



November 20, 1998

Ms. Caroline Kwan
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U.S. Environmental Protection Agency - Region II
Emergency and Remedial Response Division
290 Broadway, 20th Floor
New York, NY 10007-1866

**RE: Island Chemical Site
St. Croix, U.S. Virgin Islands
Field Modifications During Supplemental Remedial Investigation (Phase IV RI)**

Dear Ms. Kwan:

Implementation of the field work for the Supplemental Remedial Investigation (Phase IV RI) at the Island Chemical Site located in St. Croix, U.S. Virgin Islands took place from October 5, 1998 through October 21, 1998. Pursuant to the conference calls between the U.S. Environmental Protection Agency (EPA), CDM Federal Programs Corporation (CDM Federal), Berlex Laboratories, Inc. (Berlex), and McLaren/Hart, Inc. (McLaren/Hart) during the course of the field work, several modifications to the EPA-approved correspondence entitled *Supplemental Remedial Investigation (Phase IV RI)* dated August 12, 1998 and *Clarifications to Supplemental Remedial Investigation* dated August 24, 1998 were discussed and verbally approved by EPA and CDM Federal. The purpose of this letter is to document those field changes and to confirm their approval with EPA. In addition, this letter briefly summarizes the work that took place at the Site and presents the analytical results for the samples collected during the investigation.

Vertical Groundwater Screening

The vertical groundwater screening methodology, as described in the EPA-approved August 12th correspondence, consisted of collecting Hydropunch[®] samples at 10-foot intervals, upon reaching the desired starting depth. Vertical screening points at the EPA-approved locations were to be advanced to the top of bedrock (approximately 100 feet), where a final groundwater sample was to be collected to characterize the overburden groundwater traveling along the top of bedrock.

During the field investigation, Hydropunch[®] samples could not be collected at 10-foot intervals since the nature of the formation did not produce sufficient volume within a reasonable time frame (up to one hour standby time). For the most part, the underlying soils consisted of mainly clay with some silt and rock intermixed. Water did move through this material, as evidenced by the fact that, if allowed to sit overnight, groundwater would enter the screened interval. However, waiting more

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than one hour at each depth interval would have impeded the overall schedule. In order to collect a representative groundwater sample at most depth intervals, the Hydropunch[®] sampler had to sit in the hole overnight or a temporary 1-inch to 2-inch well had to be set and sampled the following day. Therefore, depending on the location and work sequence, discrete depth samples were collected on the average of 15- to 20-foot intervals, and sometimes up to 40-foot intervals. Split-spoon samples were collected at each vertical screening point location, at various depths, to aid in the evaluation of the lithology and to identify a good water-bearing zone for groundwater sampling. Temporary wells that were set to collect a groundwater sample at the various vertical screening point locations consisted of a 10-foot screen interval, sand pack to approximately 2 feet above the top of the screen, and an approximate 2-foot bentonite slurry seal. The wells were allowed to sit overnight and were purged (at least one well volume) before sampling.

The field investigation approach assumed that a competent rock (i.e., point where refusal would be met by the drill rig) would be encountered at approximately 100 feet. This assumption was based on the previous EPA-approved Work Plan prepared by Harding Lawson Associates (HLA), dated July 1997, and the video log of production wells P-1 and P-2. However, during the field investigation, it was discovered that the Site conditions were not consistent with what was originally expected. During the drilling of vertical screening point GWPP-29A (first point to be drilled beyond 100 feet), the rig did not meet rod refusal at 100 feet. Instead, drilling continued to approximately 154 feet (maximum footage of rods brought to the Site by the drillers). Evaluation of split-spoon samples collected during drilling indicated a distinct change in lithology at approximately 90 feet (at this screening point). The lithology beyond this point was characterized by a very light brown silty clay with zones of weathered rock. This was confirmed at the other vertical screening point locations at approximately the same depth (given the change in topography between points). In addition, McLaren/Hart consulted with an individual (Bruce Green) who is knowledgeable about the geology/hydrogeology of St. Croix. He confirmed the presence of this zone, which is identified as the Post Kingshill Marl Formation (the water-bearing unit of the surrounding area where most wells are screened). In addition, he indicated that competent bedrock (where refusal might be met) was at approximately 1,500 feet. Therefore, to stay consistent with the original goal of collecting a groundwater sample at the top of bedrock, a sample was collected at the top of the Kings Hill Formation, as well as at least one sample being collected 20 to 40 feet within the Formation.

Vertical point GWPP-14A was eliminated as part of the groundwater screening program. In addition to the originally-placed location, attempts were made at two other locations (former Geoprobe location GWPP-25 and GWPP-30) to complete the work. In each instance, intermixed zones of gravel and clay was encountered, causing a loss of circulation in the rods. This condition had been encountered at other locations, at much deeper depths. This was the last drilling location in the field program and, since overall drilling at the Site had gone deeper than originally expected, drilling materials had been depleted. In addition, it was feared that this problem of lost circulation at a shallow depth could be indicative of drilling to depths greater than 100 feet; thus causing a large

amount of time to be spent at this location. Since this vertical screening point was located in an area where previous Geoprobe work (and groundwater sampling) at the top of the water table had revealed trace amounts to non-detect levels of chloroform, McLaren/Hart concluded that deeper chloroform impacts were not likely (given the fact that there were no deep impacts in areas where shallower impacts existed, such as the source area). This conclusion was approved by EPA and CDM Federal.

Groundwater samples collected from the vertical screening points were analyzed onsite by a gas chromatograph (GC)/mass spectrometer (MS) for the Site Target Compounds (acetone, methylene chloride, chloroform, toluene, ethylbenzene, and total xylenes). In addition, confirmation samples were collected from GWPP-36 (82 to 85 feet below ground surface [bgs]) and GWPP-37 (124 to 134 feet bgs) and submitted to Pace Analytical for analysis of Target Compound List (TCL) volatile organic compounds (VOCs). Draft analytical results (unvalidated) from the onsite analysis of groundwater samples collected from the four vertical screening points are provided on the attached tables.

Mobile Laboratory

Samples collected during the field investigation were analyzed by a mobile laboratory (i.e., onsite GC/MS). During the latter stages of the investigation, the GC/MS malfunctioned and sample analysis utilizing this equipment ceased. Subsequent samples were forwarded to the subcontractor's facility for analysis. This included a total of 25 samples (collected after October 14, 1998).

Decontamination Procedure

A change in the decontamination procedure described in the EPA-approved HLA work plan was requested by McLaren/Hart and verbally approved by EPA and CDM Federal. This change involved the deletion of the acetone rinse from the overall procedure. As acetone is a potential constituent of concern at the Site, it was agreed that the use of methanol only, as the solvent rinse, would provide sufficient equipment decontamination.

Monitoring Well Installation

Two monitoring well clusters (shallow and deep) were installed during the field investigation. All wells are constructed of 4-inch diameter, polyvinyl chloride (PVC) screen (10-foot length) and riser. Locations and total depths are as follows:

- *Location - Vertical Screening Point GWPP-29A*
 - MW-11 installed to a depth of 40 feet bgs
 - MW-12 (converted into well from screening point) installed to a depth of 147 feet bgs

- *Location - Vertical Screening Point GWPP-37*
 - MW-13 installed to a depth of 40 feet bgs
 - MW-14 (converted into well from screening point) installed to a depth of 134 feet bgs

Sample Collection for Remedy Screening Purposes

Shelby tubes were to be collected from various locations, and at multiple depths, during the field investigation for analysis of geotechnical/geochemical parameters (as listed in the EPA-approved August 12th correspondence) by Raytheon Environmental Services. However, sample retrieval was difficult due to the soils encountered during drilling (i.e., clay, silt, and rock that bent the Shelby tube during hammering). Two samples were collected at vertical screening point GWPP-27A, one at the 13- to 15-foot depth interval (representing the unsaturated zone within the source area) and one at the 20- to 22-foot depth interval (representing the "fringe zone" at the source area), and sent via Federal Express to the offsite laboratory. Unfortunately, the samples were lost during shipment (laboratory received the box that the tubes were shipped in, but not the Shelby tubes themselves) and by the time McLaren/Hart was informed of this incident (towards the end of the field work), it was not practical (i.e., time constraints and depletion of drilling materials) to return to the source area point (GWPP-27A) to re-collect the samples.

Groundwater samples were collected from the following locations and submitted to Pace Analytical (offsite laboratory) for analysis of the suite of bioremediation parameters listed in the EPA-approved August 12th correspondence:

- MW-2,
- MW-7,
- MW-11,
- MW-13, and
- GWPP-27A (110 to 120 feet bgs).

Packer Testing

Packer testing was conducted at onsite production well P-1 to evaluate the possibility that the slots identified in the video log at approximately 60 to 70 feet bgs could be a means for groundwater to enter the well and affect the overall groundwater quality at that measuring point (i.e., concentrations measured during previous sampling events may not be indicative of screen interval of well which is approximately 3 feet into the top of "rock").

The packer assembly, approximately 11 feet in length, was lowered into the well so that the submersible pump extending from the bottom of the assembly was positioned at approximately 95 feet bgs. Therefore, the packer isolated the 80- to 90-foot zone. A data logger, with transducers,

were used to measure continuous water levels above and below the packer assembly. At first, the submersible pump below the packer was allowed to run at approximately 3 gallons per minute (gpm) for at least 20 minutes. Manual water level measurements above the packer indicated no change in water level. After approximately 20 minutes, the pump rate was lowered and a sample was collected from the discharge line for VOCs (analysis by the onsite GC/MS) and total dissolved solids. Then the pump was turned off and the submersible pump lowered in the production well above the packer was allowed to run for the same time period and purge rate (around 1 gpm at first and increase to 3 gpm within 10 minutes). Manual water level measurements above the packer indicated an approximate 2-foot drawdown in the water level. After approximately 20 minutes, the pump turned off. It was discovered that the teflon tubing attached to the pump had come off. Due to the number of cords and lines in the well (from the packer, transducers, submersible pumps, etc.), attempts to sample the zone above the packer via bailer were unsuccessful. Finally, the packer assembly was deflated and all equipment was pulled from the production well. Once the well was clear, a bailer was slowly lowered to the top of the water table and a groundwater sample was collected. Although there was probably some mixing of the water when the packer assembly was pulled from the well, McLaren/Hart felt that sampling the very top of the water was still representative of groundwater above the packer zone. To be conservative, one casing volume was purged from the production well and an additional groundwater sample was collected (similar to a "regular" groundwater sample from the well). This course of action was approved by EPA and CDM Federal.

The three samples from P-1 were analyzed by the onsite GC/MS for the Site Target Compounds. Draft analytical results (unvalidated) from the onsite analysis are provided on the attached tables.

Manual and Automatic Groundwater Elevation Measurements

A round of water level measurements was collected on the first day of the field investigation (10/5/98) from the existing onsite monitoring/production wells (MW-1 through MW-10 and P-1 through P-2) and from selected offsite production/supply wells (Charlie's Concrete #1 and #2, Virgin Islands Port Authority (VIPA) #1 and #2, Water and Power Authority (WAPA), USGS, Carr's, Meridian #2, and Zenon #1). With the exception of Carr's and Charlie's Concrete #1 and #2 (due to the difficulty in obtaining access to the wells and coordinating the removal of pumps in order to collect measurements), an additional round of water level measurements was collected from the abovementioned wells, as well as the newly-installed monitoring wells, at the conclusion of the investigation (10/21/98). No major storm events took place during the field investigation; therefore, additional rounds of water level measurements did not take place.

Telog® automatic water level monitoring devices were installed in the following monitoring wells:

<u>Well ID</u>	<u>Telog® Installed</u>	<u>Telog® Removed</u>
MW-7	10/8/98	10/20/98
MW-8	10/6/98	10/19/98
MW-9	10/6/98	10/19/98
P-1	10/14/98	10/18/98
P-2	10/6/98	10/19/98
MW-12	10/21/98	not removed yet
MW-14	10/21/98	not removed yet

The devices currently in monitoring wells MW-12 and MW-14 will be removed during the week of November 23, 1998.

Groundwater Quality Sampling — Onsite Wells

Groundwater samples were collected from the following existing and newly-installed monitoring wells for analysis of the Site Target Compounds by the onsite GC/MS:

- MW-2 (sampled 2 times - 10/8/98 and 10/20/98),
- MW-3 (sampled on 10/15/98),
- MW-7 (sampled on 10/8/98),
- MW-11 (developed on 10/19/98 and sampled on 10/20/98),
- MW-12 (developed on 10/15/98 and sampled on 10/19/98),
- MW-13 (developed on 10/18/98 and sampled on 10/20/98), and
- MW-14 (developed on 10/17/98 and sampled on 10/18/98).

In addition, confirmation samples were collected from MW-2 (10/8/98) and MW-11 and submitted to Pace Analytical for analysis of TCL VOCs. Draft analytical results (unvalidated) from the onsite analysis of groundwater samples collected from these monitoring wells is provided on the attached tables.

Groundwater Sampling — Offsite Wells

Groundwater samples were collected from the following offsite production/supply wells in the vicinity of the Site and analyzed by the onsite GC/MS for the Site Target Compounds:

- Charlie's Concrete #1 and #2 (2 wells),
- VIPA #1 and #2 (2 wells), and
- Fairplains #9 (1 well).

In addition, a confirmation sample was collected from Fairplains #9 and submitted to Pace Analytical for analysis of TCL VOCs. Draft analytical results (unvalidated) from the onsite analysis of groundwater samples collected from these offsite wells is provided on the attached tables.

With the aid of Virgin Islands Department of Planning and Natural Resources (VIDPNR) and WAPA, the Fairplains wells were located during the field investigation. The well field located near the Site consists of three wells, designated as Fairplains #7, #8, and #9. WAPA personnel indicated that Fairplains #7 (formerly referred to as Zenon #2 in McLaren/Hart correspondence) was destroyed by Zenon Construction (well covered by debris and other material) and no longer exists. Fairplains #8 is located within a locked pump house on Zenon's property and is inaccessible. Due to the fact that Fairplains #8 is at a similar depth to Fairplains #9 (verified by well specifications received from WAPA during the field investigation - total depth of Fairplains #8 is 83 feet while Fairplains #9 is 75 feet), as well as in close proximity to each other, further attempts to access and sample Fairplains #8 were not undertaken. Fairplains #9 (formerly referred to as WAPA in McLaren/Hart correspondence) was sampled.

Investigation Derived Waste (IDW)

Pursuant to the EPA-approved August 12th correspondence (which references previous McLaren/Hart correspondence dated December 29, 1997 and March 22, 1998 regarding Phase III IDW drums containing drilling mud, soil, and water) previously-sampled drums of IDW generated during the Phase III investigation and determined to be Resource Conservation and Recovery Act (RCRA) non-hazardous material (through sampling) were emptied and spread over the area of the Site from which they were generated. The Aboveground Storage Tank (AST) water sample that was determined to be RCRA hazardous material was separated into two categories. The decontamination fluid drums (total of 11) and AST development/purge water drums (total of 5) were resampled by collecting a 2-drum composite from each group. Samples were submitted to Pace Analytical for Toxicity Characteristic Leaching Procedure (TCLP) and RCRA characteristics. Based on the results, both sets of drums were considered non-hazardous material and were spread over the area of the Site from which they were generated.

Drums of IDW generated during the Phase IV field investigation were sampled and analyzed by the onsite GC/MS for the Site Target Compounds. Draft analytical results (unvalidated) from the onsite analysis of samples collected from the drums is provided on the attached tables. Development/purge water generated and drummed from the monitoring wells was not sampled. Instead, the results of the actual monitoring well sample were used as an indication or whether the drums could be emptied

back onsite. In summary, all IDW generated during the field investigation were not considered to be hazardous and were spread back over the area of the Site from which they were generated.

Construction Details/Pumping Information — Offsite Wells

Construction details and pumping information was obtained for the offsite wells listed in the EPA-approved August 12th correspondence. Current information indicates that offsite pumping influences that may have affected the onsite monitoring/production wells, and thus groundwater flow across the Site, in the past may not exist to the same extent as the present. For example, Charlie's Concrete Plant is in the process of shutting down their operations; thus only one of their two wells is in service (use is up to a maximum of 50 gallons per day pumped for flushing toilets and sink use). In addition, the two VIPA wells only pump on a periodic basis in order to refill the reservoir tank used for emergency purposes. Specific details on the information collected as part of this task will be incorporated into the Remedial Investigation Report for the Site. In addition, evaluation of data collected from the Telogs[®] will be used to determine the effects of any offsite, ongoing pumping influences on groundwater flow across the Site.

Precipitation Information

Precipitation information (actual weather logs from the Henry Rohlsen Airport) is being obtained from the National Climatic Data Center in Asheville, North Carolina covering the period from September 14, 1998 (one week before the original start date of the field investigation and the occurrence of Hurricane Georges) through November 30, 1998 (after the Telogs[®] are removed from monitoring wells MW-12 and MW-14); thus spanning an eleven-week period.

Schedule

The anticipated schedule in the EPA-approved August 12th correspondence was to complete the field investigation in approximately 15 calendar days. The actual schedule entailed 17 calendar days. The additional two days was largely attributable to the increase in drilling depths at the vertical screening/well installation locations (i.e., from an anticipated 100-foot maximum depth to an actual 110- to 150-foot maximum depth at the various locations), and the installation of temporary wells at some of the vertical screening point locations to facilitate collection of groundwater samples from discrete depth intervals (i.e., hydropunching was not successful at some depth intervals due to lack of water within a reasonable time frame [up to one hour] and required installation of a temporary well point so that work could proceed in an expeditious manner).

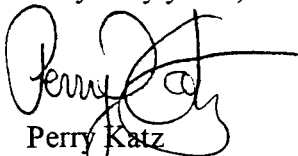
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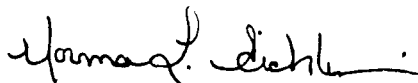
It was anticipated that conference calls would occur two times a day to increase the level of coordination and decision-making during the field investigation. By mutual agreement between EPA and Berlex, a single daily conference call was determined to be adequate.

Should you have any questions or concerns regarding this letter, or have a different understanding of the modifications to the EPA-approved correspondence dated August 12th and August 24th, please do not hesitate to contact either of us at (908) 647-8111.

Very truly yours,



Perry Katz
Principal Environmental Scientist



Norma Eichlin
Senior Engineer

cc: Terry Grimmer - Berlex
Eric Threadgold, Esq. - Berlex
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