03.01-5/30/2000-02429

**OHM Remediation Services Corp.**
*11560 Great Oaks Way, Suite 500*
*Alpharetta, GA 30022-2424*
*Tel. 770.475.8994*
*Fax. 770.777.9545*

*A Member of The IT Group*

the IT group

May 30, 2000

Ms. Kate Landman, Code 18232
Naval Facilities Engineering Command
1510 Gilbert Street
Norfolk, VA 23511-2699

RE: Response to Baker Environmental Comments
Draft Dye Trace Study Report for Camp Geiger Air Sparge Trench
Contract N62470-93-D-3032, Delivery Order 0083
MCB Camp Lejeune, North Carolina

Dear Ms. Landman:

OHM Remediation Services Corp. (OHM) offers the following responses to the Baker Environmental comments dated April 17, 2000 regarding the above referenced submittal. Attached is the revised cover rendering the submittal final.

Section 4

1 - The "zero-hour sample" is not actually a "zero-hour sample". According to the text, the sample was obtained on the morning of December 10 ( it assumed that the 1998 date is a typo). Dye injection was completed in the evening of December 9. This would indicate that the zero-hour sample was collected a significant time after injection was completed. The presence of dye in the shallow well could, therefore, be related to injection rather than "background" especially since no occurrence of dye was detected in any of the background samples (unfortunately OB-4S was not amongst the background sample locations).

*Response:*

*It appears the text has been misread. Section 3 text indicates that injection well installation and development occurred on December 9. Dye injection occurred the morning of December 10, at the same time other members of the field crew were collecting background groundwater samples. Exact collection times for the December 10 event are shown on the laboratory reports in Appendix D. Text will be revised to read December 10, 1999. Additionally, OB-4S was also sampled during the background event of December 10. The reported value, "B" qualified, is 59 ppt.*

Section 5

1- Additional discussion should be provided regarding the potential reasons for the very high dye concentrations seen in MP-3D which is significantly north of where expected groundwater flow direction would take the dye. The discussion should include potential reasons for why similar dye concentrations were not seen in OB-4D, which is directly downgradient. Particular attention should be paid to possible trench effects on the groundwater flow and possible ramifications for the full-scale design.

*Response:*

*OHM agrees that groundwater flow appears to be contradictory to that which has been historically inferred from the slope of the potentiometric surface. This may be one of a number of sites where groundwater flows is different than that predicted by the traditional " flow is perpendicular to the potentiometric contours " approach. However, additional field investigations would be required to completely understand flow direction(s) in the area. One possibility is that the trench itself, which is more permeable than the indigenous soils, is allowing some groundwater flow to the north. However, this would seem not to be a concern as only additional sparging/ treatment of the groundwater results from this scenario.*

*Note that the original intent of this study was to determine if the contaminated groundwater plume was "backing up" behind or migrating around the sparge trench, which has been proven is not occurring.*

2 - A discussion of whether the depth difference in MP-3D (screened 40-45' bgs) and the injection point (36-41' bgs) is significant in terms of a potential downward component of flow should be provided.

*Response:*

*OHM believes that the fact there is some overlapping screen depth between MP -3D and the injection point and the fact that no wells have been installed below 45 feet bgs makes the determination of downward groundwater flow difficult. Note that the test results do indicate that an upward flow does not appear to be occurring.*

3 - The calculated groundwater flow velocity from the previous studies should be provided and compared to these calculated from the dye trace study.

*Response:*

*OHM has reviewed historical groundwater information supplied by Baker Environmental on 5/14/00. This report indicates the upper surficial aquifer flow rate varies from 0.38 feet/day to 0.80 feet/day and lower surficial aquifer flows between 3.3 feet/day and 127/feet/day. OHM's calculated flow rates of 0.7 feet/day to 4.6 feet/day in the lower surficial aquifer appears to be within the historically determined values.*

Section 6

1 - The report states "The operation of the air sparge trench does not appear to influence the direction of groundwater migration" There is an approximate 90° change in groundwater flow direction from that predicted as evidenced from the significant presence of dye in well MP-3D. It is unknown whether this effect is a result of trench operations or is a natural anomalous condition. As indicated in the report, wing trenches at either end of a full-scale system should be addressed in the design.

*Response:*

*Please refer to the response to comment for Section 5, number 1 regarding groundwater flow. Extension of the trench and/ or end wing trenches will be considered for system improvements.*

Should you have any additional comments or questions, please contact me at your convenience.

Very truly yours,
OHM Remediation Services Corp.

James A. Dunn, Jr., P.E.
Senior Project Manager

Pc: Rick Raines - IDR/EMD
Dave Lown - NCDENR
Diane Rossi - NCDENR
Gena Townsend - EPA Region IV
Rich Bonelli - Baker Environmental
Tom McCrory - OHM
Ron Kenyon - OHM
Project File 917536 - CR 4.1