U-007-105.6

4495

CONDITIONAL APPROVAL OF CHARACTERIZATION OF BACKGROUND FOR STREAMS AND GROUNDWATER

06/10/93

USEPA/DOE-FN
6
LETTER

4495

G-04223
AR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUN 11 3 34 PM '93

JUN 10 1993

REPLY TO THE ATTENTION OF:

Mr. Jack R. Craig
United States Department of Energy
Feed Materials Production Center
P.O. Box 398705
Cincinnati, Ohio 45239-8705

HRE-8J

RE: Conditional Approval of Characterizatrion of Background for Streams and Groundwater

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Characterization of Background Water Quality for Streams and Groundwater. The Report details the location and justification of background groundwater and surface water sampling points to be used in the Remedial Investigation and Feasibility Studies at the Site. The Report also discusses statistical methodologies used to analyze the data.

The Report adequately describes the location and justification for several of the sampling points, but some clarification is required. Therefore, U.S. EPA hereby approves the Report pending incorporation of the attached comments.

Finally, this Report raises issues regarding risk assessment. Although the purpose of this background report is to detail the location of the sampling points and the statistical procedures to analyze the data, there are concerns that must be addressed in future risk assessment documents. All future groundwater samples collected for metals analysis must be unfiltered. Also the use of statistical Upper Tolerance Limits above exisiting health-based standards, as indicated in Section 9 is unacceptable.

(YERACE)
PARTIAL
ACTION RESPONSE
to DOE-1871-93
(6216)

Printed on Recycled Paper

Please contact me at (312/FTS) 886-0992 if you have any questions.

Sincerely,

James A. Saric
Remedial Project Manager

Enclosure

cc: Graham Mitchell, OEPA-SWDO
Pat Whitfield, U.S. DOE-HDQ
Nick Kauffman, FERMCO
Jim Thiesing, FERMCO
Paul Clay, FERMCO

TECHNICAL REVIEW COMMENTS ON "CHARACTERIZATION OF BACKGROUND WATER QUALITY FOR STREAMS AND GROUNDWATER"

MAY 1993

The "Characterization of Background Water Quality for Streams and Groundwater," dated May 1993, was reviewed. The study was prepared for Operable Unit 5 of the Fernald Environmental Management Project (FEMP). Overall, the selection of background wells and the calculation of background levels follows U.S. Environmental Protection Agency guidance and accepted scientific methodology. However, several issues should be clarified regarding groundwater flow direction and background levels for Paddy's Run. General and specific comments are presented below.

General Comments

1. In Section 3, recent groundwater piezometric maps should be overlain on Figures 10 through 13 in order to assist in determining if appropriate background wells have been selected.

2. Section 8 should explain how background levels for Paddy's Run will be calculated in light of the limited amount of validated data that will be available (only one sample was recently collected).

Specific Comments

1. **Section 1.4.1, Page 1-9, Line 14.** The text states that airborne contamination from FEMP *may* reach sampling location W1. However, isopleths of uranium concentrations in surface

soil indicate airborne contamination up to the vicinity of W1. The text should be revised accordingly.

2. **Section 2.1, Page 2-1 and Appendix A: Tables A-1 and A-2.** The report should indicate how the private wells sampled through the Environmental Monitoring Program and listed in Table A-1 and A-2 correlate with the depths of the remedial investigation/feasibility study series wells.

3. **Section 2.4, Page 2-3, Figure 9, and Appendix A: Table A-5.** Wells AL EMR-6, EMR-7, and EMR-22 should be shown in Figure 9. Page 1 of Table A-5 shows 12 2000-series wells, while pages 2 through 5 indicate that six of the wells are "unknown." This inconsistency should be corrected.

4. **Section 3.2, Page 3-14, Lines 29 through 31.** This sentence incorrectly states that all radionuclide values reported in this document are total concentrations from unfiltered samples. Table A-4 indicates that samples analyzed for metals and radionuclides were filtered; however data in Table A-4 were not used to calculate background. The sentence should be revised to reflect that all radionuclide data used to calculate background levels were from unfiltered samples.

5. **Appendix F, Page F-3, Fourth Equation.** The equation should be corrected to include the standard deviation; it is given correctly on page F-23.

   Appendix F, Page F-19. The subscript "t" should indicate 35 degrees of freedom, not 29; it should appear "$t_{0.975,35}$."

RISK ASSESSMENT ISSUES

1. At FEMP, there is a risk assessment issue regarding filtered and unfiltered metals analyses for groundwater. All metals analyses were conducted on filtered samples, including groundwater samples from private wells. Private wells are being used to calculate background levels in the glacial overburden and the Great Miami Aquifer. Using filtered versus unfiltered samples is probably of less concern in monitoring wells installed in the Great Miami Aquifer, because the wells were developed using a relatively low turbidity requirement. However, the issue is of greater concern for monitoring wells in the glacial overburden, where the turbidity requirement could not be reached, and for private wells in the glacial till and Great Miami Aquifer, which were installed without regard to turbidity.

   A 0.45 micron (μm) membrane filter size was used to filter groundwater samples. According to the U.S. Environmental Protection Agency's *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*, dated December 1989, a 0.45-μm filter may screen out some potentially mobile particulates to which contaminants are absorbed, thus underrepresenting contaminant concentrations (see Page 4-13 of the guidance). The guidance suggests the use of a 1.0 μm-filter. In addition, the guidance states that if unfiltered water is of potable quality, data from unfiltered water samples should be used to estimate exposure (see Page 4-13 and 6-27 of the guidance).

   Two options exist to overcome this potential problem: (1) collect one round of groundwater samples from all background wells and other selected wells, analyze unfiltered samples for metals, and compare data for filtered

and unfiltered samples to determine which data to use in the risk assessment; or (2) explain the impact of using filtered metals data on the results of the risk assessment. Option 1 is more favorable but may be impractical at this point in the process.

2. Section 9 presents the conclusions of the background calculations and summarizes Section 4.0. One problem with the scheme outlined in Section 4.0 results from several parameters having upper tolerance limits that exceed health-based standards, particularly regarding applicable regulations like maximum contaminant levels (MCL) and corresponding action levels for copper and lead. Affected parameters include the following:

- Cadmium and mercury in all three water sources listed in Table 21
- Arsenic, chromium, lead, and nickel in both aquifers
- Beryllium in the glacial overburden
- Antimony and nitrate in the Great Miami Aquifer

When using data to decide which contaminants should be considered chemicals of concern for the risk assessment, FEMP should lower the tolerance limits for these analytes to the MCL. In any event, all risk assessments should include separate, parallel calculations for the risk posed by relevant background concentrations. The calculations should be drawn from the database used in this background study and should use the same exposure point concentrations, water sources (aquifers and streams), and so on as the risk assessment itself. In addition, the calculations should include all background chemicals, whether they are used in the main risk assessment or not. This type of information will be useful to risk managers when making decisions.