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DRAFT

October 8, 1996

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PROJECT: ARCS II Contract No. 68-W9-0024
Work Assignment 078-2PN7

DOCUMENT NO.: 7720-078-EP-CLWT

SUBJECT: Technical Review of Draft Supplemental Data Summary
Report
Virgin Island Chemical Site
St. Croix, United States Virgin Islands
Document No.: 7720-078-LR-CLWV

Dear Ms. Devine:

CDM FEDERAL PROGRAMS CORPORATION (CDM Federal) is pleased to submit this letter report entitled, "Technical Review of the Supplemental Data Summary Report for the Virgin Island Chemical Site" as partial fulfillment of the reporting requirements for this work assignment.

If you have any questions regarding this submittal, please do not hesitate to call Pamela Philip at (212) 785-9123.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION

Robert D. Goltz, P.E.
ARCS II Program Manager

cc: C. Kwan, EPA
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Project File
Document Control

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October 8, 1996

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PROJECT: ARCS II EPA Contract No.: 68 -W9-0024
Work Assignment No.: 078-2PN7
Virgin Island Chemical Site
St. Croix, United States Virgin Islands

DOCUMENT NO.: 7720-078-LR-CLWV

SUBJECT: Technical Review of Draft Supplemental
Data Summary Report

Dear Ms. Kwan and Ms. Henry:

CDM FEDERAL PROGRAMS CORPORATION (CDM Federal) has reviewed the Draft Supplemental Data Summary Report (DSDSR) for the Virgin Island Chemical site on St. Croix in the United States Virgin Islands. The report was prepared by Harding Lawson Associates (HLA) on behalf of the potentially responsible party (PRP). The DSDSR is a supplement to the initial Data Summary Report (DSR) dated August, 1995. CDM Federal has the following general and specific comments regarding the DSDSR.

General Comments

1. By design a data summary report is intended to summarize and evaluate all data collected during a site investigation. The analytical data should be combined in a comprehensive manner and include historical data and environmental and physical setting information so a conceptual site model can be formed. Once this model is developed, areas of potential concern can be

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identified and it can be determined, if necessary, what further actions or solutions are required. The DSDSR provides only the results from the Phase II sampling with little, if any, interpretation of the data. No recommendations for further investigation actions are offered. The DSDSR does not synthesize together or reference the results of previous site investigations and, therefore, presents an incomplete analysis of the identified concerns. A final data summary report should be compiled that synthesizes and evaluates all site data as well as recommends additional actions to be conducted at the site.

2. HLA states that the extent of soil contamination has been defined in all directions from the AST Area except to the west. However, HLA must explain further how the vertical and lateral extent of soil contamination to the south of the AST Area has been defined. Samples collected from the southernmost boring, SBB2, contained elevated levels of several volatile organic compounds. The extent of contamination beyond this point has not been defined. Further delineation of the lateral and vertical extent of soil contamination in the areas both south and west of the AST area is recommended. A minimum of four borings in each quadrant should be installed to delineate the extent of soil contamination.
3. As stated above, the report does not compile or interpret past sampling results. Chloroform historically has been identified as a site contaminant of concern but its recent detection in the shallow groundwater in MW-2 (Process Pit) at a concentration above the Federal MCL, 470 ppb, is not subject to any interpretation by HLA. It should be noted that lower concentrations of the compound were previously detected in the two deep process wells P-1 (> 90 feet) and P-2 (> 90 feet). P-1 and P-2 are upgradient and laterally gradient of the former lab pit area, respectively, and upgradient (P-1) and downgradient (P-2) of the process pit area. Chloroform was detected in P-1 at a concentration of 31 ppb and in P-2 at a concentration of 130 ppb. The chloroform value detected in MW-2 is approximately 15 times higher than the P-1 concentration and approximately four times the P-2 concentration.

The detection of chloroform in both the shallow and deep aquifer zone with a higher concentration present in the shallow groundwater zone strongly suggests the site is the source of the chloroform. It should also be noted that no potential upgradient sources have been identified in the area of the topographic high located to the south of the property.

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The extent of chloroform in both the shallow and deep aquifer units needs to be further delineated. As per the EPA-approved HLA work plan, the production wells should be resampled to establish the present quality of the groundwater. The effects of pumping and sampling of the deeper production wells on adjacent shallow wells should be also monitored. It is also recommended that additional shallow and deep monitoring wells be installed and sampled to fully delineate the extent of the VOC groundwater contamination.

Based on a review of historical data, CDM Federal believes that the most likely origin of the chloroform was a direct injection of the compound rather than a surface spillage of contaminants that vertically migrated to the water table. Support for this contention is based on the physical characteristics of chloroform, regional climate conditions, and the regional geologic and hydrogeologic properties at the site. Chloroform is a very soluble and volatile compound (Vapor Pressure: 160 mm @20 C and 245 mm @ 30 C). Given the climate, a surface spill of chloroform in either a dilute or concentrated form would tend to evaporate or vaporize in the shallow soil zone, minimizing the potential impact to the groundwater quality. Conversely, a subsurface discharge or injection of the compound would minimize vaporization and increase the potential impact to groundwater quality.

During previous meetings concerning the site, several below grade structures (i.e., catch basins and recharge pits) that historically discharged untreated effluent directly into the soils were identified. These structures included the centrally located Process Pit and interconnected catch basins and the Laboratory Pit. Operations in the lab pit area resulted in a direct discharge of untreated liquid wastes to an unlined pit while process pit operations discharged contaminated effluent into a drain system whose design specifications are only partially known.

Soil samples collected during HLA's onsite investigations did not indicate chloroform in the soils. However, a chloroform concentration of 200 parts per billion was detected in a composite soil sample previously collected in the laboratory pit area. The DSDSR neither examines these data together nor does it speculate or provide an analysis of this discrepancy.

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Due to the presence of chloroform in the groundwater, additional soil sampling in this area appears to be warranted. The absence of chloroform in HLA soil sample results could be the direct result of the sampling procedures utilized combined with the high volatility of the compound. Consideration should therefore be given to revise future soil sampling protocols to include the methanol extraction procedure which has been shown to be effective in reducing volatilization during the sample collection process.

4. Volatile organic compounds were detected in groundwater samples collected from MW-1 and MW-6, wells located along the site's boundary, at concentrations above Federal MCLs. The groundwater flow direction presented in the DSDSR indicates that a strong potential for the offsite migration of contaminants exists. It is recommended that offsite wells be installed so the offsite migration of site contamination can be delineated.
5. The groundwater elevation data presented suggest the monitoring well network may be insufficient to definitively depict groundwater flow directions. Mapping of groundwater elevations indicate inconsistencies in flow directions with the more recent contour maps showing a "groundwater divide". Insufficient data currently exist to support HLA's assertion that a groundwater divide is present onsite. Evaluations of previous groundwater measurements and local lithology are required to support this assertion. In addition, postulation concerning the cistern does not appear to be supported by the data provided. If the cistern were the source of water recharging the shallow water table it would be anticipated that a mounding effect would be visible around the cistern rather than upgradient of it.
6. A comparison of the Tubers-generated groundwater elevation data and May 1995 groundwater sampling water level measurements indicates that the groundwater samples were collected following a major storm event. The large influx of fresh water from the storm event resulted in a significant rise of the local water table over levels measured the preceding day. This influx of fresh water possibly, and most probably, diluted the contaminants present in the groundwater. Therefore, the May 1995 sampling results should not be considered representative of the actual groundwater quality.

Groundwater elevations measured at the time of the most recent groundwater sampling event (June 18, 1996) show that the water table had equilibrated,

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and minimal, if any, effects from storm related water influx were noted. Therefore, the June 1996 analytical results appear to be representative of actual groundwater quality conditions. The DSDSR should be revised so all previous elevation data is presented and the effects of storm events on analytical data thoroughly evaluated.

Since the validity of the May 1995 data is questionable, it is strongly recommended that a complete round of groundwater samples be collected at the time of equilibrium conditions. Data collected will be used to determine if the current shallow monitoring well network is adequate for groundwater characterization.

7. There appears to be some confusion regarding HLA's data validation procedures and data reporting. Methylene chloride values in several soil samples are flagged with a "B" to indicate blank contamination. If the values in the samples are less than 10 times the associated blank concentrations, then the detected values should be qualified as nondetected and flagged with an "U". However, there are several high concentrations of methylene chloride that are flagged with a "B" but do not appear to be attributable to blank contamination. According to the USEPA CLP National Functional Guidelines for Organic Data Review, EPA 540/R-93/012, February 1994; Section V, Blanks, E (page 21), a "B" qualifier remaining on validated data indicates that the analyte was detected in the associated method blank but can not be attributed to the method blank contamination. These values were most likely not disqualified during validation because the sample results were greater than five or ten times the associated blank value. HLA should revise the data summary so the actual detections of methylene chloride are reported and evaluated.
8. Due to the high volatility of the groundwater contaminants that have been detected in the site monitoring wells, it is recommended that any future groundwater sampling be conducted in accordance with the EPA Region 2 Low Stress Purging and Sampling Guideline. This procedure is recommended since it will reduce sample aeration and will result in the collection of samples that are more representative of actual aquifer conditions.

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9. A proper evaluation of the hydrographs cannot be performed without area precipitation records. The records should be submitted for review and comparison.

Specific Comments

1. **Section 3.2.1:** HLA states that organic vapors were not detected in any surface soil sample, including those samples in which volatile organic compounds were detected in soil samples collected at depth. This statement supports CDM Federal's previous contention that PID surface soil screening or surface soil collection and analysis is inadequate to delineate the extent of soil contamination due to the volatilization of compounds in shallow soils.
2. **Section 3.3.3:** The volatile organic groundwater sample results (volatile fraction) have high detection limits indicating that these samples were diluted. These high detection limits render the results unusable for comparison against regulatory standards. The accepted practice in EPA Region II is to report the undiluted sample results and replace any results exceeding the calibration range (E qualified data) with the diluted result for that particular analyte.

In addition, the principal results of the validation of only the organic data are completely discussed in this section. The validation of the inorganic data should be more thoroughly discussed.

3. **Section 3.2.2:** Based on CDM Federal's review of the volatile organic compound (VOC) soil sampling results, several VOCs were reported by the laboratory, but not identified in the text. These compounds were: 1,1 Dichloroethene; Benzene; and Trichloroethene. The text needs to be expanded to incorporate these compounds.
4. **Section 3.4.1: Fifth Paragraph:** The term "relatively dry period" requires definition. Precipitation records should be provided.
5. **Section 4.1:** It should be noted in the conclusion that methylene chloride and acetone were also detected in soil samples at concentrations above the risk based criteria. In addition, the text should be edited to reflect that the lateral and vertical extent of soil contamination has not been defined to the area south of the AST area. See General Comment # 6.

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6. **Section 4.2:** During the June 18, 1996, only the newly installed monitoring wells (MW-2 and MW-6) were sampled. Since the results of the May 1995 sampling results should be invalidated (See General Comment # 4), a complete round of groundwater sampling is required to evaluate the quality of the shallow and deep aquifer systems at the site. As per the EPA approved HLA work plan, both deep (P-1 and P-2) production wells should also be sampled. Sampling should be conducted only when monitoring of the groundwater elevations reveals equilibration of the water table.
7. **Figure 3-1 and Figure 3-2:** The May 1995 groundwater sampling data can not be presented as being representative of groundwater quality due to the time of sampling. See General Comment # 4.
8. **Figure 3-3:** No explanation or interpretation of the trough observed over the period covering the end of April beginning of May 1996 is provided. The hydrograph for well MW-3 (and to a lesser extent MW-1) is provided. The hydrograph shows a significant, almost instantaneous, water loss followed two weeks later by a storm event. Immediately following the water loss, the slope or trend of the stabilization of the water levels remains constant. Measured precipitation levels should be incorporated (graphed) onto this figure and presented in tabular form.
9. **Figure 3-4:** This figure is confusing. It is presented in black and white with identical line weights for each of the wells graphed. The graphed lines overlap and crossover making it difficult to interpret the data. It is extremely difficult to discern the data provided for wells MW-1, MW-4 and MW-5 for the two weeks leading up to and including the storm event. It also appears that the designation for MW-3 is incorrect.
10. **Figure 3-3 and Figure 3-4:** The MW-1 Tubers data plot shows a regular pattern of peaks and valleys. This significant flow pattern is not seen for any of the other monitored wells. Over the 8-month monitoring period, the depth of the valleys and the rate of recovery are fairly consistent. These peaks and valleys as could be interpreted as Drayton and recovery from a pumping well located to the west of the site. As groundwater contamination, above the Federal MCLs, has been reported in the AST area, the pumping well should be identified and its impacts on site contamination should be evaluated during additional groundwater delineation studies.

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11. **Figure 3-7 and Figure 3-8:** Further examination and evaluation of the "groundwater divide" is required.
12. **Table 3-8:** Nickel, chromium and cobalt results in samples MW-2 and MW-2(Dup) are qualified with both "B" and "U". This is not possible. The result is either non-detect and is qualified "U" or the concentration is between the instrument and the contract detection limit and is qualified "B".

Aluminum in samples MW-2 and MW-2(Dup) are reported on the table with "UJ" qualifiers, however, as the report notes (section 3.3.2.4) these results are above CRDL. No "U" qualifiers should be used with these results.

13. **Table 3-9:** Samples MW-2 and MW-2(Dup) Aluminum, chromium, cobalt, iron, nickel and vanadium on MW-2 are qualified with both "B" and "U". As explained above, the result is either non-detect and is qualified "U" or between the instrument and the contract detection limit and is qualified "B". In addition, the report notes (section 3.3.2.4) that dissolved copper was not detected, however, the table reports copper at 4.2B ug/l. The text should be clarified.

Please contact me at (212) 785-9123 if you have questions regarding this submittal.

Sincerely,
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