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OhioEPA

State of Ohio Environmental Protection Agency

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George V. Voinovich
Governor

November 6, 1998

RE: DOE FEMP
COMMENTS TECH MEMO
OSDF CELL 1

Mr. Johnny Reising
U.S. Department of Energy, Fernald Area Office
P.O. Box 538705
Cincinnati, OH 45253-8705

Dear Mr. Reising:

This letter provides Ohio Environmental Protection Agency comments on the Technical Memorandum for the OSDF Cell 1 Baseline Groundwater Conditions.

If you have any questions, please contact Tom Ontko or me.

Sincerely,

for Tom Ontko

Thomas A. Schneider
Fernald Project Manager
Office of Federal Facilities Oversight

cc: Jim Saric, U.S. EPA
Terry Hagen, FDF
Ruth Vandergrift, ODH
Mark Shupe, HSI- GeoTrans, Inc.
Francie Hodge, Tetra Tech EM Inc.
Manager, TPSS/DERR,CO

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Ohio Environmental protection Agency Comments on the Technical Memorandum for the OSDF Cell 1 Baseline Groundwater Conditions

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General Comments

1) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: Code:
Comment: Page 6-11 of the OSDF Groundwater/Leak Detection and Leachate Monitoring Plan lists two bulleted items that are not addressed in this Technical Memorandum: the action leakage rate for the LDS and the pump operating level for the LCS.

Specific Comments

2) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: N/A Pg.#: N/A Line #: N/A Code: G
Comment: This document should include a detailed description of the technique used for the collection of groundwater samples from the horizontal till well. It should be noted that these procedures are missing from the GWLMP (DOE 1997) and from the Sitewide CERCLA Quality Assurance Project Plan.

3) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 2.0 Pg.#: 6 Line #: 16 Code: M
Comment: The text indicates that 15 sampling rounds were completed in the horizontal till well in the period from the end of October through early December. Assuming that the sampling procedure used involves purging at least one well volume prior to sample collection and that one well volume is, at minimum, several hundred gallons, the well appears capable of producing a significantly greater volume of water than was initially envisioned. For example, the GWLMP states (p. 4-6, paragraph 6) that the "clay-rich deposits may not readily yield fluid to a well." Such high well yields are contradictory to the hydrogeology of the perched zone which is characterized in the GWLMP as having an average gray till thickness of 30 feet and a percentage of interbedded sands and gravels of approximately four percent. Given the purging protocol assumed above, what is the groundwater source enabling the till well to be sampled 15 times in less than two months?

4) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 3.0 Pg.#: 9 Line #: 2 Code: C
Comment: The Ohio EPA agrees with the choice of an intra well approach for evaluating groundwater data at the OSDF, particularly for the till. As indicated in the text, flow in the till is essentially vertical resulting in no recognizable up versus down gradient in that unit. The technique is also appropriate for the GMA to account for heterogeneity in the aquifer and the gradient reversal conditions discussed.

5) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 3.0 Pg.#: 9 Line #: 2 Code: C

Comment: USEPA (1993) recommends against using control charts for truncated data sets (i.e., data sets with a large nondetect fraction). Organic COCs are typically characterized by a large amount of nondetects. Gibbons (1994) indicates that control charts should only be used for data sets with at least 25 percent quantified values. The sample variance is not adequately quantified for data sets with fewer than 25 percent quantified values. An alternative approach to control charts, therefore, should be identified for TCE in OSDF Well 22201 (one estimated detect in 15 sample rounds).

6) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 3.0 Pg.#: 9 Line #: 29 Code: C
Comment: Application of the control chart method is complicated by the pre-existing contamination at the OSDF. Pre-existing contamination can cause trends in the baseline data that are completely unrelated to the OSDF. The statistical procedures presented in this document should, therefore, include trend analysis of the baseline data and, if trend exists, demonstrate the application of the estimated trend to the raw data. The de-trended data can then be used for computing the sample mean, variance, and the control limits. Failure to account for trend in the baseline data will result in biased estimates of the population parameters and control limits.

7) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 3.0 Pg.#: 9 Line #: 30 Code: C
Comment: The baseline data should be screened for outliers prior to the computation of the mean, variance, and control limits. Any detected outliers should be excluded from the control chart but should be identified using a unique symbol on the control chart plots. Failure to exclude outliers from the control chart calculations will result in an artificially inflated false negative rate (i.e., concluding no impact when, in fact, impact exists).

8) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.0 Pg.#: 10 Line #: 20 Code: E
Comment: Revise text to read "Table 3 identifies the range of concentrations for the seven..."

9) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.0 Pg.#: 10 Line #: 22 Code: M
Comment: The text indicates that the baseline data set generated by collecting 15 till well samples in less than two months is "limited in regards to representing the range of variability in perched water quality." Assuming that a low-flow (micropurging) sampling technique was used in collecting the 15 till well samples, ambient groundwater flow must be sufficient to permit flushing the volume of the 6.0-inch horizontal well on approximately a bi-weekly basis. As is presented in the Pre-design Investigation and Site Selection Report for the OSDF (DOE 1995), however, groundwater flow at the site is essentially vertical and in the vicinity of Cells 1 and 2 is

on the order of 0.06 feet/year. Vertical flow at this rate would require approximately eight years for ambient flow to flush one well volume. In order to ensure the collection of independent samples from monitoring wells installed in glacial till, USEPA (1989) recommends a minimum one month period between sampling rounds. Given the assumed micropurging sampling procedure, the same volume of water was, therefore, probably sampled during each of the 15 baseline rounds. The collection of non-independent samples is the likely reason that baseline samples showed limited variability. USEPA (1989) states that the most important assumption in the use of control charts is that the data analyzed are independent. A revised approach for characterizing perched groundwater baseline conditions in the horizontal till wells is needed. Assuming that very slow rates for vertical groundwater flow exist at the OSDF, FEMP should determine what minimum time interval between sampling is required to ensure that groundwater samples will be independent.

10) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 4.0 Pg.#: 10 Line #: 39 Code: C
Comment: The total uranium pre-design data discussed in the referenced text could not be located in the pre-design documents and should be summarized in this technical memorandum. Total uranium concentrations from pre-design well clusters 11491/11492 and 11493/11494 ranged from 0.35 to 14.4 ug/L.

11) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 5.0 Pg.#: 11 Line #: 22 Code: C
Comment: The text should include a discussion of how and at what frequency the control charts will be updated. As indicated by USEPA (1989) "as monitoring continues and the process is found to be in control, these parameters (baseline sample-based estimates of the mean and standard deviation and the pre-selected performance parameters h, k, and SCL) need periodic updating so as to incorporate this new information into the control charts."

12) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.1 Pg #: 12 Line #: 9-19 Code: c
Comment: The Ohio EPA has concerns about the validity of combining the two baseline data sets from the Cell 1 and Cell 2 horizontal till wells. The two wells are almost certainly placed in different perched water systems. Is there any data from other perched systems that supports combining the two data sets? Are there statistical tests which can be used to decide if two sets of data are drawn from the same population?

13) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 5.0 Pg.#: 13 Line #: 26 Code: C
Comment: The text indicates that COCs detected during baseline monitoring and during post

baseline monitoring will be compared against the established control limits. No procedure, however, is provided regarding what will be done if a COC exceeds its control limits. Assume, for example, a COC is detected in the LDS and exceeds its control limits. Does the control chart procedure described in this document include the collection of verification resamples. If so, how?

14) Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: Appendix C Pg.#: N/A Line #: N/A Code: C
Original Comment #: The control charts should be constructed in their original metric (e.g. mg/L) rather than standard deviation units for ease of interpretation.

15) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5.2 Pg #: 14 Line #:3 Code: c
Comment: The text states that data review will determine if volumes of leachate in the LCS and LDS is increasing. As stated in Section 4.6.1 of the OSDF Groundwater/Leak Detection and Leachate Monitoring Plan, trend analysis is an appropriate tool to evaluate the data.

16) Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5.3 Pg #: 14 Line #: 15 Code: c
Comment: The bullet states that summary data will be provided in the Quarterly IEMP Status Reports. Please provide the complete data set including weekly LDS volumes.

REFERENCES

Gibbons, R.D. 1994. Statistical Methods for Groundwater Monitoring. John Wiley & Sons.

U.S. Dept. of Energy 1997. Groundwater/Leak detection and Leachate Monitoring Plan, On-Site Disposal Facility, Final.

U.S. Environmental Protection Agency, 1989. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance.

U.S. Environmental Protection Agency, 1993. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Draft Addendum to Interim Final Guidance.

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