERA. Intakes and HQs based on both maximum and 95% UCL concentrations (all non-tidal wetlands) were used to evaluate risk to wetland receptors in the revised IA H1 ERA.

11. *In several sections discussing the various wetlands a point is made that estimated site specific daily doses are similar or below ambient doses (e.g., Wetland D, Section VI, page 20). Please verify that ambient tissue concentrations were obtained in the Onshore ERA. It would seem impossible to calculate an ambient dose without ambient tissue concentrations.*

Response: Ambient tissue concentrations were estimated from tissue obtained in the Onshore ERA. Tissue concentrations were estimated by multiplying median BAFs for Mare Island by the ambient soil concentration for each chemical. BAFs were generated from both tissue samples collected in the field (plants, invertebrates, amphibians, and mammals) and from tissues harvested as a result of the laboratory bioaccumulation tests (lettuce and earthworms).

12. *HERD previously reviewed a document titled Draft Groundwater Remedial Investigation, Investigation Area (IA) H1 prepared by Roy F. Weston, Inc. and dated 9 February 2001. As an example of potential ecological hazard, copper was detected 'consistently exceeding' groundwater screening criteria in shallow water bearing wells. The samples exceeding the groundwater criterion on 6 µg/l do not account for those exceeding the Federal Ambient Water Quality Criterion (AWQC) of 2.9 µg/l. The maximum shallow aquifer concentrations of copper are adjacent to Wetland A, Wetland B and Wetland D. Copper concentrations of 55.6 µg/l were detected in the well closest to San Pablo Bay. Discharge of groundwater to San Pablo Bay during low tides was suggested. As there appears to be an obviously complete pathway for groundwater contaminants to enter the wetlands and San Pablo Bay, this pathway should be included in the IA H1 ERA.*

Response: On 21 June 1995, the California Regional Water Quality Control Board adopted a Water Quality Control Plan for the San Francisco Bay Basin. This plan defines five beneficial uses for groundwater: (1) municipal and domestic water supply, (2) industrial process water supply, (3) industrial service water supply, (4) agricultural water supply, and (5) freshwater replenishment to surface water. These beneficial uses were identified in the California Regional Water Quality Control Board San Francisco Bay Region Order No. 00-132, "Site Cleanup Requirements for: United States Department of the Navy for property located at the former Mare Island Naval Shipyard, Vallejo, Solano County". Based on the TDS concentrations and the production capacity of groundwater

within IA H1, a request was submitted to the RWQCB in support of an exemption of the municipal beneficial use. The RWQCB concurred with this exemption in a letter dated 17 March 2004.

As presented in Appendix L of the revised RI, an evaluation of the hydrology of the wetlands within IA H1 concludes that most (99.9%) of the surface water in the wetlands is attributable to stormwater runoff, with the negligible balance contributed by groundwater. Therefore, the revised RI does not consider this to be a complete pathway and it is not included in the ecological risk assessment.

The geology of IA H1 is such that natural clay barriers prevent vertical and horizontal migration of contaminants. A study of the salinity, stable isotopes, and tritium concentrations in the SWBZ concluded that groundwater in the clay-rich portion of IA H1 has not migrated to the IWBZ. Additionally, the clay-rich dredge material and Young Bay Mud forms a barrier which greatly reduces horizontal flow to San Pablo Bay. Therefore, with negligible flow to San Pablo Bay, the ecological risk assessment did not include discharge from the SWBZ, IWBZ, and DWBZ to the Bay.

13. *The current memorandum makes no mention of including the area of spent sand blast grit ('Green Diamond') in the area on the eastern edge of the IWTP. This deposit of spent sand blast grit is referenced in the Draft Groundwater Remedial Investigation, Investigation Area (IA) H1. Potential ecological effects associated with this material should be included in the IA H1 ERA unless an interim action is planned.*

Response: An interim action has not been performed in this area. The upland area is treated as a whole in the IA H1 ERA, and this area would be addressed in any remedy developed for the entire upland area. We propose that we could include a separate ecological evaluation of the data from the greensand area separately (including an evaluation of the size of the greensand area to the habitat requirements of the receptor species) and compare this data to the upland area as a whole.

CONCLUSIONS

A. *Graphic presentation of the comparison of site-specific HQs and ambient HQs together with graphic presentation of sample chemical concentrations should be presented rather than qualitative statements regarding how 'close' these HQs are.*

Response: Graphic presentations are not included in the IA H1 ERA. Though graphic presentations are a good way to depict site risks, we would like to defer such presentations to the Feasibility Study. We feel that such presentations would aid in determining specific locations within the wetland and upland habitats that require remediation. Upon agency review and approval of the IA H1 ERA, we trust that agreement on contaminants of concern and the critical exposure pathways and receptors could be reached, and our graphic presentations in the FS would be focused solely on these rather than all contaminants, receptors, and exposure pathways that are evaluated in the ERA.

B. *Comparison of intake from prey only to intake from prey and soil intake is not a valid rationale for a determination of no hazard. If there appears to be a small incremental hazard the estimate should remain for consideration by the risk manager.*

Response: All risk estimates are presented in the revised IA H1 ERA for consideration by the risk manager.

C. *Use of a BAF of 1.0 for selection of COPCs will not be accepted. Other BAF values may be proposed for review as long as this is an inclusive criterion for those COPECs which would have been dropped from the analysis without consideration of BAF values.*

Response: BAFs were not used to select COECs in the revised IA H1 ERA. See response to Specific Comment 5.

D. *Potential hazard for aquatic receptors in wetland ponds A, B and D should be included in the IA H1 ERA.*

Response: Potential hazards to higher level aquatic receptors through ingestion of sediment, prey, and surface water from the non-tidal wetlands in quantified in the revised IA H1 ERA.

E. *The hazard associated with the area of spent sandblast grit should be included in the IA H1 ERA unless some interim remedial action is planned.*

Response: An interim action has not been performed in this area. The upland area is treated as a whole in the IA H1 ERA, and this area would be addressed in any remedy developed for the entire upland area. We propose that we could include a separate ecological evaluation of the data from the greensand area separately (including an evaluation of the size of the greensand area to the habitat requirements of the receptor species) and compare this data to the upland area as a whole.