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RESPONSE TO COMMENTS DRAFT REMEDIAL INVESTIGATION REPORT, INSTALLATION RESTORATION SITES 09 AND 10

Naval Station Treasure Island, San Francisco, California

May 3, 2004

Prepared for

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SOUTHWEST DIVISION

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RESPONSES TO DEPARTMENT OF TOXIC SUBSTANCES CONTROL COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT, INSTALLATION RESTORATION SITES 09 AND 10 NAVAL STATION TREASURE ISLAND, CALIFORNIA

This document presents the U.S. Department of the Navy's (Navy) responses to comments from the Department of Toxic Substances Control (DTSC), Brian Davis, Ph.D., Staff Toxicologist, Human and Ecological Risk Division on the "Draft Remedial Investigation for Sites 09 and 10, Naval Station Treasure Island, California," dated July 2003. The Navy received the comments addressed below on November 12, 2003.

GENERAL COMMENTS

1. Comment: BACKGROUND FOR INORGANIC CHEMICALS.

A. Appendix F presents the evaluation of background for inorganic chemicals in soil. Appendix G presents the evaluation of background for inorganic chemicals in ground water. Please state whether the regulatory agencies have agreed to these evaluations. If there is agreement, please document this. Please state the applicability of each evaluation. That is, state whether the background estimates for soil are applicable to all of Treasure Island or to a subset of sites. State the same for the background estimates for ground water.

B. Whenever background estimates are applied at Treasure Island, the text should note that the island soil is composed of fill dredged from the Bay. Neither the island nor its soils are "naturally occurring". Risk managers should be cognizant of this fact.

Response: As discussed during the March 8, 2004 BCT meeting, the draft and final ambient concentration of metals in groundwater report, finalized in March 2001, was reviewed by the regulatory agencies (Tetra Tech 2001). Comments were received on the draft report, and addressed in the document prior to the Navy's completion of the final report. A letter from Dr. James Polisini of DTSC, dated August 3, 2001, stated that the majority of comments contained in a previous memorandum from DTSC have been addressed, but DTSC will evaluate and discuss the ambient concentrations used in any site specific ecological risk assessment. The letter from Dr. Polisini is included in Attachment A.

The estimation of background and ambient metals concentrations in soils study was completed in June 1996 (PRC 1996). In November 1995, the U.S. Environmental Protection Agency (EPA) and DTSC recommended that background and ambient metal concentrations at Naval Station

(NAVSTA) Treasure Island (TI) be evaluated using the estimation procedures that were applied at other Navy installations. The technical memorandum completed in 1996, and used to complete the RI risk assessments, incorporated these regulatory comments and estimation procedures. No additional documentation from the regulatory agencies was located.

The soil background assessment is applicable to all of TI, since the entire island (including Sites 09 and10) was built upon fill dredged from the bay. Although ambient concentrations of metals in groundwater vary over space and time, statistical analysis and derivation of the 95th percentile value allow for the use of this ambient groundwater assessment for simple screening purposes applicable to all of TI.

The following changes will be made to remove "naturally occurring" from Appendix I (underlined text denotes new text and deleted text is crossed out).

Section 5.3, Page I-20 – "In addition, the base-wide ambient study to document ~~naturally occurring~~ inorganic compounds was conducted with low-flow sampling techniques."

Section 6.1, page I-23 – "If an inorganic chemical is considered ~~naturally occurring (~~present at ambient levels~~)~~, a further step in risk characterization includes a statistical analysis of whether the analyte is present below the ambient levels documented at NAVSTA TI (PRC Environmental Management, Inc. [PRC] 1996). In these cases, ambient concentrations could have been excluded as a COPC. In the case of Sites 09 and 10, however, all inorganic compounds with ambient data sets from NAVSTA TI media (with the single exception of silver at Site 09) were present below their ~~residential PRGs and thus, no ambient screen was included in the HHRA~~ ambient levels (see Attachment I-3). ~~Arsenic was reported to have maxima above the 10 mg/kg background value and the cancer-based residential Region IX PRG of 0.39 mg/kg but below the noncancer EPA Region IX PRG of 22 mg/kg. For this reason, a more detailed analysis of arsenic was conducted (see Section 6.1.3.1).~~ Although iron may be present at ambient levels ~~naturally occurring~~, no ambient data set was available to conduct such an analysis."

2. Comment: CHEMICALS OF POTENTIAL CONCERN

A. Sections 7.1.2.1 and 11.1.2 state that two criteria were used in selecting chemicals of potential concern, based on U.S. EPA and Navy guidance. These two criteria are comparison to Preliminary Remediation Goals (PRGs) and essentiality as a nutrient. The

guidance cited in Section 7.1.2.1 (U.S. EPA, 1989) is in fact not consistent with the first criterion. The Risk Assessment Guidance for Superfund (U.S. EPA, 1989) has explicit guidance for the selection of chemicals of potential concern. This explicit guidance does not include the use of screening criteria. As was discussed in the May 19, 2003 conference call, DTSC also excludes the use of screening criteria in the selection of chemicals of potential concern. DTSC does allow the elimination of inorganic chemicals of potential concern by comparison to background concentrations, but not by comparison to PRGs.

Section 6.1 of Appendix I lists the same two criteria as does Section 7.1.2.1, but adds a third criterion – elimination of inorganic chemicals based on comparison to ambient levels. Section 6.1 states that this criterion was not used "*...no ambient screen was included in the HHRA.*"

Recent guidance (U.S. EPA, 2002) proposes retention of inorganic chemicals even if they are within background concentrations and removal of chemicals of potential concern based on comparison to screening criteria. DTSC has not adopted this method. See also General Comment 10 and Specific Comment 11.

B. Section 7.1.2.1 states that arsenic was eliminated as a chemical of potential concern, based on comparison to ambient levels and comparison to the noncancer residential PRG. Section 11.1.1.4 shows that the first comparison was of exposure point concentrations to ambient concentrations. Comparison to ambient concentrations is inconsistent with the two proposed criteria of Section 7.1.2.1. Use of exposure point concentrations for comparison to ambient concentrations is inconsistent with any guidance. Comparison to the noncancer PRG is inconsistent with any guidance. Arsenic is a well-established carcinogen and must be treated as such (General Comment 3). This was also discussed in the May 19, 2003 conference call.

Response: As discussed during the March 8, 2004 BCT meeting, 2004 DTSC and Navy guidance has been adopted to formally exclude inorganic contaminants below ambient. All inorganics (including arsenic) are below ambient at Site 10, and all inorganics (except silver) are below ambient at Site 09. As discussed and agreed to at the BCT meeting, the "total risk" screening assessment has been revised (see response to human health risk assessment (HHRA) Comment (2) to address the concern with use of preliminary remediation goals (PRG) to screen contaminants of potential concern (COPC). Because use of screening criteria (for example, PRGs) to select COPCs is consistent with (1) Navy tiered guidance (Navy 2001);

(2) EPA RAGS Part A (EPA 1989); and (3) EPA RAGS Part D Table 2 sample tables (EPA 2001), the Navy presents "incremental risk" using the PRG screen against maxima as well as the "total risk" evaluation without a PRG screen. A new Attachment I-3 will be included with Appendix I in the revised draft HHRA for Sites 09 and 10.

3. **Comment:** **ARSENIC**

A. **Four of 23 soil samples in the 0 to 2 feet below ground surface range of Site 9 had arsenic levels exceeding the ambient level (Section 6.1.3.1 of Appendix I). Therefore, arsenic is a chemical of potential concern for both 0 to 2 feet below ground surface and 0 to 8 feet below ground surface. The discussion in Sections 6.1.3.1, 7.1.2.1, and 11.1.1.4 of Appendix I provide useful information, but it does not alter this fact. Please evaluate arsenic as a carcinogen and noncarcinogen for all exposure scenarios at Site 9.**

B. **Two of 28 soil samples in the 0 to 8 feet below ground surface range of Site 10 had arsenic levels exceeding the ambient level (Section 6.1.3.1 of Appendix I). Therefore, arsenic is a chemical of potential concern for the 0 to 8 feet below ground surface soil data. Please evaluate arsenic as a carcinogen and noncarcinogen for Site 10.**

C. **The uncertainty section (Section 11.3.3 of Appendix I) states that "*The uncertainties associated with the ingestion of inorganic arsenic are such that estimated cancer-based PRGs for arsenic are overly conservative and could be modified upwards as much as an order-of-magnitude relative to risk estimates associated with most other carcinogens.*" Whether the PRGs are "*overly conservative*" is a value judgment, not supported scientifically by Section 11.3.3. The suggestion that it would be appropriate to increase the PRGs by a factor of ten "*relative to risk estimates associated with most other carcinogens.*" is completely speculative. Please revise this discussion for accuracy.**

Response: As discussed during the March 8, 2004 BCT meeting, arsenic is statistically below ambient fill concentrations, as demonstrated in a new Attachment I-3 to the HHRA. As requested at the BCT meeting, the arsenic outliers are now discussed in relation to their spatial distribution and propensity to present a hot spot in a hypothetical residential yard in Section 7.3. The following text was added to Section 7.3.

"Arsenic was not considered significantly greater than background at either Site 09 or 10, as demonstrated in Attachment I-3 in the revised draft HHRA. However, there were three samples (09-SB10, 09-SB12, and 09-SB18) collected from the surface soil (0.5 to 2 feet below ground surface

{bgs}) at Site 09 that were considered outliers, as their concentrations were greater than the 80 percent lower confidence limit on the 95th percentile (10 milligrams per kilogram {mg/kg}) for fill material dredged from the Bay. The three outlier concentrations of arsenic (15.4, 16.9, and 17.7 mg/kg) may be considered part of the natural variability of a dataset, as would concentrations of arsenic that are lower than the 10 mg/kg concentration in fill material (that is, the minimum detected concentration for arsenic at Site 09 is 2.5 mg/kg). Also, these three locations with elevated arsenic are not in the same vicinity (see Figure 2-3 in the RI Report); soil sample 09-SB12 would be located (even in a residential yard) remotely from the other two samples in a different exposure area. Therefore, a future resident or commercial/industrial worker would likely not be exposed to these three highest concentrations of arsenic over time. This is especially true for residents who have small residential properties and are not regularly exposed to surface soil on another residential property. These three arsenic locations are not considered to be significant outliers that warrant a hotspot evaluation (in part because of their failure to exceed the noncancer EPA Region IX PRG), but were considered part of the natural variation of a dataset. Further, the entire dataset was statistically below ambient fill concentrations in a two-population test (see Attachment I-3)."

Because of the above reasons, (and DTSC and Navy guidance concerning chemicals below ambient), arsenic is not a soil COPC for either site at either depth, and no forward risks for arsenic have been included following Navy (2004) guidance. The arsenic uncertainty discussion from Section 11.3.3 will be subsequently removed.

4. Comment: LEAD

A. Table I-3 summarizes the exposure point concentrations for lead in Site 9 and Site 10 soils. Please add a footnote to explain how the lead data from boring 09-SB03 were treated (see General Comment 6B).

B. No exposure point concentrations for lead in Site 10 soils were given in Table I-3 because the maximum concentrations were below the U.S. EPA Region IX PRG of 400 mg/kg. This PRG has been applied as a ceiling remediation goal at Treasure Island. This results in an exposure concentration less than 400 mg/kg for the area under remediation. DTSC does not accept comparison to any PRGs for baseline risk assessments. For the residential scenario, the DTSC lead model should be used for both Sites 9 and Site 10.

Response: Lead data for boring 09-SB03 were averaged with those for boring 09-SB05 as requested by DTSC during the HHRA conference call in May 2003. The RAGS Part D Table 2 and Table 3 series were corrected to show maximum based on these average data. Exposure point concentrations (EPC) for lead in soil were added to the Sites 09 and 10 Table 3 series.

As discussed during the March 8, 2004 BCT meeting, the EPCs are 2 to 20 times below even the California-modified residential lead PRG of 150 mg/kg, which is back-calculated to be protective based on the LEADSPREAD model. Since no inputs other than soil would be changed from the default (that is, the contribution from airborne sources of lead would be the default, and the contribution from a water ingestion pathway would be that which is presented by the municipal water supply, conservatively set to the full action level for lead of 15 micrograms per litter {ug/L}), LEADSPREAD results cannot show an unacceptable child resident blood lead level based on these EPCs. Therefore, the DTSC agreed at the March 8, 2004 BCT meeting that, based on these site-specific conditions, LEADSPREAD is not required.

The following text will be inserted into Section 8.5: "Surface and subsurface soil EPCs that are less the California-modified residential lead PRG of 150 mg/kg are not further evaluated because the PRGs are considered protective of residential exposure. Even if a surface or subsurface soil EPC that is less than the California-modified residential lead PRG of 150 mg/kg was modeled, the LEADSPREAD model would not indicate potential deleterious effects because the only site-specific input that changed (that is, soil EPC) was reduced; because the soil EPC is reduced, the potential deleterious effects are likewise reduced. Therefore, surface and subsurface soil EPCs that are less the California-modified residential lead PRG of 150 mg/kg are not further evaluated."

5. Comment: **HEXAVALENT CHROMIUM**

Since activities which may have used hexavalent chromium (painting; metal work) took place at both Sites 9 and 10, this carcinogenic chemical must be addressed. Section 8.4 of Appendix I mentions in passing that "*...hexavalent chromium was analyzed in soils but found to be nondetect in all samples.*" Section 11.3.1 of Appendix I, in discussing uncertainty, states that three samples from each site were analyzed for hexavalent chromium. Please discuss hexavalent chromium in the body of the risk assessment, including potential sources, location and depth of the samples analyzed for hexavalent chromium, any ground water analysis for hexavalent chromium, and a rationale for why this effort was sufficient.

Response: As presented at the March 8, 2004, BCT meeting, the following are analytical results reported from the August 1995 sampling events.

Sample Location	Cr 6+ Result (mg/kg)	Total Cr Result (mg/kg)	Depth Interval (ft bgs)	Date Sampled
Site 09				
09-HP001	0.05 UJ	38.6	1.25-1.75	8/3/95
09-HP002	0.05 UJ	25.1	6.5-7	8/3/95
09-HP003	0.05 UJ	23.2	5.5-6	8/3/95
Site 10				
07/10-HP012	0.05 U	52.4	7.25-7.75	8/10/95
07/10-HP013	0.05 U	36.1	3.25-3.75	8/10/95
07/10-HP013	0.05 U	33.8	7.25-7.75	8/10/95

The locations and depths for hexavalent chromium samples were selected as described in the draft final RI report (TtEMI 1997). The inclusion of hexavalent chromium analysis is described in Section 8.4.2 and 10.4.2. The Navy agreed to analyze for chromium VI at selected sites during the phase I investigation.

Based on the small site sizes, three samples from each site are sufficient to demonstrate the absence of hexavalent chromium. Painting and metalwork occurred at each site, and the type (color and vintage) of paint and nature of the metalwork are important in concluding that a hexavalent chromium source actually exists. The data indicate an absence of release. Furthermore, as discussed at the BCT meeting, the chromium results were evaluated as "total chromium" (which is assumed to be one-to-six hexavalent to trivalent chromium), rather than the less conservative 100 percent trivalent chromium assumption. Given the statistical test provided in a new Attachment I-3 to the RI, total chromium at Sites 09 and 10 is below the ambient fill concentrations of total chromium. This indicates little likelihood of any incremental Navy impact to what was preexisting when Site 09 and 10 went into operation. The following insert will be added to the main body of the HHRA in Section 8.4, after the bullet list:

"Hexavalent chromium was evaluated at Sites 09 and 10 because historical operations (for example, painting and metal work) are associated with the use of hexavalent chromium. Therefore, six soil samples were collected from Sites 09 and 10 (three at each site) and analyzed for trivalent and hexavalent chromium. Although trivalent chromium was detected in all six samples, hexavalent chromium was not detected in any of the samples (see table below). The reporting limits for the nondetect hexavalent

chromium samples (0.05 mg/kg) were significantly less than the EPA Region IX PRG for residential exposure (30 mg/kg) so reporting limits were determined to be adequate for this evaluation. Although hexavalent chromium was not detected at either Site 09 or 10, chromium was evaluated as "total chromium" in the HHRA. Total chromium is assumed to be comprised of a one-to-six ratio of hexavalent chromium, the most toxic form of chromium, to trivalent chromium, a less toxic form of chromium. The effect of using total chromium in the HHRA was conservative (that is, overly protective) but had no net effect on the results of the risk assessment as chromium concentrations were determined to be significantly less than background. Chromium was not included in the forward risk characterization." The table of hexavalent chromium results listed in this response to comments above will then be placed into Section 8.4.

6. Comment: REPLACEMENT DATA.

A. In several instances, resampling in the same location failed to confirm an elevated concentration of some chemical. This has led (Section 5.2 of Appendix I) to the proposal of discarding the original high value in favor of the lower resampled value ("*Replacement Data*"). This cannot be done without strong justification. It appears that no consideration is given to the possibility that both results are correct. Heterogeneity in the soil or imprecision in identifying the location provide plausible alternative explanations to the findings.

B. Section 5.2.1 of Appendix I discusses the report of 974 J mg of lead per kg of soil in 09-SB03. The text states that this result was anomalous and that all results from the boring were J-qualified. For these reasons the location was resampled. The maximum concentration of lead in the new boring was 76 mg/kg. Nonetheless, "*...regulators have not been comfortable with the complete replacement of 09-SB03 lead results with the 09-SB05 results.*" It is unclear what was done in the risk assessment. Section 5.2.1 of Appendix I references Section 5.1.1.5, but little information about these lead samples is found there. Section 9.4.1 of Appendix I discusses the exposure point concentration for Site 9, but doesn't state which value (09-SB03 or the resampling boring) was used. Please provide this information.

C. Section 6.1.3.1 of Appendix I dismisses the arsenic concentration from 09-SB03 because the resampling boring (09-SB05) had a lower concentration. As noted in General Comment 6A, the text states that all results from 09-SB03 were J-qualified. It is generally unacceptable to dismiss data based on finding lower concentrations in later sampling of the same location. In this case, all of the results

from 09-SB03 do seem questionable. Therefore, we accept the proposed substitution.

D. **Section 5.2.2 of Appendix I dismisses the finding of polycyclic aromatic hydrocarbons in 10-SB03 at Site 10. The basis is that resampling boring (10-SB24) had lower detection limits and state-of-the-art laboratory analysis. Since fluoranthene, phenanthrene, and pyrene were measured at one mg/kg and five other polycyclic aromatic hydrocarbons had estimated concentrations in 10-SB03, the detection limits do not provide an adequate explanation. Since there is no reason to suspect that these results are artifactual, they should be included in the risk assessment for Site 10.**

E. **Section 5.2.2 of Appendix I dismisses the finding of chlordane in 07/10-HP06 at Site 10. The basis is that resampling boring (10-SB19) had lower detection limits. Since alpha-chlordane was measured at 21 mg/kg and gamma-chlordane was measured at 1.9 mg/kg in 07/10-HP06, the detection limits do not appear to have been a limitation. Since there is no reason to suspect that these results are artifactual, they should be included in the risk assessment for Site 10.**

Response: As discussed at the March 8, 2004, BCT meeting, (1) lead was averaged, as requested by DTSC, as detailed in the response to Comment 4 above, (2) arsenic does not require a response since DTSC concurred with the replacement, and arsenic is below ambient, (3) polycyclic aromatic hydrocarbon (PAH) reductions for the light-end PAHs are indicative of 10 years of biodegradation and the change for the high molecular weight PAHs would not change the HHRA significantly, and (4) the results seven years later for chlordane follow the half-life of chlordane in soil. None of the data sets or EPCs in the HHRA were changed since the agencies agree that this additional information would suffice.

Below is the PAH data table presented in a PowerPoint slide shown at the BCT meeting:

Chemical	1992 Concentration (mg/kg) 6 to 6.5 feet bgs 10-SB03	2002 Concentration (mg/kg) 6 to 7.5 feet bgs 10-SB24	Notes
Benzo(a)anthracene	0.38 J	ND (0.014 U)	Reduction reflects 10 years of biodegradation and improved analytical techniques. Samples were collected from the exact same location. These three detects from 1992 are for noncarcinogens; hence, there is no effect on the cancer risk estimate and the kidney target organ hazard index(HI) isn't near 1.
Benzo(a)pyrene	0.3 J	ND (0.022 U)	
Benzo(b)fluoranthene	0.27 J	ND (0.02 U)	
Benzo(k)fluoranthene	0.27 J	ND (0.022 U)	
Chrysene	0.52 J	0.015 J	
Fluoranthene	1	ND (0.043 UJ)	
Phenanthrene	1	ND (0.012 U)	
Pyrene	1	0.05 J	
Benzo(ghi)perylene	ND (0.8 U)	0.024 J	

Ten years of degradation have occurred, and although there were detections of the smaller, noncarcinogenic PAHs in 1992, the carcinogenic actors Benzo(a)anthracene (BAA), Benzo(a)pyrene (BAP), Benzo(b)fluoranthene (BBF), and Benzo(k)fluoranthene (BKF) were not detected in the sample collected in 2002. Further, Benzo(ghi)perylene (BGHIP) was detected in 2002, whereas it was not in 1992. Therefore, one data set over the other would have a negligible impact on the final risk characterization. It was agreed at the BCT meeting that the PAH EPCs would not be revised to include 1992 results from this boring.

Below is the table of data for chlordane previously presented in a PowerPoint slide shown at the BCT meeting:

1995 Concentration (mg/kg) 3 to 4 ft bgs 07/10-HP06	2002 Concentration (mg/kg) 2.5 to 5ft bgs 10-SB19
2.1	0.0018J
1.9	0.0026J

- As noted at the BCT meeting, use of the historic data would not be reflective of present-day conditions as it disregards seven years of biodegradation. Use of historic data would not change the risk characterization significantly. The residential PRG for chlordane is 1.6 mg/kg.

- The half-life of chlordane in soil is 350 days (OSU 1994). Therefore, the reduced concentrations measured in 2002 reflect seven years of biodegradation. (For example, 2.1/2 = 1.1 after 1 year; 1.1/2 = 0.56 after 2 years; 0.56/2 = 0.28 after 3 years; 0.28/2 = 0.14 after 4 years; 0.14/2 = 0.07 after 5 years; 0.07/2 = 0.035 after 6 years; 0.018 after 7 years).

- The DTSC commented that this half-life for chlordane in soil seemed low; however, it was confirmed as accurate and still current in the reference cited (OSU 1994) at the BCT meeting.

The uncertainty associated with use of replacement data will be clarified in the uncertainty evaluation (Section 11.1.1). However, as agreed at the BCT meeting, no changes were made to the text with regard to replacement data for arsenic, PAHs, or chlordane; the averaging approach for lead is discussed in the response to Geomatrix Comment for Appendix I, Comment 1.

7. Comment: **GROUND WATER**

A. Section 4.3.1.4 states that the Region Water Quality Control Board's 1996 Pilot Beneficial Use Designation Project report "*...recommended that the basin plan be revised to no longer designate groundwater at NAVSTA TI as a potential municipal or domestic water supply but retain designation for potential agricultural, process, and industrial supply.*" Section 5.3.1 of Appendix I reiterates this "*recommendation*". Please state whether the recommendation was implemented and if it was, where that is documented.

B. It is surprising to learn (Section 7.1.1.2; Section 5.3.2 of Appendix I) that the control well for Site 10, 14MW03, "*was destroyed some time between 1998 and 2002*" and MW01, "*was also destroyed or buried some time between 1998 and 2002*". We defer to the Regional Water Quality Control Board to determine the implications of this uncertain record keeping.

C. Ground water data for Site 10 are limited to one round of sampling from two monitoring wells. The sample from one of the two wells (MW02) was analyzed only for pesticides and polychlorinated biphenyls (Section 5.3.2 of Appendix I). These data are described (Section 5.3.2 of Appendix I; Section 2.2.1 of Appendix J) as "*...a conservative snapshot of representative conditions in the aquifer underlying Site 10.*" This is not "*conservative*". It may or may not be representative. Please revise the text to give a more accurate description, including an acknowledgment that the data are highly uncertain.

Response: Please also see response to Geomatrix HHRA general comment 21. At the March 8, 2004 BCT meeting, there was concurrence that the data would not change the findings of the HHRAs because the pathways for human health exposure are incomplete at NAVSTA TI Sites 09 and 10. The RWQCB has officially provided Navy with concurrence that the shallow groundwater at TI is not a current or potential source of drinking water. A copy of the concurrence letter is included in Attachment A. In the

uncertainty analysis, the following text will be added to indicate that the exposure assessment was based on a limited data set, accompanied by the following changes (underlined text denotes new text and deleted text is crossed out).

From Section 5.3.2, Page I-22: "The 2002 data from the two newer wells (10-MW02 and 10-MW03) provide a ~~conservative~~ "snapshot" of likely ~~representative~~ conditions in the aquifer underlying Site 10. Unfortunately, although monitoring well 10-MW03 was sampled for VOCs, SVOCs, metals, total petroleum hydrocarbons (TPH), and pesticides/PCBs, MW02 was only sampled for the pesticide/PCB analytical suite in 2002; both monitoring wells 10-MW02 and 10-MW03 have only been sampled once, in 2002. Despite this, data from the two monitoring wells are considered sufficient to characterize Site 10 groundwater conditions for three reasons. First, Site 10 is a small site; second, sampling locations are biased, near a suspected release; and third, groundwater underlying Site 10 is not a drinking water source."

In Section 11.1.1, Site Characterization Data: "The risk assessment is based on analytical data presented in the RI. Each of the strengths and weaknesses associated with the data is then carried through to the risk assessment. The very small (0.25-acre and 0.75-acre, respectively) sizes of Sites 09 and 10 and the appropriate , if somewhat limited (for example, groundwater data collected for Site 10), ~~relatively large~~ number of samples collected from site media indicate that sufficient data are available to detect human health risks. As with any small data set, uncertainty is associated with the data and subsequently characterized risks. Since groundwater is not a source of drinking water and VOCs were not detected for intrusion to overlying indoor air, the impact of the small data set on protection of human health is negligible, as no complete human health exposure pathways exist."

8. Comment: EXPOSURE ASSESSMENT

A. Section 7.1.3 engages in hyperbole in describing reasonable maximum exposure (RME). Example 1: "*An RME scenario represents a plausible worst-case situation (not likely to occur)...*" RME is intended to capture the upper end of the distribution of potential exposures. It is not intended to describe worst case exposure or to describe exposures that are unlikely to occur. It is intended to assess exposure which can plausibly occur. Example 2: "*It is assumed that in evaluating an RME scenario, potential health impacts to extremely sensitive individuals (emphasis added) within a particular receptor population will be adequately addressed.*" Standard risk assessments, including this one, clearly do not address extremely sensitive individuals. Perhaps the most significant,

though by no means the only, overlooked group of highly sensitive individuals is pica children. Pica behavior is common among children and can result in daily consumption of gram quantities of soil and other contaminated material. Standard risk assessments never address pica children. Risk assessments, including this one (e.g. Table I-4.1), assume that no child ingests more than 200 mg of soil per day. Please revise Section 7.1.3.

B. **Sections 10.1.2 and 10.2.2 of Appendix I also use hyperbole. "*This predicted value is, however, based on conservative assumptions (for example, ingesting 200 mg-soil/day for 350 days per year) that are unlikely to occur and may be considered within the range of accepted values.*" As discussed above, the reasonable maximum exposure is not intended to describe exposure conditions that are unlikely to occur. It is intended to be plausible, upper end exposure. With respect to soil ingestion, not only do some children ingest the assumed amounts of soil, but pica children may ingest greater amounts of soil than is assumed. Please revise Sections 10.1.2 and 10.2.2 of Appendix I.**

C. **During the May 19, 2003 conference call, it was stated that the reuse plan specified residential use. Please check the accuracy of the statement that the Naval Station, Treasure Island, reuse plan specifies retail, restaurant, and community facilities, but not residential use for Site 10 (Section 7.1.2.2 of Appendix I and elsewhere).**

D. **Soil data were divided by depth in 0 to 2 feet below ground surface and 0 to 8 feet below ground surface. The former set was only used to evaluate the industrial scenario (Section 7.3.1 of Appendix I). The latter set was used to evaluate all three (industrial, construction, and residential) exposure scenarios (Section 7.3.2 of Appendix I). DTSC requires that consideration be given to exposure of residents to deeper soils, because swimming pools are common in California and excavation for swimming pools often results in deeper soils being distributed on the surface of the yard. However, this does not occur in all yards. It may be unlikely on Treasure Island because of the shallow ground water. It was our understanding from the May 19, 2003 conference call that the residential scenario would be evaluated for both sets of soil data. If the Navy wishes to evaluate the residential scenario at only one soil depth, it should be the one with the higher contaminant concentrations.**

E. **DTSC (2000) guidance assumes that dermal exposure is greater in California because of the moderate climate. Please use 5700 cm^2 for Exposed Skin Surface Area for both the industrial worker and the**

construction worker (Section 7.4.2.3 of Appendix I; Table I-4.1). Please use 2900 cm^2 for Exposed Skin Surface Area for the residential child. Please use 0.8 mg/ cm^2 for the Soil Adherence Factor for the construction worker.

Response: Revisions will be made to the HHRA text as requested in Comments 8A and 8B. However, regarding Comment 8B, the Navy disagrees that 200 milligrams per day (mg/day) is not protective of a pica child, noting specifically that DTSC's LEADSPREAD model recommends a default of 200 mg/day for the "pica child resident" ingestion rate.

In response to Comment 8A, the following sentences have been edited in Section 7.1.2 (underlined text denotes new text and deleted text is crossed out): "An RME scenario represents a plausible upper-end exposure ~~worst-case~~ situation ~~(not likely to occur)~~ while a CTE scenario represents an average or more typical exposure. ~~believed most likely to occur~~. ~~It is assumed that in e~~ Evaluating an RME scenario will address potential health impacts to most of an exposed population, absent those extremely sensitive individuals within a particular receptor population. ~~will be adequately addressed.~~

In response to Comment 8B , the following sentences have been removed from Sections 10.1.2 and 10.2.2 of Appendix I: "This predicted value is, however, based on conservative assumptions (for example, ingesting 200 mg-soil/day for 350 days per year) that are unlikely to occur and may be considered within the range of accepted values."

In response to Comment 8C, please see also response to City HHRA comment 4 regarding residential reuse. As noted in the response to the City, and as discussed during the BCT meeting, the "residential" reuse in the 1996 plan has short-term housing for filmmakers and other intermittent workers.

Regarding Comment 8D, as discussed at the BCT meeting, the Navy has already evaluated the soil interval that presents the greatest risk to a future resident. Benzo(a)pyrene was the only COPC in surface soil for Site 09 and dibenz(a,h)anthracene was the only COPC in surface soil for Site 10 (see Table I-3.1). However, benzo(a)pyrene and dibenz(a,h)anthracene, in addition to iron, were COPCs in subsurface soil at Sites 09 and 10 (see Table I-3.2). Also, EPCs for subsurface soil were equal to or greater than EPCs in surface soil. The total risk screening for residents and commercial/industrial worker exposure using Region IX PRGs predicts similar or slightly increased risks from exposure to subsurface soil versus surface soil. Because all inorganics (except silver at Site 09) were not significantly greater than background, the evaluation would primarily be an evaluation of organics in soil, which have higher concentrations in subsurface soil than in surface soil (see RAGS D Table 2 series and total risk

screens). Based on these factors, evaluating residential exposure to subsurface soils is considered the most protective of the two exposure scenarios. Thus, as discussed at the BCT meeting, residential exposure to surface soils would show lower risks and thus will not be incorporated into Appendix I.

Regarding Comment 8E, as discussed at the BCT meeting, the incorporation of the requested minor changes to the exposure factors for the Sites 09 and 10 HHRAs would not significantly affect the findings. These exposure parameters will be incorporated into future NAVSTA TI HHRAs, as requested and agreed to during the March 8, 2004 BCT meeting.

Specifically, DTSC concurred that a 100 square centimeter (cm^2) change to the child resident will not affect risk findings for the Site 09 and 10 residential HHRA, so risks for the resident will not be recalculated.

At the BCT meeting, it was noted that the requested exposure parameter change for the commercial/industrial worker would increase dermal risk by 73 percent, but since dermal risk is only a minimal contributor to industrial risk, change to industrial risk would be insignificant. The risk conclusions would not change.

Similarly, for the construction worker, dermal risks would increase by more than 73 percent, but since dermal risk is only a minor contributor to already very low risks, the change to construction worker risks would be insignificant. No construction worker risks will be unacceptable, and risk management decisions at Sites 09 and 10 are being made with the assumption of unrestricted (including residential) land use, and will not be made solely on a construction worker risk.

For these reasons, the exposure parameters were not readjusted in the RAGS Part D Table 4s, as the level of effort required to update Tables 7 through 10 for the two worker scenarios was considerable given the fact that risk characterization would not change, and the goal for the Sites 09 and 10 RI is to obtain a no further action without an institutional control.

To demonstrate that the changes in exposure parameters will not alter the conclusions of the risk assessment, a sample calculation was completed for exposure to subsurface soil (0 to 8 feet bgs) for the commercial/industrial and construction workers at Site 09. The exposed skin surface area for the commercial/industrial and construction workers was increased to 5,700 cm^2 and the soil adherence factor was increased to 0.8 mg/cm^2 for the construction worker. As noted from the table below, carcinogenic risks for the ingestion and inhalation pathways are not altered by the change in exposure parameters. The total receptor risk for the commercial/industrial worker increased from 1.1E-6 to 1.6E-6 and the total receptor risk for the

construction worker increased from 1.1E-7 to 2.3E-7; neither change in exposure parameter would change the conclusions or risk management decisions derived from the HHRA. The risks were reported to two significant figures to facilitate checks for mathematical accuracy.

Receptor	Commercial/Industrial Worker		Construction Worker	
Pathway	Current Values	Alternative Values	Current Values	Alternative Values
Ingestion	5.8E-07	5.8E-07	7.7E-08	7.7E-08
Dermal	5.6E-07	9.7E-07	3.4E-08	1.6E-07
Inhalation	8.8E-11	8.8E-11	3.5E-12	3.5E-12
Total Receptor Risk	1.1E-06	1.6E-06	1.1E-07	2.3E-07

9. Comment: TOXICITY ASSESSMENT

A. Section 3.2.2 of Appendix I indicates that California toxicity values are used only when "*significant differences exist between the DTSC and EPA Region IX toxicity value.*" Section 8.0 states that DTSC toxicity values were used only if they were "*4 times more conservative*" than the U.S. EPA values. To be precise, neither DTSC nor U.S. EPA Region IX generates toxicity criteria. California toxicity criteria are developed by the California Office of Environmental Health Hazard Assessment (OEHHA), not DTSC. Federal toxicity criteria are developed by U.S. EPA Headquarters, not the regions. More importantly, DTSC requires that all California toxicity criteria, not a subset of criteria, be used to evaluate facilities in California. Please add the OEHHA website (www.oehha.ca.gov/risk) as a source of toxicity criteria (Section 7.1.4). Please incorporate all California toxicity criteria into all risk assessments for Naval Station, Treasure Island.

B. Section 7.1.4 states that no California toxicity criteria were available for any of the chemicals of potential concern. Section 7.1.4 states that "*No California-specific noncancer toxicity values were available for the two PAH COPCs, benzo(a)pyrene or dibenz(ah)anthracene.*" Since both of these compounds are potent carcinogens, this is indeed a curious statement. Section 8.0 does acknowledge that OEHHA provides an oral cancer slope factor of 12 $[mg/(kg \times day)]^{-1}$ and an inhalation cancer slope factor of 3.9 $[mg/(kg \times day)]^{-1}$ for benzo(a)pyrene and provides an oral cancer slope factor of 4.1 $[mg/(kg \times day)]^{-1}$ and an inhalation cancer slope factor of 4.1 $[mg/(kg \times day)]^{-1}$ for dibenz(ah)anthracene. These California toxicity criteria should be used in all risk assessments for Naval Station, Treasure Island.

C. **Section 7.1.4 states that route to route extrapolation was used for organic compounds, but not for inorganic compounds. Since no dermal toxicity criteria are available, they are all derived from oral toxicity criteria for both organic and inorganic compounds (Section 8.3; Table I-5.1). Furthermore, route to route extrapolation may be appropriate for other routes of exposure with inorganic compounds. No contaminant or route of exposure should be excluded from the risk assessment based on the failure to find a toxicity criterion. The selection of appropriate toxicity criteria should be done in consultation with the DTSC toxicologist.**

Response: As discussed during the March 8, 2004, BCT meeting, no dual tracking of California and EPA toxicity values is necessary, given the nature of the site-specific concentrations (and resultant low risks) at Sites 09 and 10. For the two COPCs for incremental risk (the risk drivers for residential re-use), the effective difference in the California toxicity values versus those used in the draft HHRA from EPA sources is negligible.

As discussed at the March 8, 2004 BCT meeting, the assumption that use of California toxicity values would cancel each other out at Sites 09 and 10 assumes equivalent EPCs (and equivalent doses) between the two PAHs. Therefore, further assessment was requested to ensure that use of EPA toxicity values would not impact the risk characterization in this site-specific instance. A comparison of the toxicity values and potential change are provided in the table below.

Federal (EPA) Toxicity Value	DTSC-Requested Value	Effective Change
BAP: 7.3	BAP: 12	BAP California risks would be 61% higher.
DBA: 7.3	DBA: 4.1	DBA California risks would be 56% lower.

To demonstrate that the changes in toxicity values will not alter the conclusions of the risk assessment, a sample calculation was completed for exposure to subsurface soil (0 to 8 feet bgs) for the commercial/industrial worker at Site 09. An oral cancer slope factor of 12 $[mg/(kg \times day)]^{-1}$ and an inhalation cancer slope factor of 3.9 $[mg/(kg \times day)]^{-1}$ was used for benzo(a)pyrene and an oral cancer slope factor of 4.1 $[mg/(kg \times day)]^{-1}$ and an inhalation cancer slope factor of 4.1 $[mg/(kg \times day)]^{-1}$ was used for dibenz(ah)anthracene.

The total receptor risk for the commercial/industrial worker increased from 1.1E-6 to 1.5E-6. The above tables demonstrate how a change to the toxicity criteria (using California sources) would not influence the risk

characterization significantly. Risks were reported to two significant figures to facilitate checks for mathematical accuracy.

For future assessments, DTSC has indicated California values should be used. Therefore, for other HHRAs at NAVSTA TI, dual tracking of the toxicity assessment consistent with Navy's (September 2003) guidance (issued after the draft HHRA was submitted to the agencies in July 2003) will be implemented.

The Navy disagrees with Comment 9C. Attachment I-3 demonstrates that all inorganics (other than iron, for which no background data set exists) are below ambient concentrations in fill, with the exception of silver at Site 09. Therefore, a change to the dermal toxicity assessment for inorganics would not impact the findings of the HHRA. In addition, the toxicity assessment followed EPA Region IX practice for extrapolation, as well as the recommendations of EPA dermal guidance (RAGS Part E) and Navy dermal guidance (Navy 2001). No contaminants or routes of exposure were excluded from the HHRA. The "exclusion" of some chemicals from the dermal assessment was based on EPA dermal exposure guidance for Superfund, not a failure to find toxicity criteria. The Navy's toxicologists will continue to identify toxicity values for use in future Navy HHRAs for DTSC review and comment.

10. Comment: CUMULATIVE RISKS AND HAZARDS

A. During the May 19, 2003 conference call, we stated that chemicals of potential concern cannot be eliminated based on screening criteria (see General Comment 2). The document has attempted to address this by calculating risk estimates and hazard indices for all chemicals which were excluded from the main risk assessment. This was done by comparison to PRGs (Section 9.3). The following table compares the results for the residential scenario. Risks and hazards for additional chemicals were not presented for the industrial scenario or construction scenario. In the table, we have used "Risk Drivers" to designate the results from the baseline risk assessment in the document and "Other Chemicals" to designate the results from the comparisons to PRGs of those chemicals eliminated in the selection of chemicals of potential concern.

	SITE 9		SITE 10	
	Cancer risk	Hazard index	Cancer risk	Hazard index
"Risk Drivers"	3.8×10^{-6}	0.5	4.3×10^{-6}	0.6
Other chemicals	1.9×10^{-6}	3.6	3.6×10^{-6}	1.6
Total	5.7×10^{-6}	4.1	7.9×10^{-6}	2.2

B. Comparison of the cancer risk estimates and hazard indices from the subset of contaminants judged to be "risk drivers" with the cancer risk estimates and hazard indices from the contaminants that were eliminated appears to show that the risk assessment has greatly underestimated risks and hazards. For Site 9 the "risk drivers" account for only 12% of the total hazard and 67% of the total risk. For Site 10 the "risk drivers" account for only 27% of the total hazard and 54% of the total risk.

C. This illustrates the potential pitfalls of eliminating chemicals based on screening criteria. Ten contaminants at Site 9 had cancer risk levels between 1×10^{-7} and 1×10^{-6} (Table I-5). Although each of these ten contaminants taken individually passes the screen, their cumulative risk estimate is 3.6×10^{-6}.

D. The hazard indices for the chemicals that were eliminated from the risk assessment greatly exceed the hazard indices for the "risk drivers" for both Site 9 and Site 10.

E. In discussing the uncertainty associated with the selection of chemicals of potential concern, Section 11.1.2 of Appendix I) states that "*None of these criteria is likely to significantly underestimate risks.*" This statement flies in the face of the analysis of cumulative risks and hazards.

F. The estimates are not actually comparable because the "Risk Driver" risk and hazards estimates are based on forward risk assessment calculations and the "Other Chemicals" risk and hazard estimates are based on PRGs.

G. The human health risk assessment needs to be revised to estimate total risks and hazards from all exposure pathways and all chemicals in a meaningful way. 1) All potential contaminants must be evaluated in one risk assessment. 2) Arsenic must be included and evaluated as a carcinogen and as a noncarcinogen. 3) Inorganic chemicals that are consistent with background levels should be identified. Risks and hazards should be presented with and without these inorganic chemicals. 4) Hazard indices should be recalculated based on the critical organ. 5) This should be done for all exposure scenarios.

Response: As presented at the March 8, 2004 BCT meeting, the "total risk" screen will be completely updated (following the two examples presented to the BCT). First, the recommendations of Comment 10G were implemented to update the total risk screening.

Secondly, in conjunction with the ambient screen (which demonstrated inorganics are not related to former site operations as they are below ambient fill concentrations), the updated total risk screen demonstrates that no significant underestimate or change in conclusions would result if "total risk" were evaluated. Specifically, the total risk screen using Region IX residential PRGs demonstrates that the total carcinogenic risk from all analytes that were not excluded in the ambient evaluation was approximately 3E-6 for Site 09 surface soil, 6E-6 for Site 09 subsurface soil, 3E-6 for Site 10 surface soil, and 7E-6 for Site 10 subsurface soil; also, no target organ hazard index exceeds 1 using Region IX residential PRGs in the total risk screen. These risks are similar to those presented in the HHRA (see RAGS Part D 9 series tables). Thus, it was agreed at the BCT meeting that (specific to Sites 09 & 10), excluding the Region IX PRG screen as part of the COPC selection process is not necessary. However, DTSC requested that the PRG screen to identify COPCs for future NAVSTA TI HHRAs be dropped. Since Navy tiered HHRA guidance (Navy 2001) recommends the PRG screen in the COPC selection stage, the Navy agrees that future assessments will show an "incremental" (with PRG screen – per Navy request) risk as well as the "total" (without PRG screen – per DTSC request) risk.

SPECIFIC COMMENTS

1. **Comment:** **Section 1.2.2, paragraph 2. Please clarify the sentence, "*Approximately 29 million cubic yards of fill…was transported to or dredged from the Bay and the Sacramento River delta and used for construction of the island.*" It is unclear what is meant by saying that the fill "*was transported to or dredged*".**

   Response: The fill material was either dredged from the bay adjacent to the island and deposited directly to the island or dredged from the river delta and then transported to the island via truck or barge. The text will be revised to clarify this issue.

2. **Comment:** **Section 1.2.2, paragraph 4. The text states that Figure 1-3 is a 1942 aerial photograph, but then refers to changes since 1947. The legend of Figure 1-3 identifies it as a 1945 aerial photograph. Please correct the text and legend as appropriate.**

   Response: Figure 1-3 is a 1945 aerial photograph. The text will be revised to correlate with the correct date.

3. **Comment:** **Sections 2 and 5. Section 2.2.2.4 names the hydraulic punch borings "*09-HP001 through 09-HP009*". Section 5 sometimes (5.1.1.2, 5.1.1.4, 5.1.1.5) uses the notation "*09-HP01, 09-HP02, etc.*" and sometimes**

(5.1.1.2, 5.1.1.3) uses "*09-HP001, 09-HP002, etc.*", apparently for the same borings. Similarly, the Figures 5-1 through 5-8 use both notations for the same borings in Site 9. The notations for Site 10 are more consistent, except for the figures. Figures 5-9 through 5-17 use both notations for the same borings. Please use the correct nomenclature throughout the document.

Response: The nomenclature from the sample locations will be standardized throughout the document.

4. **Comment:** **Section 5.2. The text describes "*four soul borings*". Perhaps "*four soul barings*" was intended.**

Response: The text will be revised to state "...four soil borings...".

5. **Comment:** **Section 6.1.1.1. Please correct the text, "*...the vapor pressure of carbon dioxide is 4.3 x 104 mm Hg.*"**

Response: The text will be revised to read "...4.3 x 10^4 mmHg."

6. **Comment:** **Section 7.1.3. The text states that the particulate emission factor is "*1.3 x 10^9 cubic mg/kg*". Please correct the units to "*m^3/kg*".**

Response: The units will be revised to m^3/kg.

7. **Comment:** **Section 7.2.1.2. The text refers to "*the acceptable agency target risk range of 10^{-6}*". The risk number 1 x 10^{-6} is the point of departure. It is a number, not a range. Any risk levels greater than 1 x 10^{-6} are potentially of concern.**

Response: The text will be changed as follows (underlined text denotes new text, and stricken text reflects deleted text): "A future construction worker in contact with soil (0 to 8 feet bgs) was calculated to have no unacceptable noncancer risk (HI of 0.13), and this receptor's cancer risk (1.~~11~~ × 10^{-7}) was also below the acceptable ~~agency target risk range~~ risk point of departure of 10^{-6} (Table 7-1)."

8. **Comment:** **Sections 8.1.4 and 10.1.5. Please find a more accurate description to replace "*reasonable worst-case*".**

Response: The text will be changed to "*reasonable maximum exposure,*" as appropriate.

9. **Comment:** **Section 10.1.4. The text states that the human health risk assessment is based in part on "*basewide groundwater monitoring data*". It isn't. It is based on seven wells at Site 9 and two wells at Site 10.**

Response: The text will be changed to indicate the assessment is based on "site-specific groundwater monitoring data from the basewide groundwater monitoring program."

10. **Comment:** **Appendix G. It is confusing to have appendices to an appendix to a document. Please label Appendices A, B, and C, associated with Appendix G, in some other manner.**

Response: Appendix G in the draft RI report is a copy of a document completed in 2001. Because the document included as Appendix G is a final document, revisions are not warranted.

11. **Comment:** **Appendix I, Section 3.2.1. The methods described for screening human health risk assessment are inconsistent with DTSC (1994) guidance and should not be used for any future risk assessments at Treasure Island. See General Comment 2.**

Response: Please see response to General Comment 2 and the revised total risk screen. As discussed in the response to DTSC's comments on total risk characterization, DSTC and Navy agreed to this approach for Sites 09 and 10 at the BCT meeting. The Navy's contractor explained at the BCT meeting that because Navy tiered HHRA guidance (Navy 2001) recommends the PRG screen in the COPC selection stage, future assessments would show an "incremental" risk as well as the "total" risk that DTSC has requested.

12. **Comment:** **Appendix J, Section 4.1. The text states that "*The sample size was adequate for characterization of inorganic and organic groundwater concentrations at both Sites 09 and 10. The nature and extent of contamination at NAVSTA TI was considered well characterized, leaving little uncertainty in this regard.*" Please revise this text for accuracy (see General Comment 7).**

Response: The text will be revised to address the sample size.

RESPONSES TO REGIONAL WATER QUALITY CONTROL BOARD (RWQCB) COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT, IR SITES 09 AND 10
NAVAL STATION TREASURE ISLAND, CALIFORNIA

This document presents the Navy's responses to comments from the Regional Water Quality Control Board (RWQCB), Sara L. Raker, Engineering Geologist on the "Draft Remedial Investigation for Sites 09 and 10, NAVSTA Treasure Island, California." The Navy received the comments addressed below via email on November 03, 2003.

1. **Comment:** **Executive Summary, page ES-3**

   The statement "Because groundwater at Sites 09 and 10 is nonpotable..." is incorrect. The text should be revised to state that "Because groundwater at Sites 09 and 10 is not a source of drinking water..."

   Response: The text will be revised accordingly.

2. **Comment:** **Executive Summary, page ES-5**

   An evaluation of ARARs is not needed if the results of the RI indicate no further action is required. Suggest deleting this section. It is normally part of an FS.

   Please see my comments on the final recommendations.

   Response: The Navy will remove the evaluation of applicable or relevant and appropriate requirements (ARAR) section from the final RI report.

3. **Comment:** **Section 4.3.1.4 Treasure Island Groundwater Quality and Beneficial Uses**

   Please revise this text to be consistent with the description provided in the *Final Corrective Action Plan, Sites 06, 14/22, 15, and 25*, June 28, 2002 (Section 2.5.5). The text in the draft RI is missing the RWQCB's finding that the quality and the hydrogeologic conditions of the groundwater beneath Treasure Island is such that this water is not a potential source of drinking water pursuant to SWRCB Resolution 88-63 and Regional Water Quality Control Board (RWQCB) Resolution No. 89-39. Please note that there is no mention of potable or nonpotable water.

Response: The text will be revised to be consistent with the description of groundwater quality and beneficial use provided in the final corrective action plan document.

4. **Comment:** **Section 7.1.2.2 Groundwater Chemicals of Potential Concern**

The statement "Because groundwater at Sites 09 and 10 is nonpotable..." is incorrect. The text should be revised to state that "Because groundwater at Sites 09 and 10 is not a source of drinking water..."

Response: The text will be revised to state that groundwater is not a source of drinking water.

5. **Comment:** **Section 8.1.3 Identification of Chemicals of Potential Ecological Concern**

Is the table of screening criteria presented in Table J-1 the same as the table of criteria presented in the *Final Groundwater Status Report, Summary of Groundwater Monitoring from May 2001 to August 2002, Treasure Island, San Francisco, California*, dated August 18, 2003? If so, please reference the facility wide groundwater monitoring program for consistency.

Response: Table J-1 is a revised edition of Table A-1 in the above referenced Groundwater Status Report. Table J-1 includes only the screening criteria for protection of saltwater aquatic life (mainly the 20 percent of acute lowest observed effect level {LOEL} values). The selected screening criteria in Table J-1 are for protection of aquatic life while selected criteria in Table A-1 are based on protection of human health.

6. **Comment:** **Section 10.2 Recommendations**

The recommendations for Sites 09 and 10 should be revised to clearly state the Navy's position. For example, "The current level of site characterization is adequate to complete no further action..." what does this mean? In addition, "The IRP effort for soil and groundwater should move on to the remedial action plan", yet why is a remedial action plan needed for a site where no further action is needed? The following revised text may clarify these points, as follows:

1) **No additional soil or groundwater data are needed at Sites 09 and 10. The current level of site characterization is adequate to complete the human health and ecological risk assessments.**

2) **Based on the results of the human health risk assessment, remedial action is not required for soil or groundwater at Sites 09 and 10.**

3) **Based on the results of the ecological risk assessment, remedial action is not required for soil or groundwater at Sites 09 and 10.**

4) **The IRP effort for soil and groundwater at Sites 09 and 10 should be to pursue site closure through a No Action Record of Decision.**

Response: The text will be revised to clarify the Navy's position for pursuing a No Further Action Record of Decision.

7. **Comment:** **Appendix L Petroleum Screening Levels**
Please revise this text to be consistent with the description provided in the *Final Corrective Action Plan, Sites 06, 14/22, 15, and 25*, June 28, 2002 (Tables 3-1 and 3-2). The document provided in Appendix L was not approved by the RWQCB. Where is Appendix L referenced in the RI?

Response: The text and tables in Appendix L will be revised to be consistent with Tables 3-1 and 3-2 from the Final CAP (2002). References to Appendix L will be given in the TPH discussion for Site 9 in Section 5.1.1.

RESPONSES TO GEOMATRIX CONSULTANTS, INC. COMMENTS ON THE DRAFT REMEDIAL INVESTIGATION REPORT, IR SITES 09 AND 10 NAVAL STATION TREASURE ISLAND, CALIFORNIA

This document presents the Navy's responses to comments from Geomatrix Consultants, Inc. on the "Draft Remedial Investigation for Sites 09 and 10, NAVSTA Treasure Island, California." The Navy received the comments addressed below from Stephen Proud, Treasure Island Development Authority, on November 20, 2003.

GENERAL COMMENTS

1. **Comment:** ***TPH Concentrations at Site 9 that Exceed Screening Criteria.*** **At Site 9, total petroleum hydrocarbon (TPH) concentrations in the diesel range (TPH-d) and motor oil range (TPH-m) exceed residential screening criteria (1,380 and 1,900 milligrams per kilogram [mg/kg], respectively) at two locations:**

   - **near the former hydraulic lift station inside Building 41 (where TPH-d and TPH-m were detected at 38,000 and 12,000 mg/kg respectively in a sample from boring 09-HP-002), and**
   - **near the southeast corner of the site (where TPH-d was detected at 7,100 and 7,600 mg/kg, respectively, in a sample collected near the water table from borings 09-SB-07 and 09-SB23).**

   In accordance with standard practice for conducting risk assessments, TPH values were not considered in the human health risk assessment; the risk assessment results provided the basis for the conclusion that no risk-based remedial action was necessary to protect human health. The document needs to discuss whether any remedial action (including institutional controls) would be necessary to address the TPH concentrations that exceed the residential screening criteria.

   Response: The human health and ecological risk assessments determine the total petroleum hydrocarbons (TPH) risk based on TPH constituent concentrations such as benzene, toluene, ethylbenzene, and xylene (BTEX), and PAH. The risk assessments have determined that there is no risk at the site in relation to TPH constituents. Remedial actions for soil at NAVSTA TI in the past have addressed shallow soils that pose a risk to human health and the environment. The TPH contamination in question is near the water table at a depth of approximately seven feet bgs. Since it does not contain BTEX and PAH constituents as risk drivers and occurs at depth, it does not pose an unacceptable health risk. This decision is consistent with other petroleum contaminated sites at NAVSTA TI.

In addition, since groundwater is not a source of drinking water and is not being significantly impacted, soil contamination in the smear zone does not require remediation. No institutional control is necessary since there is no risk.

2. **Comment:** *Extent of TPH at Site 9.* **We concur with the document's conclusion that elevated TPH in the vicinity of the former hydraulic lift (boring 09-HP002) appears to be isolated based on data from a boring drilled adjacent to this location and several borings drilled within 10 to 15 feet of this location. However, the extent of TPH is less constrained in the southeast corner of the Site (borings 09-SB07 and 09-SB23). In both borings, elevated TPH was detected in samples collected near the water table, where petroleum staining and odor also was noted on boring logs. The extent may be laterally continuous between the two borings, and may extend beneath Building 3 to the north. It does not appear that a source for the TPH has been identified; however, the TPH does not appear to be a significant source to groundwater based on data from wells 09MW04 and 09MW07.**

Response: While elevated levels of TPH were detected in soil samples collected from borings SB-07 and SB-23, concentrations in soil samples collected from borings upgradient, downgradient, and crossgradient of the borings in question, (SB-10, SB-11, SB-22, SB-24 and SB-25) had maximum TPH concentrations well below screening criteria. Analytical results from groundwater samples collected from monitoring wells MW-04 and MW-07 also indicate that TPH concentrations in soil do not significantly impact groundwater. Based on the low level TPH concentrations detected in borings surrounding SB-07 and SB-23, the lack of significant impacts to groundwater, and the lack of human health and ecological risks associated with the TPH contamination, no further investigation is warranted in this area.

3. **Comment:** *Future Land Use Restrictions.* **In light of the Navy's conclusion that no remedial action is necessary to protect human health (under a residential scenario) or the environment and that no further action is necessary, we infer that the Navy believes that no land use restrictions (including a soil management plan) will be necessary for Sites 9 and 10. One possible exception may be a restriction on use of groundwater because the Navy's human health risk assessment assumed that groundwater would not be used; therefore, human exposure to groundwater was not evaluated. We request that the Navy confirm this understanding with respect to future land use restrictions.**

Response: Sites 09 and 10 are part of the early transfer parcels. A prohibition on groundwater use will be included as part of the transfer document.

SPECIFIC COMMENTS ON TEXT

1. **Comment:** *Executive Summary (p. ES-3, first two paragraphs).* **The last sentence in the first paragraph states "Both TPH-d and TPH-m concentrations are below TPH screening criteria." This sentence should clarify which criteria are being used for comparison (i.e., residential) and should clarify that this statement only applies to the additional RI data (not to the phase II RI data discussed in the same paragraph, where TPH-d was 38,000 mg/kg and TPH-m was 12,000 mg/kg). In the second paragraph on this page, the text should discuss how the "elevated concentrations of TPH-d at 7,600 mg/kg and 7,100 mg/kg...near the southeast corner of the IR Site 09 boundary" compare to the residential screening criterion (both are above it). This comment also applies to Section 10.1.3 (in Conclusions, page 10-4) where identical language is used.**

   Response: The text will be revised to clarify that TPH concentrations were compared to NAVSTA TI residential PRGs as outlined in the "Final Preliminary Remediation Critieria for Petroleum and Petroleum Constituents, Technical Memorandum, Naval Station Treasure Island, November 2001." The text will be revised to clarify that the statement regarding TPH levels below criteria applies to the additional RI data. The text will also be revised, where necessary, to clarify TPH levels in comparison to the screening criteria.

2. **Comment:** *Executive Summary (p. ES-5, last bullet in Recommendations).* **It is unclear why the last bullet recommends moving to the "remedial action plan stage" in light of the previous three bullets that state no remedial action is necessary to protect human health or the environment and no further action is recommended. This comment also applies to Section 10.2, which uses identical language.**

   Response: The executive summary will be revised to state that the Navy will pursue site closure through a No Action Record of Decision.

3. **Comment:** *Section 2.1.1 Site 09 (top of page 2-2).* **The text states that the 30-gallon underground storage tank (UST) for the hydraulic lift inside Building 41 has been removed. However, the document does not provide the basis or citation for this statement. The text states that the lift system itself was concluded to be removed based on a site inspection; however, it does not provide the basis for the conclusion that the UST was removed. Table 2-1, which provides a summary of previous reports, states "No USTs have been located on Sites 09 or 10" according to Tetra Tech's April 2003 Draft Facility-wide UST Summary Report. According to this table, the UST summary report states that one AST was present at Site 09 (not discussed in this RI). Please resolve the apparent discrepancies.**

Response: The phase II RI report indicated that two concrete trenches, apparently remaining structures from a hydraulic lifting system, were present in building 41. The hydraulic lift system and tank were apparently removed between 1995 and 1997 by SPORTS (personal communication between Tetra Tech EM Inc and Michael Mentik, NAVSTA TI). The SPORTS documentation has not been located at this time. The RI report also noted that a 30-gallon storage tank, presumably used to contain hydraulic oil for use with the hydraulic lift, was located in a concrete-lined pit at the east end of one trench. The tank was subsequently removed and the lined pit also filled with concrete.

Table 2-1 summarizes information contained in other reports specific to Sites 09 and 10. The reference to one above ground storage tank (AST) located at Site 09 was only on a figure in the April 2003 Draft Facility-wide UST Summary Report (Tetra Tech 2003). No description of this AST and no other documentation for the AST were found in Navy files.

4. **Comment:** ***Section 2.2.2.5 Sampling and Analysis–Site 10.*** **During the Phase IIB RI, sediment samples were collected from two catch basins (335R and C). What was the rationale for sampling these two catch basins, but not the two additional catch basins at the site (2640 and 2641)? (Also pertains to Section 5.2 discussion.)**

Response: The phase IIB remedial investigation work plan outlined that any storm drains on Sites 07 and 10 would be sampled if they contained sediment. Sediment samples were collected for analysis from catch basins 335R and C. Catch basins 2640 and 2641 were not sampled, as they did not contain enough sediment for an adequate sample.

5. **Comment:** ***Section 2.3.2 Remedial Investigation Objectives and Sampling–Site 10.*** **This section should include the objective for the two borings inside Building 335 and the two borings located southeast of this building. Figure 2-6 identifies the area southeast of Building 335 as an "Area of Potential Soil Contamination." Why was it believed that this area had potential soil contamination?**

Response: The two borings inside Building 335 were drilled to investigate the former floor drain; the text will be revised to clarify the sampling objective. During the review of the Environmental Baseline Survey (EBS) (Tetra Tech 1997), a discolored area was identified south of Building 335 in a 1968 aerial photograph. The Navy and DTSC agreed that this area would be included as part of the Site 10 additional investigation to determine whether or not the discoloration was due to soil contamination. The discolored area is the "area of potential soil contamination".

6. **Comment:** ***Section 3.0 Investigation Procedures and Field Methods.*** **Have the monitoring wells (sometimes referred to as temporary monitoring wells) been destroyed? If so, well destruction procedures should be documented.**

Response: The monitoring wells have not been destroyed or abandoned and are still intact. The text will be revised to clarify the condition of the wells.

7. **Comment:** ***Section 4.3.1.1 Treasure Island Aquifer Testing.*** **The second to last sentence of this section states "Site-specific hydraulic conductivities for Sites 09 and 10 are found in Section 4.4.2 and 4.5.2." This statement is not correct. No site-specific hydraulic conductivities were measured at these two sites. Rather, hydraulic conductivities were assumed using base-wide data or data from nearby sites.**

Response: The text will be revised to indicate that the hydraulic conductivities used for Site 09 were derived from base wide data since no site specific data were available for Site 09. Hydraulic conductivities for Site 10 were derived from site specific data from Site 14 due to its proximity to Site 10 and similar lithology.

8. **Comment:** ***Section 4.4.2 and 4.5.2 (Hydrogeology discussions for Sites 09 and 10, respectively).*** **These two sections identify single hydraulic conductivity values (K) for Sites 09 and 10 that are used in the fate and transport analysis (Appendix H); the fate and transport analysis was used to estimate chemical concentrations at a point of exposure (POE) for an ecological receptor (i.e., San Francisco Bay). The document cites the Treasure Island average K (10.12 feet per day [ft/k]) as appropriate to use for Site 09; however, hydraulic conductivities measured at nearby Site 21 were considerably higher (average of 108 ft/d in the shallow zone). K values at Treasure Island are likely to be variable and the fate and transport analyses are likely to be highly sensitive to this parameter. Therefore, Sections 4.4.2 and 4.5.2 should provide a range of likely values for K (Site 9 should include data from nearby Site 21) and the fate and transport analysis in Appendix H should include a sensitivity analysis using the range of potential K values. Statements such as "The hydraulic conductivity for Site 09 is approximately 10.12 ft/d." (top of page 4-8) are not correct. This is an assumed value in the absence of actual data from Site 09.**

Response: To evaluate the sensitivity of the model in relation to changes in the hydraulic conductivity parameter value, the model was re-run as suggested, and model output for the simulations was compared (see Attachment B). Specifically, the BIOSCREEN model was run for monitoring well 09-MW02 using the original hydraulic conductivity model parameter value in Appendix H equal to 10.12 feet per day (ft/d)

(Run 1). The model was then re-run keeping all parameter values the same except for hydraulic conductivity which was set equal to 101.2 ft/d (Run 2). Model results for Run 1 and Run 2 in Attachment B to this response to comments indicate the resulting concentrations at the point of exposure are identical even though the hydraulic conductivity for Run 2 is an order of magnitude greater than Run 1. The relative insensitivity of the model is likely the result of (1) the relatively short travel distance (hundreds of feet) and (2) the long time period for simulation (100 years). The long time period of simulation relative to the short travel distance results in steady state conditions at the point of exposure (POE).

9. **Comment:** *Section 5.1.1.1 Site 09 Soil Sample Results for Volatile Organic Compounds (VOCs).* **We note that many of the samples from the 2002 investigation had low concentrations of carbon disulfide. Was carbon disulfide used as a preservative with the Encore sampling method? If so, it should be identified as a potential source of the detections. Additionally, we note that several samples had low concentrations of methylene chloride, acetone, and toluene (all common laboratory contaminants that were frequently detected in method blanks–see Appendix E). If these detections have been attributed to laboratory contamination, they should be identified as such in the text, tables and figures.**

Response: Carbon disulfide was not used in the Encore sampling procedures. It was reported at low concentrations in some samples. It is qualified as estimated (Jg), at concentrations reported below contract required quantification limit (CRQL), and considered quantitatively unreliable. Information on carbon disulfide qualifications are found in Appendix E of the draft RI report.

The detections of methylene chloride, acetone and toluene in field blanks indicates the possibility of laboratory introduced contamination, as noted in Appendix E. Reference to possible laboratory contamination will be included in the RI report.

10. **Comment:** *Section 5.2 Site 10.* **Please describe soil sampling and analysis for the EBS investigation (fourth paragraph, page 5-12) consistent with descriptions of other investigations.**

Response: The sampling and analysis for the EBS will be described in a method consistent with the descriptions of the other investigations.

11. **Comment:** ***Section 5.2.1.1 and 5.2.1.2.*** **These sections describe significantly elevated concentrations of TPH and related compounds (toluene, ethylbenzene and xylenes) in samples from the two catch basins that were sampled and states "These catch basins have been cleaned out." (Page 5-14). Please provide information or citation to support this statement.**

Response: The 1997 draft final RI report will be referenced to support this statement.

12. **Comment:** ***Section 5.2.1.2 Site 10, Soil Sample Results--Total Petroleum Hydrocarbons.*** **Under the discussion for the Phase II RI, the text should note that 1,200 mg/kg TPH was detected in sample 07/10-HP013 (0.75-1.25 feet).**

Response: The text will be revised to note the detected TPH concentration in the sample collected from boring 07/10-HP013.

13. **Comment:** ***Section 5.2.1.3 Site 10, Soil Sample Results–Semivolatile Organic Compounds (SVOCs).*** **One of the objectives of the 2002 investigation was to assess SVOCs detected on previous boring 10-SB03. However, the text does not discuss the results within context of this objective. This comment also pertains to Section 10.1.3, where SVOC impacts at Site 10 are not even mentioned. Additionally, if it has not done so, the Navy should confirm that phenol, which was detected in many of the Phase II RI samples, is not a lab or field contaminant.**

Response: The text will be revised to state the objective and results of SVOC sampling at boring 10-SB03. While phenol is not commonly a laboratory introduced contaminant, laboratory blanks will be checked again to determine that possibility.

14. **Comment:** ***Section 5.2.1.4 Site 10, Soil Sample Results–Pesticides and Polychlorinated Biphenyls.*** **The text should discuss the DDD, DDT and DDE detections in sample 10-SB12 (0.5-2') (2002 investigation).**

Response: The text will be revised to include a discussion of the DDD, DDT and DDE detections.

15. **Comment:** ***Section 5.2.2.1 Site 10, Groundwater Sample Results–Volatile Organic Compounds (VOCs).*** **Under quarterly groundwater sampling, it would be helpful if the text noted that the single tetrachloroethene (PCE) and carbon disulfide detections were "J" values (estimated concentrations below the reporting limit) and not reproduced in subsequent sampling events.**

Response: The text will be revised to note the aforementioned "J" values and indicate they were not reproduced in subsequent sampling events.

16. **Comment:** ***Figure 5-10 Site 10 SVOC Soil Sampling Results.*** **Geomatrix has not checked data presented on tables and in figures for accuracy. However, we note that data from borings 10-SB24 and 10-SB26 are missing from this figure.**

Response: The figures will be revised to include data from borings 10-SB24 and 10-SB26.

17. **Comment:** ***Table 5-1. Analytical Results for Site 09 Soil Samples.*** **Geomatrix has not checked data presented on tables and in figures for accuracy. However, we note that Sample 09-HP002 (6.5 to 7.0 feet) had concentrations of 12 mg/kg reported for four PAHs (benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, and benzo[k]fluoranthene); these detections were flagged as "rejected." Because these detections are significantly higher than others at the site (and well above screening criteria), please provide information in the footnote about why these detections were rejected.**

Response: Sample 09-HP002 was located in Building 41 and associated with elevated concentrations of TPH-diesel and TPH-motor oil. The footnote will be revised to include information as to why the data were rejected.

18. **Comment:** ***Section 6.1.1.3.*** **Please provide information that supports the statement that "utility lines appear to be continuously above the water table" at Sites 09 and 10. The accuracy of this statement is fundamental to the conclusion that there are no preferential pathways for contaminant migration.**

Response: The petroleum program and groundwater monitoring program completed a coordinated effort to address this issue for storm drains and sanitary sewers at UST and Pipeline sites, as well as associated IR sites. Based on this effort, data indicate that the utility lines at IR Sites 09 and 10 are located above groundwater. The reference will be added to the text.

19. **Comment:** ***Section 7.0 (Human Health Risk Assessment).*** **This section of the main text is intended to be a summary of Appendix I; however, there are several issues addressed in the appendix that are omitted from this section. For example, there is no mention of arsenic in soil and ambient concentrations. In addition, there is no mention of several data quality issues and how data were included or excluded in the risk calculations. Finally, the appendix presents a relatively detailed uncertainty analysis that is essentially absent from this section of the main text.**

Response: The Section 7.0 summary was intended to be concise, and details of the data anomalies, ambient screen, and uncertainty were originally considered too detailed for the RI report summary. However, we will add the requested details here. Arsenic, as part of the ambient evaluation, is addressed further in the HHHRA Comment 3. The Section 7.0 summary will be updated to include a summary of the ambient evaluation, with text as suggested below:

To be added as a new third bullet in the bullet list of Section 7.1.2.1: "Consistent with Navy (2004) and DTSC guidance, inorganic analytes statistically shown to be below ambient concentrations in fill material (see Attachment I-3) were eliminated as COPCs." This third bullet will replace the first paragraph on page 7-3 ("One inorganic... Appendix I.").

To be added as a new paragraph at the end of Section 7.1.1 on page 7-1: "See Appendix I, Section 5 for details of the data reduction. In summary, all data without qualifiers and all data qualified as estimated (J) were used in the HHRA, with the exception of the data quality issues noted in Appendix I, Section 5. Data qualified as not detected (U) were incorporated into the HHRA by using a proxy concentration of one-half of the sample quantitation limit (EPA 1989). Consistent with EPA guidance, only data qualified as rejected (R) were considered unusable for risk assessment purposes (EPA 1989, 1992a). None of the rejected data (summarized in Appendix I, Section 5) presented a data gap for the HHRA."

To be added to the end of Section 7.1.6: "The following summary presents information related to the main uncertainties in the Site 09 and 10 HHRA; detail is provided in Section 11 of Appendix I.

Uncertainty is introduced during the data evaluation and selection of COPCs. Each of the strengths and weaknesses associated with the data is carried through to the risk assessment. Fortunately, the very small sizes of Sites 09 and 10 (0.25-acre and 0.75-acre, respectively) and the relatively large number of samples collected from site media indicate that sufficient data are available to detect human health risks, and no underestimate is presented. To ensure that risks were not underestimated by use of the COPC selection process, a quantitative assessment of the impact of a "no screen" HHRA is presented as a "total risk" assessment for soil (see end of Section 9 in Appendix I). This discussion concluded that no risk drivers were excluded from the HHRA and that the conclusions of the HHRA would not change had the COPC screen not been followed in accordance with Navy (2001) guidance.

Uncertainties were identified in association with four areas of the exposure assessment process: (1) the selection of exposure scenarios, (2) the selection of exposure pathways, (3) the estimation of EPCs, and (4) the selection of exposure variables used to estimate chemical intake. All parameters are expected to err on the conservative side, rather than underpredicting unforeseen human health risks.

The primary uncertainties associated with the toxicity assessment are related to derivation of toxicity values for COPCs. Standard RfDs and SFs developed by EPA were used to estimate potential cancer and noncancer health effects from exposure to COPCs at the site. These values are derived by applying conservative (health-protective) assumptions and are intended to protect the most sensitive potentially exposed individuals. Although the State of California has its own toxicity values to describe the cancer potency of the two organic risk drivers (BAP and DBA), one California value is higher, and one is lower, resulting in an insignificant change to the risk characterization if one toxicity assessment were chosen over the other. Application of dual toxicity assessments (per Navy 2003 guidance) was not needed in this site-specific case, as uncertainty was not significant to the risk characterization findings.

Standard EPA methodologies were used for the risk characterization step. Using these methods, the risks from exposure to multiple carcinogens were added to estimate the total cancer risk associated with exposures at the site. The underlying assumption with this approach is that the risks from carcinogens with different target organs are additive. This assumption contributes to the uncertainty in the risk assessment and may result in underestimated or overestimated risks, depending on whether there are synergistic or antagonistic interactions between the site COPCs. Because information on such interactions, however, is generally not available, most possible interactions were not evaluated in this HHRA. The target organ-specific analyses may be conducted if additive effects contributed to HIs greater than unity; however, for Sites 09 and 10, no unacceptable HIs were found, so no target organ breakdown was necessary.

In summary, the HHRA was developed based upon a series of assumptions, almost all conservative, that are expected to yield an overestimate of risks."

20. Comment: ***Section 7.0 (Human Health Risk Assessment).*** **A number of specific comments on Appendix I also apply to this summary section. For example, noncancer hazard indexes and excess cancer risks should be limited to one significant figure. This is especially important in the absence of a discussion on uncertainty in these estimates. The other**

issues identified above should be addressed in this section of the main text.

Response: At the March 8, 2004 BCT meeting, this comment and others related to significant figures presented in the HHRA were discussed. It was agreed that the revised HHRA text will present the risks to one significant figure. The statement, "Risks and health hazards discussed in the text and main tables of the RI report and the HHRA appendix are limited to one significant figure, as recommended by RAGS Part A (EPA 1989). However, to enable checks for mathematical accuracy to additional decimals, the tables of Appendix I include results beyond the single significant figure." The other issues identified above will be addressed in the main text, where relevant.

21. **Comment:** ***Sections 7.0 and 8.0 (Human Health Risk Assessment and Screening Level Ecological Risk Assessment).*** **Both of these assessments only utilized groundwater data collected in 2002. While there is a good distribution of 2002 data at Site 9, only two monitoring wells at Site 10 were sampled in 2002, and samples from only one of these two wells (10-MW03) was analyzed for a full suite of constituents (the sample from 10-MW02 was only analyzed for pesticides). While we generally support the concept of utilizing recent groundwater data, the general paucity of data from 2002 necessitates consideration of historic data (including hydropunch data). We believe that consideration of earlier data is not likely to change the findings from these two assessments, but will provide a more robust data set for supporting the findings.**

Response: At the March 8, 2004 BCT meeting discussing this comment, it was agreed that the revised HHRA will not summarize the entire historical dataset (and will continue to exclude hydropunch data from the tables and discussion), particularly since readers can review all data (including the screening-level hydropunch data) in Appendices C and D of the RI report. We concur that the data would not change the findings of the HHRAs, because the pathways for human health exposure are incomplete at NAVSTA TI Sites 09 and 10. In addition, the RWQCB has officially provided the Navy with concurrence that the groundwater is not a potential source of drinking water, pursuant to SWRCB Resolution 88-63 and RWQCB Resolution 89-39. A copy of the concurrence letter is included in Attachment A.

APPENDIX H—CONTAMINANT FATE AND TRANSPORT MODELING

1. **Comment:** **We did not perform a detailed review of the fate and transport modeling; however, we note that there are several places where the text claims that the modeling approach and assumptions used would "result in the most conservative model results possible." (pages H-2, H-3 and H-9). Statements such as this are highly debatable and**

should be deleted, especially in light of the fact that an argument could be made that the modeling for Site 09 should have used a hydraulic conductivity that is an order of magnitude higher than what was used (See specific comment #8). On another note, it appears that the distance from monitoring well to the POE for Site 10 (approximately 90 feet) should be revised to about 160 feet (in-text table, page H-7).

Response: In some cases, a range of input parameter values could be used to represent field conditions at the site. BIOSCREEN Model input parameter values were selected to ensure the model calculated DAF values resulted in conservatively high concentrations of constituents in groundwater for use in the screening level risk assessment. The Navy agrees that the phrase "most conservative model results possible" could be misleading. Pages H-2, H-3, and H-9 will be revised to indicate that the modeling approach and assumptions used would result in "relatively conservative model results."

Contrary to the conclusion presented in this comment, the BIOSCREEN models for Sites 9 and 10 are insensitive to the value for the hydraulic conductivity parameter. Model results are conservative, regardless of the value for hydraulic conductivity used. A full explanation of the model sensitivity to variations in the hydraulic conductivity parameter is provided in the response to Geomatrix specific comment 8.

Page H-2 of Appendix H states that the point of exposure (POE) for the modeling evaluation is defined "as the inland margin of the tidal mixing zone adjacent to San Francisco Bay." The distance from Site 10 monitoring wells to the inland margin of the tidal mixing zone is, in fact, approximately 90 feet. The in-text table on page H-7 is correct, and does not require revision.

APPENDIX I—HUMAN HEALTH RISK ASSESSMENT

1. **Comment:** **<u>Section 5.2.1, p. I-9</u> – The last paragraph of this section refers the reader to Section 5.1.1.5 of the main text "... for further details regarding the intended use of the 09-SB05 data and this data anomaly." However, no additional information, and in fact, substantially less information is provided in the main text. Most importantly, the primary reason given for discounting the original lead detection of 974 milligrams per kilogram (mg/kg) in Site 9—i.e., the value was estimated and of questionable quality—is not even mentioned in the main text of the report. While this section could be corrected by deleting this sentence, it would be preferable if the additional information provided in Section 5.2.1 of Appendix I is provided in Section 5.1.1.5 of the main text as originally intended. Finally, in the second-to-last paragraph of this section, there are**

several references to "regulators" making suggestions, concurring, or not being comfortable; however, the specific regulators are not identified nor are any citations provided.

Response: Information from Section 5.2.1 of Appendix I will be provided in Section 5.1.1.5 of the main text, as follows:

"At Site 09, lead results collected from location 09SB03 (1 to 1.5 feet bgs) included an estimated measurement of 974 mg/kg (J-qualified). The sample was collected just below the asphalt and gravel cover and was considered anomalous in comparison to other results from the Site 09 yard. Because all results from this 1992 boring were estimated (J-qualified) detections, the location was resampled in 1995. Resampling results identified 2.41 mg/kg of lead at the 1- to 2-foot bgs depth interval and 76.2 mg/kg in the 0.5- to 1-foot bgs depth interval. The working hypothesis of the Navy and its contractors has been that either the data quality for the original result was poor (as evidenced by estimated concentrations) or the 1992 lead result represented a flake of lead-based paint from the nearby structure.

The collection of two samples from the same spatial location is problematic for subsequent spatially based statistics. Multiple measurements of the same spatial location gives more weight to the data characterizing that single location. To offset this, a simple mean (average) of the two borings' results could be calculated. The net effect of averaging the original 1992 09SB03 lead measurement and the 1995 confirmation 09SB05 lead measurement in the relevant interval would be an average result of 488 mg/kg. However, the use of a simple mean in this manner is also in technical violation of generally-accepted statistical principles, but is preferred by DTSC in this specific situation. Averaged data should not be subsequently subjected to further statistical treatment. While the resampling of this location is similar to confirmation (also known as clearance) sampling, the DTSC has requested that rather than the complete replacement of 09SB03 lead results with the 09SB05 results, that the two results be averaged for this assessment. Thus, the concentration for lead at this spatial location is the average of the two borings' depths at each interval sampled."

2. **Comment:** **<u>Section 6.1, p. I-13</u> – This section describes the methods by which chemicals of potential concern (COPCs) in soil were identified. As discussed in this section and during the May 19, 2003, conference call, maximum detected concentrations were compared to EPA Region IX preliminary remediation goals (PRGs) for residential soil on a chemical-by-chemical basis. While there is nothing necessarily wrong with this approach, the draft RI does not address a comment made by DTSC on May 19, 2003; i.e., the DTSC and the Department of Defense**

entered into an agreement in 1994 that required potential cumulative effects to be considered in such a screening evaluation, and that this procedure needed to be adhered to in the RI report. While the Navy addressed this issue in a separate analysis (Section 9.3 – "'Total Risk' versus 'Incremental Risk'"), there is no mention of the 1994 DTSC/DOD agreement or how the Navy actually addressed DTSC's concern in this section of the draft appendix.

Response: As presented at the March 8, 2004, BCT meeting, the total risk evaluation has been updated to address DTSC's concerns with the draft HHRA "total risk" presentation. As DTSC agreed at the BCT meeting, total risk has been addressed sufficiently at Sites 09 and 10 after revision. However, for future HHRAs at NAVSTA TI, a more detailed forward risk evaluation (rather than a Navy Tier 1 screening-level evaluation that was appropriate for Sites 09 and 10 given the site-specific concentrations) may be required to establish total risk to DTSC's satisfaction. The revised draft HHRA appendix text has been revised to reflect the revised total risk screen demonstrated at the BCT meeting.

3. **Comment:** **<u>Section 6.1.3.1, p. I-16</u> – This section is intended to be a more detailed evaluation of arsenic data from Sites 9 and 10 with respect to ambient concentrations at Treasure Island, as agreed to during the May 19, 2003, conference call. In addition, "...the more detailed analyses ... were conducted by comparison to the 95th percentile ambient level, which is consistent with the 1997 DTSC guidance for background comparisons." While it is true that a comparison of the maximum detected concentration to the 95th percentile ambient concentration is consistent with the referenced DTSC guidance, the remainder of the Navy's analysis, which consisted of comparing the data to the EPA Region IX PRG based on non-cancer effects and/or comparing the data to the maximum detected ambient concentration (rather than the 95the percentile concentration), is not. Furthermore, the reason for not doing a more rigorous statistical comparison between the site data and the ambient data as agreed to during the May 19, 2003, conference call appears to be that the Navy and its contractors could not locate the actual ambient data, but were forced to rely on a summary table provided in a 1996 report. Finally, despite concluding that arsenic was not a COPC in soil in either Site 9 or Site 10, the potential health risks associated with residual arsenic concentrations were actually evaluated as part of the uncertainty section. As such, the Navy should (1) attempt to locate the ambient data or acknowledge that they cannot conduct a more rigorous statistical analysis as requested by DTSC but that the distribution of detected concentrations does not suggest that the sites have been affected, (2) remove any reference to the non-cancer PRG because it is irrelevant**

to whether or not arsenic is present at Sites 9 and 10 at background concentrations, and (3) direct the reader to the uncertainty section. It should also be noted that this issue is further confused in Tables 1-2.1, 1-2.2, 1-2.5, and 1-2.6. These tables identify COPCs in soil based on comparisons of maximum detected concentrations to EPA Region IX PRGs or ambient levels or because the chemicals are essential nutrients. With respect to arsenic in Site 9, the reason given for not identifying arsenic as a COPC in soil is "BSL," or below screening level, whereas the reason given for arsenic in Site 10 is "BSL/BAL," or below screening level and below ambient level. The screening level listed for arsenic in the tables is the noncancer PRG of 22 mg/kg, not the cancer PRG of 0.39 mg/kg. At a minimum, this table should list both the cancer and noncancer PRGs for arsenic and acknowledge that the primary reason for not identifying arsenic as a COPC in soil in both areas is the belief that the detected concentrations are within background, as stated in Section 6.1.3.1 of the appendix.

Response: As discussed at the March 8, 2004 BCT meeting, the original 1995 ambient fill dataset has been located, and two-population statistical tests have now been conducted for the inorganics at NAVSTA TI Sites 09 and 10. The specific arsenic example at Site 09 (commented on above) was demonstrated during the BCT meeting, along with the Site 10 arsenic outliers. All inorganics are below ambient with the exception of silver at Site 09 (as demonstrated in new statistical Attachment I-3); all RAGS Part D Table 2 series tables will be revised accordingly. In addition, the contribution of inorganics to EPA's requested ambient risk will be presented in the uncertainty analysis according to Navy's January 30, 2004 guidance on this issue. Thus, inorganics that are not considered significantly greater than ambient will not be shown in the forward risk calculations of either the incremental evaluation or "total risk" evaluation (risk without a COPC selection except based on ambient levels and frequency of detection).

4. **Comment:** **<u>Section 7.0, p. I-19</u> – Figure I-3, the conceptual site model, was not included in the report. However, based on the information contained in the text and in Table I-1.1, it appears that two issues raised during the May 19, 2003, conference call were not addressed. First, it appears that volatilization from groundwater to indoor air was considered a complete pathway, whereas volatilization from soil to indoor air was not. While it does not affect the conclusion of the report, because essentially no volatile organic compounds were detected in soil or groundwater, it does not make sense that one of the pathways is considered complete when the other one is not. Second, the potential for future onsite residents to be exposed to residual chemicals in soil via ingestion of homegrown produce was not addressed adequately. There is no mention of this potential exposure**

pathway in the text. Whether or not it is mentioned in the conceptual site model is unknown; however, Table I-1.1 includes the following statement: "Because of the light industrial and commercial reuse plan for Sites 09 and 10, future homegrown produce pathways in a residential setting are incomplete. Vegetable gardening is not a reasonable anticipated future activity for Sites 09 and 10." However, based on the information provided, there is no reason to believe that exposure to residual chemicals in soil via ingestion of homegrown produce is any more or less likely than potential exposure via the other pathways evaluated for a future onsite resident (i.e., incidental soil ingestion, dermal contact with soil, and inhalation of vapors or particulates). Preferably, this pathway will be included in the assessment. At a minimum, another rationale for considering this pathway to be "incomplete" should be provided and/or the exclusion of this pathway should be addressed in the uncertainty section of the report.

Response: The conceptual site model (CSM) was inadvertently left out of the copy provided to reviewers, but had been modified as agreed to during the May 19, 2003, conference call. The figure is provided in Attachment C, and will also be included in revisions to the RI. Revisions to Figure I-3 responsive to this comment will include:

- Addition of a new footnote c to Figure I-3, stating, "All receptors were evaluated for soil sampled between 0 and 8 feet bgs because these soils were generally more impacted than soil sampled between 0 and 2 feet bgs. Soil sampled between 0 and 2 feet bgs were evaluated for the commercial/industrial worker because of the potential for exposure to soils in the absence of intrusive redevelopment activities, which are likely to disturb deeper soils.
- Addition of the callout to footnote b to the box for indoor air derived from groundwater.

Volatilization from groundwater to indoor air is considered a potentially complete pathway, but volatilization from soil to indoor air is not considered a complete pathway. During the RAGS Part D Table 2 stage (selection of COPCs), the Navy determines whether the pathway is actually (not just conceptually) complete: presence of a VOC in soil would be required; however, no VOCs were present in soil at great enough concentrations to result in indoor air impacts. This was agreed to during the May 19, 2003, conference call; specifically, the concentrations of infrequently detected VOCs in soil are minor. For example, toluene was detected in 2 of 69 soil samples collected from the 0 to 8 foot depth interval at Site 09; the maximum concentration was estimated (J-qualified) at 0.003 mg/kg. Also, no VOCs were present in soil collected from the 0

to 8 foot depth interval at Site 10. Even if the pathway was complete, the evaluation of subsurface soil volatilization to indoor air is not recommended by the EPA *Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (Subsurface Vapor Intrusion Guidance) because of the "large uncertainties associated with measuring concentrations of volatile contaminants introduced during soil sampling, preservation, and chemical analysis, as well as the uncertainties associated with soil partitioning calculations" (EPA 2002).

As discussed during the BCT meeting, the "residential" reuse in the 1996 plan is short-term housing for filmmakers and other intermittent workers who are not likely to plant vegetable gardens. In the event that long-term individual family housing becomes a likely future reuse scenario, the pathway is further incomplete because all inorganics are below ambient fill concentrations (this will be demonstrated in a new statistical Attachment I-3), which is to be expected as fill material was used to create all of TI. Therefore, Navy has not impacted the inorganics with operations at Sites 09 and 10. Because inorganics are the most likely class of compounds to be taken up from soil into produce, no forward risk calculations would be required for this pathway; this protocol is supported by DTSC and Navy (January 30, 2004) guidance on ambient metals. Further, the only surface soil (0 to 2 feet bgs) COPCs were large molecular weight PAHs (benzo(a)pyrene and dibenz(a,h)anthracene) that are fairly insoluble in water (inhibiting uptake) and are unlikely to accumulate in homegrown produce. Because homegrown produce does not have extensive root systems likely to exceed 2 feet in depth, soil collected from greater than 2 feet bgs and groundwater are not considered potential sources to homegrown produce. The text will be adjusted to address these incomplete pathways in Section 7.2 with the following revision:

> "Volatilization from groundwater to indoor air is considered a potentially complete pathway, but volatilization from soil to indoor air was found to be an incomplete pathway. At the RAGS Part D Table 2 stage (selection of COPCs) where it is determined whether the pathway is actually (not just conceptually) complete, the presence of a VOC in soil would be required. However, no VOCs were present in soil at great enough concentrations to result in indoor air impacts. Specifically, the minor concentrations of infrequently detected VOCs in soil did not require quantification. For example, toluene was detected in 2 of 69 soil samples collected from the 0 to 8 foot depth interval at Site 09; the maximum concentration was estimated (J-qualified) at 0.003 mg/kg. Also, no VOCs were present in soil collected from the 0 to 8 foot depth interval at Site 10. Even if the pathway was complete, the evaluation of subsurface soil volatilization to indoor air is not recommended by the EPA *Guidance for Evaluating the Vapor*

Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) because of the 'large uncertainties associated with measuring concentrations of volatile contaminants introduced during soil sampling, preservation, and chemical analysis, as well as the uncertainties associated with soil partitioning calculations' (EPA 2002)."

Ingestion of homegrown produce is considered an incomplete pathway. The "residential" reuse in the 1996 plan has short-term housing for filmmakers and other intermittent workers who are not likely to plant vegetable gardens. In the event that long-term individual family housing becomes a likely future reuse scenario, the pathway is further incomplete because all inorganics (with the exception of silver at Site 09) are below ambient fill concentrations (see Attachment I-3), which is to be expected as fill material was used to create all of TI. Therefore, the Navy has not impacted the inorganics with operations at Sites 09 and 10. Because inorganics are the most likely class of compounds to be taken up from soil into produce, no forward risk calculations would be required for this pathway (see Navy 2004). Further, the only surface soil (from 0 to 2 feet bgs) COPCs were large molecular weight PAHs (benzo[a]pyrene and dibenz[a,h]anthracene) that are fairly insoluble in water (inhibiting uptake) and are unlikely to accumulate in homegrown produce. Because homegrown produce does not have extensive root systems likely to exceed 2 feet in depth, soil collected from greater than 2 feet bgs and groundwater are not considered potential sources to homegrown produce.

The uncertainty associated with these pathways will be addressed in the Section 11.2.2 of the report with an insert as follows:

"Volatilization from groundwater to indoor air was considered a potentially complete pathway, but volatilization from soil to indoor air was not considered a complete pathway. The likelihood that potential risks are underestimated is negligible because VOC concentrations in soil and groundwater were very low (that is, below respective screening criteria).

Ingestion of homegrown produce was considered an incomplete pathway. The likelihood that potential risks are underestimated are negligible because: the 1996 planned reuse indicates receptors are unlikely to spend significant time at the site; all inorganics (except silver) are below ambient fill concentrations (see Attachment I-3); and the only surface soil COPCs were large molecular weight PAHs that are fairly insoluble in water, which inhibits uptake and

thus makes these COPCs likely to accumulate in hypothetical produce."

5. **Comment:** **<u>Section 7.2, p. I-22</u> – At the top of this page, there is a sentence that states: "Because no groundwater COPCs were identified in Section 6.2, no complete groundwater exposure pathways were carried through the evaluation." This sentence is in direct conflict with statements made later in this section and in Table I-1.1, which suggest that volatilization from groundwater to indoor air was quantitatively evaluated. In actuality, it appears that the first sentence is correct, and that the later sentences should be removed and the table corrected.**

Response: Table I-1.1 indicates that the vapor intrusion pathway for the commercial/industrial worker and adult/child resident will be quantitatively evaluated in the risk assessment. The intent of the RAGS Part D Table 1 is to portray *conceptually* complete pathways; however, actual completed pathways depend on the data collected from the site. Upon compilation of the RAGS Part D Table 2 series, groundwater was found to lack VOCs requiring quantitative assessment. Table I-1.1 will be changed to note that the vapor intrusion pathway is not quantitatively evaluated in the risk assessment based on an absence of VOCs requiring assessment. Also, the following sentences that appear on page I-32 in Section 7.2 (intended to show that the pathway was considered for quantitative evaluation) will be deleted to avoid confusion:

"The only complete groundwater-related exposure would be for volatile chemicals migrating upward through overlying vadose zone soils. Based on expected behavior (that is, the potential for working in a building or warehouse) in addition to the previously listed pathways, potential exposure to chemicals migrating from groundwater into indoor air was evaluated for the commercial/industrial worker. In addition, though much less likely, a residential scenario evaluating migration of volatiles into indoor residential air was also evaluated."

6. **Comment:** **<u>Section 8.3, p. I-33</u> – The last paragraph of this section is confusing. It would be helpful to clarify that, for noncancer effects, which is limited to iron, the oral absorption efficiency was assumed to be 100%, whereas for cancer effects, which is limited to PAHs, the oral absorption efficiency was assumed to be 89%.**

Response: The paragraph in question will be changed as follows (underlined text denotes new text and deleted text is crossed out):
"In addition, the dermal pathway was evaluated using oral toxicity values, <u>which were</u> adjusted for oral absorption efficiencies where appropriate ~~following recommendations in~~ (EPA ~~(~~2001b; Navy 2001). For <u>iron</u>, the ~~TI~~

~~Sites 09 and 10 COPCs,~~ oral absorption efficiency was ~~considered~~ 100 percent and ~~thus~~ no conversion was applied to the oral RfD to adjust for dermal exposure. For the PAH COPCs, the oral SF values were divided by a chemical-specific oral ~~gastrointestinal~~ absorption factor (0.89) to transform administered doses into absorbed doses for dermal contact (see Tables I-5.1 and I-6.1)."

7. **Comment:** **Section 8.4, p. I-33 – The basis for the chosen surrogates should be provided, although this issue is partially addressed in Section 11.3.4 (Surrogates for Preliminary Remediation Goals Screening).**

Response: The text in question will be changed as follows (underlined text denotes new text and deleted text is crossed out):
"Because of a lack of EPA Region IX PRGs for screening chemicals to identify COPCs, surrogate chemicals were chosen for the following chemicals based upon structural similarity ~~the following surrogates were employed~~ to avoid leaving data gaps ~~in the HHRA~~:

- Pyrene was used as a surrogate to represent phenanthrene and benzo(ghi)perylene, which have no EPA Region IX PRG or chemical-specific toxicity factors. Pyrene was chosen as a surrogate chemical for phenanthrene because of the similar structure; phenanthrene is a three-ringed PAH and pyrene is a four-ringed PAH. The three-ringed PAH pyrene was chosen as the surrogate chemical for the six-ringed PAH benzo(ghi)perylene because it was the closest surrogate with a non-carcinogenic endpoint. Other PAHs that were more structurally similar to benzo(ghi)perylene (for example, indeno(123-cd)pyrene) were not considered because they had carcinogenic endpoints and EPA toxicity information on benzo(ghi)perylene was insufficient to classify the chemical as a carcinogen.

- ~~While not completely a "surrogate" as such, t~~ Total chromium toxicity values and PRGs were chosen to ~~appropriately and conservatively~~ represent~~ed~~ all chromium ~~the total chromium~~ detected at Sites 09 and 10. This is considered protective because the total chromium toxicity value and PRG are based on a one-to-six ratio of hexavalent chromium, the most toxic form of chromium, to trivalent chromium, a less toxic form of chromium. Because ~~since~~ hexavalent chromium was analyzed in soils but found to be nondetect in all samples (see Section 11.3.1), this surrogate is considered appropriately conservative.

- Many pesticide analogs did not have their own PRGs. However the following detected pesticides were structurally similar to other pesticides in their class: Endosulfan's PRG was used to screen detected endosulfan sulfate~~;~~ endrin was used to screen endrin aldehyde and endrin ketone~~;~~ technical chlordane was used to screen both gamma- and alpha-chlordane~~,~~; and DDT was used to screen DDE.

Although the selection and use of surrogates for PRG screening is not ideal, the surrogates selected for use in the COPC screening process were all very closely structurally related to the contaminants they were chosen to represent. A lack of a PRG would otherwise remain a data gap. The degree of uncertainty contributed by the use of surrogates in this manner is addressed in the uncertainty section (see Section 11)."

8. **Comment:** **Section 9.2, p. I-35 – The quotation from 40 CFR 300.430 is not exactly correct. Importantly, the range for residual cancer risk is actually between "10^{-4} and 10^{-6}," reflecting that these estimates should be reported to only one significant figure (see comments below).**

Response: Navy agrees that risk estimates are only significant to one figure. The quotation in question will be replaced by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) language, "an excess upper bound lifetime cancer risk to an individual of between10^{-4} and 10^{-6}" rather than the version in the draft showing, "between 1.0×10^{-4} and 1.0×10^{-6}." The original text was meant to be consistent with the numerical format of the risk estimates so that the lay public could try to compare risk estimates to the NCP range. Please see response to general comment 20. At the March 8, 2004 BCT meeting, it was agreed that the revised HHRA text will present the risks to one significant figure.

The following statement will be added to the end of the second paragraph of Section 9.2 on page I-35 to clarify: "Risks and health hazards discussed in the text and main tables of the RI report and the HHRA appendix are limited to one significant figure, as recommended by RAGS Part A (EPA 1989). However, to enable checks for mathematical accuracy to additional decimals, the tables of Appendix I include results beyond the single significant figure."

9. **Comment:** **Sections 9.3 through 9.5, pp. I-36 through I-38 – It does not make sense that these "alternative" results are presented prior to the primary results in Section 10.0. Further, the estimated noncancer hazard indices and excess cancer risks in Section 9.3 (and elsewhere) should be limited to one significant figure.**

Response: The Navy agrees that the alternative results (that is, total risk, lead, and TPH evaluations) should be removed from Section 9 and placed in Section 10 after the results of the HHRA; thus Sections 9.3 through 9.5 will become Sections 10.3 through 10.5. Also, the total risk screening will be updated to incorporate agreements made at the March 8, 2004 BCT meeting.

Please see response to general comment 20 and specific comment 8.

10. **Comment:** **<u>Section 10.0, p. I-38</u> – As discussed above, the estimated noncancer hazard indices and excess cancer risks should be limited to one significant figure.**

Response: Please see response to general comment 20 and specific comment 8.

11. **Comment:** **<u>Section 10.1, p. I-39</u> – It appears that the incorrect exposure-point concentration (EPC) may have been used for benzo(a)pyrene in some of the calculations. As shown in Table I-3.1, the 95% upper confidence limit of the mean (UCL_{95}) for benzo(a)pyrene in soil from 0 to 2 feet below ground surface is 0.244 mg/kg, whereas the maximum detected concentration is 0.1 mg/kg. Nevertheless, the value listed as the EPC is the UCL_{95}, which would be contrary to standard practice and contrary to what was assumed for dibenz(a,h)anthracene in soil from 0 to 2 feet below ground surface (i.e., the UCL_{95} was greater than the maximum detected concentration; therefore, the maximum detected concentration was used as the EPC, which is standard practice).**

Response: As noted, the incorrect EPC was used and the lower maximum will be corrected in the RAGS Part D tables (Table I-3.1 and Tables I-7.1.1 through I-10.1.1). This change will only affect the future commercial/industrial worker exposure to surface soils at Site 09; the carcinogenic risk for this receptor will be changed from an estimate of 1.2E-6 to an estimate of 5.0E-7, which is less than the risk management range of 1E-4 to 1E-6. Results were reported to two significant figures to check for mathematical accuracy. Hence, conclusions are unaffected.

12. **Comment:** **<u>Section 10.1.1, p. I-39</u> – Even though earlier sections of the report conclude that there are no current uses of Site 9, potential noncancer hazard indexes and excess cancer risks were calculated for this scenario (see Tables I-7.1.1 and I-8.1.1). The report should be consistent with respect to the scenarios evaluated.**

Response: The text and Table I-1.1 indicate that the commercial/industrial worker is exposed to Site 09 surface soils (0 to 2 feet bgs) in the future scenario only. Because there is very infrequent "current" use of Site 09 by commercial/industrial workers (short-term walk-through type exposures), Tables I-7.1.1 through I-10.1.1 will be changed to indicate future use only.

13. **Comment:** **<u>Sections 10.1 and 10.2, p. I-39</u> – The majority of the risk summary tables (I-10 series) appear to be blank. These tables should be corrected or some explanation added as to why there is a series of blank tables in the appendix.**

Response: For transparency, when no risk drivers were identified, the RAGS Part D Table 10 was still included. A footnote has been added to the blank Table 10 to state, "No risk drivers were identified for this receptor."

14. **Comment:** **<u>References, p. I-49</u> – The references are missing from the draft report.**

Response: References were inadvertently omitted from the hard copy and will be included in the revised draft HHRA. References cited in these responses to comments were added to the reference section as appropriate.

APPENDIX J—ECOLOGICAL RISK ASSESSMENT

1. **Comment:** **The ecological risk assessment appears to have been completed in accordance with the procedures discussed during the May 19, 2003, conference call. A detailed evaluation of the basic methodology and assumptions used (e.g., fate-and-transport modeling, ecological screening criteria, etc.) was beyond the scope of this review; however, the approach presented appears logical and consistent with my understanding of these types of screening assessments.**

Response: Comment noted.

References:

Navy. 2001. Navy Guidance for Conducting Human Health Risk Assessments: Dermal Contact with Soil. Pioneer Technologies Corporation. December. Available at http://www-nehc.med.navy.mil/HHRA/guidancedocuments/issue/pdf/PTC_Dermal_IP.pdf.

Navy. 2004. Navy Policy on the Use of Background Chemical Levels. From Chief of Naval Operations, David L. Olson, Special Assistant for ER&IR. To Commander, Naval Facilities Engineering Command. January 30.

OSU (Oklahoma State University). 1994. *OSU Extension Pesticide Properties Database.* (Eds.) P.A. Vogue, E.A. Kerle, and J.J. Jenkins. Available at http://ace.orst.edu/info/nptn/ppdmove.htm.

PRC. 1996b. "Technical Memorandum Estimation of Background and Ambient Metal Concentrations in Soils", Naval Station Treasure Island, San Francisco, California. June.

Tetra Tech and Uribe and Associates (Uribe). 1997. "Environmental Baseline Survey Sampling and Analysis Summary Report. November.

Tetra Tech. 2001. "Final Technical Memorandum Estimation of Ambient Concentrations of Metals in Groundwater", Naval Station Treasure Island, San Francisco, California. March.

Tetra Tech. 2002. "Final Corrective Action Plan, Sites 04/19, 06, 14/22, 15, 16, 20, and 25, Naval Station Treasure Island, San Francisco, California." Department of the Navy, Southwest Division, Naval Facilities Engineering Command. June 28.

Tetra Tech. 2003. "Draft Facilitywide Underground Storage Tank Summary Report Naval Station Treasure Island, San Francisco, California." Department of the Navy, Southwest Division, Naval Facilities Engineering Command. April.

U.S. Department of the Navy (Navy). 2001. Memorandum Regarding Conducting Human Health Risk Assessments Under the Environmental Restoration Program. From William G. Mattheis, Deputy Director, Environmental Protection, Safety and Occupational Health Division. To Commander, Naval Facilities Engineering Command. February 12.

U.S. Environmental Protection Agency (EPA). 2002. "Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)." Draft Federal Register. November 29, 2002. Volume 67, Number 230. Pages 71169-71172. Available at: http://www.epa.gov/correctiveaction/eis/vapor.htm

ATTACHMENT A

DEPARTMENT OF TOXIC SUBSTANCES CONTROL AMBIENT METALS LETTER

REGIONAL WATER QUALITY CONTROL BUREAU GROUNDWATER CONCURRENCE LETTER

Department of Toxic Substances Control

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

Winston H. Hickox
Secretary for
Environmental
Protection

Gray Davis
Governor

MEMORANDUM

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

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

DATE: August 3, 2001

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

Background

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

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

California Environmental Protection Agency
Printed on Recycled Paper

General Comments

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

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

Specific Comments

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

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

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

Conclusions

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

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

cc: Clarence Callahan, Ph.D., BTAG Member
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c:\jmp\risk\1\Final Groundwater Ambient at Tl.doc\h:34

California Regional Water Quality Control Board
San Francisco Bay Region

Winston H. Hickox
Secretary for Environmental Protection

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

Gray Davis
Governor

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

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

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

Dear Ms. Klimek:

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

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

Sincerely,

Curtis T. Scott

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

Resolution88-63-exemption

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

ATTACHMENT B

BIOSCREEN MODEL INPUT AND OUTPUT SCREENS

BIOSCREEN Model Input for Well 09-MW02
Site 09, Treasure Island

Contaminant Fate and Transport in Groundwater
(advection and dispersion only; no retardation due to sorption; no degradation)

Site 09, Well 09-MW02
K = 10.12 ft/d
Run Name

Data Input Instructions:

115 — *1. Enter value directly....or*
or — *2. Calculate by filling in grey cells below. (To restore formulas, hit button below).*
0.02

Variable* — *Data used directly in model.*
20 — *Value calculated by model. (Don't enter any data).*

1. HYDROGEOLOGY

Seepage Velocity*	*Vs*	63.3	*(ft/yr)*
or		*or*	
Hydraulic Conductivity	*K*	3.57E-03	*(cm/sec)*
Hydraulic Gradient	*i*	0.0048	*(ft/ft)*
Porosity	*n*	0.28	*(-)*

2. DISPERSION

Longitudinal Dispersivity*	*alpha x*	23.0	*(ft)*
Transverse Dispersivity*	*alpha y*	7.7	*(ft)*
Vertical Dispersivity*	*alpha z*	1.2	*(ft)*
or		*or*	
Estimated Plume Length	*Lp*	230	*(ft)*

3. ADSORPTION

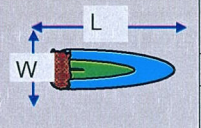
Retardation Factor*	*R*	1.0	*(-)*
or		*or*	
Soil Bulk Density	*rho*	1.6	*(kg/l)*
Partition Coefficient	*Koc*	0	*(L/kg)*
FractionOrganicCarbon	*foc*	1.0E+0	*(-)*

4. BIODEGRADATION

1st Order Decay Coeff*	*lambda*	0.0E+0	*(per yr)*
or		*or*	
Solute Half-Life	*t-half*	1000.00	*(year)*
or Instantaneous Reaction Model			
Delta Oxygen*	*DO*	0	*(mg/L)*
Delta Nitrate*	*NO3*	0	*(mg/L)*
Observed Ferrous Iron*	*Fe2+*	0	*(mg/L)*
Delta Sulfate*	*SO4*	0	*(mg/L)*
Observed Methane*	*CH4*	0	*(mg/L)*

5. GENERAL

Modeled Area Length*	230	*(ft)*
Modeled Area Width*	80	*(ft)*
Simulation Time*	100	*(yr)*



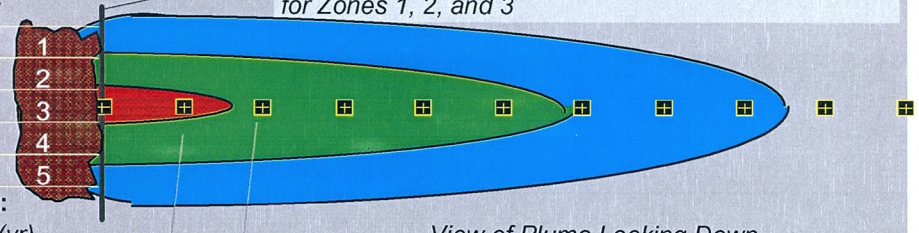
6. SOURCE DATA

Source Thickness in Sat.Zone* 5 *(ft)*

Source Zones:

Width* (ft)	Conc. (mg/L)*
0	0
0	0
80	1
0	0
0	0

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Source Halflife (see Help):

Infinite	Infinite	*(yr)*
Inst. React.	1st Order	

Soluble Mass In Source NAPL, Soil: infinite *(Kg)*

7. FIELD DATA FOR COMPARISON

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

Concentration (mg/L)	1.0										
Dist. from Source (ft)	*0*	*23*	*46*	*69*	*92*	*115*	*138*	*161*	*184*	*207*	*230*

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — **View Output**

RUN ARRAY — **View Output**

Help

Recalculate This Sheet

Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

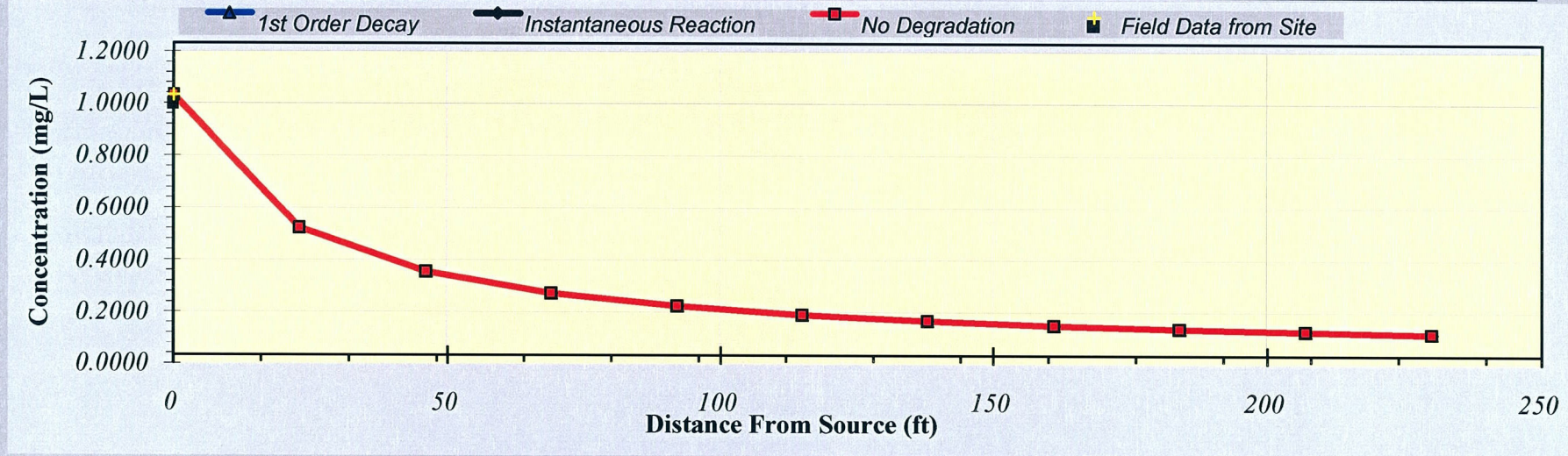
BIOSCREEN Model Output for Well 09-MW02
Site 09, Treasure Island

CONTAMINANT CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

K = 10.12 ft/d

Distance from Source (ft)

TYPE OF MODEL	0	23	46	69	92	115	138	161	184	207	230
No Degradation	1.000	0.491	0.324	0.241	0.192	0.159	0.136	0.119	0.105	0.095	0.086
1st Order Decay	1.000	0.491	0.324	0.241	0.192	0.159	0.136	0.119	0.105	0.095	0.086
Inst. Reaction	1.000	0.491	0.324	0.241	0.192	0.159	0.136	0.119	0.105	0.095	0.086
Field Data from Site	1.000										



Calculate Animation

Time: 100 Years

Return to Input

Recalculate This Sheet

BIOSCREEN Model Input for Well 09-MW02
Site 09, Treasure Island

Contaminant Fate and Transport in Groundwater
(advection and dispersion only; no retardation due to sorption; no degradation)

Site 09, Well 09-MW02
K = 101.2 ft/d
Run Name

Data Input Instructions:

115 — *1. Enter value directly....or*
↑ or — *2. Calculate by filling in grey cells below. (To restore formulas, hit button below).*
0.02

Variable* — *Data used directly in model.*
20 — *Value calculated by model. (Don't enter any data).*

1. HYDROGEOLOGY

Seepage Velocity*	*Vs*	633.2	*(ft/yr)*
or		↑ or	
Hydraulic Conductivity	*K*	3.57E-02	*(cm/sec)*
Hydraulic Gradient	*i*	0.0048	*(ft/ft)*
Porosity	*n*	0.28	*(-)*

2. DISPERSION

Longitudinal Dispersivity*	*alpha x*	23.0	*(ft)*
Transverse Dispersivity*	*alpha y*	7.7	*(ft)*
Vertical Dispersivity*	*alpha z*	1.2	*(ft)*
or		↑ or	
Estimated Plume Length	*Lp*	230	*(ft)*

3. ADSORPTION

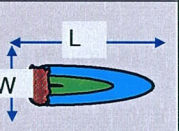
Retardation Factor*	*R*	1.0	*(-)*
or		↑ or	
Soil Bulk Density	*rho*	1.6	*(kg/l)*
Partition Coefficient	*Koc*	0	*(L/kg)*
FractionOrganicCarbon	*foc*	1.0E+0	*(-)*

4. BIODEGRADATION

1st Order Decay Coeff*	*lambda*	0.0E+0	*(per yr)*
or		↑ or	
Solute Half-Life	*t-half*	1000.00	*(year)*
or Instantaneous Reaction Model			
Delta Oxygen*	*DO*	0	*(mg/L)*
Delta Nitrate*	*NO3*	0	*(mg/L)*
Observed Ferrous Iron*	*Fe2+*	0	*(mg/L)*
Delta Sulfate*	*SO4*	0	*(mg/L)*
Observed Methane*	*CH4*	0	*(mg/L)*

5. GENERAL

Modeled Area Length*	230	*(ft)*
Modeled Area Width*	80	*(ft)*
Simulation Time*	100	*(yr)*



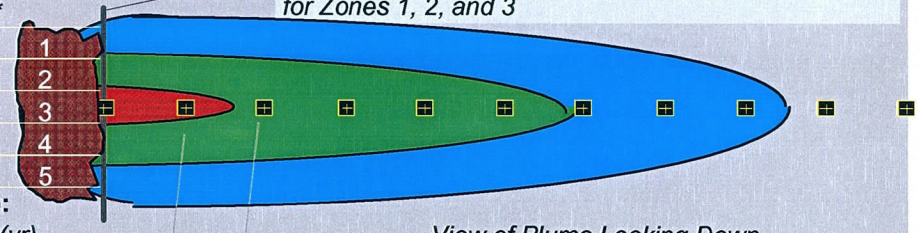
6. SOURCE DATA

Source Thickness in Sat.Zone* 5 *(ft)*

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3

Source Zones:

Width* (ft)	Conc. (mg/L)*
0	0
0	0
80	1
0	0
0	0



View of Plume Looking Down

Source Halflife (see Help):

Infinite	Infinite	*(yr)*
Inst. React.	1st Order	
Soluble Mass	infinite	*(Kg)*
In Source NAPL, Soil		

7. FIELD DATA FOR COMPARISON

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

Dist. from Source (ft)	Concentration (mg/L)
0	1.0
23	
46	
69	
92	
115	
138	
161	
184	
207	
230	

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE — **View Output**

RUN ARRAY — **View Output**

Help

Recalculate This Sheet

Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

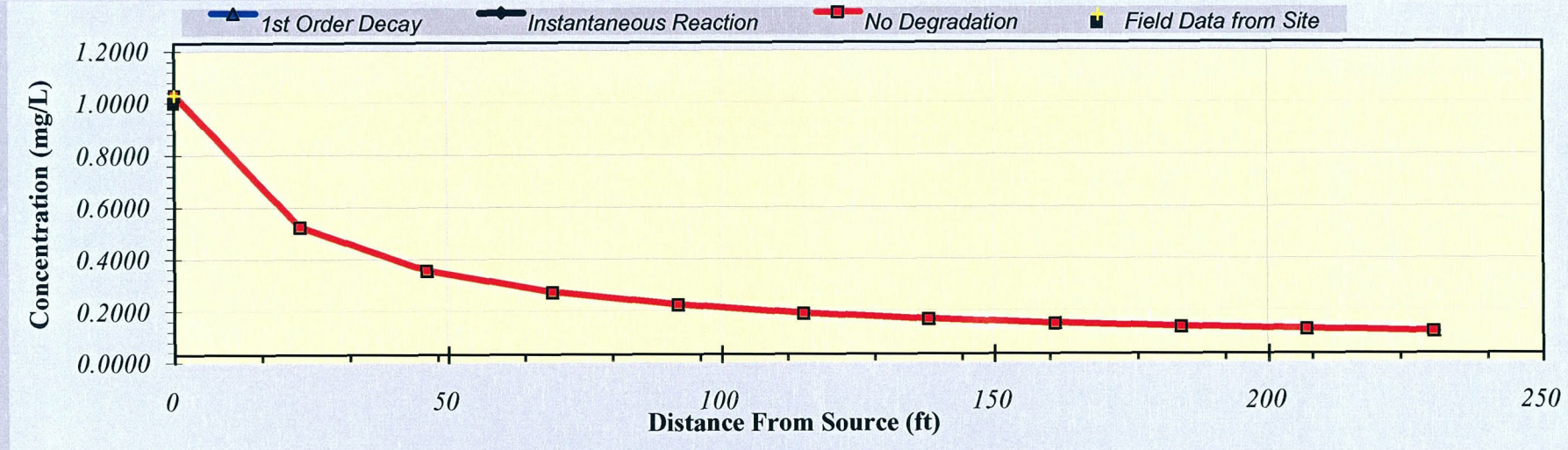
BIOSCREEN Model Output for Well 09-MW02
Site 09, Treasure Island

CONTAMINANT CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

K = 101.2 ft/d

Distance from Source (ft)

TYPE OF MODEL	0	23	46	69	92	115	138	161	184	207	230
No Degradation	1.000	0.491	0.324	0.241	0.192	0.159	0.136	0.119	0.105	0.095	0.086
1st Order Decay	1.000	0.491	0.324	0.241	0.192	0.159	0.136	0.119	0.105	0.095	0.086
Inst. Reaction	1.000	0.491	0.324	0.241	0.192	0.159	0.136	0.119	0.105	0.095	0.086
Field Data from Site	1.000										



Calculate Animation

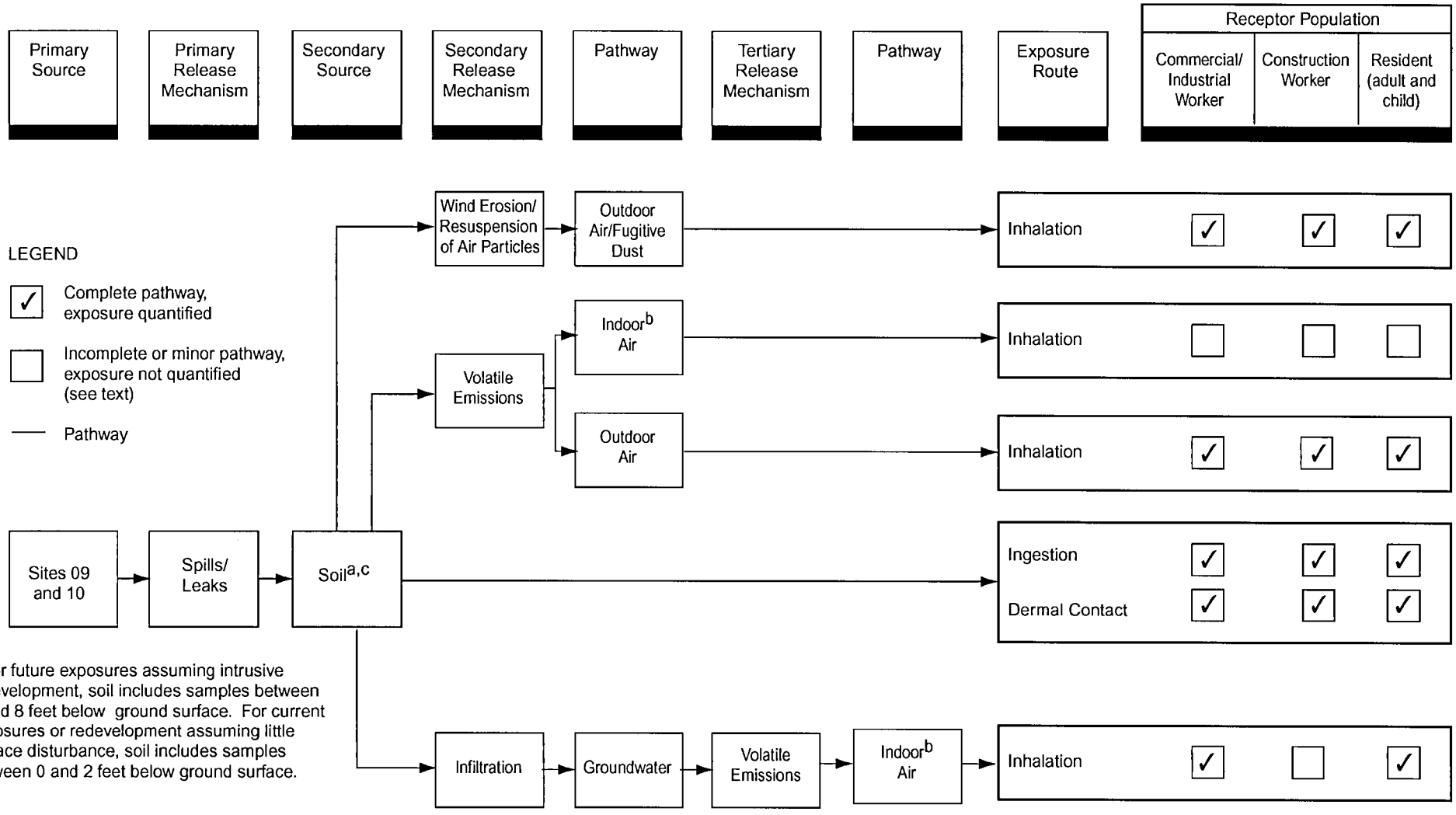
Time: 100 Years

Return to Input

Recalculate This Sheet

ATTACHMENT C

CONCEPTUAL SITE MODEL



[a] For future exposures assuming intrusive redevelopment, soil includes samples between 0 and 8 feet below ground surface. For current exposures or redevelopment assuming little surface disturbance, soil includes samples between 0 and 2 feet below ground surface.

[b] While indoor air pathways are conceptually complete from impacted soil and groundwater, no soil gas data were collected since groundwater concentrations of volatiles were all below risk-based levels protective of inhalation in indoor air. No soil volatiles were detected above preliminary remediation goals and therefore, the soil-based portion of the conceptual indoor air pathway was also an insignificant one that was not quantified.

[c] All receptors were evaluated for soil sampled between 0 and 8 feet below ground surface because these soils were generally more impacted than soil sampled between 0 and 2 feet below ground surface. Soil sampled between 0 and 2 feet below ground surface were evaluated for the commercial/industrial worker because of the potential for exposure to soils in the absence of intrusive redevelopment activities, which are likely to disturb deeper soils.

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CONCEPTUAL SITE MODEL
SITES 09 AND 10

Figure I-3