

APR 22 1999



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Re: Comments of the Feasibility Study Technical Memo and Draft Treatability Study Work Plan for the VI Chemical Site, St. Croix, USVI

The USEPA has completed its review of the Feasibility Study Technical Memorandum and Draft Treatability Study Work Plan for the Virgin Island Chemical site in St. Croix, United States Virgin Islands. Both documents were prepared by McLaren Hart on behalf of Berlex Laboratories, Inc. and Pharmacia & UpJohn. EPA's review focused on the technical and engineering merit of these documents.

It should be noted that both documents have been submitted in advance of the Final Remedial Investigation (RI) and Human Health Risk Assessment (HHRA) Reports for the site. In order to complete this review, the following assumptions were made:

- ▶ the summary sections presented in both documents will be consistent with the findings of the Final RI and HHRA Reports; and.
- ▶ the information and findings presented in the Draft RI Report (MH/ET, January 1999) will be consistent with those presented in the Final RI Report.

EPA referenced the Draft RI Report (January 1999) during the technical review to obtain pertinent base-line information regarding site characterization that was not presented the summary sections of the subject documents.

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EPA's general and specific comments on both documents are presented below.

Feasibility Study Technical Memorandum

General Comments

1. It should be noted that EPA has not set a cleanup range for the site. In addition, the text should state that "the risks are within EPA's target risk range of 10⁻⁶ to 10⁻⁴". McLaren/Hart should not further editorialize that these risks "are not considered to be a health concern at the Site". The text should be revised.
2. McLaren Hart still needs to provide the 95%UCL calculations with the Final Risk Assessment. Until EPA approves the Final Risk Assessment, the summary of risks presented in the FS Technical Memorandum is subject to change and therefore any conclusions drawn from the summary are premature. The risk summary may need to be revised after the final review of the risk assessment is completed.
3. The FS Technical Memorandum neglects to summarize critical information related to site characterization that serve as the basis for screening remediation technologies for soil and groundwater. For example, no information is presented regarding the following: the number and size of contaminated areas, magnitude and extent of soil contamination, soil type, depth to groundwater, aquifer characteristics, magnitude and extent of groundwater contamination, and media-specific cleanup goals for each contaminant. This information should be concisely summarized in Section 1 of this document based upon the findings of the RI and HHRA. Relevant figures from these reports (soil contamination and plume delineation maps, groundwater flow maps, vertical profile of site geology) should also be included, and the Final RI and HHRA Reports should be referenced.
4. The FS Technical Memorandum contains minimal discussions pertaining to the site-specific application of the technology alternatives considered as part of the screening process. The information presented is largely generic. Based upon the information presented in the Draft RI Report, it is noted that the remedial technologies screened and the remedial action alternatives developed for further evaluation, as outlined in this document, are generally appropriate for this site.

Specific Comments

1. **Page 2, Section 2.1** - The text on page 2 under surface soil should at a minimum add the word "unacceptable" before the words "health concern at the site".
2. **Page 3, Section 2.1** - It was agreed during the past conference calls that McLaren Hart would screen the subsurface soil data to EPA SSLs (migration to groundwater using a DAF of 20) and present the results in the Final HHRA report. EPA has not seen this analysis so its results can not be evaluated. The text in this subsurface soil section is misleading therefore to state that "no risks exist under a current or future use

scenario", since the results of the SSL comparison have not been incorporated into the HHRA.

Six compounds were found to exceed the SSL screening which would suggest a potential for migration of these compounds into the groundwater. The text dismisses the metals cadmium and cyanide since they were only "slightly above" the SSL limits (however, one exceeded the SSL by 50 percent and the other by 25 percent). These metals cannot be dismissed since they did exceed the SSL limit which was to be used to determine if additional chemicals needed to be evaluated in the HHRA.

3. **Page 3, Section 2.1-** Arsenic should not be deleted for reasons discussed in the NCP (40 CFR300.430(e)(2)(A)(2). The NCP basically states that the 10⁻⁶ risks level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of multiple contaminants at a site or multiple pathways. With respect to this, the cumulative effect of multiple chemicals should be evaluated, including arsenic, since the risk is in the 10⁻⁵ range. In later stages it can be noted that arsenic is below the MCLs a discussion of the hydrogeologic conditions that identifies the plume and indicates that the wells are representative of the site conditions can be introduced.

The reasoning for the deletion of lead from the analysis is weak since the analyte was detected at a concentration of 50.7 ppb during the second round of sampling. The reasoning for why this compound is detected intermittently is not strong enough to warrant deletion as a COC. Manganese cannot be deleted as a COC since the HHRA identified a HI of 4.52 for exposure to this chemical in a commercial use scenario. In addition, there is no target range for HQ other than 1. Please clarify where the target range of 0.1 to 10 comes from.

4. **Table 4-** Offsite discharge to the public-owned treatment works (POTW) should be retained as an alternative to onsite discharge. Insufficient technical information was presented in the document to eliminate this alternative during preliminary screening. The results of a detailed analysis could reveal offsite POTW discharge to be the preferred disposal alternative.
5. **Table 6 -** Refer to Comment #4.
6. **Tables 7 and 8 -** Please clarify which treatment method will be evaluated for Alternative 4. Based upon Table 6, a number of sub-alternatives could be included corresponding to the in situ and ex situ treatment technologies retained after screening. It is also recommended that alternatives presented in order of increasing cost and design conservatism. Consider the following suggested modifications:
 - ▶ Keep Alternatives 1 and 2 the same;
 - ▶ Re-structure Alternative 3 as "Source Control with Monitored Natural

- Attenuation (MNA)";
- ▶ Re-structure Alternative 4 as " Full Hydraulic Control and Treatment "(Pump and Treat)";
 - ▶ Include other alternatives, as appropriate;
 - ▶ Prior to completing the detailed evaluation of alternatives, perform focused evaluations to 1) identify the preferred method of source control, considering pump and treat and the in-situ treatment technologies retained in Table 6, for inclusion in Alternative 3 and 2) identify the preferred disposal method for inclusion in Alternative 3 (if pump and treat) and Alternative 4; and
 - ▶ Summarize the scope and results of focused evaluations in technical memorandums that are appended to the FS Report and referenced accordingly.

Draft Treatability Study Work Plan

General Comments

1. The study requirements (e.g. sampling, filed measurements) described throughout this work plan are redundant and inconsistent. It is recommended that these requirements be accurately detailed in Table 6-1, and that Table 6-1 be referenced in the text, accordingly, to prevent confusion.
2. Figures delineating the impacted area of soil and groundwater contamination were not included in the work plan. It is recommended that relevant figures from the RI Report be attached. It is noted that the figures in the Draft RI Report only delineate ethylbenzene and xylene plumes in the Above-Ground Storage Tank (AST) Area, a chloroform plume in the Former Process Pit (FPP) Area, and the general area where soils were impacted above the cleanup goals at both locations. For the purpose of this review, it was assumed that the other site contaminants (e.g. acetone, methylene chloride) did not exceed their respective cleanup levels beyond these delineated areas.
3. Based upon Figure 4-2 of the Draft RI Report, it is suggested that split spoons be collected during the upcoming installation of Treatability study wells and monitoring points. Well screens and monitoring points should be biased toward any localized, more-permeable geologic formations that are present (e.g. silty sand versus silty clay) to maximize their performance.
4. Use of a non-hazardous tracer gas, such as helium, should be considered for the SVE/AS pilot study. It can be injected during AS and monitored in the SVE gas and in VMPs to gain further insight regarding AS influence and capture.

Specific Comments

1. **Page 1-5, Section 1.2.5, paragraph 2** - The cleanup goals for site contaminants in soil and groundwater should be indicated.
2. **Page 4-3, paragraph 1 and page 4-5, paragraph 3** - The deep vapor monitoring point (VMP) for each cluster should extend into the saturated zone, so that water level

measurements can be taken from them. Existing monitoring wells are not generally located within the radius of influence (ROI) for the SVE/AS test wells and are insufficient for evaluating groundwater mounding caused by system operation. It is also recommended that water levels be monitored in the SVE wells using data loggers, or equivalent, to evaluate worst-case mounding affects.

3. **Page 4-4, paragraph 1 and page 4-5, last paragraph** - Please indicate the technical basis for the depths selected for AS wells. In addition, saturated zone monitoring points (SMPs) should be installed and utilized to evaluate AS performance, since the monitoring wells proposed in Table 6-1 and shown on Figures 4-1 and 4-5 are generally outside the estimated ROI for AS wells. Based upon Figures 4-5, 4-10, 4-11, and 4-12 of the Draft RI Report, it is also specifically noted that:
 - ▶ of the four wells proposed for monitoring AS performance at the AST Area, MW-6, MW-8, are located upgradient of the AS ROI, MW-1 is located sidegradient of the AS ROI, and MW-10 is located outside the plume area (upgradient); and
 - ▶ of the three wells proposed for monitoring AS performance at the FPP Area, MW-2 and MW-7 are located side-gradient of the AS ROI, and MW-3 is located outside the plume area (sidegradient).
4. **Page 4-7, baseline measurements/activities** - Bullets 1 and 2 should include soil gas samples from the VMPs. Bullet 3 should include depth to water measurements from SVE wells and VMPs/SMPs. Bullet 4 should include groundwater samples from VMPs/SMPs. Bullet 5 should include automatic water level measurements inside SVE wells. The following baseline measurements/data should also be obtained: ambient temperature and barometric pressure, and static vacuum in VMPs.
5. **Page 4-7, Section 4.4.1, bullet items** - Calculations were provided to support that offgas treatment is not required. However, it is recommended that DPNR provide comments to EPA regarding the exclusion of offgas treatment. It is suggested that the SVE offgas, at minimum, be treated with activated carbon prior to discharge and that effluent gas samples be collected after carbon treatment to evaluate its effectiveness. If high loading rates are anticipated or encountered for acetone or chloroform, carbon treatment would not be suitable.

Based upon the SVE well screen length shown in Figure 2-1, it is also recommended that a continuous vapor barrier be placed over the ground surface within the SVE study area to prevent short-circuiting of the system.

6. **Page 4-7, last two paragraphs** - Based upon experience at other sites in the Virgin Islands where SVE is being used to remediate silty clay (low permeable) soils, it is recommended that a more powerful blower be used for pilot testing. It is also noted that flexible hose connections should be sufficiently rigid to withstand collapse under SVE system vacuum.

7. **Page 4-8, paragraph 2** - Please clarify that vacuum measurements will be taken at the VMPs to determine the SVE ROI. Please also clarify that SVE vacuum and air flow measurements will be taken. References to "injection" should also be deleted, since the paragraph pertains to SVE testing only.
8. **Page 4-8, paragraph 3** - Please specify the general criteria for determining when "stabilization" is achieved. It appears that stabilization is achieved when the SVE air flow rate, and the vacuum at VMPs and the SVE blower intake ("physical parameters") approach constant values. It does not appear that the criteria for stabilization include consideration of "chemical parameters," as indicated, unless field VOC measurements (e.g. with a PID/FID) are also being taken. The referenced paragraph indicates that vapor samples would be collected for analysis after stabilization occurs. Also, stabilization should not be limited by "a reasonable length of time." It could, however, be limited based upon a reasonable degree of variation between successive stabilization parameter measurements.
9. **Page 4-9, paragraph 3** - It is suggested that offgas treatment be used, as indicated in Comment #5.
10. **Page 4-9, paragraph 4** - Please specify the general criteria for "breakthrough" in Bullet 1 regarding the FPP Area. Please also specify the general criteria for "noticeable change in the vacuum pressure detected at selected monitoring points." With respect to Bullet 2, please specify the general criteria for "significant reduction of mass removal." Overall, the difference between and significance of the defined "stabilization" and "breakthrough" points of the SVE test is not evident and should be clarified.
11. **Page 4-9, paragraph 5** - The sampling/measurements performed after SVE "breakthrough" should be consistent with the baseline efforts, including the additional sampling and monitoring items noted in the above comments.
12. **Page 4-10, Section 4.4.2, paragraph 1** - It is recommended that the transition from Phase I to Phase II testing be continuous, so that the sampling/measurements taken following the completion of Phase I (SVE testing) will effectively serve as the secondary baseline for Phase II (SVE/AS testing).
13. **Page 4-10, Section 4.4.2, paragraph 4** - It is noted that "efficiency" is typically evaluated as a function of contaminant mass removal and operational cost. It is unclear how DO measurements can be used to evaluate AS efficiency, since the goal of AS is to mobilize contaminants to the vapor phase for recovery by SVE. SVE gas samples would be more appropriate for this evaluation.
14. **Page 4-10, Section 4.4.2, paragraph 4** - Refer to Comment #8. Also, water level measurements should be included to evaluate the AS ROI.
15. **Page 4-11, paragraph 1** - Please clarify at which point that the vapor sampling frequency

will change from three times per day (page 4-10, last paragraph) to two times per day. "Thereafter" does not clearly correspond to any progress milestone.

16. **Page 4-11, paragraph 2** - Refer to Comment #5.
17. **Page 4-11, paragraph 3** - Refer to Comment #2 and #3.
18. **Page 4-11, paragraph 5** - The sampling/measurements performed following the SVE/AS test should be consistent with the baseline efforts, including the additional sampling and monitoring items noted in the above comments.
19. **Page 5-1, Section 5-1, bullet items** - It is recommended that sample ports be included on each SVE well to allow for sampling/measurements that facilitate optimization of system operation under full-scale conditions with multiple SVE wells. It is also noted that SVE wells that are installed, but not used during the SVE/AS pilot study, could act as passive injection wells during the test and produce unrepresentative test results. It is recommended that any wells installed prior to initiating pilot testing be capped and equipped with vacuum gages and sample ports, unless passive injection is also intended to be evaluated as part of the study.
20. **Page 5-1, paragraph 4, bullet items** - Refer to Comment #5. If offgas treatment is used, it is also suggested that effluent gas samples be collected and analyzed to evaluate its performance during the pilot study.
21. **Page 6-3, paragraph 1** - It is noted that "optimization" typically applies to the operation of multiple SVE wells. It is unclear how the operation of one SVE well can be optimized. Achievement of the required capture zone appears to be the most critical factor.
22. **Page 6-3, paragraphs 2 and 3** - Refer to Comment #3. In addition, two data/measurement sets are insufficient for drawing conclusions related to contaminant removal from groundwater. A minimum of three data sets (1 pre-test, 1 during-test, and 1 post-test) should be collected. Based upon the extended duration of this test, 5 data sets (1 pre-test, 3 during-test, and 1 post-test) are recommended. Field measurements (DO, pH, temperature, conductivity, ORP) could also be performed more frequently to gain better insight regarding treatment system performance and changes in the groundwater chemistry. Water level measurements should also be routinely performed to evaluate groundwater mounding.
23. **Page 6-4, Off-Site Soil Vapor Analysis** - Please specify that "gas-tight" syringes will be used for sample collection.
24. **Page 6-5, paragraph 2** - The use of bailers in conjunction with the low-flow purge groundwater sampling technique is not technically acceptable. Groundwater samples should be collected from the pump directly into sample jars.

25. **Page 6-5, DO Measurements During SVE/AS Testing** - Refer to Comment #3. Please also indicate the locations and minimum frequency for DO measurements. Also refer to Comment #22 regarding other field measurements.
26. **Page 6-5, CO₂ Measurements** - Two measurements are insufficient for drawing conclusions. A minimum of three measurements (1 pre-test, 1 during-test, and 1 post-test) should be taken. Based upon the extended duration of this test, 5 measurements (1 pre-test, 3 during-test, and 1 post-test) are recommended.
27. **Page 14-1, paragraph 1** - Please clarify what work is included in the "start-up test."

Appendix A

28. Sections of the analytical procedure are vague and need to be more specific. The following questions should be addressed: 1)How will samples be collected to ensure that the soil gas sample vial is pressurized during sample collection?; and 2) Will the analysis be monitored to ensure that an instrument blank is analyzed after a high concentration sample?
29. Levels of acceptability need to be established for retention time windows and area limits of the standards analyzed during sample analysis.
30. The method is acceptable with the following recommendations: 1)Independent verification of the initial calibration is required to ensure that the system provides true values; 2)The standard analyzed for every ten samples should be obtained from an independent source to that used for the initial calibration; and 3) It is recommended that additional QC, such as, matrix spikes or laboratory control standards be analyzed.

DPNR comments, if any, will be sent to you under a separate cover. Please resubmit the draft Treatability workplan for EPA and DPNR review and approval by May 17. Comments from the FS technical Memo should be addressed in the . A conference call can be scheduled to go over these comments, please call me at (2120 637-4275 to schedule such a call.

Sincerely yours,

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Project Manager
Sediments/Caribbean Team

cc: Syed Saydali- DPNR
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