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MARE ISLAND
SSIC NO. 5090.3.A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

March 9, 2009

Mr. Michael Bloom
Dept of the Navy
Base Realignment and Closure
Program Management Office
1455 Frazee Road, Suite 900
San Diego, CA 92108-4301

Re: Draft Engineering Evaluation/Cost Analysis/Interim Remedial Action Plan, Former Mare Island Naval Shipyard, Vallejo California, December 1, 2009

Dear Mr. Bloom:

EPA has reviewed the above referenced document, and offers the following comments:

GENERAL COMMENTS

1. The soil removal action described in this Draft Engineering Evaluation/Cost Analysis/Interim Remedial Action Plan, Building 742 Former Degreasing Plant, Investigation Area C2 at the Former Mare Island Naval Shipyard, Vallejo, California (Draft Building 742 IRAP) appears to be appropriate to begin to mitigate the potential for indoor air vapor intrusion risk in the immediate vicinity of Building 742; the soil excavation may also reveal additional sources of contamination in the area that is contributing to vapor intrusion (VI) risks.

   Having recognized the vapor intrusion risks at Building 742 and the necessary remedial actions, the Navy should expand the evaluation of groundwater as a source of vapor intrusion risks in other locations on the Mare Island property as part of the property transfer process. Please include storm drains acting as vapor conduits as well as volatilization of contaminants from groundwater in this VI evaluation.

2. The Removal Action Work Plan (RAW) should be sufficiently detailed to address the proposed soil excavation and groundwater remediation activities as part of Alternatives 2 or 3, and based on information in this Draft Building 742 IRAP there are several major concerns that require clarifications or revisions. For example, the soil volume estimates appear to be based only on the volume of contaminated soil and do not include any side slope excavations to prevent wall collapse. The statement that "No temporary shoring or sheet-piling is proposed along the building" may not be an acceptable construction practice for trenches of an 8 to 9-foot depth, and should be supported. Also, the text and cost estimate tables (Tables 5-1and 5-2) do not appear to include replacement and repair

of the storm drain along the south side of Building 742, and restoring the integrity of this storm drain segment is critical to proper drainage of the larger area of the former shipyard. Please provide a complete RAW that addresses these concerns, and which are detailed in Specific Comments below.

3. The Removal Action is intended to address removal of PCBs to the TSCA cleanup standard of 1 mg/kg. Please clarify if the Navy intends to conduct this action under CERCLA, with TSCA as an ARAR, or does the Navy intend to submit a notification of self implementing cleanup und 40 CFR 761.61(a) and receive TSCA approval from EPA? It is confusing when Navy has determined that they will not be using CERCLA authority to address PCB cleanup elsewhere on Mare Island.

4. As part of the RAW, or possibly as a separate Enhanced InSitu Bioremediation (EISB) Work Plan, please provide a more complete evaluation of the scope and objectives of enhanced bioremediation approach as it relates the EE/CA. Most importantly, the amount of oxidant required to achieve groundwater bioremediation appears to have been underestimated (see specific comment below.) Please include a detailed EISB Work Plan, including Data Quality Objectives that describes the groundwater monitoring well network, the oxidant dosing procedures, and the bioremediation parameters and other analyses that will be measured to assess the progress toward mitigation of the vapor intrusion risks and cleanup of groundwater. This EISB Work Plan should also present a site conceptual model (CSM) that includes water flow through the utility corridor backfill to the east/northeast to the strait, and also apparently groundwater flow to the north/northeast under Building 742 (see Figure 2-6.) The tidal influences should also be discussed in this conceptual model, with the overall purpose of the CSM is to support the monitoring well network, and evaluate groundwater contaminant transport as it relates to VI risks and movement of contaminants to the strait.

5. The risk assessment in the Draft Building 742 IRAP uses information taken from Section 4.0 of the Screening Level Human Health Risk Assessment (2007 SLHHRA) in the Draft Final Expanded Site Inspection, Additional Characterization at the Former Degreasing Plant, Investigation Area C2, Mare Island, Vallejo, California (SulTech 2007). The 2007 SLHHRA used the EPA Region 9 2004 preliminary remediation goals (PRGs) to evaluate soil exposure via the oral and dermal contact as well as the particulate inhalation pathways and the groundwater exposure via the oral pathway. The 2004 PRGs have been subsequently replaced by Regional Screening Levels (RSLs) in 2008. The latest version of the RSLs, issued in September 2008, is available online at www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

   It is unclear whether the Draft Building 742 IRAP uses the most recent toxicity data reflected in the 2008 RSLs. Based on a cursory review of the seven risk and hazard drivers in soil and groundwater listed in this Draft Building 742 IRAP, differences between 2004 PRG and 2008 RSL values include the following examples:

   - The residential PRG and RSL values for non-cancer hazard driver iron are 2.3E+04 mg/kg and 5.5E+04 mg/kg, respectively.

- The residential PRG and RSL values for non-cancer hazard driver vanadium are 78 mg/kg and 390 mg/kg, respectively.

Some PRGs for trichloroethene have also been revised. Therefore, revision of the 2007 SLHHRA data based on more recent toxicity data will change the risk calculations and possibly the subsequent risk management decisions made for the site.

While the RSL values were not available at the time that the 2007 SLHHRA was completed, the Draft Building 742 IRAP should follow the standard risk assessment protocol of reviewing available toxicity information based on the hierarchy of sources presented in Office of Solid Waste and Emergency Response (OSWER) Directive 9285.7, Human Health Toxicity Values in Superfund Risk Assessments (EPA 2003). This approach endeavors to ensure that risk assessments – and risk management decisions that are based on them – consider the most current toxicity data available. If the Draft Building 742 IRAP is not revised to incorporate the most recent toxicity data, the Draft Building 742 IRAP should evaluate the uncertainty associated with risk findings that are not based on the most recent toxicity data, and revise its conclusions to address impacts of this uncertainty on risk management. Please confirm that risk management decisions are based on risk estimates that incorporate the most recent toxicity data or discuss why the estimates have not been revised.

6. The 2007 SLHHRA estimated potential risks of soil gas and groundwater exposure by comparing maximum detected concentrations to subsurface vapor intrusion guidance screening levels (EPA 2002) and EPA Region 9 tap water PRGs (EPA 2004), respectively. However, for unstated reasons, the Draft Building 742 IRAP compared soil gas and groundwater concentrations to screening levels that were not used in the 2007 SLHHRA. Instead, the Draft Building 742 IRAP compared maximum soil gas concentrations to the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) shallow soil gas screening levels for commercial/industrial land use (OEHHA 2005); maximum groundwater concentrations were compared to California Regional Water Quality Control Board San Francisco Bay Region (Water Board) groundwater vapor intrusion screening levels (Water Board 2008). Please discuss (1) the rationale for using the OEHHA and Water Board screening levels in the Draft Building 742 IRAP and not those in the 2007 SLHHRA; (2) the differences between the screening results presented in the 2007 SLHHRA and the Draft Building 742 IRAP; and (3) the impact of these differences on risk evaluations.

7. The 2007 SLHHRA derived total risk and total hazard estimates from exposure to multiple chemicals by summing the risks and hazards associated with detected chemicals in specific media. However, a complete risk assessment must also present cumulative risk across multiple exposure media and pathways. Therefore, in addition to reporting media-specific risks, which are useful in evaluating residual risks after remedial activities, please present and discuss cumulative risks from all media relevant to the risk assessment.

SPECIFIC COMMENTS RELATED TO PROPOSED REMEDIATION ALTERNATIVES

1. **Section 5.2.1.1 Soil Excavation, Pages 5-2 to 5-4:** There are several concerns related to the proposed excavation and soil handling activities that need to be reevaluated or detailed in the RAW. The descriptions of these activities in the Draft Building 742 IRAP do not indicate previous site-specific experience in addressing these concerns, and where available such information should be presented to support the implementability of the proposed remediation efforts. Please address the following concerns in the RAW:
   - The statement that "No temporary shoring or sheet-piling is proposed along the building" (Building 742) may not be an acceptable construction practice for excavations to 8 or 9-feet. Additionally, based on the information that excavation will be to approximately 8-feet below ground surface (bgs) and the water table is approximately 5 to 6-feet bgs, sloughing of saturated soils from underneath the building into the excavation may also occur. Please address the safety and as well as the construction issues associated with these concerns.
   - The excavation in the Former Degreasing Plant (FDP) footprint is proposed as approximately 35-feet by 60-feet and 8-feet deep, and which corresponds to approximately 650 cubic yards (yd^3), as stated in the text; however, this volume estimate does not appear to include any excavation of side slopes to avoid wall sloughing into the excavation. The excavations in other locations (Figure 5-5) also do not appear to include the volumes of soil from side slopes. While it may be possible to initially segregate the most contaminated soils from the designated footprints (Figure 5-1) from the presumably less-contaminated side slope soils, the situation that saturated soils will also be excavated without any dewatering may make the segregation problematic. Please reevaluate the volume of soil estimates and discuss how the soils may be segregated for offsite disposal or replacement into the excavations.
   - The text states that a damaged section of the storm drain will be removed, and it appears that excavations to 9-feet could damage (if not remove) other sections of the storm drain. However, the text or cost estimates (Tables 5-1 and 5-2) do not appear to include replacement of storm drain segments to restore the integrity of the larger storm drain system. Please include storm drain system restoration in the RAW.
   - The text indicates that the saturated soils will be placed on pads and (presumably) air dried but it is unclear if site-specific experience is available to support such treatment without the addition of amendments (such as the use of drying agents.) Please provide a bench-scale or pilot scale treatability test work plan to demonstrate the feasibility of soils dewatering, and recognize that addition of drying or stabilizing amendments will increase the volume of soil that must be disposed.

2. **Section 5.2.1.2 Groundwater Remediation. Page 5-4:** It is stated in the previous section that the excavations will not be dewatered, but this step should be reevaluated for the purpose of effectively removing a mass of contaminants that could shorten the groundwater remediation times, particularly if additional structures are discovered (such

as floor drains) that may contain organic liquids which enter the excavation. Dewatering the excavations at the FDP and at D1-C85 could be especially beneficial in this regard. Please reevaluate pumping contaminated water (and the suspended solids) that have been in contact with contaminated soils from the open trench/excavation as a mass removal step.

3. **Section 5.2.1.2 Groundwater Remediation. Page 5-4:** The text correctly recognizes that bench-scale testing of the oxygen release compound (ORC) will be necessary, but it should be also recognized that bench scale tests on such a complex mixture of contaminants of different reactivity toward oxidation may not be readily extrapolated to a large field scale, particularly for the acknowledged heterogeneous subsurface conditions. For example the amount of ORC required appears to be based on vinyl chloride (VC), chlorobenzene (CB), iron and manganese (second bullet on page 5-5) in groundwater, but the groundwater analysis data also indicate that significant concentrations petroleum hydrocarbons are also present; based on the relative concentrations and reactivity of these groundwater constituents it should be expected that the hydrocarbon constituents will be preferentially oxidized. Please provide an EISB work plan for bench-scale tests that will represent the reactivity and variable concentrations of all constituents at the site, and that can be more confidently scaled to a larger scale.

4. **Section 5.2.1.2 Groundwater Remediation. Page 5-5:** Text on this page indicates that amount of ORC to be used is calculated based the maximum concentrations of contaminants of concern that have been measured in groundwater, but this estimate may be an underestimate to achieve remediation goals. The estimate has not considered the presence of a hydrocarbon mass (measured as Total Petroleum Hydrocarbon) also present in groundwater that can have a significant oxygen demand, and the fact that the oxygen demand is not stoichiometric for oxygen vs. chemical concentrations (there is more oxidant demand than can be calculated based on the measured concentrations of chemical) so that a greater amount of ORC will be required. The estimate of ORC required also has not accounted for sorbed organic mass and inorganic mass on soil that will continue to be a source of oxidizable material to groundwater. Please recognize the actual ORC demand could be determined in bench-scale tests, but even then site heterogeneity will be an unknown parameter in scaling oxidant demand to the large scale.

SPECIFIC COMMENTS RELATED TO HUMAN HEALTH RISK ASSESSMENT

1. **Section 2.5, Risk Evaluation, Page 2-22; and Appendix B, Section 4.0, Screening Level Human Health Risk Assessment, Page 22:** The second paragraph in these sections describes the 2007 SLHHRA approach as involving the estimation of potential risks by comparing "the maximum detected concentrations…to…screening levels (EPA 2004)." While only one citation is provided in this sentence, the 2007 SLHHRA uses two sets of screening levels, specifically, EPA Region 9 PRGs (EPA 2004) and subsurface vapor intrusion guidance screening levels (EPA 2002). Please reference all sources of screening levels used in the 2007 SLHHRA as appropriate.

2. **Appendix B, Section 4.2.2.3, Exposure Parameters, Pages 25 to 26:** This section describes the exposure parameters used to calculate 2004 EPA Region 9 PRGs. As indicated in the General Comments section, the 2007 SLHHRA ideally should use the recommended RSLs, which incorporate the most recent toxicity data. Please revise the Draft Building 742 IRAP to discuss the potential impact of the differences between the PRG and RSL exposure parameters on risk estimates, and on the ultimate risk management decisions for the site.

3. **Appendix B, Section 4.3, Toxicity Assessment, Pages 26 to 27:** This section describes the toxicity criteria used to calculate 2004 EPA Region 9 PRGs. As indicated in the General Comments section, the 2007 SLHHRA ideally should use the recommended RSLs, which incorporate the most recent toxicity data. Please revise the Draft Building 742 IRAP to discuss the potential impact of the differences between the PRG and RSL toxicity values on risk estimates, and on the ultimate risk management decisions for the site.

   The second to last paragraph in Section 4.3 (page 27) states that screening levels for surrogate chemicals were used to evaluate those chemicals for which no screening levels are available. While the chemicals requiring surrogate screening levels are identified in the cancer risk and non-cancer hazard results tables (Tables 16 through 19, and 21 through 26), please provide in the Draft Building 742 IRAP the list of chemicals for which surrogate chemicals toxicity data were used, to facilitate a review of the appropriateness of the selected surrogates.

4. **Appendix B, Section 4.4, Risk Characterization, Pages 27 to 33:** The summary of risk findings contain several statements that elevated risk and hazards due to inorganics are likely due background. Similarly, Table 20, Cancer Risk and Noncancer Hazard Summary, presents calculated risk results along with alternative risk results "without metals that may be less than background". However, no technical documentation is provided to support these hypothetical statements and alternative results. The 2007 SLHHRA should include a statistical background analysis that evaluates whether detected concentrations reflect background conditions; or if no technical documentation is provided, the aforementioned hypothetical statements and alternative results should be removed from the Draft Building 742 IRAP.

5. **Appendix B, Section 4.4.3.1, Hypothetical Future Residential Exposure to Groundwater – Domestic Use, Page 31:** The second paragraph in Section 4.4.3.1 presents the results of the non-cancer hazard evaluation, including the hazard quotients (HQs) associated with hazard drivers. However, there appears to be a typographical error in the second sentence, where arsenic is mentioned twice as contributing HQs of 9.73 and 9.04. Please correct this error in this paragraph by attributing the HQ of 9.73 to Aroclor-1260, and the HQ of 9.04 to arsenic, as presented in Table 22, Preliminary Residential Domestic Use Cancer Risks and Noncancer Hazards for Chemicals in Groundwater. Furthermore, since this correction results in Aroclor-1260 as the primary hazard driver

instead of arsenic, please remove the statement about the potential for arsenic being "considered significantly greater than background."

6. **Appendix B, Section 4.4.3.2, Hypothetical Future Residential Exposure to Groundwater – Vapor Intrusion, Page 32; Table 21, Chemical-Specific Cancer Risk Drivers and Noncancer Hazard Drivers; and Table 23, Preliminary Residential Vapor Intrusion Cumulative Cancer Risks and Noncancer Hazards for Chemicals in Groundwater:** The first paragraph in Section 4.4.3.2 identifies the chemicals for which risk estimates exceeded 1E-06. The chemicals identified reflect the list of risk drivers presented in Table 21, except for chloroform, which appears on Table 21 but not in Section 4.4.3.2. Furthermore, according to Table 23, chloroform does not appear as a detected chemical in groundwater that was evaluated in the 2007 SLHHRA. Please address these discrepancies and revise the text and/or tables as appropriate.

7. **Appendix B, Table 16, Preliminary Residential Cumulative Cancer Risks and Noncancer Hazards for Chemicals in Surface Soil (0 to 2 feet bgs):** The headings for the last two columns of Table 16 are labeled "cumulative cancer risk" and "cumulative hazard index", respectively. However, the cumulative results are actually the sum totals of chemical-specific risks and hazards that appear at the bottom of the table. Please revise the headings of the last two columns to state "cancer risk" and "hazard quotient"; and use the terms "cumulative cancer risk" and "cumulative hazard index" to identify the total values at the bottom of the table. This comment also applies to the remaining cancer risk and non-cancer hazard results tables (i.e., Tables 17 through 19, and 21 through 26).

8. **Appendix B, Table 25, Preliminary Residential Vapor Intrusion Cumulative Cancer Risks and Noncancer Hazards for Chemicals in Soil Gas; and Table 26, Preliminary Industrial Vapor Intrusion Cumulative Cancer Risks and Noncancer Hazards for Chemicals in Soil Gas:** Based on the headings for the fourth and fifth columns in Table 25 – "Cancer-based Industrial Vapor Intrusion SL" and "Noncancer-based Industrial Vapor Intrusion SL", respectively – the screening levels used in Table 25 are applicable to an industrial exposure scenario and not a residential exposure scenario as the table title suggests.

   Similarly, based on the headings for the fourth and fifth columns in Table 26 – "Cancer-based Residential Vapor Intrusion SL" and "Noncancer-based Residential Vapor Intrusion SL", respectively – the screening levels used in Table 26 appear to be applicable to a residential exposure scenario and not an industrial exposure scenario as the table title suggests.

   Furthermore, according to Tables 25 and 26, the non-cancer hazard indices for the residential and industrial vapor intrusion exposure scenarios based on soil gas are identical, which is highly unlikely.

   Please revise Tables 25 and 26 as necessary, and update the corresponding summary tables and text.

REFERENCES

California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA). 2005. Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil. November 2004 (revised January 2005).

California Regional Water Quality Control Board San Francisco Bay Region (Water Board). 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Interim Final. November 2007 (revised May 2008).

SulTech (Sullivan Consulting Group and Tetra Tech EM Inc.). 2007. Draft Final Expanded Site Inspection, Additional Characterization at the Former Degreasing Plant, Investigation Area C2, Mare Island, Vallejo, California. Dec

Please feel free to contact me at (415) 972-3150 if you have any questions about this letter.

Sincerely,

Carolyn d'Almeida,
Remedial Project Manager

cc: Chip Gribble, DTSC
Paisha Jorgensen, RWQCB