

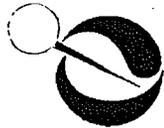


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MEMORANDUM

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DATE: 16 December 2010

SUBJECT: Crows Landing Draft Feasibility Study

DOCUMENTS REVIEWED OR CITED

- 1) *Draft Feasibility Study, Site 17 Administration Area Groundwater Plume, NASA Crows Landing Flight Facility, Crows Landing, California* (Draft FS Report), dated November August 30, 2010, and prepared by Terra Pacific Group.
- 2) *Draft Phase 3 Bioremediation Treatability Study Report, Site 17 Administration Area Plume, NASA Crows Landing Flight Facility, Crows Landing, California* (Draft Phase 3 Treatability Study Report), dated November 1, 2010, and prepared by Oneida Total Integrated Enterprises.

INTRODUCTION

At your request, the Geological Services Unit (GSU) has reviewed the Draft FS Report which documents the selection process for selecting Alternative 4 (Enhanced Bioremediation with Recirculation) for achieving target remedial action objectives (RAOs). The review examined the rationale for alternative selection and supporting

figures and data. The chief contaminants of concern (COCs) at the Site include benzene, 1, 2-dichloroethane (DCA), carbon tetrachloride, and total petroleum hydrocarbons.

The following comments with recommendations address specific portions of the Draft Phase 3 Treatability Study Report text. The recommendations address incorporation of new treatability study data, the focus on carbon tetrachloride, and the examination of vadose zone impacts. The Draft FS Report is a draft document; consequently, the recommendations can be addressed in draft-final documents.

COMMENTS WITH RECOMMENDATIONS

COMMENT 1: Draft FS Report and Draft Phase 3 Treatability Study Report

The Draft FS Report is dated August 30, 2010, in advance of the Draft Phase 3 Treatability Study Report prepared November 1, 2010. The Draft FS Report recommends a remedial program for ground water RAOs based on analysis of four alternatives. The alternative analyses appropriately included the nine evaluation criteria established by the United States Environmental Protection Agency (USEPA, 1988a).

"The purpose of a treatability evaluation is to provide information needed for the detailed analysis of alternatives and to allow selection of a remedial action to be made with a reasonable certainty of achieving the response objectives (USEPA 1988a)." The treatability results can be used for evaluation of technologies during the detailed analysis phase of the Feasibility Study (1988a). However, the Draft Phase 3 Treatability Study Report results were not included with the Draft FS Report. Although preliminary data or results from an on-going treatability study can be incorporated into a draft feasibility study, the Draft FS Report does not include or refer to data or results from the third phase (Phase 3) of the treatability study, nor does it state that on-going treatability study results will be evaluated and included in the draft final version of the feasibility study.

Recommendation

GSU recommends that the Draft Phase 3 Treatability Study Report results be incorporated and evaluated with respect to Alternative 4 in a draft final feasibility study report.

COMMENT 2: Alternative 4 Applied to All Sites in Administration Area Plume

The Administration Area Plume consists of three source areas: UST Cluster 1, IRP Site 17, and UST Site 117. According to Draft FS Report Section 7.2.4, carbon tetrachloride is the focus of ground water extraction and treatment in the Administration Area Plume.

According to the Draft Phase 3 Treatability Study, each site underwent different treatments and rebound tests. The Draft Phase 3 Treatability Study focuses on the following COCs for each plume area:

UST Cluster 1: Benzene and DCA in soil, and in the shallow and the mid-shallow monitoring zones

UST Site 117: Benzene and DCA in the shallow and mid-shallow monitoring zones.

IRP Site 17: Carbon tetrachloride in the shallow, mid-shallow and mid-deep monitoring zones.

Draft Feasibility Report Section 8.5, Detailed Analysis of Alternative 4, emphasizes that achievement of RAOs for carbon tetrachloride drive the alternative implementation. However, carbon tetrachloride was not a primary COCs in two of the three Administration Area plumes addressed in the Draft Phase 3 Treatability Study.

Draft Feasibility Report Section 4.2.1 discusses the selection of benzene, DCA, and carbon tetrachloride as COCs for the Site. In that discussion, there is no ranking of the COCs. Although carbon tetrachloride is one of the identified COCs, it is unclear why it is the focus of the Alternative 4 ground water extraction program described in Draft FS Report Section 7.2.4, Alternative 4 – Enhanced Bioremediation with Recirculation. It appears that the other COCs, chiefly benzene and DCA, are to be captured incidental to the carbon tetrachloride remediation. The incidental capture of benzene and DCE with carbon tetrachloride should be explicitly stated as the strategy for achieving RAOs.

Recommendation

GSU recommends that the draft final feasibility study report include a discussion of the choice of carbon tetrachloride as the focus of ground water extraction and RAO attainment and explain how carbon tetrachloride-focused treatment will impact other COC concentrations.

COMMENT 3: Alternative Selection in Advance of Phase 3 Treatability Study Results

Draft FS Report Section 10.0 states that Alternative 4, Enhanced Bioremediation with Recirculation, meets the criteria for highest ranking amongst four alternatives. The Alternative 4 highest ranking resulted, in part, from its relatively rapid potential for achieving site-boundary RAOs with active ground water hydraulic controls and carbon-enhanced re-injection.

The selection process for Alternative 4 is tabulated in Draft FS Report Table 8-1 (Summary of Detailed Evaluation of Final Remedial Alternatives). Draft FS Report

Section 8.5 provides detailed description of the Alternative 4 processes. In Table 8-1, under the column titled "Reduction of Toxicity, Mobility, and Volume", source area mass will be reduced through "natural processes". Reduction of source area mass is a powerful method for reducing ground water impacts. However, other than the Table 8-1 statement that source area mass will be reduced through natural processes, the Draft FS Report does not present the analysis of source area mass reduction and its remedial benefits to ground water contamination.

Vadose zone biosparging was successfully performed at UST Cluster 1 source area as documented in Draft Phase 3 Treatability Study Report. Draft FS Report Section 6.2.7.2, Biological Treatment, in the subsection titled Biosparging, states that benzene is the primary COC and that the biosparging technology is "being currently pilot-tested at UST Cluster 1". Considering that the Phase 3 biosparging results were not yet complete when the Draft FS Report was prepared, the Phase 3 UST Cluster 1 biosparging results for the residual benzene mass were not included in the analysis of Alternative 4. Also, the Draft FS Report does not include benzene as the primary COC at UST Cluster 1 in the alternative discussion. Rather, carbon tetrachloride is the focus of ground water treatment while residual mass benzene appears to be relegated to monitored natural attenuation (MNA) remediation.

It is unclear how the MNA residual mass remediation for UST Cluster 1 was selected without the Phase 3 biosparging results. The results of the Phase 3 biosparging results should be included in the draft final feasibility study discussion of Alternative 4 criteria. Other Phase 3 biotreatment results should be incorporated in the draft final feasibility study report.

Recommendation

GSU recommends that the results of the Phase 3 bioremediation study documented in the Draft Phase 3 Treatability Study Report, particularly the biosparging results for benzene-impacted vadose zone contaminant residual mass, be included in the discussion Alternative 4 selection.

Please contact me at (916) 266-6538 or wrowe@dtsc.ca.gov if you have any questions.

Reference

United States Environmental Protection Agency (USEPA), 1988a. Guidance for Conduction Remedial Investigations and Feasibility Studies Under CERCLA: EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.