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TREASURE ISLAND
SSIC NO. 5090.3.A

# Department of Toxic Substances Control

Alan C. Lloyd, Ph.D.
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700 Heinz Avenue, Suite 200
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Arnold Schwarzenegger
Governor

November 4, 2005

Ms. La Rae Landers
Lead Remedial Project Manager
Southwest Division, Naval Facilities Engineering Command
BRAC Operations Office
1455 Frazee Road
San Diego, California 92108

DRAFT REMEDIAL INVESTIGATION REPORT, INSTALLATION RESTORATION SITE 31, FORMER SOUTH STORAGE YARD, NAVAL STATION TREASURE ISLAND (NSTI), SAN FRANCISCO, CALIFORNIA.

Dear Ms. Landers:

The Department of Toxic Substances Control (DTSC) staff completed its review of the Draft Remedial Investigation (RI) Report for Installation Restoration Site 31 (Former South Storage Yard), dated August 2005. The stated purpose of the RI is to 1) collect data to characterize site conditions, 2) determine the nature and extent of contamination, and 3) assess risk to human health and the environment for Site 31 in partial fulfillment of the ongoing activities and responsibilities required under the Navy's Installation Restoration Program. Please find enclosed a comment memorandum from Dr. Brian Davis, a staff toxicologist with DTSC's Human and Ecological Risk Division, dated November 3, 2005.

General Comments

1. In Section 1.3.6, Additional Sampling and Debris Characterization, the Navy discusses past investigation results and the four separate debris areas (A through D) that have been identified at Site 31. However, the area beneath 11th street was not designated a separate area consistent with the others at the site and without any explanation. By not designating the area beneath 11th street a separate debris cell, the reader tends to focus only on Areas A through D which creates the impression that most of the contamination at Site 31 does not extend beyond the school yard and that the contamination beneath 11th street is of less concern. To address this issue, DTSC believes that the area beneath 11th street needs to be identified as a separate debris cell and discussed throughout the document in a manner that conveys to the reader the nature and extent of contamination in this area. Also, given that utility construction or maintenance is

likely to occur within 11th street, and independently of the rest of the areas at Site 31, the risk associated with the contamination in 11th street needs to be evaluated separately in order to allow the risk managers to determine the need for remedial actions in this area.

2. When discussing the fate and transport of contaminants at Site 31, the Navy states that *"To focus contaminant fate and transport discussions on those contaminants considered most likely to affect the outcome of this RI, the fate and transport evaluation is limited to contaminants identified as exceeding comparison criteria at two or more sampling locations. Contaminants exceeding comparison criteria at two or more locations are evaluated because of their greater lateral extent and volume, which represent a greater potential for significant impact to human and ecological receptors. Contaminants exceeding comparison criteria in only one location were not included in the fate and transport evaluation because of their limited lateral extent. These contaminants were frequently not detected at surrounding locations, indicating that they have limited lateral extent."*

   DTSC questions the appropriateness of only evaluating contaminants that exceeded the screening criteria two times, especially when dealing with the heterogeneous nature of debris and the fact that samples were collected on approximately twenty-five-foot centers. Please provide the Navy's technical basis for only evaluating contaminants exceeding criteria at two or more locations.

3. DTSC recently reviewed and commented on the Draft Historical Radiological Assessment (HRA) for Naval Station Treasure Island, dated August 22, 2005, and noted that radiation monitoring during soil excavation of the known solid waste disposal areas in Site 12 was recommended. As a result, we questioned the need to "survey" other sites at NSTI where debris is known to exist. Until justification is provided for not surveying other sites where debris is known to exist, DTSC will be unable to concur that the characterization of Site 31 is complete.

If you have any questions regarding this letter, please contact me at (510) 540-3763.

Sincerely,

David Rist

David Rist
Hazardous Substances Scientist
Office of Military Facilities

Enclosure

cc: See next page.

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# Department of Toxic Substances Control

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**TO:** David Rist
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**FROM:** Brian Davis, Ph.D., Staff Toxicologist
Human and Ecological Risk Division

**DATE:** November 3, 2005

**SUBJECT:** Remedial Investigation, Site 31, Former South Storage Yard
PCA: 18040 Site: 201210

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## BACKGROUND

**Document Reviewed:** Draft Remedial Investigation Report, Installation Restoration Site 31, Former South Storage Yard. Naval Station Treasure Island; San Francisco, California. Prepared for the Base Realignment and Closure, Program Management Office West, U.S. Navy. Prepared by SulTech (Sullivan Consulting Group and Tetra Tech EM Inc. San Diego, California. Dated August, 2005.

**Nature of the Facility and Site 30 (based on this and other Navy documents):** Naval Station, Treasure Island is a closed base located in San Francisco Bay. The facility includes Yerba Buena Island, a natural island of about 147 acres, and Treasure Island, constructed of materials dredged from San Francisco Bay, and encompassing about 403 acres. The U.S. Coast Guard owns 30 acres on Yerba Buena Island. Military activities at Naval Station, Treasure Island date from 1866. Naval Station, Treasure Island was designated for closure in 1993 and closed on September 30, 1997.

The northern portion of Parcel T095 was developed as an elementary school during the late 1960s. During the early 1970s, the southern portion of Parcel T095 was used as a storage yard, called the South Storage Yard. It is not known what was done at the South Storage Yard. Installation Restoration Site 31 consists of The South Storage Yard, the adjacent portion of 11$^{th}$ Street, the adjacent portion of Avenue E, and a portion of a lot across Avenue E (Figure 1-3). Site 31 consists of the southern half of Parcel T095 and the northern-most portion of Parcel T094. The day care center (Site 30) is in Parcel T094, across 11$^{th}$ Street to the south of Site 31. Site 31 is 87,950 square feet or about 2.0 acres.

Site 31 was paved and developed as an elementary schoolyard in the late 1970s. The school and associated schoolyard were leased to the San Francisco Unified School District under a Finding of Suitability to Lease (FOSL) in 1996. The school has a capacity of 1000 students from kindergarten through eighth grade.

In April, 2002, evidence was found of an "*old trash dump*" underlying 11th Street between Avenues D and E. A subsequent investigation revealed contamination with lead, polychlorinated biphenyls (PCBs), dioxins/furans, and 4,4-dichlorodiphenyltrichloroethane (DDT), as well as debris. The debris included glass, porcelain, burnt lumber, and metal (utensils, iron and copper pieces, metal plating, nails, bars, and wire). These results led to a time-critical removal action (TCRA) for contaminated soil in July, 2002. Soil was removed on both sides of 11th Street but not under the street or the associated sidewalks. Other contaminants, including dioxins and furans, were later found in a 2003 investigation.

**Scope of Review:** The document was reviewed for scientific content related to risk assessment issues. Our review was directed toward human health risk assessment. We have not commented on minor grammatical or typographical errors that do not affect the interpretation. We assume that regional personnel have evaluated the sampling of environmental media, analytical chemistry data, and quality assurance procedures. Any future changes or additions to the document should be clearly identified.

## GENERAL COMMENTS

1. SITES 31 AND 30.

   A. Site 31 and Site 30 are interrelated in several respects. They are geographically related (Figure 1-3). Part of Parcel T094 is split into a small portion in Site 31 and the majority in Site 30. The sources of contamination are debris areas in both Site 31 and Site 30. The Remedial Investigation for Site 30 is in SulTech (2005). See also General Comment 18.

   B. Soil samples and ground water temporary microwells in the area were divided between Site 31 and Site 30 (Sections I.6.1 and I.6.2 in Appendix I). For example, microwells 30/31MW01, 30/31MW02, 30/31MW03, 30/31MW04, 30/31MW05, and 30/31MW07 were applied to Site 31, but not Site 30, while microwells 30/31MW06 and 30/31MW08 were applied to Site 30 but not to Site 31.

   C. The time-critical removal action of debris and related contaminants involved portions of Site 30 as well as Site 31 (Figure 1-4).

   D. This comment is not intended to suggest that Sites 31 and 30 should be redefined. Rather, the intention is to draw attention to the relationship between the sites, which should be taken into account. In particular, consideration should be given to what impact the inclusion of other soil sample locations or microwells might have had on

exposure point concentrations and subsequent risk and hazard estimates for Site 31 and for Site 30. See also General Comment 16.

2. DEBRIS AREAS.

   A. The report identifies four contaminated areas, Debris Area A, Debris Area B, Debris Area C and Debris Area D (Figures 1-4 and Figures 4-1 through 4-11). These figures suggest that Debris Area A and Debris Area B are independent. Prior to the removal action these two areas were part of a larger area which extended between them and also extended under 11th Street and into Site 30. It appears from the figures in Section 4 that the separation of Debris Area A and Debris Area B and the shape of the two areas under the paved portion of Site 31 is based on limited information. Please provide the justification for the separation and the shapes.

   B. The drawings in Figures 1-4 and Figures 4-1 through 4-11 also imply that there is no debris under 11th Street. This is unlikely. The discussion should explicitly state what is known about debris and chemical contamination under 11th Street.

   C. These figures do show Debris Area D as continuing under 11th Street and a small portion of Avenue E. It appears from the figures in Section 4 that there is limited information about Debris Area D. The discussion should provide the basis for the Debris Area D drawing.

   D. The figures imply that there is no debris under Avenue E with the exception of the small part of Debris Area D. Unless there are adequate data to support this, consideration should be given to additional sampling under Avenue E.

   E. Based on the limited sampling in and around Debris Area D, it seems possible that Debris Areas A, B, and D are in fact one large contiguous debris area. If there is evidence to refute this, it should be included in the report.

   F. It appears from the figures in Section 4 that there is limited information about Debris Area C. The discussion should provide the basis for the Debris Area C drawing under the paved school yard.

   G. Debris and chemical contamination extend under 11th Street from Avenue D to some distance beyond Avenue E. Debris and chemical contamination also extend under some portion of Avenue E. The risk assessment should evaluate the potential for harm to workers doing intrusive activities under current Site 31 conditions.

3. CONTAMINANT FATE AND TRANSPORT. The document provides an analysis of fate and transport for a subset of contaminants at Site 31 (Section 5.0). A somewhat arbitrary standard is used to generate this subset of contaminants (Section 5.2.1). This standard is that "*...the fate and transport evaluation is limited to contaminants identified as exceeding comparison criteria at two or more sampling locations.*"

This criterion differs from the new criterion for selection of chemicals of potential concern discussed in General Comment 9. One criterion for the selection of chemicals of potential concern is to consider chemicals for exclusion if they were detected in only one sample. Furthermore, this criterion for chemicals of potential concern considers additional factors, such as frequency of detection, toxicity, and source. The standard for analysis of fate and transport excludes chemicals on the basis of comparison to screening criteria. No supplementary considerations were applied to the selection of contaminants for fate and transport evaluation. Frequency of detection is not a consideration, though the text (Section 5.2.1) does state that "*These contaminants were frequently not detected at surrounding locations, indicating that they have limited lateral extent.*"

Because this reduction of the number of contaminants does not affect the selection of chemicals of potential concern and does not directly impact the risk assessment, it may be acceptable. The primary purpose of the discussion of contaminant fate and transport is informational. However, the rationale behind this selection process should be presented.

4. SOIL DATA – TIME-CRITICAL REMOVAL ACTION.

   A. Since a removal action was done in 2002, current conditions are not represented by any samples taken in soil which was removed. A baseline risk assessment should be based only samples from soil that is still remaining. The text in Sections 4.0, 6.1.1.1, and I.6.1 in Appendix I discuss this issue and explicitly state what was done.

   B. Following the removal action, 73 sidewall confirmation samples and 18 floor confirmation samples were taken in the excavated area (Section I.6.1 of Appendix I). If all of the sidewall samples were included in the soil data, they would comprise 23% of the total sample number (73/312). If the 18 floor samples were also included, the confirmation samples would comprise 29% of the total sample number (73/312). The text in Sections 4.0, 6.1.1.1, and I.6.1 in Appendix I discuss this issue and explicitly state what was done. The impact of the confirmation samples on the exposure point concentrations should also be discussed.

5. SOIL DATA FOR RISK ASSESSMENT.

   A. The report considers surface soil to be zero to two feet below ground surface and subsurface soil to be zero feet to ground water (summarized in Section I.7.1.3 of Appendix I). Although zero to two feet goes beyond what is reasonably surface, we accept the definition for this risk assessment.

   B. The soil sample depths shown in Figures 4-1 through 4-9 are ambiguous. While some depths are reported as a range (e.g., SSYHP002 is reported as 2.0-4.0), many are reported as no range (e.g., T094-024 is reported as 1.2-1.2). Is this

intended to suggest that the soil sample was taken at precisely one and two tenths feet with no vertical range?

C. Since surface soil is defined as zero to two feet below ground surface (Part A above) and since many sample depths are reported with no vertical range (Part B above), it is a question whether soil samples reported as taken at 2.0-2.0 feet (e.g. T094-024) belong in the surface soil group. Apparently, these samples were excluded from the surface soil data (General Comment 13).

D. The report evaluates surface soil in unpaved areas outside the fence, surface soil inside the fence, site- wide surface soil, site-wide combined surface and subsurface, and site-wide combined surface and subsurface for vapor intrusion into indoor air (summarized in Section I.7.1.3 of Appendix I). We concur with this approach.

E. The Southeast Quadrant including Debris Area D was evaluated separately (Attachment I6 to Appendix I. The report must clearly state whether the Debris Area D sample data were also included in the main Site 31 risk assessment (General Comment 18).

6. GROUND WATER DATA FOR RISK ASSESSMENT. Ground water data for Site 31 are limited to a single sampling event in May, 2004 from six temporary microwells (Section I.6.2 of Appendix I). The uncertainty discussion does acknowledge that "*...a relatively small number of groundwater samples were collected from Site 31...*" (Section I.12.1.1 of Appendix I). Please add a discussion of the limitations of microwells contrasted to monitoring wells and a discussion of the limitations of a single round of sampling.

7. CONCEPTUAL SITE MODEL.

A. The Conceptual Site Model is discussed in Section 1.5 and illustrated in Figure I-2 of Appendix I. The figure must be improved to clearly indicate which exposure pathways are included in the exposure assessment for each receptor.

B. The importance of an unambiguous illustration of the Conceptual Site Model (Figure I-2 of Appendix I) is illustrated by the ambiguities in the table in Section I.11.2 of Appendix I. The first row is "*Construction Worker – Exposure to Soil (0 foot bgs-groundwater), Groundwater, and Vapors*[1]". The third row is "*Resident – Exposure to Soil (0 foot bgs-groundwater), and Vapors*[1]". Footnote "*1*" explains "*From groundwater and site-wide combined surface and subsurface soil (0 foot bgs to groundwater)*". The reader might therefore assume that the only difference is that construction workers are assumed to encounter ground water, while residents do not, and that exposure to soil and to vapors is the same. The reader would be wrong. Both receptor categories are assumed to be exposed to contaminants bound to particles and volatile contaminants in outdoor air. The resident is evaluated for exposure to volatile contaminants from both ground water and soil in

indoor air. The construction worker is evaluated for exposure to volatile contaminants from ground water in a trench (Table I-10.16).

C. The construction worker scenario should include exposure to volatile contaminants from soil in a trench.

8. RISK ASSESSMENT METHODS. The two different risk assessment approaches used in this report have been discussed at length in meetings and through document reviews. We have accepted these approaches. However, we have pointed out that screening chemicals with generic risk-based numbers in Method 1 can result in apparent inconsistencies between the two methods.

9. CHEMICALS OF POTENTIAL CONCERN. .

A. A new criterion for the selection of chemicals of potential concern (COPC) has been added to Method 1 (Section I.7.0 and Figure I-1 in Appendix I). This criterion was not included in previous risk assessments (e.g., SulTech, 2005). The criterion is "*Chemicals that were detected in only one sample were considered for exclusion as COPCs.*" The text describes further factors to be considered before the chemical is excluded. We accept the use of this criterion, accompanied by the additional factors.

B. Consistent with U.S. EPA Risk Assessment Guidance for Superfund, DTSC does accept the criterion of frequency of detection in the selection of chemicals of potential concern. The criterion applied in this risk assessment is similar since it couples the requirement of a single detection with the number of samples taken. DTSC does ask that other considerations be made before eliminating any contaminant as a chemical of potential concern. These considerations are toxicity, potential for bioaccumulation, records of historical use, magnitude of the concentrations, persistence in the environment, spatial distribution, and known sources of contamination.

C. Only one chemical (bis{2-chloroethyl}ether) was eliminated from soil on this basis during the selection of chemicals of potential concern for ingestion and dermal contact (Table I-2.3 and I-2.4 of Appendix I). The supporting factors were provided in a footnote for each table. Bis{2-chloroethyl}ether had a very low frequency of detection (once among 147 soil samples). On the other hand, it is quite toxic. Hence, a strong case needs to be made among the other factors.

D. During the selection of COPCs for inhalation, seven volatile organic compounds were eliminated from soil on the basis of a single detection (Table I-2.5 of Appendix I). The supporting factors need to be added to that table.

10. EVALUATION OF SCHOOL RECEPTORS.

A. The report has evaluated potential risks and hazards for school children and school staff (Section I.11.0 in Appendix I). The exposure assessment (Section I.8.2 in Appendix I) followed guidance for school sites from the California Office of Environmental Health Hazard Assessment (OEHHA, 2003). This guidance is draft and has not yet been fully adopted by the Human and Ecological Risk Division (HERD) of DTSC. For consistency at military sites, the Federal Facilities unit of HERD continues to follow U.S. EPA Risk Assessment Guidance for Superfund exposure assessment methods, with exposure factors appropriate for school children or school staff.

B. We note that the OEHHA guidance was also applied to the day care center at Site 30 (SulTech, 2005). We do not recommend revision of the exposure assessment for schools in either report. We do request that the Navy consult HERD in future regarding the appropriate risk assessment methods for schools.

C. Exposure assessment based on the OEHHA guidance is not expected to differ greatly from that based on alternative methods. We performed an audit to confirm that exposure estimates and risk and hazard estimates are consistent with those derived by other methods.

11. EXPOSURE PARAMETERS.

A. The exposure assessment states that children attending kindergarten through eighth grade are "*between the ages of 6 and 14*" (Section I.8.1.1 of Appendix I) and that they are "*children older than five years of age*" (Section I.8.4.1.1 of Appendix I). Children in fact begin kindergarten at the age of five years. Since some children will be 14 years old while they are in eighth grade, the actual age span of children at the Site 31 elementary school is five through 14. The inclusion of five year old children will impact exposure parameters, such as body weight and soil ingestion rate. Please make the appropriate corrections in the Part D tables and the exposure assessments.

B. The number of days spent in school is given as 180 for children (Exposure Frequency in Table I-4.1 of Appendix I). If this is a site-specific number, it should be identified as such. If it is an assumption, it should be replaced with a site-specific number.

12. SUBCHRONIC TOXICITY CRITERIA. The text discusses subchronic exposure and subchronic toxicity criteria, but states that only chronic toxicity criteria were applied in this risk assessment (Section I.9.1 of Appendix I). Therefore, our comment is informational and doesn't require a response. U.S. EPA headquarters has withdrawn all subchronic reference doses and reference concentrations from the Integrated Risk Information System (IRIS) because of inconsistencies in their derivation. Currently,

neither U.S. EPA Region 9 nor the Department of Toxic Substances Control DTSC subscribes to the use of subchronic toxicity criteria.

13. LEAD.

A. Lead is an important issue because of the day care center at Site 30 and the elementary school at Site 31. Children are of particular concern because of the detrimental effects on the developing nervous system. Although blood lead concentrations less than 10 ug/dL have been treated as not of regulatory interest, there is mounting evidence that this level may not be sufficiently protective of children.

B. The data used to evaluate lead are ambiguous. The report (Section I.11.6 of Appendix I) states that ten of the 115 samples collected in shallow soils had concentrations exceeding 400 mg/kg. Figure 4-6 shows ten such samples, but it also shows six additional samples with concentrations exceeding 400 mg/kg and soil depths of "*2.0-2.0*" feet below ground surface. Apparently, these samples were excluded from the 0 to 2 feet shallow soil category. This seems arbitrary (General Comment 5).

C. This risk assessment used the DTSC LeadSpread model to evaluate the potential for harm to school children and to future potential residents (adults and children). Site-specific data were used for the concentrations of lead in drinking water and in air (Section I.11.6). Justification is needed for the choice of data from the San Francisco Arkansas Street air quality monitoring station. Treasure Island is not located on the San Francisco peninsula and might have different concentration of lead in air than Arkansas Street. Please discuss any alternative data that are available and provide a rationale for the choice that was made.

D. This risk assessment also altered some intake parameters from the LeadSpread model default values. The breathing rate for children was set at 10 $m^3$/day (Tables I-12.1 through I-12.7 of Appendix I), rather than the default rate of 6.8 $m^3$/day. The soil ingestion rate was set at 59 mg/day for school children (Tables I-12.1, I-12.2 and I-12.5 of Appendix I), at 200 mg/day for residential children (Tables I-12.3, I-12.4, I-12.6 and I-12.7 of Appendix I), and at 100 mg/day for residential adults (Tables I-12.3, I-12.4, I-12.6 and I-12.7 of Appendix I), rather than the default rate of 100 mg/day for all children and 50 mg/day for residential adults. The use of default intake rates for inhalation and ingestion **increases** the estimates of blood lead level for school children (Tables I-12.1 and I-12.2 of Appendix I) but doesn't bring them above 10 ug/dL. The use of default intake rates for inhalation and ingestion **decreases** the estimates of blood lead level for residential children and adults (Tables I-12.3, I-12.4, I-12.6 and I-12.7 of Appendix I). In particular, the residential child estimate for site-wide surface soil is reduced from 16.7 ug/dL (Table I-12.3 of Appendix I) to 9.8 ug/dL.

E. In future, LeadSpread modeling should use default intake parameters and should justify site-specific modifications.

F. As discussed in Section I.11.6, DTSC no longer recommends use of the LeadSpread model for adults, because there is evidence that it may not be sufficiently protective of women of reproductive age. This risk assessment applied the U.S. EPA Region 9 industrial Preliminary Remediation Goal (PRG) of 800 mg/kg as a standard for adult receptors (elementary school staff, construction workers, future potential industrial workers). We concur with this approach.

G. High concentrations of lead remain at Site 31, as illustrated by Figure 4-6 and by the modeling results (Tables I-12.3 and I-12.4 of Appendix I). The 99$^{th}$ percentile residential child is predicted to have a blood lead level of 39.3 ug/dL (Table I-12.4 of Appendix I). This is obviously of concern. The finding is exacerbated by the proximity of both the elementary school and the day care center. The finding is also exacerbated by the nature of the site. The heterogeneity of the debris introduces considerable uncertainty into the characterization of lead as well as other contaminants.

14. COPPER. Copper was found at very high concentrations at Site 31. Sites with levels of copper far exceeding human health criteria are quite unusual. Five sample locations had copper exceeding the residential PRG of 3,100 mg/kg (Figure 4-7). The table below shows these five concentrations of copper along with the lead concentrations found in the same sample location. With the possible exception of sample location T094-071, if remediation were undertaken for lead, it would likely resolve the copper contamination as well.

| HIGH CONCENTRATIONS OF COPPER AND LEAD AT SITE 31 (mg/kg) | | | | | |
|---|---|---|---|---|---|
| | SAMPLE LOCATION | | | | |
| ANALYTE | T094-047 | T094-071 | T094-074 | T094-114 | T094-2-1 |
| Copper | 8,400 | 57,000 | 8,800 | 4,200 | 9,650 |
| Lead | 5,200 | 460 | 1,700 | 1,100 | 1,950 |

15. CALCULATIONS. We did not review all exposure and risk characterization calculations. Instead, we performed spot checks.

16. INDOOR AIR.

A. Vapor intrusion into indoor air is evaluated in Attachment I2 to Appendix I. The text (Section I2.1.2 of Attachment I2 to Appendix I) notes that there are currently no buildings on Site 31. The text notes that vapors can move laterally and impact buildings that are not directly over contaminated soil or ground water. The text states that "*None of the nearest off-site indoor structures, specifically the school's buildings to the north and northwest of the schoolyard, are within 100 feet from*

*sampling locations where VOCs were detected in soil or groundwater.*" The report should provide a relevant map to support this statement.

Examination of Figure 4-10 suggests that the elementary school is about 75 feet from the closest Site 31 border. The day care center is about 30 feet from the closest Site 31 border. Thus, although the day care center was evaluated as part of Site 30 (SulTech, 2005), it could be impacted by volatile organic compounds located at Site 31. See also General Comment 1.

The report needs further justification for not evaluating current structures. This should include identification of distances to the elementary school and the day care center and identification of the locations of volatile organic contaminants in soil and in ground water. A map would be helpful. One hundred feet is an approximate distance over which volatile organic compounds can spread. The report should comment on whether this distance is appropriate for Site 31.

B. The report must address the issue of appropriate sample data for vapor intrusion modeling. DTSC guidance clearly states that soil matrix data can be unreliable and that soil gas data is to be used in most cases. There are no soil gas data for Site 31. Therefore, the vapor intrusion modeling for Site 31 was based on soil matrix data and ground water data (Section I2.2.1.4 of Attachment I2 to Appendix I). This issue is complicated at Treasure Island by the shallow ground water (seven feet below ground surface on average). Please address the soil gas issue in Attachment I2 to Appendix I and in the uncertainty discussion for the risk assessment. The team should consider whether soil gas sampling at selected locations is warranted.

C. The report (Section I2.1 of Attachment I2 to Appendix I) references DTSC's "*advanced 2003 vapor intrusion model*". For modeling vapor intrusion to indoor air from ground water, please use the current (2005) model from the DTSC website. Because DTSC does not recommend the use of soil matrix data for modeling vapor intrusion to indoor air, the DTSC website has only ground water and soil gas models.

D. The report consistently (Section I2.1.1, Section I2.2.1.3, Table I2-2 and Table I2-3 of Attachment I2 to Appendix I) indicates that an infinite source of contamination was assumed for modeling. This is not correct. Soil parameters were set to deplete the source over time. In particular, the "*Depth below grade to bottom of contamination*" was set at 122 cm = four feet for the modeling of vapor intrusion from soil (Table I2-6.1 and Table I2-7.1 of Attachment I2 to Appendix I). This assumes that there is no contamination in soil at depths between four feet and seven feet (ground water level). If the sampling data for soil between four and seven feet are adequate to support this assumption, this must be demonstrated. In the absence of complete characterization, the screening model and not the advanced model should be applied.

E. We note that the Remedial Investigation Report for Site 30 (Table I2-2 and Table I2-3 of Attachment I2 to Appendix I in SulTech, 2005) also indicates that an infinite source of contamination was assumed for modeling. Insufficient information was provided to determine whether this is correct. If a finite source was assumed, then the potential for risks and hazards at the day care center may have been underestimated.

F. The vapor intrusion modeling for Site 31 did not set the "*Average vapor flow into building*" or "$Q_{soil}$" (Tables I2-4.1, I2-5.1, I2-6.1 and Table I2-7.1 of Attachment I2 to Appendix I). The model therefore calculated the $Q_{soil}$, based on other parameters including the "*Floor-wall seam crack width*". Since the "*Floor-wall seam crack width*" has been set at a low value (0.1 cm), the $Q_{soil}$ estimate will be correspondingly low (Tables I2-1, I2-4.1, I2-5.1, I2-6.1 and Table I2-7.1 of Attachment I2 to Appendix I). DTSC guidance for vapor intrusion modeling states that $Q_{soil}$ should be 5 L/m for small buildings, such as residences. The floor of such buildings is assumed to be 10 meters by 10 meters. The $Q_{soil}$ for commercial and other buildings should be adjusted upwards according to the ratio of the floor space. That is, $Q_{soil}$ for a larger building is equal to $Q_{soil}$ for a small building multiplied by the ratio of the floor space of the large building to the floor space of the small building. Based on the small building values, $Q_{soil}$ for a larger building equals 5 L/m multiplied by the floor space of the large building and divided by 100 square meters.

G. Because of these issues with the vapor intrusion modeling, we audited the results. We concur with the estimates of indoor air concentrations for the three contaminants in ground water (Table I2-2 of Attachment I2 to Appendix I). We do not concur with the estimates of indoor air concentrations for contaminants in soil (Table I2-3 of Attachment I2 to Appendix I). For compounds with high volatility, such as benzene, changing the parameters as described in Parts D ("*Depth below grade to bottom of contamination*" ) and F ($Q_{soil}$) results in estimates of indoor air concentrations more than two orders of magnitude higher than those presented in Attachment I2 to Appendix I.

H. The Remedial Investigation Report for Site 30 (SulTech, 2005) provided little detail on the vapor intrusion modeling which was done. None of the tables from the Johnson and Ettinger modeling were included. It seems probable that the same issues apply and that the potential for risks and hazards at the day care center and to future buildings may have been underestimated.

17. RISK CHARACTERIZATION.

A. Risk and hazard estimates were calculated for elementary school children and for elementary school staff for exposure to contaminants in soil by incidental ingestion, dermal contact and inhalation of both dust and volatile compounds (Section I.11.1 of Appendix I).

i. Vapor intrusion into indoor air at the elementary school was not evaluated because of the distance between the contamination with volatile compounds and the school. This requires better justification. See General Comment 16 A.

ii. Hazard indices are all less than one for soil exposure and the school scenarios (Tables I-10.12 through I-10.15 of Appendix I).

iii. Cancer risk estimates based on DTSC guidance are $2 \times 10^{-6}$ for the child and $5 \times 10^{-6}$ for the adult staff worker exposed to currently unpaved areas outside the fence (Tables I-10.12 and I-10.14 of Appendix I).

iv. Cancer risk estimates based on DTSC guidance are $2 \times 10^{-5}$ for the child and $4 \times 10^{-5}$ for the adult staff worker exposed to currently paved areas inside the fence, assuming that the pavement had been removed (Tables I-10.13 and I-10.15 of Appendix I).

v. The most significant exposure pathway is ingestion of indoor dust, assuming its source was outdoor soil (Tables I-10.12 through I-10.15 of Appendix I).

vi. Debris Area C is the primary source of risk-driving contaminants (polycyclic aromatic hydrocarbons [PAHs] and dioxins). Excluding the PAH data from one sample location (89S031-26) and the dioxin data from all of Debris Area C reduces the cancer risk estimates to $1 \times 10^{-6}$ for the child and $3 \times 10^{-6}$ for the adult staff worker exposed to currently paved areas inside the fence, assuming that the pavement had been removed (Section I.11.1.1.1). This may provide useful information for risk management.

B. Risk and hazard estimates for construction workers were based on exposure to contaminants in soil at all depths from surface to ground water, including direct contact (ingestion and dermal contact) and inhalation of dust and volatile compounds in outdoor air, exposure to contaminants in ground water by dermal contact and inhalation of volatile compounds in a trench setting (Section I.11.2 and Table I-10.16 of Appendix I). Based on DTSC guidance (Method 2) the cancer risk estimate is $5 \times 10^{-6}$ and the hazard index is 0.8. Inhalation of volatile compounds from soil in a trench setting was not evaluated (General Comment 7).

C. Risk and hazard estimates for future potential residents were based on exposure to contaminants in site-wide surface soil and to contaminants in site-wide combined surface and subsurface soil. Exposure was assumed to be from incidental ingestion, dermal contact and inhalation in outdoor air of both dust and volatile compounds from soil and inhalation of volatile compounds from soil and from ground water in indoor air.

i. Hazard indices are almost identical (six or seven) for both soil data sets and for both Method 1 and Method 2 (DTSC guidance). These estimates are well above safe levels.

ii. A target organ analysis was done to address hazard indices that exceed one (Section I.11.2.2 of Appendix I). The hazard index is four for the respiratory system in the child (Tables I-10.19 and I-10.20 of Appendix I) and two for the respiratory system in the adult (Tables I-10.17 and I-10.18 of Appendix I). This is true for both site-wide surface soil and site-wide combined surface and subsurface soil.

iii. Cancer risk estimates (Section I.11.2 of Appendix I) are identical for both soil data sets and similar for Method 1 ($2 \times 10^{-4}$) and Method 2 ($6 \times 10^{-4}$). These cancer risk levels are the sum of the estimates for the adult and those for the child. The levels are well above the risk management range.

D. Risk and hazard estimates for future potential industrial workers were based on the same exposure routes and exposure pathways as the residents (see Part C above).

i. Hazard indices (Section I.11.2) are all less than one for site-wide soil exposure, both surface and subsurface and both Method 1 and Method 2.

ii. Cancer risk estimates (Section I.11.2) from Method 2 (DTSC guidance) are $9 \times 10^{-5}$ for site-wide surface soil and $8 \times 10^{-5}$ for site-wide combined surface and subsurface soil. These cancer risk levels are at the upper boundary of the risk management range, far above the point of departure.

E. Because of the known contamination under 11th Street, we recommend that this area be evaluated as a separate exposure unit for utility or construction workers. Utility work is a plausible current exposure scenario, as illustrated by the fact that the debris areas of Site 31 were discovered during the installation of a water line by the Navy Public Works Center (Section 1.2.3). This is of concern because of the remaining high levels of contaminants.

F. The text (Section I.11.2 .1 of Appendix I) is correct in identifying bis(2-chloroethyl)ether as a dominant risk driver for Method 2 (DTSC guidance). This compound was eliminated as a chemical of potential concern for method 1. The vapor intrusion modeling of this compound accounts for a large fraction (43 to 69 percent) of the total risk estimate for the adult resident (Tables I-10.17 and I-10.18 of Appendix I), child resident (Tables I-10.19 and I-10.20 of Appendix I), and industrial worker (Tables I-10.21 and I-10.22 of Appendix I). These estimates will increase substantially when the parameters are adjusted as discussed in General Comment 16. However, bis(2-chloroethyl)ether was detected only once among 147 soil samples, and the exposure point concentration has been set at the maximum concentration, i.e., the single detected value. Furthermore, this

concentration was J-flagged. These facts should be taken into account by the risk managers.

G. The text (Section I.11.1.1 of Appendix I) refers to "*...the acceptable ambient soil dioxin TEQ level for NAVSTA TI of 12 ng/kg (DTSC 2004a)*". The adjective "*acceptable*" should be used with great caution in risk assessments. In this case, the ambient soil concentration was estimated to have the value of 12 ng/kg. Since this is an observation, acceptability is irrelevant. In general, statements such as that quoted above can be inflammatory to the public. If the Navy and the regulators consider a concentration of 12 ng/kg to be "*acceptable*", then it follows that it is "*acceptable*" to the Navy and the regulators to have an additional cancer risk of 3 x $10^{-6}$ (based on the U.S. EPA Region 9 residential PRG) in a school yard or elsewhere at Treasure Island. We recommend that the word "*acceptable*" be replaced with "*established*".

18. SOUTHEAST QUADRANT (ATTACHMENT I6 TO APPENDIX I).

A. The Southeast Quadrant contains Debris Area D (Figure 1-4). It includes portions of Avenue E and 11th Street. The Southeast Quadrant has been separated from the rest of Site 31 with its own "*Risk Evaluation*" in Attachment I6 to Appendix I. Please add a clear rationale for doing so.

B. This approach adds further confusion to the definition of Site 31 (General Comment 1).

C. This approach also adds further confusion to the issue of sample data used in risk assessment (General Comment 5). The report (Section I.7.1.3 of Appendix I) states that all chemicals detected in soil were included in the "*Risk Evaluation*" for the Southeast Quadrant, but it doesn't specify whether the Southeast Quadrant data were also included in calculation of exposure point concentrations for the remainder of Site 31. What is the justification for excluding or including the data?

D. The "*Risk Evaluation*" for the Southeast Quadrant is in fact a screening risk assessment, applying U.S. EPA Region 9 residential PRGs. The cancer risk estimates for surface soil are 1 x $10^{-5}$ for site-related chemicals and 3 x $10^{-5}$ for site-related and ambient chemicals. The cancer risk estimates for combined surface and subsurface soils are 4 x $10^{-5}$ for site-related chemicals and 4 x $10^{-5}$ for site-related and ambient chemicals. Since these cancer risk estimates exceed the point of departure value of 1 x $10^{-6}$, the site fails the screening risk assessment.

E. The report (Section I6.3.1 of Attachment I6 to Appendix I) states that the proposed land use for the Southeast Quadrant is "*recreational development*". This is useful information. However, the screening assessment based on residential PRGs assesses whether unrestricted land use is appropriate. The results suggest that unrestricted land use may not be appropriate. Even if this turns out to be the case, recreational use might be appropriate, without further action.

F. The report (Section I6.3.1 of Attachment I6 to Appendix I) notes that benzo(a)pyrene and dioxins were risk drivers for the Southeast Quadrant and states that "*The risks associated with benzo(a)pyrene and dioxins can be largely attributed to the small sample size in the southeast quadrant, which required use of the maximum detected concentration as the EPC for both benzo(a)pyrene and dioxins.*" This is quite accurate. It doesn't follow that the risks can therefore be dismissed. Instead it suggests that further site characterization may be in order.

   The report notes that only one of the seven surface soil samples and only one of the six subsurface soil samples were analyzed for dioxins. However, the dioxin toxicity equivalent concentrations were 24.2 ng/kg at 1.3 feet below ground surface and 54.6 ng/kg at 2.5 feet below ground surface. Both results far exceed the residential PRG of 3.9 ng/kg.

G. The report should include the area of the Southeast Quadrant in order to put the number of samples in perspective.

H. The maximum concentration of lead was 354 mg/kg. The report dismisses this because it is less than the U.S. EPA Region 9 residential PRG for lead (400 mg/kg). The fact that 400 mg/kg has been applied at other Treasure Island sites as an investigation criterion does not mean that it is a de facto, generic concentration, applicable to all sites. DTSC requires the use of the Cal-modified PRGs for screening sites. Since 354 mg/kg exceeds the Cal-modified PRG for lead (150 mg/kg), the Southeast Quadrant fails the screen on this basis.

I. Consideration must be given to further site characterization for the Southeast Quadrant. Then consideration must be given to either a repeat of the screening risk assessment or a baseline risk assessment.

19. REFERENCES (Pages R-1 to R-10).

A. This document has the same problems with references that we identified for the Site 30 Remedial Investigation Report. Names of government agencies are inconsistent and therefore unnecessarily confusing in the reference list. Some Department of Toxic Substances Control references are listed as "*DTSC*"; one is listed as "*Cal/EPA*"; two are listed as "*California Environmental Protection Agency (Cal/EPA)*"; and one is listed as "*California Environmental Protection Agency Department of Toxic Substances Control (DTSC)*". This confusion is compounded by the alphabetization which places one of the "*California Environmental Protection Agency (Cal/EPA)*" items with the "*Cs*" and the other "*California Environmental Protection Agency (Cal/EPA)*" items with the "*Ds*". .

B. This inconsistency is nomenclature and in alphabetization is also found for other California government agencies (Office of Environmental Health Hazard Assessment and Regional Water Quality Control Board) and for federal

government agencies (U.S. EPA). The confused alphabetization is found for the U.S. Navy as well as U.S. EPA).

C. Several references in the document are not found in the Reference list (see Specific Comments).

20. ECOLOGICAL RISK ASSESSMENT.

A. A brief discussion of ecological risk assessment is found in Section 7.0. On June 3, 1994 representatives from the Navy and "*federal, state, and regional*" agencies toured the sites on Treasure Island and Yerba Buena (Section 7.1). It was concluded that terrestrial habitat on Treasure Island is generally limited and of poor quality. Although this tour did not include Site 31, it is our observation that Site 31 fits this description.

B. Ground water data for Site 31 are limited to a single sampling event in May, 2004 from six temporary microwells (Section I.6.2 of Appendix I). See also General Comment 6. Nonetheless, the report (Section 7.2) asserts that "*This data set is sufficient to characterize the migration and eventual discharge of groundwater into the Bay and the effects this may potentially have on offshore aquatic biota.*" In the absence of a rationale, this assertion is not informative.

C. Chemicals of potential ecological concern were based on ground water screening values from the "*NAVSTA TI groundwater monitoring program*". The reference for these screening values, "*SulTech 2005*", is not included in the reference list (Pages R-1 to R-10). Table 4-2 cites a different reference for these screening values (Sullivan Consulting Group and Tetra Tech EM Inc., 2004). Please provide the correct references in the text and the reference list.

D. The screening values and the comparisons of contaminants in ground water do not appear in Section 7.0. At a minimum, Section 7.0 should reference Table 4-2 in Section 4 where this information is found.

E. Section 4.4.2 states that barium, calcium, magnesium and sodium exceeded ground water background concentrations, and dismisses calcium, magnesium and sodium as essential nutrients. Section 7.3 discusses only barium. Neither section acknowledges the finding of vanadium at 5.3 ug/L (Table 4-4), which exceeds the background concentration of 4.4 ug/L (Table 4-2). This must be acknowledged and addressed.

F. Section 7.3 states that "*As discussed in Section 4.4, no metals were detected in groundwater at concentrations that exceeded both screening criteria (if available) and ambient levels.*" The best that can be said of this statement is that it is inaccurate. Of the eight metals listed in Table 4-4, only one (arsenic) has a screening criterion. Hence arsenic is the only metal that could have exceeded both its screening criterion and ambient level.

G. The comparison to screening criteria (Table 4-4) fails to take cumulative risks from exposure to multiple chemicals into account.

H. Section 7.0 discusses barium, which exceeded the background concentration, and for which no screening criterion was available. No mention is made of mercury. Section 4.3.5 reports that mercury was detected in one grab sample at a concentration above the ecological screening level. Section 5.2.3 reports on the mercury finding and makes no mention of mercury. Please revise these sections for completeness and for consistency. They also need revision for accuracy (Specific Comments 6 and 7).

I. The document (Sections 4.0, 5.0, 7.0) doesn't report the distance between Site 31 and San Francisco Bay, though Section 5.2.3 states that the distance makes migration of contaminants unlikely. Although Site 31 is centrally located on Treasure Island (Figure 1-2), it appears to be only about 1200 feet from the bay.

J. A stronger case needs to be made for dismissing the potential for contaminants in ground water to be transported to San Francisco Bay and harm ecological receptors. Please provide a complete description in Section 7.0, including all contaminants found in both microwells and grab samples and their concentrations. Reporting that mercury exceeded its screening level is insufficient. Both concentrations must be provided. Please include consideration of potential cumulative risks from multiple contaminants.

## SPECIFIC COMMENTS

1. Section 1.2.4. The text describes Site 31 as being within the southern half of Parcel T095 and the northern-most portion of Parcel T094. Figure 1-3 indicates an additional area within Site 31. This is the corner land bounded by 11$^{th}$ Street and Avenue E. Figure 1-3 indicates that this corner is outside both Parcel T095 and Parcel T094. Figure 1-4 shows that this area is the location of Debris Area D. The text in Section 1.2.4 should explain why this corner area was included in Site 31.

2. Section 1.3.2.1. The text states that "*A one-sided tolerance limit was used to determine reasonable upper levels of ambient concentrations of metals at a site.*" Later the text states that "*The ambient concentrations of metals in soil were estimated using distribution-dependent formulae to find the strict 95$^{th}$ percentile.*" Please clarify what was done. First, it is not clear what is meant by a "*strict 95$^{th}$ percentile*", as opposed to any other "*95$^{th}$ percentile*". Second, Table 1-1 indicates that the distribution type was identified only for manganese and vanadium (see the following comment). All other distributions were "*unknown*". Third, a "*tolerance limit*" is not the same as a "*95$^{th}$ percentile*".

3. Table 1-1.

   A. Please report the Cal-modified residential PRG for arsenic (0.062) rather than the U.S. EPA PRG.

   B. Footnote "*e*" states that "*The 95$^{th}$ percentile of the distribution was calculated using distribution-dependent formulae.*" This appears to be inconsistent with the sixth column that reports that manganese and vanadium had lognormal distributions, but all other distributions were "*unknown*".

   C. Footnote "*g*" states that "*The PRG for total chromium, which assumes a one to six ratio of hexavalent chromium 8 to 6 trivalent chromium.*" Please revise this sentence to convey what was intended.

4. Section 1.3.5.2. The text states that the time-critical removal action was reported in Shaw, 2003a. Please state that the removal action was performed in July, 2002 (Section 2.3.3).

5. Figures 4-1 and 4-2. Please replace "*SCREENIG CRITERIA*" with "*SCREENING CRITERIA*" in the figure legends.

6. Section 4.3.5. The text states that "*Only one metal, mercury from grab groundwater sample SSYHP001 was detected at a concentration above the NAVSTA TI ecological screening criterion.*" This is incorrect. Arsenic also exceeded its ecological screening criterion. It is also misleading because most metals have no NAVSTA TI ecological screening criterion (Table 4-4). Finally, please add a citation to help the reader locate this information in the report.

7. Section 5.2.3. The description of "*Migration Pathways*" states that "*Because of the distance between Site 31 and the Bay, and the low concentration (and single detection) of mercury in groundwater, migration offsite via groundwater is not expected.*" First, the statement should report the distance between Site 31 and the Bay. Second, mercury was not the only chemical of concern. Barium exceeded the background concentration and could not be eliminated based on a screening criterion.

8. Section 6.1. Please provide the reference "*DTSC 2005a*" in the Reference list (Pages R-1 to R-10).

9. Section 6.1. Please provide the references "*Navy 2004c and 2005*" in the Reference list (Pages R-1 to R-10).

10. Section 7.3. Please provide the reference "*SulTech 2005*" in the Reference list (Pages R-1 to R-10).

11. Section 8.2. The text states that "*Risks associated with exposure to soil were below or within the target cancer risk range ($10^{-6}$ to $10^{-4}$) and below the noncancer hazard*

*threshold of 1.*" This is incorrect. Risk estimates for residents exposed to soil exceed $10^{-4}$ and hazard indices exceed one (Tables I-10.17, I-10.18, I-10.19, I-10.20).

12. Tables. Many of the tables use such a small font that legibility is marginal. This is exacerbated when table entries are "*highlighted*" with shading.

13. Tables I-3.8 and I-3.9 of Appendix I. These tables include 3,4-methylphenol as a chemical of potential concern in site-wide surface soil and in site-wide combined surface and subsurface soil. The compound is also listed as a chemical of potential concern in Section 1.7.1.3.1. However, it is not listed as a chemical of potential concern in surface soil outside the fence line (Table I-3.6 of Appendix I) or in surface soil inside the fence line (Table I-3.7 of Appendix I).

14. Table I-4.1 of Appendix I. This table evidently used the comparable table in the Site 30 Remedial Investigation Report as a template. Please replace "*day care center*" with "*elementary school*" throughout the table's "*Parameter Definition*" column.

15. Table I-4.1 of Appendix I. Please replace "*soil/dust ingestion*" with "*soil/dust dermal contact*" in the "*Parameter Definition*" column in those cases where the exposure route is dermal contact (pages 4, 6, and 7).

16. Figure I-1 of Appendix I. The definition of "*bgs*" in the Notes is irrelevant and should be deleted.

17. Equation 9-2, Section I.9.2 of Appendix I. The units for the "*Unit risk*" should be "$(ug/m^3)^{-1}$", rather than "$(ug/m^3)$".

18. Section I.9.4 of Appendix I. The text states that "*Soil samples were not analyzed for hexavalent chromium, as historical operations at the site are not associated with the use of this form. It is likely that the form of chromium detected at Site 31 is therefore trivalent.*" Since the historical operations at Sites 31 and 30 appear to have been disposal of debris and since hexavalent chromium has a variety of industrial applications, the stated premise seems to be incorrect.

19. Section I.9.5 of Appendix I. The text states correctly that DTSC recommends using the U.S. EPA Region 9 Preliminary Remediation Goal (PRG) for evaluating lead contamination in industrial scenarios. Please include the value of the lead PRG (800 mg/kg).

20. Section I.11.2 of Appendix I. The text states that "*The table below summarizes the potential cancer risks and noncancer HIs for each of these receptors when exposed to site-wide surface soil (0 to 2 feet bgs) or site-wide combined surface and subsurface soil (0 foot bgs to groundwater), groundwater, and vapors (from soil and groundwater).*" To paraphrase, this statement is that exposure was to either (a) surface soil or (b) combined soils, ground water, and vapors. This is inconsistent with the table. Construction workers were assumed to be exposed to combined soil, ground water,

and vapors (category b). Residents were assumed to be exposed to surface soil and vapors (neither category) or to combined soil and vapors (neither category). Industrial workers were also assumed to be exposed to surface soil and vapors (neither category) or to combined soil and vapors (neither category). No receptor was assumed to be exposed to category a.

21. Section I.11.6 of Appendix I. The text states that "*...lead was selected as a COPC in all four soil data sets for Method 1 or Method 2 for exceeding the EPA Region IX PRG for residential soil (EPA 2004e) or ambient concentrations.*" This explanation is imprecise. Lead was selected as a COPC for Method 1 because concentrations exceeded **both** the PRG and the ambient concentration, not because they exceeded one or the other. Lead was selected as a COPC for Method 2 because concentrations exceeded the ambient concentration. The PRG is not a consideration for Method 2.

22. Tables I-10.5 through I-10.22 of Appendix I. No entries appear under the column titled "*External (Radiation)*". If this column serves a purpose, this should be explained. Otherwise it could be deleted.

23. Section I2.1.2 of Attachment I2 to Appendix I. The term "*indoor structure*" is ambiguous. What the report means by "*indoor structure*" is a building.

24. Appendix J. The Table of Contents doesn't list "*Appendix J*". However, "*Appendix J. Petroleum Screening Level*" does appear at the end of the report. It has no content.

## CONCLUSIONS

1. The definitions of Site 31 and of the debris areas are ambiguous.

2. Although the day care center is located in Site 30, it is much closer to the highest levels of contamination than the elementary school. This should be taken into account.

3. An arbitrary criterion has been applied to select contaminants for fate and transport evaluation.

4. The sample data used in risk assessment need to be clearly identified and the rationale for the selection needs to be justified.

5. Ground water data are limited to six microwells and a single sampling event.

6. The conceptual site model needs clarification.

7. Very high concentrations of lead remain at Site 31, though they may not currently be accessible. This situation is exacerbated by the proximity of the elementary school and the day care center. It is also exacerbated by the uncertainty resulting from heterogeneity of contamination in debris areas.

8. Several issues related to the evaluation of vapor intrusion into indoor air are identified in our comments.

9. We recommend that contaminated area under 11th Street be evaluated as a separate exposure unit for utility or construction workers. Utility work is a plausible current exposure scenario and the remaining high concentrations of contaminants are quite high.

10. The risk assessment results based on current conditions indicate that risks could exceed the point of departure ($1 \times 10^{-6}$ for excess cancer risk) for children and staff at the elementary school.

11. Potential current risks and hazards from vapor intrusion into indoor air were not evaluated for children and staff at the elementary school. Better justification is required.

12. If the current paving were removed from Site 31, the risks to children and staff at the elementary school could be well above the point of departure ($1 \times 10^{-6}$ for excess cancer risk).

13. Potential cancer risks for future residential use are well above $1 \times 10^{-4}$ while hazard indices exceed one based on target organ analysis.

14. Potential cancer risks for future commercial/industrial workers are in the upper part of the risk management range.

15. A screening risk assessment was performed for the Southeast Quadrant. The area fails to meet unrestricted land use standards. The next step should probably be better site characterization.

16. The report needs to make a more consistent and thorough case that contaminants in ground water are not of concern for aquatic ecological receptors.

## REFERENCES

OEHHA (California Office of Environmental Health Hazard Assessment), 2003. Guidance for School Site Risk Assessment Pursuant to Health and Safety Code Section 901(f): Guidance for Assessing Exposures and Health Risks at Existing and Proposed School Sites. Final Draft Report. October, 2003. http://www.oehha.ca.gov/risk/pdf/screenreport010405.pdf

SulTech (Sullivan Consulting Group and Tetra Tech EM Inc.), 2005. Draft Remedial Investigation Report, Installation Restoration Site 30, Day care center. Naval Station Treasure Island; San Francisco, California. May, 2005.

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