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Contract Task Order 0024

Response to Comments
**REVISED DRAFT HUMAN HEALTH RISK
ASSESSMENT, INSTALLATION
RESTORATION SITES 09 AND 10**
Naval Station Treasure Island, San Francisco, California

December 15, 2004

Prepared for



DEPARTMENT OF THE NAVY
Base Realignment and Closure
Program Management Office West
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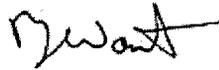
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TABLE OF CONTENTS

RESPONSES TO DTSC COMMENTS ON THE REVISED DRAFT HUMAN HEALTH RISK ASSESSMENT

GENERAL COMMENTS1
SPECIFIC COMMENTS7

RESPONSES TO GEOMATRIX CONSULTANTS, INC. COMMENTS ON THE REVISED DRAFT HUMAN HEALTH RISK ASSESSMENT

GENERAL COMMENTS9
SPECIFIC COMMENTS9

**RESPONSES TO DEPARTMENT OF TOXIC SUBSTANCES CONTROL COMMENTS
ON THE REVISED DRAFT HUMAN HEALTH RISK ASSESSMENT,
INSTALLATION RESTORATION SITES 09 AND 10
NAVAL STATION TREASURE ISLAND, CALIFORNIA**

BACKGROUND

This document presents the U.S. Department of the Navy's (Navy) responses to comments received from David Rist and Brian Davis, Ph.D., Staff Toxicologist, of the Department of Toxic Substances Control (DTSC), on the "Revised Draft Human Health Risk Assessment for Installation Restoration Sites 09 and 10, Naval Station Treasure Island, California," dated September 2004. The Navy received the comments addressed below on November 3, 2004 via fax.

Prior to the submittal of the "Revised Draft Human Health Risk Assessment," the Draft Remedial Investigation Report for Installation Restoration Sites 09 and 10 dated July 2003 was submitted, reviewed, and commented on by DTSC in a memorandum dated November 12, 2003. Representatives of the Navy and its consultants, the City of San Francisco's consultants, and the DTSC took part in a conference call on May 19, 2003, to discuss risk assessment for Sites 09 and 10. On March 8, 2004, a meeting was held at the Regional Water Quality Control Board offices in Oakland, California to discuss resolution of risk assessment issues for Sites 09 and 10. Responses to comments on the Draft Remedial Investigation (RI) report for Sites 09 and 10, which also provided the revised human health risk assessment (HHRA) approach that was agreed upon in the March 8, 2004 meeting, was submitted to the Base Realignment and Closure (BRAC) Cleanup Team (BCT). DTSC provided comments on the May 3, 2004 Final Response to Comments on the Draft Remedial Investigation Report, Installation Restoration Sites 09 and 10 in a memorandum dated June 9, 2004. Based on these meetings and discussions, the Navy revised the HHRA for Sites 09 and 10 and submitted it to the BCT in July 2003.

The comments are organized by general comments and specific comments. Navy response to the comments follows each comment.

GENERAL COMMENTS

1. Comment: SELECTION OF CHEMICALS OF POTENTIAL CONCERN.

- A. Our understanding of the agreement made in the March 8, 2004 BCT meeting and described in the responses to comments is that two risk estimates were to be provided, one risk estimate in which chemicals were eliminated as chemicals of potential concern if the concentrations were less than the corresponding preliminary remediation goals (PRGs) and one risk estimate without such a screen. We have consistently stated that the Department of Toxic Substances Control (DTSC) does not accept the elimination of chemicals of potential concern based on screening criteria. Because of the nature of Sites 9 and 10, and in order to move the process**

forward, we agreed to the inclusion of two sets of risk and hazard estimates. This risk assessment fails to provide these two sets.

Response: The Navy provided two sets of risk and hazard estimates in the revised draft human health risk assessment as agreed to during the March 8, 2004 meeting. The "Total Risk" screen included a ratiometric comparison of exposure point concentrations (EPCs) and PRGs (US EPA Region IX and Cal-modified) to provide an estimate of risks and hazards. The "Total Risk" screen did not include chemicals of potential concern (COPCs) that were greater than the PRGs because those risks were estimated using RAGS A equations (EPA 1989). To provide complete "Total Risk" estimates, the risk associated with the analytes identified as COPCs will be added to the "Total Risk" screening results.

B. Section 7.2 (Results) reports only on the Navy's preferred method. The DTSC method is relegated to Appendix I. Section 7.2.3 (Total Risk Sensitivity Analysis) makes a qualitative statement that the analysis in Section 10.3 of Appendix I shows that the inclusion of all contaminants would not alter the general conclusions about either site.

Response: To facilitate a full understanding of the "Total Risk" results in Section 7.2 of the Remedial Investigation (RI), the estimates of risks and hazards using the "Total Risk" screen will be summarized similar to the Navy's preferred method. The Section will present "Total Risk" results in accordance with the method described in response to General Comment 1A.

C. Section 10.3 of Appendix I is titled "*Total Risk versus Incremental Risk*", but like Section 7.2 the DTSC method is not quantitated. Instead, a qualitative statement is made that the inclusion of all contaminants would not alter the general conclusions about either site.

Response: As indicated in the response to General Comment 1A, the "Total Risk" estimates will be updated by adding the risk associated with analytes identified as COPCs. The "Total Risk" screening results discussion for Sites 9 and 10 in Section 10.3 of Appendix I will be revised accordingly. The following statement from Appendix I and RI main text: "Thus, the findings of this residual (non-COPC) risk assessment screen would not change the conclusions of the HHRA presented in Section 10.1." will be modified to read as follows: "Thus, the results associated with 'Total Risk' would not change the conclusions of the HHRA presented in Section 10.1."

D. Section 7.1.2.1 states that "*In addition, in response to DTSC requests to evaluate the contribution of all detected analytes to total risk without applying the EPA and Navy guidance for COPC selection, a sensitivity analysis was presented in Section 10.3 of Appendix I...As noted in Section 10.3 of Appendix I, the total risk findings from the residential scenario did not affect the overall conclusions of the*

HHRA, including use of the COPC selection process...". This is incorrect. Section 10.3 doesn't present total risks and therefore, any conclusions are questionable.

Response: As indicated in the response to General Comment 1A, the "Total Risk" estimates will be updated by adding in the risk associated with analytes identified as COPCs. This update will hence present the "Total Risk." The document will thereby provide the supporting documentation for the conclusions in question.

E. Section 10.3.1 of Appendix I is titled "Total Risk Based on Site 09 Soil" and Section 10.3.2 of Appendix I is titled "Total Risk Based on Site 10 Soil". However, total risks and hazards do not appear. Instead, the additional risks and hazards are estimated by comparing the excluded contaminants to their respective PRGs and summing the ratios. The reader is left to take this information from Section 10.3 and combine it with the previous information from Section 7.2 to find total risk and hazard estimates.

Response: As indicated in the response to General Comment 1A, the "Total Risk" estimates will be updated by adding in the risk associated with analytes identified as COPCs to the Total Risk screening results. Sections 10.3.1 and 10.3.2 of Appendix I will reflect this revision.

F. The additional risks and hazards are evaluated only for the residential scenario (Sections 10.3.1 and 10.3.2).

Response: "Total Risks" were evaluated for residential and commercial/industrial scenarios. A summary of the "Total Risk" screening results was included for both scenarios in Section 10.3.1 for Site 09 soil and 10.3.2 for Site 10 soil. As indicated in the response to General Comment 1A, these risk estimates will be updated by adding in the risk associated with analytes identified as COPCs to the Total Risk screening results. Sections 10.3.1 and 10.3.2 of Appendix I will be modified accordingly for residential and commercial/industrial worker scenarios.

G. We do not agree with the Section 10.3 interpretation of "incremental risk" and "total risk". The text states that "DTSC has voiced an interest in insuring that not only 'incremental risk' contributed by Superfund releases and former site operations at Treasure Island be characterized, but that 'total risk' (with no risk-based screen, such that all detected analytes above ambient concentrations were included in the risk assessment) be communicated as well." As discussed above, Section 10.3 fails to report total risk. Furthermore, the quoted statement suggests that comparison to PRGs somehow distinguishes between chemicals which are present because of past releases by the Navy and those which must be attributed to other sources. Clearly, this is incorrect. Releases of

contaminants by the Navy may or may not result in concentrations exceeding PRGs.

Response: The text will be modified to read as follows: "DTSC has voiced an interest in insuring that "total risk" (with no risk-based screen, such that all detected analytes above ambient concentrations were included in the risk assessment) be communicated in addition to the incremental risk."

H. The final paragraphs in Sections 10.3.1 and 10.3.2 conclude that "*A total risk evaluation (with no risk-based screen, such that all detected analytes were included in the risk assessment) should have no impact on the risk management decisions based on the conclusions of Section 10.1.*" The purpose of risk assessment is to provide the best estimates of risk and hazard. The purpose of risk management is to consider the results of the risk assessment as part of the decision-making process. It is not appropriate to draw risk management decisions in the risk assessment.

Response: The sentence will be removed from Appendix I and RI main text.

I. Please provide quantitative estimates of total risks and hazards for all receptor categories. Please include these estimates in Section 7.2 as well as in Appendix I. Please provide a table to summarize what was done. We acknowledge and the document should also, that the uncertainty of these estimates is increased because part of the risks and hazards was evaluated by baseline risk assessment methods and part was evaluated by comparison to PRGs.

Response: Quantitative estimates of Total Risks and hazards will be provided as indicated in response to General Comment 1A. Tables 7-1 and 7-2 of the RI will be updated to include the surface soil (0 to 2 feet below ground surface) evaluation for hypothetical future residents and the revised "Total Risk" results. The uncertainty associated with providing risk estimates using the two methods will be addressed in the uncertainty section of the HHRA in Appendix I.

J. Agreement was reached in the March 8, 2004 BCT meeting to provide a dual track risk assessment for Sites 9 and 10. The agreement was specifically for this Remedial Investigation Report for Sites 9 and 10. The difficulties in this approach are illustrated by this comment. As discussed in the March 8, 2004 BCT meeting, future risk assessments should follow DTSC procedures.

Response: Comment noted.

2. Comment: SOIL DEPTH.

The Navy version of the risk assessment evaluates the residential scenario for soils from 0 to 8 feet below ground surface (Sections 7.2.1.2 and 7.2.2.2; Sections 10.1.2

and 10.2.2 of Appendix D). The "*Sensitivity Analysis*" (Sections 10.3.1 and 10.3.2 of Appendix D) evaluates the residential scenario for soils from 0 to 2 feet below ground surface as well as soils from 0 to 8 feet below ground surface. This inconsistency further complicates the consideration of total risks and hazards (General Comment 1).

DTSC requests that deeper soils (0 to 8 feet below ground surface in this case) be considered for residential scenarios because swimming pools are common in California, frequently resulting in deeper soils being brought to the surface of yards. However, both shallow and deeper soils should be evaluated for residential scenarios, so that surface soil contamination is not ignored if it is higher than deeper soil contamination.

Response: Risk and hazard estimates were not provided for residential exposure to surface soil (0 to 2 feet below ground surface) because no current residential exposure exists. The hypothetical future residential exposure scenario was evaluated assuming exposure to deeper soil (0 to 8 feet below ground surface). To facilitate a full understanding of risks and hazards, the residential exposure scenario will include an evaluation of surface soil (0 to 2 feet below ground surface) using RAGS A equations (EPA 1989). The "Total Risk" screen already provides an evaluation of surface soil (0 to 2 feet below ground surface) for residential and commercial/industrial exposure.

3. **Comment: ARSENIC**

A. As illustrated in Figure I3-3, the distributions of arsenic include outliers for both Site 9 and Site 10. The two outliers for Site 10 are of less concern because they fall within the range of ambient concentrations and are lower concentrations than the Site 9 outliers. The three Site 9 outliers all fall outside range of ambient concentrations and may be of concern.

Response: The discussion of arsenic at Site 09 will be revised to indicate that the on-site distribution of arsenic is not significantly greater than background, but may contain potential outliers.

The arsenic concentrations between 15.4 to 17.7 milligrams per kilogram (mg/kg) are well within the range of naturally occurring arsenic in the United States (1 to 100 mg/kg; Shacklette and Boerngen 1984). These higher concentrations (i.e., potential outliers) and lower concentrations are likely a manifestation of two different soil types from different geologic deposits (i.e., native soils and fill/dredged material). There are general correlations between arsenic, chromium, molybdenum, selenium, and vanadium, which are oxyanion-forming metals that tend to behave similarly under certain environmental conditions. This correlation further supports

that the arsenic concentrations are naturally occurring, although the concentrations are still considered potential outliers for Site 09 soils.

Shacklette, H.T. and Boerngen, J.G. 1984. Element concentrations in soils and other surficial materials of the conterminous United States. USGS Professional Paper 1270.

- B. The distributions of arsenic at Sites 9 and 10 were discussed at length in the March 8, 2004 BCT meeting. It was agreed to accept the statistical conclusion that the site distributions of arsenic are not different from the ambient distribution, with the caveat that the three Site 9 outliers required attention.**

Response: As stated in response to General Comment 3A, the discussion of arsenic at Site 09 will be revised to indicate that although the distribution of arsenic is not significantly greater than background, it may contain potential outliers. However, although still considered potential outliers, geochemical correlations indicate that these arsenic concentrations are naturally occurring.

- C. During the March 8, 2004 BCT meeting, we pointed out that nonparametric tests, such as the Wilcoxon Rank Sum Test and the Gehan-Wilcoxon Test are insensitive to the magnitude of values in the tails of the distribution. The distribution of arsenic at Site 9 provides an excellent illustration of this insensitivity. The three outliers have concentrations of 15.4 mg/kg, 16.9 mg/kg, and 17.7 mg/kg. Their ranking is 1, 2, and 3 in the pooled ambient and site population. This ranking and the outcome of the statistical test would be the same if the concentrations were 154 mg/kg, 169 mg/kg, and 177 mg/kg or even if the concentrations were 154,000 mg/kg, 169,000 mg/kg, and 177,000 mg/kg. The results of any statistical test must be evaluated critically. In this case, the fact that the statistical test ignores the magnitude of the highest concentrations must be taken into account.**

Response: As stated in response to General Comment 3A, the discussion of arsenic at Site 09 will be revised to indicate that although the distribution of arsenic is not significantly greater than background, it may contain potential outliers. The uncertainty associated with using tests that do not account for the magnitude of the values in the tails of distribution will be addressed in the uncertainty section (Section 11) of the HHRA in Appendix I.

- D. We do not agree with the conclusions stated in the document (page I3-7) that “*The three outlier concentrations of arsenic (15.4, 16.9, and 17.7 mg/kg) are considered part of the natural variability of a data set...*” and that “*These three arsenic locations are not considered to be significant outliers that warrant a hot spot evaluation but were considered part of the natural variation of the data set.*” As we pointed out in our review of the responses to comments (DTSC, 2004), it is unlikely that these three concentrations are natural variation in a Site 9 population with a median of 2.9**

mg/kg, a 90th percentile of 7.3 mg/kg, and a next highest concentration of about 9 mg/kg.

Response: The discussion of arsenic at Site 09 will be revised to indicate that although the on-site distribution of arsenic is not significantly greater than background, it may contain potential outliers. The text will also indicate that that the three potential outlier concentrations of arsenic (15.4, 16.9, and 17.7 mg/kg) are likely a manifestation of two different soil types from different geologic deposits (i.e., native soils and fill/dredged material).

E. The text in Table I3-1 states that *“Because long-term exposure is represented by an average concentration over time and is not based on exposure to the values in the extreme upper tail of a dataset, the overall distribution of the data should be given more weight. Based on this weight-of-evidence evaluation, arsenic is not considered significantly greater than ambient for Site 9.”* Exposure in the residential scenario may not be well represented by using concentrations averaged over a site. Residents get their exposure primarily in their own yards. Children may get their exposure primarily in some portion of the yard. Because of this, DTSC (1992) recommends using residential lot-sized areas to determine exposure point concentrations. However, we recognize that Site 9 is only 11,000 square feet (Section 2.1) and Site 10 is only 32,000 square feet (Section 2.2).

Response: Comment noted. The following sentence will be removed from Table I3-1: “Because long-term exposure is represented by an average concentration over time and is not based on exposure to the values in the extreme upper tail of a dataset, the overall distribution of the data should be given more weight.”

F. Please add a discussion of the three outliers to Section 7.1.2.1 and to Sections 6.1 and 6.1.3 of Appendix I and to Table I-10 of Appendix I. This discussion should provide sufficient information to allow the risk managers and other readers to be aware of the issue and to make an informed decision regarding the significance of the outliers.

Response: The discussion of arsenic at Site 09 will be revised to indicate that the distribution of arsenic, although not significantly greater than background, may contain potential outliers. As indicated in response to comment 3A, the text will also provide information regarding the significance of the geologic conditions and associated arsenic results.

SPECIFIC COMMENT

1. Comment: Section 10.2.1 of Appendix I, paragraph 1. The reference should be to Section 10.2.2, rather than Section 10.1.2.

Response: The reference to Section 10.2.1 will be changed to reference Section 10.2.2.

2. **Conclusions** **The human health risk assessment must provide a balanced presentation of total risks and hazards at Sites 9 and 10, as required by DTSC for all hazardous waste sites in California. Evaluation of residential scenarios should consider exposure to those soil depths with the highest concentrations of contaminants. The three outliers in the distribution of arsenic at Site 9 must be acknowledged as such in the risk assessment.**

Response: Comments noted. See previous response to comments.

**RESPONSES TO GEOMATRIX CONSULTANTS, INC. COMMENTS ON THE
REVISED DRAFT HUMAN HEALTH RISK ASSESSMENT, IR SITES 09 AND 10
NAVAL STATION TREASURE ISLAND, CALIFORNIA**

This document presents the Navy's responses to comments received from Geomatrix Consultants, Inc. on the "Revised Draft Human Health Risk Assessment for Sites 09 and 10, NAVSTA Treasure Island, California." The Navy received the comments from Gary Foote of Geomatrix, on October 18, 2004 via email.

GENERAL COMMENT

1. Comment: It is my understanding that dioxins were recently detected in soil samples collected at Site 10. The results of these samples should be considered in the HHRA prior to completion of the final document.

Response: Recent discussions at the BCT meetings indicate that the dioxin issue at Site 10 will be handled as part of a removal action. The removal action will be documented as part of the Record of Decision (ROD) and not addressed in the RI. The Navy and DTSC are currently discussing the appropriate approach to complete the removal of dioxins in soils at Site 10.

SPECIFIC COMMENTS

1. Comment: Executive Summary, p. ES-3 and ES-4 – There is no mention of the "Total Risk" vs. "Incremental Risk" analysis in the Executive Summary (or in what will be Section 7.0 of the RI report). At a minimum, a summary of the discussion of this analysis, which is presented in Appendix I, should be included in the Executive Summary (and Section 7.0).

Response: The "total risk" vs. "incremental risk" discussion will be added to the following sections of the RI: Executive Summary, Section 7.0, and Results and Conclusions.

2. Comment: Section 7.1.1.2, p. 7-2 – The use of the word "snapshot" in the second bullet regarding Site 10 groundwater data does not make sense. A similar sentence appears in Appendix I (see p. I-12); however, the word "sufficient" is used in place of "snapshot," which does make sense within the context of the paragraph.

Response: The sentence "*As detailed in Section 5.3.2 of Appendix I, the 2002 data from the two newer wells (10-MW02 and 10-MW03) provide a "snapshot" of likely conditions in the aquifer underlying Site 10.*" will be replaced by "*As detailed in Section 5.3.2 of Appendix I, the 2002 data*

from the two newer wells (10-MW02 and 10-MW03) are considered sufficient to characterize likely conditions in the aquifer underlying Site 10.”

3. **Comment:** **Section 7.1.2.2, p. 7-3** – This section is confusing because, on the one hand, it states that only volatile chemicals are screened, but in the very next sentence, it states that all data, including data for non-volatile chemicals, were screened. After reviewing Appendix I, it appears that tap water preliminary remediation goals (PRGs) were used to “screen” non-volatile chemicals (see p. I-18). These sections need to be made consistent as to which chemicals were evaluated in the process of identifying chemicals of potential concern in groundwater.

Response: The following sentence will be removed from Section 7.1.2.2 to make the RI text consistent with the HHRA text in Appendix I: “For this reason, only VOCs were evaluated as potential COPCs in groundwater.”

4. **Comment:** **Section 7.1.3, p. 7-4 and Figure 7-1** – There is still no acknowledgement that ingestion of homegrown produce is a potentially complete pathway under a residential scenario. While I do not necessarily disagree with the Navy’s decision not to evaluate this pathway quantitatively, the potential for this pathway to be complete should be addressed qualitatively in the final report. This comment also applies to Appendix I.

Response: The ingestion of homegrown produce was addressed in the Navy’s response to DTSCs comment number 4 in the May 3, 2004 response to comments. As noted in the response to comments, the ingestion of produce pathway was addressed in the uncertainty section (Section 11.2.2) of the HHRA in Appendix I. A brief summary of the uncertainty associated with this pathway will be placed in HHRA uncertainty summary (Section 7.1.6) of the RI.

5. **Comment:** **Section 7.2.3, p. 7-11** – The results of the “total risk evaluation” should be provided in this section rather than simply stating that there would not be a significant change to the HHRA conclusions. This comment also applies to Appendix I.

Response: Estimates of “Total Risks” will be provided and summarized in Section 7.2.3 and Appendix I. See response to DTSC General Comment 1A.

6. **Comment:** **Section I-5.2.1, p. I-8** – The first sentence in this paragraph states that the initial sampling results from boring 09-SB03 were “deleted before the soil statistics were calculated.” However, later in this section, there is a long discussion as to how those results were used

and how they affected the statistics. Further, at the very end of this section, it states that lead was evaluated separately from other chemicals yet later sections state that lead was not a chemical of potential concern in soil (see Section 6-3). Such discrepancies in the report need to be resolved prior to completion of the final HHRA.

Response: The word “deleted” will be replaced with “averaged” in the following sentence: “At Site 09, sample boring 09-SB03 results were *deleted* before the soil statistics were calculated for the HHRA because sample boring 09-SB05 was later drilled in the exact same location to verify results.” The following sentence will be removed from Section I-5.2.1: “Because lead is a unique contaminant with regard to its toxicity (Tetra Tech 2003), it was evaluated separately, as discussed in Section 8.5, with lead risks characterized in Section 10.4.”

7. **Comment:** Section I-6.1, p. I-14 – There is no mention of hexavalent chromium in this section as agreed to by the Navy during the March 8, 2004 meeting on the HHRA for Sites 9 and 10.

Response: As identified in the Navy’s response to DTSCs comment number 5 in the May 3, 2004 response to comments, hexavalent chromium has been added to Section 8.4 of the revised draft HHRA, Appendix I. In addition, a new table, Table I-3, that provides the results of hexavalent and total chromium sampling results, has been provided in Appendix I.

8. **Comment:** Section I-6.2.1, p. I-17 – The second paragraph states that the California Regional Water Quality Control Board (CRWQCB) screening values for inhalation of chemical vapors in indoor air have not been updated recently (based on a 2001 citation); however, the CRWQCB issued revised values in 2003, which were updated further in 2004.

Response: The statement was correct at the time when the first draft of this report was issued in June 2003. The sentence will be updated (strikethrough text denotes deleted text) as follows: Although risk-based screening levels (RBSL) developed by the CRWQCB are available to account for the inhalation of chemical vapors while indoors (CRWQCB 2004), these values ~~have not been updated recently. The values presently lack (1) updated building default values recommended by federal EPA guidance (EPA 2002c) and (2) updated toxicity values recommended by DTSC and EPA Region IX, including updated toxicity factors developed in 2002 and 2003.~~

9. **Comment:** Attachment II – There are many blank tables in this attachment (see Tables I2-10.1.1 through the end of the attachment). These tables should be removed if truly not necessary or the appropriate data should be provided.

Response: RAGS D Table 10s are an important part of the RAGS D series tables and provide a summary of the “risk drivers” (i.e., those analytes with a carcinogenic risk greater than 1E-06 or a noncarcinogenic hazard greater than one). “Blank tables” are necessary because they inform the reviewer that there are no “risk drivers” for the particular exposure scenario in question. No changes will be made to the RAGS D Table 10s.