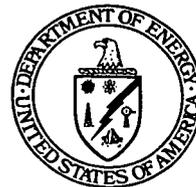




Department of Energy

**Ohio Field Office
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3323

OCT 18 2000

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0056-01

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

**RESPONSES TO THE OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON
THE RE-INJECTION DEMONSTRATION TEST REPORT FOR THE AQUIFER RESTORATION
AND WASTEWATER PROJECT**

This correspondence submits the responses to the Ohio Environmental Protection Agency (OEPA) Comments on the Re-Injection Demonstration Test Report for the Aquifer Restoration and Wastewater Project for your review and approval.

If you have any questions or concerns regarding this correspondence, please contact Robert Janke at (513) 648-3124.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:R.J. Janke

Enclosure

Mr. James A. Saric
Mr. Tom Schneider

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OCT 18 2000

cc w/enclosure:

R. J. Janke, OH/FEMP

G. Jablonowski, USEPA-V, SRF-5J

T. Schneider, OEPA-Dayton (three copies of enclosure)

F. Bell, ATSDR

F. Hodge, Tetra Tech

M. Schupe, HSI GeoTrans

R. Vandegrift, ODH

~~AR Coordinator, Fluor-Fernald, Inc./78~~

cc w/o enclosure:

N. Hallein, EM-31/CLOV

A. Tanner, OH/FEMP

D. Brettschneider, Fluor Fernald, Inc./52-5

K. Broberg, Fluor Fernald, Inc./52-5

D. Carr, Fluor Fernald, Inc./2

T. Hagen, Fluor Fernald, Inc./65-2

J. Harmon, Fluor Fernald, Inc./90

W. Hertel, Fluor Fernald, Inc./52-5

S. Hinnefeld, Fluor Fernald, Inc./31

M. Jewett, Fluor Fernald, Inc./52-2

T. Walsh, Fluor Fernald, Inc./65-2

ECDC, Fluor Fernald, Inc./52-7

**RESPONSES TO OEPA COMMENTS ON THE
RE-INJECTION DEMONSTRATION TEST REPORT FOR THE
AQUIFER RESTORATION AND WASTEWATER PROJECT**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**

OCTOBER 2000

U.S. DEPARTMENT OF ENERGY

**RESPONSES TO OEPA COMMENTS ON THE
RE-INJECTION DEMONSTRATION TEST REPORT
FOR THE AQUIFER RESTORATION AND WASTEWATER PROJECT**

Original Comments

1. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section #: 4.4.2 Pg. #: 4-7 Line #: 13 Code: C
Original Comment #: 1
Comment: Future injection well monitoring designs should consider the installation of a monitoring well with multiple depth sampling capability below the injection interval. In addition, the well should be installed as close as possible to the injection well. Such a monitoring well would provide more accurate monitoring of downward movements of the plume at the injection well site, where such movements would be most likely to occur.
Response: DOE agrees with the comment.
Action: DOE will consider the installation of a monitoring well with multiple depth sampling capability below the injection interval for future reinjection monitoring well designs.

2. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section #: 5 Pg. #: NA Line #: NA Code: E
Original Comment #: 2
Comment: The graphical data analysis provided in Section 5 on the geochemical data is limited to the construction of Piper Trilinear Diagrams. While the Piper diagrams were useful, additional graphics should have been included for visualizing the trends discussed in the text. Given the extent of the data collection effort for the re-injection demonstration, limiting presentation of much of the data to tabular format is inappropriate.
Response: The trends discussed in the section were very simple in nature and easily discernable from the tabulated data, therefore it was felt that additional graphics were not needed.
Action: No action required.

3. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section #: 5.3.2 Page #: 5-6 Line #: 28 Code: C
Original Comment #: 3
Comment: The trend to lower dissolved oxygen concentrations and Eh values with increase in depth in the aquifer was not observed near all injection wells some discussion should be provided to account for the somewhat anomalous water chemistry results obtained from Monitoring Well 32305, located near IW-9. The dissolved oxygen and Eh results for this deep interval monitoring well are very similar to the data obtained from the shallow wells.
Response: This comment pertains to the same issue as Comment #5. Please refer to the response prepared to address Comment #5.
Action: See action for comment #5.

4. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section #: 5.3.2 Page #: 5-7 Line #: 5 Code: C
Original Comment #: 4
Comment: The 12.09 mg/L dissolved oxygen level is not considered representative for Monitoring Well 32305 on 12/14/98. Tables G-15 through G-22 show many anomalously high DO results. For the measurement in question and the majority of the other high values, the "DO %Sat" result appears to indicate that the DO saturation is greater than 100 percent. How should these data be interpreted or should they simply be ignored? Also, the greater-than-100 percent DO concentrations occurred most often for the first three monitoring events. No such values were obtained after January. Is the Hydrolab data collected after January more accurate than the data from the initial monitoring event after re-injection started?

Response: This comment raises two questions concerning the dissolved oxygen data collected during the re-injection demonstration. 1) How should the dissolved oxygen data that is greater than 100% be interpreted? And 2) Is the Hydrolab data collected after January more accurate than the data from the initial monitoring event after reinjection started? Responses to these questions are provided as follows:

1). For the purpose of the demonstration the dissolved oxygen data were used to interpret trends or relative changes over time. The data presented in Table 5-1 are considered adequate for achieving this objective. Several of the percent-saturation readings are above 100% though, which cannot be correct. DO probes are known to be quite sensitive. The over 100% saturated readings could have resulted from poor calibration, improper fitting of the membrane, or membrane failure or fouling.

To better understand the accuracy of this data, the concentrations presented in Table 5-1 were normalized to an upper limit of 100% using a scaling factor. The adjusted DO concentration for 100% saturation was then compared to the expected DO concentration in saturated surface water, at atmospheric pressure. This comparison shows that the Hydrolab result is higher than it should be. This comparison is further explained below.

The largest percent saturation reading recorded in Table 5-1 (Well 22300, Dec-98, 13.16 mg/L, 117.6% sat.) was adjusted to 100% saturation. The concentration in mg/L was adjusted using the following ratio relationship:

$$[(13.16 \text{ mg/L}) / (117.6 \% \text{ sat.})] \times (100 \% \text{ sat.}) = 11.19 \text{ mg/L}$$

The other concentrations were then adjusted using the following scaling factor:

$$[(11.19 \text{ mg/L}) / (13.16 \text{ mg/L}) \times (\text{measured conc. in mg/L})]$$

The saturated % values were adjusted using the following relationship:

$$[(100 \%) / (117.6 \%) \times \text{measured \% sat.}]$$

The adjusted data are provided in Table 1.

The dissolved oxygen concentration expected for saturated surface water was calculated. The dissolved oxygen concentration is temperature dependent. The temperature data for the aquifer, presented in Table 5-1 of the report is close to 12 degrees celcius. Atmospheric pressure (760 Torr) is assumed. The expected DO concentration in saturated surface water at atmospheric pressure and 12 degrees Celsius is 10.8 mg/L (<http://antoine.fsu.umd.edu/chem/sense/101/solutions>). The reading at 100% saturation from the adjusted Hydrolab result (11.19 mg/L) is larger then the expected concentration in saturated surface water (10.8 mg/L). This is opposite of what is expected. It is expected that the dissolved oxygen concentration in the surface water should be higher than the groundwater because it has a greater surface area exposed to the atmosphere. Therefore the largest Hydrolab reading is too high. It is assumed, based on this comparison that the other readings are biased high also.

2). There is no evidence available that indicates that the readings collected prior to January are more accurate or less accurate than the readings collected after January. Administrative controls were in place to assure that the probes were calibrated, operated, and maintained in a consistent manner during the demonstration. As mentioned earlier, DO probes are quite sensitive. Improper fitting of the membrane or membrane failure and fouling can lead to poor probe operation. It is possible that technician skills improved over time such that better membrane fits and/or better calibrations were being achieved by January. If this occurred, then

