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Baker

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January 5, 1993

U.S. EPA Region IV
Waste Management Division
345 Courtland Street
Atlanta, Georgia 30365

Attn: Ms. Michelle Glenn
Senior Project Manager

Re: Summary of RI/FS Activities to Date
and Recommendations for Additional Work at Site 6
MCB Camp Lejeune, North Carolina

Dear Ms. Glenn:

Baker Environmental, Inc. (Baker) has prepared a brief summary of RI/FS activities to date for Site 6 (Attachment 1). Recommendations for additional field investigation activities are included as Attachment 2.

These attachments have been forwarded to you for your review in advance of the January 14, 1993 meeting.

If you have any questions, please do not hesitate to contact me at (412) 269-2016.

Sincerely,

BAKER ENVIRONMENTAL, INC.

Raymond P. Wattras

Raymond P. Wattras
Project Manager

RPW/DCS/nd
Attachment 1 - Summary of RI/FS Activities as of December 22, 1992
Attachment 2 - Recommendations for Additional RI Activities

cc: Mr. Byron Brant, Code 1822
Mr. George Radford, (MCB Camp Lejeune)

Attachment 1
Summary of RI/FS Activities as of December 22, 1992

ATTACHMENT 1
SUMMARY OF RI/FS ACTIVITIES AT SITE 6 AS OF DECEMBER 22, 1992

Project Status

- With the exception of the second round of groundwater sampling (to be conducted in March), RI field activities are complete at Site 6.

- Results of laboratory analysis of soil, surface water, surface sediment, and groundwater samples have been received. These results, with the exception of groundwater sampling, were included and discussed in an October 15, 1992, correspondence to LANTDIV from Baker.

- Preliminary laboratory analytical results of groundwater collected from "deep" monitoring wells (approximately 110 feet deep) were received in November. VOC contaminants were detected in the following deep monitoring wells:

  6GW1D - 58,104 ppb total VOCs
  6GW2D - 1.4 ppb total VOCs
  6GS27D - 18,058 ppb total VOCs
  6GW28D - 4,100 ppb total VOCs

  Detected VOC contaminants include TCE, DCE, and ethylbenzene.

  The location of these wells is presented on Figure 1. These wells are located between the north fence of Storage Lot 203 and the south bank of Wallace Creek; a second area located east of Piney Green Road exhibited low VOC contamination (6GW2D). The area north of Storage Lot 203 will hereafter be referred to as the "area of concern."

- The contaminants detected in the newly installed deep monitoring wells are similar to contaminants that have been detected in nearby water supply wells 651 and 653 (Figure 1). Similar contaminants (in much lower concentrations) have also been detected in surface water collected from nearby locations in Wallace Creek.

- Shallow groundwater samples were collected from shallow (25 ft. deep) monitoring wells within the area of concern as part of the RI. Preliminary results of the laboratory analysis were received in early December. VOC contaminants were detected in the following shallow monitoring wells in the area of concern:

  6GW1S - 12.2 ppb total VOCs
  82MW2 - 1.6 ppb total VOCs
  6GW28S - 162 ppb total VOCs

  Detected VOC contaminants include vinyl chloride, DCE, TCE, and toluene.

  The location of these wells is shown on Figure 1. These wells are located between the north fence of Storage Lot 203 and the south bank of Wallace Creek in the area of concern.

- Surface and subsurface soil samples were collected within the area of concern as part of the RI. VOC contaminants were not detected in these samples. Soil samples collected in this area during a previous investigation (NUS/Halliburton, 1991) also did

not contain elevated concentrations of VOCs (1,2-dichloroethene was detected at 13 ppb in one subsurface soil sample).

- With a limited amount of surveying data available, shallow groundwater flow is to the north-northwest and deep groundwater flow is northwest. (Baker has yet to receive all surveying data including monitoring well elevations).

Conclusions

- Shallow groundwater is contaminated with volatile organic compounds above drinking water standards, but appears to be limited to the area of concern (between Storage Lot 203 and Wallace Creek).

- Deep groundwater is contaminated with elevated levels of volatile organic compounds (an order of magnitude higher than the levels detected in shallow groundwater). The vertical and horizontal extent of deep groundwater contamination is unknown.

- Soil samples collected from approximately 35 borings in the area of concern did not exhibit organic contamination. This indicates that the source of shallow and deep groundwater contamination has not been defined.

Attachment 2
Recommendations for Additional RI Activities

ATTACHMENT 2
RECOMMENDATIONS FOR ADDITIONAL RI ACTIVITIES

The presence of VOC contaminants in the shallow and deep groundwater within the area of concern may require additional investigation activities. Further, the contaminant source or sources within the area of concern have not been identified.

Baker has initiated an expanded review of existing data regarding the geology and hydrogeology of the deep groundwater interval that has been impacted by VOC contamination. This review focused on information regarding the supply wells in this area. The information was obtained from a USGS report and includes boring logs, geophysical data, well construction diagrams, analytical results, and aquifer test data.

Based on the evaluation of all information discussed above, it has been determined that the existing groundwater monitoring network does not adequately delineate the lateral and vertical extent of groundwater VOC contamination. Additional shallow and deep groundwater monitoring points will be required in the area of concern to accomplish this.

Additional deep wells are recommended as a minimum approach to determine lateral and vertical extent of groundwater VOC contamination. An investigative approach is given below.

- One well will be installed adjacent to existing well 6GW1D. This well will be installed just above where the first low hydraulic conductivity layer (i.e., competent clay layer approximately 2 feet thick) is encountered below the screened section of 6GW1D, (which is approximately 112 feet deep). If this unit is not encountered, the well will be installed to a maximum depth of 250 feet. The purpose of this well is to evaluate the vertical extent of VOC contamination in the area where the highest concentrations were previously detected in well 6GW1D.

- Four additional deep wells will be installed to evaluate the horizontal extent of VOC contamination. The locations of these wells are shown on Figure 1. These wells will serve to define the vertical and horizontal extent of groundwater contamination that may migrate from the area of concern. The screened interval depth of these wells will depend on conditions encountered in the field. Split-spoon soil samples will be collected every 5 feet during drilling. The soil samples will be screened for volatile organic vapors using a photoionization detector (PID). This screening method will be employed to assist in determining well screened interval depth.

- The proposed deep wells will be constructed of 2-inch stainless-steel (riser and screen) with 10-foot screen lengths in accordance with EPA Region IV Standard Operating Procedures. The boreholes will be advanced using the mud-rotary drilling technique. Further, if a competent clay layer is encountered during drilling at the four additional well locations, casing will be installed (i.e., Type III well).

- Information concerning aquifer characteristics (transmissivity, hydraulic conductivity, pumping rate, and storativity) is readily available. Aquifer tests (i.e., well performance tests) were previously conducted in the supply wells located in this area of concern. Additional aquifer testing, using the newly installed deep monitoring wells, is not recommended since the existing information is adequate to evaluate groundwater remediation options.

- An attempt to locate the source of the VOC contamination should be initiated. Additional field investigation activities, such as a soil gas survey may provide data that will help locate the source area. The soil survey area would include the area of concern, the area east of Piney Green Road (near Supply Well 651), and the area just north of Wallace Creek.

  An initial sampling grid consisting of 50 foot grid spacings would be established near monitoring wells 6GW28S and 6GW1D. These areas represent the highest level of volatile organic contamination in the shallow and deep groundwater, respectively. Other soil gas sampling points throughout the study area will be established at 150-foot grid spacings. Based on the initial soil gas results, additional soil gas sampling points will be established at "hot" areas in order to delineate the area of concern.

  Additional test borings may be drilled where the results of the soil gas survey indicate probable areas of contamination. The number of test borings required will be determined following the evaluation of soil gas results. Soil samples will be collected from the surface and at five-foot intervals to the top of the water table. All soil samples will be analyzed for TCL volatile organics in accordance with CLP protocols.

  Additional shallow monitoring wells may be necessary based on the results of the soil gas survey. In addition, the proposed locations of the four deep monitoring wells may be adjusted based on the results of the soil gas survey. Soil sampling would accompany the installation of all monitoring wells.

- One round of groundwater samples will be collected from the newly-installed deep monitoring wells and potential shallow wells. The samples will be analyzed for full TCL volatile organics (Level IV data quality, CLP protocols). A 48-hour laboratory turnaround will be requested. In the event that the deep wells exhibit elevated levels of volatile contaminants, additional deep wells may be required. The number and location of any deep monitoring wells will be approved by the North Carolina DEHNR and EPA Region IV.

- A second round of groundwater samples will be collected from all monitoring wells at Site 6. These samples will be analyzed for full TCL volatile organics; however, 10 percent of the samples will be analyzed for full TCL organics and TAL inorganics.