



Department of Toxic Substances Control

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**COMMENTS TO DRAFT TREATABILITY STUDY COMPLETION REPORT;
REMEDIAL UNIT C5, BUILDING 134, HUNTERS POINT SHIPYARD, SAN
FRANCISCO, CALIFORNIA**

Dear Mr. Forman:

The Department of Toxic Substances Control (DTSC) thanks you for the opportunity to review the Draft Treatability Study Completion Report, Remedial Unit C5, Building 134, Hunters Point Shipyard, San Francisco, California dated October 11, 2011 (TS Completion Report).

The TS Completion Report presents the results of a groundwater treatability study (TS) conducted at Installation Restoration (IR) Site 25, Remedial Unit (RU)-C5, Building 134 in Parcel C, to demonstrate a multicomponent treatment strategy for a chlorinated organic contaminant source zone and contaminant groundwater plume. The TS was conducted to demonstrate treatment of various volatile organic contaminants (VOCs), including chlorinated ethenes and benzenes in the source zone and contaminant plume. A suite of technologies was evaluated in the TS, including: [1] hydraulic fracturing to enhance distribution of a long-lived solid phase amendment, EHC®, which couples in situ bioremediation (ISB) with zero valent iron (ZVI) reduction; [2] thermal conduction heating (TCH) within the dense nonaqueous phase liquid (DNAPL)-impacted source zone; and [3] LactOil® injection polishing.

Based on our review, DTSC has the following comments:

- (1) Section 1.2.2.3 - TC2 Thermal Conduction Heating. Summary of TCH system operations item 3. Please briefly explain what "superposition of heat" is and how it resulted in a temperature rise throughout the target treatment zone.

- (2) Section 2.3 – MVS Modeling. First paragraph, second sentence does not make grammatical sense and should be corrected accordingly.
- (3) Section 2.3.3 – Methodology for Baseline Contaminant Mass Estimate.
 - (a) Please verify that both the information and terms presented in this section are consistent with previous sections. For example, the text in this section states that “non-detect values were entered into the MVS software as 1×10^{-4} milligrams per kilogram (mg/kg) as a place holder” while text in the earlier Section 2.3.2 states that non-detects were modeled as 1/10 the quantitation limit. The text also states that a “horizontal/vertical anisotropy of 3 was chosen” as the best-fit compared to a “vertical/horizontal exaggeration” of 2 as presented in Section 2.3.2.
 - (b) Paragraph two. Please specify if the soil density of 1.6 grams per cubic centimeter was assumed or if that number was based on site-specific RU-C5 data gathered as a component of the current treatability study.
 - (c) Model Assumptions item 7. Please clarify the technical basis for why the mass of the NAPL mixture is not applicable to the vapor phase for the RU-C5 Building 134 Treatability Study as stated in the text.
- (4) Section 2.4.2.2 – Groundwater Flow. Second paragraph. When describing the A-aquifer groundwater flow direction, the text refers to Figure 2-8 and mentions a groundwater mound “near the center of Building 134.” The figure actually appears to present a groundwater mound near the center of the former degreaser, and not in the center of the building. Please clarify.
- (5) Section 2.5.1.2 – Amendment Distribution with Hydraulic Fracturing. Paragraph four. Please clarify that well IR25MW15F was a historic groundwater monitoring well that has been decommissioned and was located immediately to the west of the former separator. Well IR25MW15F’s location before decommissioning is presented in Figure 2-4 and may also be referenced in the text.
- (6) Section 2.6.3.2 – Installation of Surface Cover and Insulation. Photos of the actual well field and monitoring points (inside Building 134 and outside) should be provided in the TS Completion Report and referenced in the text.
- (7) Section 2.6.6.1.1 – Performance Monitoring Rounds. Please provide a technical explanation in the text as to why no groundwater performance monitoring samples were collected for rounds 1, 2, 3, 7, and 8 (TCH implementation prevented collection?).
- (8) Section 3.1.1.1.2 – Evaluation of Radius of Influence and EHC® Loading. Paragraph four. Please briefly explain or hypothesize how the chemical oxygen demand, representing the concentrations of carbon and fermentation products, increased in some of the wells during the thermal conduction heating treatment component 2 portion of the treatability study.

- (9) Section 3.2.1.2 – Contaminant Extraction Rates.
- (a) Item 3. Please clarify if the 5 to 6 gallons of water accumulated in the drums also means that no LNAPL and DNAPL was extracted and separated over the course of the TCH treatment implementation.
 - (b) Last paragraph. The text references a black line on Figure 3-7 representing the “influent vapor rate”, but it appears that such a line does not exist in the figure. Please correct either the text or the figure accordingly.
- (10) Section 3.3.2 – Technical Performance TC3: LactOil® Polish. The text states that the performance evaluation of the carbon polish with LactOil® treatment is incomplete because the time required for geochemical conditions and reduction of COCs will take between 6 months and 1 year following injections. Therefore, please briefly describe how the results will be reported and presented to regulators for review (TS addenda, monitoring reports, etc.).
- (11) Section 3.3.2.1 – TC3: Polish Radius of Influence and Loading. The text states that injections were successful with the exception of two wells. Please specify which two wells the injections were not successful and briefly describe what occurred to deem them unsuccessful.
- (12) Section 5.1.1.1 Summary of technology performance for each treatment component. Please consider adding an additional column to report the total treatability study numbers for each treatment component.
- (13) Section 5.3 – Recommendations and Integration with BGMP.
- (a) Ongoing anaerobic dechlorination of chlorobenzenes will likely result in continued production of reductive daughter products, including benzene. Considering the site-specific information gathered in the Treatability Study, are there any recommendation(s) that can be made to address benzene and other reductive daughter products that will remain in soil, groundwater, and soil gas at RU-C5 after the anaerobic dechlorination has run its course?
 - (b) Based on groundwater and soil gas sample results obtained during the current study from monitoring well IR25MW16A and soil vapor wells in the immediate vicinity, please consider a recommendation to come back as a component of Parcel C ROD implementation to address the VOC contamination that is likely from a separate source in the area.
- (14) Table 2-2 Soil Sample Description and Field Screening Results. Sample number 25SS26-0710 from boring IR25B030 at 36 to 38 feet bgs has a PID screening result of “X” which appears to be in error. Please correct accordingly.
- (15) Table 2-21 As-Built Installed Depths of Heater Wells. Please add an additional table footnote in order to clarify what the difference is between “heater” and “heater can” depths.

- (16) Table 2-22 Heater Cans and Liners Compromised during Treatment. Please add a table footnote briefly describing the criteria used to identify if a can or liner is "compromised" as well as a brief description of what, if any, impact this had on the performance of the heater(s).
- (17) Table 2-23 Calculated DRE of Vapor Treatment System Based on Monthly Influent/Effluent Summa® Samples. Please add a column identifying the dates over which each row of data applies.
- (18) Table 3-1 – Results of Tiltmeter Geophysics with Fracture Extent from the Borehole. Please add table footnotes to more clearly define what "fracture height" and "fracture width" means. It is unclear if the fracture height means the depth below ground surface of fractures created within each borehole as well as if the fracture width corresponds to the total ground surface horizontal length or along the dip angle outward from the borehole.
- (19) General comment regarding figures. Some of the groundwater monitoring well and soil boring locations have up to four different names or numbers associated with them. For example, IR25MW63A / IR25B030 / IR25B040 / MIP1-15 are all the same location making the presentation somewhat confusing. Please clarify the presentation with a general figure footnote or additional legend explanation.
- (20) Figure 2-3 – Monitoring Well, Soil Vapor Sample, and Soil Boring Locations. There are some additional figure features that appear to be in error and should likely be removed. Unidentified objects appear above the IR25MW66B / IR25SG066 and IR25MW16A figure texts.
- (21) Figure 2-27 - Well Construction Details. For the horizontal SVE well, please add a footnote identifying the source of the recycled concrete used in the current study.
- (22) Figures 2-31 and 3-4. Please briefly describe the direction toward which the photos are looking and approximate photo locations (i.e. outside on southwest corner of Building 134) as a figure footnote.
- (23) Figures 2-35, 2-36, 2-42, 3-3, 3-5, 3-6, and 3-7. Please add a vertical line or arrow to each figure that identifies the date when the heating component was shut off (22 April 2011).
- (24) Figure 3-6 – Estimated Total Mass Removed. Please either add a different scale or present both the "Total Influent Water Mass (based on lab) [lbs]" and the "DNAPL/LNAPL produced [lbs]" on a different figure in order to more clearly present this information over time. If no DNAPL/LNAPL was extracted during the course of the TCH treatment implementation, then this information does not need to be included on the graph (see comment 9(a) above).

Mr. Forman
November 10, 2011
Page 5

If you have any questions, please contact me at 510-540-3775 or by e-mail at rmiya@dtsc.ca.gov.

Sincerely,



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E-mail distribution:

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