



California Regional Water Quality Control Board

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INTERIM DATA SUMMARY, UST CLUSTER 2 SOIL VAPOR EXTRACTION TESTING, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) CROWS LANDING FLIGHT FACILITY, STANISLAUS COUNTY

We have reviewed the *Interim Data Summary, UST Cluster 2 Soil Vapor Extraction Testing, NASA Crows Landing Flight Facility, Stanislaus County* (Report), received 25 July 2002. The Report provides the historical analytical and remedial action data, and the conceptual model for Underground Storage Tank (UST) Cluster 2. The Report also proposes six soil sampling locations to further evaluate the effectiveness of the soil vapor extraction (SVE)/biosparging remedial system (system). The system was used as an SVE system to remove Total Petroleum Hydrocarbons (TPH) as gasoline (TPH-g) as diesel (TPH-d), as jet fuel (TPH-j), as motor oil (TPH-o), and benzene-toluene-ethylbenzene-xylenes (BTEX) from the vadose zone soils.

The Report states that the system operated as designed from 31 January to 2 June 2000. The Navy conducted performance testing in SVE mode until 24 September 2000. Between 26 September and 23 October 2000, the influent and individual SVE extraction wells were tested for average TPH vapor concentrations (TVPH) using flame ionization detector (FID), photo ionization detector (PID), and an oxygen analyzer to evaluate rebound effects in the vadose zone. Influent vapor was collected in SUMMA canisters and analyzed for TVPH monthly in a laboratory.

The Report states that TVPH concentrations decreased significantly in all but two extraction wells, CL2-BV-01 and CL2-BV-02. Those wells showed significant rebound in concentrations, up to 2,530 parts per million by volume (ppmv) TVPH.

General Comment:

In our letter dated 25 September 1998, we provided additional comments specifically to finalize the *Final Corrective Action Plan, Underground Storage Tank Sites, UST Cluster 1, Cluster 2, 109 and 117, Navy Auxiliary Field, Crows Landing, California* (CAP, 30 June 1998). On 2 November 1999, we received the performance testing protocols and the decision tree (Figure 3) for *UST Cluster 2, NASA Crows Landing Flight Facility, Draft Long-Term Performance Monitoring Plan* (Monitoring Plan, dated 1 November 1999). On 16 November 1999, a *Draft Corrective Action Plan Addendum, UST Cluster 1,*

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Cluster 2, 109 and 117, Navy Auxiliary Field, Crows Landing, California (Addendum) was issued, which was never finalized. The meeting minutes for the 20 January 2000 RPM Meeting state that all agencies agreed to use the Monitoring Plan decision tree (Figure 3) during the remediation at UST Cluster 2.

The Report, however, states that the UST Cluster 2 performance testing was done in accordance with the protocol specified for UST Cluster 1 in *Soil Vapor Extraction Optimization for the Remediation of UST Cluster 1 and Site Verification Activities at Various Sites, NASA Crows Landing Flight Facility, Revision 2* (Work Plan), dated 4 May 2001. The Work Plan does not include Figure 3.

Rebound testing described in the Report contradicts the protocol given in Figure 3. Figure 3 states that when wellhead vapor concentrations are below 2,500 ppmv and at asymptotic conditions, then the system would be shut down for one week, restarted, and evaluated for rebound effects. Additionally, if any wellhead in the system rebounds to 2,500 ppmv or more, then the SVE system would be restarted and run until TVPH soil gas concentrations dropped below 2,500 ppmv. System operation would continue until all wellheads showed minimal rebound effects.

The Report states rebound was evaluated after two system failures occurred during a period of 53 days. System shutdown occurred on the day following the second system failure. Contradictions to the decision tree in Figure 3 include the following:

- Rebound testing lasted one month, not one week;
- TVPH concentrations increased above decision tree levels in well CL2-BV-02 to 2,530 ppmv by FID after one month, but the system was not restarted;
- CL2-BV-01 and CL2-BV-02 showed significant increases (double the FID concentrations at shutdown) during the rebound testing, yet the system was not restarted;

Regional Board staff did not approve the deviations from Figure 3. Please provide the rationale for deviation from the approved Monitoring Plan in the Draft Closure Plan for UST Cluster 2.

Specific Comments:

1. Page 3, second table of soil sample locations:

- a) The table shows that verification soil sample depths vary between 22 feet and 35 feet below ground surface (bgs). The table uses four different vertical depth spacing variations (5, 8, 10, and 13 feet) at six locations. The text does not explain the rationale for the wide variation in soil sample spacing.
- b) The most recent available groundwater data (February 2002) shows that the winter water table at the site varies from 37 to 43 feet bgs. Groundwater levels typically drop during the dry summer months. The Report, Attachment 1 Historical Soil Analytical Data cross-sections (A-A' and B-B') show that soil staining extended down to almost 50 feet bgs at CL2-MW-02, CL2-MW-05, and CL2-SP/BV-01.

Therefore, we request that the Navy take additional soil samples at depths greater than 35 feet, down to the groundwater table, using either a 5-foot vertical sample spacing, or at depths correlating to know TPH-d concentrations from previous investigations. See Specific Comments 3, 4 and 5.

2. Appendix A, Site-Specific Groundwater (and Soil) Sampling Form (Forms): The Forms show that soil samples will be analyzed for volatile organic compounds (including benzene-toluen-ethylbenzene-xylenes), TPH-d, TPH-g, TPH as jet fuel, and TPH as motor oil. We request that the soil sample(s) with the highest TPH concentration(s) also be analyzed for TPH using the Waste Extraction Test (WET) with a centrifuge separation preparation (not paper filtration), to allow Regional Board staff to evaluate leachability and the remaining threat to water quality from any remaining petroleum hydrocarbons.

3. Appendix A, Site-Specific Groundwater Sampling Form (Forms): One Form proposes a sample location near former soil sample location SB2-9 with proposed soil sample depths of 22 and 35 feet bgs. The Report cross-section C-C' shows that contamination does not exist below 33 feet bgs at SB2-9. Please change the proposed 35 foot depth sample (CL2-GP-01) to 32 feet bgs.

4. Appendix A, Site-Specific Groundwater Sampling Form (Forms): One Form proposes a sample location near former soil sample location SB2-2A. The Report does not provide a cross-section with depth-specific data, or data in Table 4-4, for SB2-2A. Without data for SB2-2A, we cannot evaluate the new proposed sample location. A nearby location, SB2-2, was non-detect at all soil sample depths. The Report cross-section A-A' shows that nearby monitoring well CL2-MW-02 reported TPH-d in soil at 27 feet bgs (2700 mg/kg), 36 feet bgs (2900 mg/kg), and 42 feet bgs (3250 mg/kg). Please switch this sample location to a location closer to CL2-MW-02, to evaluate soil at an area of higher reported TPH-d concentrations.

5. Appendix A, Site-Specific Groundwater Sampling Form (Forms): One Form proposes a sample location near former soil sample location SB2-6, at 25, 30, and 35 feet bgs. SB2-6 soil analysis reported the highest concentration of TPH-d (5200 mg/kg) at 40 feet bgs. Please add a 40 foot depth sample, and move this proposed location to a new location between SB2-6 and CL2-SP/BV-01 (4600 mg/kg at 25 feet bgs). If you decide to keep the original proposed location near SB2-6, then add an additional sample location and sample depths as requested.

We concur with the UST Cluster 2 soil sampling proposal, if modified as requested in our comments. We believe it would be beneficial to discuss SVE Start/Stop Criteria and closure criteria for UST Cluster 2 prior to conducting the fieldwork, to ensure that the data collected are adequate to support any decisions.

If you have any questions please contact me at (916) 255-3050 or bartonj@rb5s.swrcb.ca.gov.


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