

MEMORANDUM

TO: Treasure Island Restoration Advisory Board, and Jim Sullivan - NSTI

FROM: Paul V. Hehn, Treasure Island RAB - Technical Subcommittee Chair

DATE: April 19, 1996

RE: Comments on Document from Technical Subcommittee
Document "Bench Scale Soil Bioremediation Treatability Study"

The following compiles the main points of discussion and areas of concern expressed by those RAB members who had reviewed the "Bench Scale Soil Bioremediation Treatability Study - Draft Work Plan". This summary compiles the verbal and written comments and questions submitted by RAB community members Pat Nelson, Chris Shirely, John Allman and myself.

I have again taken the liberty of submitting the compiled comments and questions expressed into an overall General comments and questions category and Specific issues dealing with sections of the document. Included are Specific comments of my own from my review of the document.

DOCUMENT:

BENCH SCALE SOIL BIOREMEDIATION TREATABILITY STUDY
(Draft Work Plan)

General Comments

- Since the timeline presented in the draft work plan is out of date, what is the current schedule to complete this work?
- Where will the actual bench scale tests be performed? Should be done at Treasure Island in order to complete them under actual site conditions?
- What is the cost of this study?

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- What is the cost of this study?
 - If the petroleum hydrocarbons issues are to be moved from the CERCLA process to the lead of the Regional Water Quality Control Board (RWQCB), is it even beneficial to do this bench scale study at all?
 - The basis of the overall study already seems very dated in light of the new regulatory picture for petroleum hydrocarbon remediation under the guidelines of the RWQCB. Should this study be put off until the petroleum hydrocarbon lead agency issue is resolved? It may turn out that the study is not necessary or should be totally revised in light of new requirements. The money might be better used for actual cleanup or other purposes than a "dated" bench scale study.
 - The location of the water table in relation to the test holes proposed and whether the depth of the test holes will be where the maximum or mean concentration of the contaminant occurs is not specified. Should be more specific.
 - The information in Tables 1 and 2 as to the depth where concentrations are observed are rather broad and inclusive (2 to 5 feet for instance), or not available as in Table 1. Table 2 information is better but it is unclear if the data is from the immunoassay or "in laboratory" analysis. How good are these results? Needs to be discussed.
 - What is the condition of the media prior to the bench scale testing? Is it a slurry or a solid? If a slurry, as it dries will it volatilize VOCs? Will the results if this is happening be a true measure of the results?
 - What was the rationale for using bioremediation (versus other technologies), and how can soil and groundwater technologies be used in a complementary fashion to address sites in totality? That is, using an alternative such as bioremediation combined with extraction/treatment of groundwater to contain plume and use of other technology such as air sparging or vapor extraction to treat volatiles? How do they or should they be combined?
 - This report begs the question "what's in the groundwater if the soil levels are high?"
 - Why are the soil sample results of the Phase II-B investigations used here before the Phase II-B report is reviewed and released? If this information is available why has the report, or at least the analytical data with accompanying
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maps not been released to the RAB for review and comment??? Has this data all been validated now???

- *What happens to the metals that may be in the soil after the bioremediation takes place and is completed? If this method is proposed for the overall site, there are other constituents of concern that will also have to be addressed? What happens to them in the soil? Will they be placed back in the ground?*
- *Is this study to be done entirely aboveground at the testing laboratory or will there be in-situ tests also completed?*
- *Have in-situ bioremediation alternatives also been considered?*
- *If this method works, will all soil be remediated aboveground or will the method be extrapolated to in-situ work? If to be used in-situ, then it should be tested in-situ not under "perfect" controlled laboratory conditions and then extrapolated!*

Comments on Specific Sections by Paul V. Hahn

- Section 2.3 - Was the draft initial screening of technologies report (PRC 1994) ever finalized? If not, why not?
- Section 3.1 - It is unclear as to whether or not the tests will be done above ground or in-situ? Do the limiting factors really make the bioremediation an infeasible option or only direct what needs to be done to make them feasible? Needs to be clarified.
- Section 3.2 - Describes the two different soil types. How are they differentiated? I thought that the soil was considered to be uniform throughout? What is the basis for the differentiation?
- Section 3.2 - What is X-19 microbiological humic polymer? What is it composed of? What is it suppose to do?
- Section 3.2 - Are all of the soils to be composited for the bench scale tests? What if the different soils react differently and bioremediate at different rate? Shouldn't we know this? Should the soil types be separated and tested separately?
- Section 3.3.2 - Are any of the tests to be conducted in-situ for volatilization from the soils? If this method works and the bioremediation is to be done above ground, will there be air permits secured from the Bay Area Air Quality Management Board? There are normally restrictions as to the amount of soil

that can be aerated per day. Will an air permit be required for the bench scale tests?

- Section 4.1 - How can the ability to attain the target cleanup goals be determined if the cleanup goals have not been established yet?
- Section 4.1 - Why is it important to “evaluate that reductions in contaminant concentrations in NAVSTA TI soil are caused by biodegradation and not abiotic processes such as volatilization”? Please explain.
- Section 4.1 - What is the “next level of testing”?
- Section 4.1 - How were the performance goals established?
- Section 4.2 - What is “remedy-selection testing”?
- Section 4.2 - What laboratory analytical methods will be used to test the soil for the results of the bioremediation testing? Will they tested in a laboratory or by immunoassay? Which laboratory will be used for the testing?
- Section 5.1.2 - If the soil will be collected from large excavation pits, how is the uniformity of the samples determined? Will additional composite soil samples be collected from the soil prior to bench scale testing to know what the average concentration in the test soil is prior to starting the test or will the previous drill hole soil sample data be averaged to get the starting test sample concentration?
- Section 5.2.1 - Again, what is “X-19 microbiological humic polymer”? We need some information on what it is and what it is composed of.
- Section 5.2.1 - What are the “special groups of microorganisms supported by X-19”? Are special “designer bugs” going to be added to the soil? If so, need to know what they are.
- Section 5.2.1 - What is “X-19/nitrate enhancement”? How is this different from “X-19 microbiological humic polymer” or “special groups of microorganisms supported by X-19”?
- Section 5.2.2 - Is this section even necessary?
- Section 5.2.3 - Wouldn't it be better to do this test on TI under actual, real-life field conditions rather than a laboratory in the east bay?
- Section 5.2.3 - Under condition #1, add X-19 with a mix ratio of approximately 30 % by volume with mild nitrate solution. What is the actual percentage mix of nitrate to be added? Why no phosphate solution in these pans? Is 30% by volume the actual amount that will need to be used under

field conditions? A large addition to the soil for the problem areas at TL. What happens to the X-19 in the soil over time if it is added to the soil and the soil is put back in the ground after remediation (in the case of above ground remediation or if injected(?) into the ground if used in-situ?

- Section 5.2.3 - Under condition #2, add mild nitrate and phosphate solution (with no X-19). What is the actual amount of nitrate and phosphate to be added? Why phosphate here but not in condition #1?
- Section 5.2.3 - In this test when get a mixture of X-19, nitrate and phosphate, how do you know what is doing the work of remediation of the soil? Is it the X-19, the nitrate or the phosphate? Should each be tested separately?
- Section 5.2.3 - Have the native soils to be used in this test already been tested for amount of nitrate and phosphate to show that they are depleted and need "enhancement"? If not, wouldn't this be important to know for the results of the test and to determine how much nitrate and/or phosphate to add to the soil?
- Section 5.2.3 - If raise the soil moisture content to "approximately 28 to 30%", is this similar to natural conditions on the site in all impacted areas or is this an artificial laboratory condition? If this method is to be used at TL, how will this be controlled? If the method is to be used ex-situ it can be monitored but what about in-situ? How can this be controlled throughout the entire site and with varying weather conditions?
- Section 7.0 - When will the final report be prepared and submitted for review? How long after the completion of the study? Not specified.
- Section 8.0 - The soils used in the testing will be returned to TI for ultimate disposal. Will they be put back into the ground from where they came? will the hole be left open during the entire time of the study? Will they be hauled offsite for disposal? If they are to be put back into the ground, need to know a lot more about the "X-19 microbiological humic polymer" and it's long term effect on the soil, groundwater and environment.