



STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION



17 August, 2000

John Burleson
BRAC Environmental Coordinator
Stratford Army Engine Plant
550 S Main St.
Stratford, CT

RE: SAEP Pilot Scale Treatability Study Report for OU 2

Dear Mr. Burleson:

DEP has reviewed the "Pilot Scale Treatability Study Report for the Chromium and VOC Groundwater Operable Unit (OU) 2, EE/CA, Stratford Army Engine Plant, Stratford, Connecticut" dated June, 2000, prepared for the U.S. Army Corps of Engineers, New England District, Concord Massachusetts by Foster Wheeler Environmental Corporation and Harding Lawson Associates.

DEP Permitting, Enforcement and Remediation Division offers the following comments:

- Expand the discussion of hydraulic containment. The demonstration of hydraulic containment of the injected chemicals on the basis of head measurements only addresses the center part of the test cells. Please also evaluate how the measured heads relate to the predicted heads, based on the groundwater flow model, to document containment at the periphery of the cell as predicted by the model. This evaluation should also take into account the actual extraction rates, which were less than those used in the model prediction. What are the implications of the significant variance in differences in head reported for the two different but similarly operated cells; is this associated with precipitation fouling of the well or aquifer? Consider also the implications of detected injection chemicals in areas beyond their predicted locations when making your evaluation; is this due to diffusion or convection, and what are the implications for containment? Demonstration of containment/control is a necessary element for DEP permitting of the injection element of the project.
- Please expand the discussion of sample age as it affects the reported results. Describe the implications of the conditions described on the interpretation of treatment chemodynamics and effectiveness. Clarify if the effects are principally associated with the TCE test cell or also affect the evaluation of the Chrome test cell. Include comparison of treatment flow lobes with the flushing-only flow lobe in your interpretation.
- The long-term effectiveness of the treatment cannot be fully evaluated until the rebound effects are documented. Are residual Fe and Mn concentrations providing a masking of potential long-term pollutant concentration rebound during the early post-injection period for phase 2?
- What is the long-term stability of the reduced and precipitated chrome under expected evolution of natural aquifer conditions? The results of chrome analyses in the TCE test cell suggest that reoxidation and mobilization of chrome may readily occur.

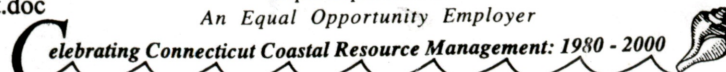
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- DEP recommends further evaluation of the concept of flushing chrome solely with a water injection, in a pump and treat mode. While there was some rebound during the test, possibly due to sorbed chromium or chromium isolated in low permeability zones, the test data suggest reasonable effectiveness in removal may be achieved, especially in a pulsed operational mode. Removal of the bulk of pollutant mass is a permanent remedy, as opposed to the stabilization achieved through reductive precipitation. Removal might be enhanced, and sorption effects overcome, through soil washing with an organic acid as an alternative to the stabilization approach to mitigation.
- The selection of Connecticut's Remediation Standard Regulation Surface Water Protection Criteria is an appropriate treatment performance goal for an interim remedy. However, the results of the RI evaluation of groundwater fate and transport to the tidal flat, and comparison to Connecticut's Surface Water Quality Criteria, may indicate a different performance standard is appropriate for the final remedy.
- It appears that aquifer heterogeneity, native groundwater flux, tidal effects, sorption, aquifer and screen fouling by precipitates, higher necessary injection rates, and other factors may significantly affect the ability to scale up the test cells to a full treatment system. The proposal for full scale design should include contingencies to allow these issues to be addressed as necessary, and the EE/CA should carefully evaluate the practicality of the proposed remedy.

If you have any questions please contact me.

Sincerely,



Kenneth Feathers
Supervising Sanitary Engineer
860-424-3770

Enclosure
Attachment

CC: Meghan Cassidy, EPA
Nelson Walter, HLA
Don Gonya, DEP