

**RESPONSES TO OEPA COMMENTS
ON THE INTEGRATED ENVIRONMENTAL
MONITORING STATUS REPORT FOR
SECOND QUARTER 1999**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**

DECEMBER 1999

U.S. DEPARTMENT OF ENERGY

1

RESPONSES TO OEPA COMMENTS ON THE INTEGRATED ENVIRONMENTAL MONITORING STATUS REPORT FOR SECOND QUARTER 1999

1. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: General Pg. #: Line #: Code:
Comment: The reporting of the LDS and LCS monitoring data is too hard to follow. Information on the LDS flows is scattered throughout two figures (flow volumes), two tables (analytical data) and three pages of text. The Tables are confusing because they are titled as providing first quarter data yet a footnote indicates that the highlighted data is from the first quarter. It is not clear if the data not highlighted is from the second quarter or the first quarter.

As much data as possible should be placed in tables. Highlighting should not be used. The following is one such data table.

Data in this table is from the 2nd Quarter 1999 IEMP.

Table with 6 columns: LCS Total flows both cells Gallons, LCS Cell 1, LDS Cell 1, LDS Cell 2, LCS Cell 2. Rows include monthly total flows for April, May, and June 1999, and analytical data for First and Second Quarters.

*Inconsistent with Figure 1-37 which states an average of 0.37 gal/acre/day was pumped from May 4 thru June 1.

Indicates data provided in text.

Response: This comment raises the issue that the presentation of the material in the on-site disposal facility reporting section could be improved. The U.S. Department of Energy (DOE) agrees with the commentor that the titles of Tables 1-6, 1-7, and 1-8 may lead to confusion and that without additional explanation, the information in the tables could be confusing. Highlighting was used to facilitate review of current sample data versus total sample data for each monitoring point.

With these tables, DOE is attempting to provide a holistic approach to evaluating the analytical information on the constituents detected during the reporting period. As identified in the Groundwater/Leak Detection and Leachate Monitoring Plan, it is important to look at the data from each of the monitored horizons together as a whole so that relationships of the constituent concentrations between the various monitored horizons can be observed. Therefore, it is prudent to continue to present the data for detected constituents by horizon for each cell. However, to clarify the information being presented, the following changes will be made:

The titles of the tables will be changed to: "On-Site Disposal Facility Cell 1, 2, or 3 Data Summary for Constituents Detected during (first, second, third, fourth) Quarter and Year."

The following explanation of the content of the on-site disposal facility tables is being provided for clarification and will be included in future Integrated Environmental Monitoring Plan (IEMP) reports:

- Constituents posted on these tables were detected during the reporting period in at least one of the four monitored horizons (i.e., leachate collection system [LCS], leak detection system [LDS], horizontal till well, or one of the Great Miami Aquifer wells).
- For each monitored horizon and each constituent detected during the reporting period, the following four pieces of information are provided:
 - Row 1, Column 1, total number of samples with detections since sampling began at that monitoring point / total number of samples analyzed since sampling began at that monitoring point (highlighted in blue)
 - Row 1, Column 2, range of results from monitoring point since sampling began at that monitoring point (highlighted in blue)
 - Row 2, Column 1, total number of samples with detections for the reporting period (highlighted in green)
 - Row 2, Column 2, range of results from the monitoring point for the reporting period (highlighted in green).

DOE agrees with the commentor's suggestion that as much information as possible be provided in tables (and previously agreed upon figures such as the LDS accumulation rate figures) rather than in the text. The LCS and LDS volumes and LDS accumulation rates can be provided in one table similar to the one provided by the commentor; however, the analytical data should be provided in a separate table (e.g., Tables 1-6 through 1-8 of the Integrated Environmental Monitoring Status Report for Second Quarter 1999). The following format is suggested:

Action: Beginning with the Integrated Environmental Monitoring Status Report for Third Quarter 1999, DOE will provide electronic versions of the groundwater elevation contour maps which will allow reviewers to zoom in on portions of the maps for a close-up view.

3. Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 1.0 Pg.#: 1-4 Line #: 32 Code: C
Original Comment #:

Comment: We concur with DOE's proposal not to use the water levels measured in the extraction wells for preparing piezometric head maps for the GMA. The production well water levels include the well loss effects and may not, therefore, be reflective of aquifer water levels.

Response: DOE acknowledges the comment.

Action: No action required.

4. Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 1.0 Pg.#: 1-4 Line #: 39 Code: C
Original Comment #:

Comment: DOE should continue to monitor the Type 3 wells. The water level data generated are important for demonstrating capture of the deeper portions of the plume. Based on 1Q99 data, four Type 3 wells (not including the South Plume Extraction Module wells) have total uranium concentrations that significantly exceed the FRL. The concentrations in 3014, 3069, 3095, and 3125 range from 41 to 331 µg/L. At a minimum, DOE should continue monitoring all Type 3 wells that fall within the 20 µg/L plume footprint plus some buffer distance (for example, 200 ft). By our estimation, this would include 38 wells compared to the 63 wells that are currently monitored for water levels, as shown on Page 3-49 of the Integrated Environmental Monitoring Plan.

Response: DOE would like OEPA to reconsider their request to continue monitoring the Type 3 wells. DOE does not believe that water level measurements in Type 3 wells are necessary to demonstrate capture of the deeper portions of the plume. DOE does not understand how measuring water levels in the Type 3 monitoring wells will demonstrate capture of the deeper portions of the plume. The Great Miami Aquifer above the blue clay behaves as one flow system. This has been documented in the past using hydrographs that compare Type 2 and Type 3 water levels. No discernable vertical gradients of importance to the tracking of the remedy have been documented, as indicated below:

- Page A.3-1 of the 1998 Integrated Site Environmental Report
- Page A.3-1 of the 1997 Integrated Site Environmental Report
- Comment Response #32 on the Draft IEMP, Revision 1
- Comment Response #10 on the Integrated Environmental Monitoring Status Report for Third Quarter 1997
- Page 4-4 of the South Plume Removal Action, Design Monitoring Evaluation Program Plan, System Evaluation Report for January 1, 1996 through June 30, 1996, for Operable Unit 5

During Round D, the deepest sample collected at location 12373 (70 feet below the water table) had a total uranium concentration of 21 µg/L. Data collected in all three previous sampling rounds (Rounds A through C) showed that the uranium concentration at this deep depth was not above 20 µg/L. Data collected during the next two sampling rounds (Rounds E and F) showed that the uranium concentration at this deep depth was not above 20 µg/L. Round E data are reported in the Integrated Environmental Monitoring Status Report for Third Quarter 1999. Round F data will be reported in the next IEMP quarterly status report, to be submitted in March of 2000.

Given that subsequent sampling has shown that the uranium concentration at this deep depth is not above 20 µg/L, it is believed that the concentration reported for the Round D sample, which was collected 70 feet below the water table, was not representative of the aquifer. This issue is discussed further in the Integrated Environmental Monitoring Status Report for Third Quarter 1999.

Action: No action required.

6. Commenting Organization: OEPA Commentor: HSI GeoTrans, Inc.
Section #: 1.0 Pg. #: Figure 1-31 Line #: N/A Code: C

Original Comment #:

Comment: The contouring shown on the figure should honor the data which is not the case for the 20 µg/L contour line.

Response: DOE agrees with the comment. In Figure 1-31, a contour should have been drawn that indicated the possibility of a deeper finger of the plume at location 12373, at an elevation of approximately 450 feet above mean sea level. The data used to prepare this figure were collected as part of the Re-injection Demonstration. The subject figure will be provided in the Final Re-injection Demonstration Test Report.

Action: The figure (referenced above) will be corrected, as suggested in the comment, and provided in the Final Re-injection Demonstration Test Report.

7. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 1.2 OSDF Leak detection Monitoring Pg. #: 1-7 Line #: 4 Code: C

Comment: The text states that "... the liner systems for cells 1 and 2 are performing as designed in that the accumulation rates are far below the on-site disposal facility design-established an initial response leakage rate of 20 gpad." While we don't necessarily disagree with that statement, it is not completely accurate. The OSDF was designed to leak at rates very much less than the initial action leakage rate. Actually, the Workshop referenced in this Section describes a study that measured field performance of landfills comparable in design to the OSDF. Cell 1's performance as measured by volumes in the leak detection system per unit Area is inferior to all but one of the landfills in the study.

Response: This comment points out OEPA's concern regarding the leakage rate of Cell 1 of the on-site disposal facility. DOE shares OEPA's concern regarding the Cell 1 leakage rates. In the Responses to U.S. EPA and OEPA Comments on the 1998 Integrated Site Environmental Report, Comment Response #10, DOE pointed out that because of the way Cell 1 was being filled, the stage of Cell 1 is somewhere between initial and active, rather than active as previously thought. Therefore, comparing Cell 1 to other landfills in their active stage is not completely accurate either. As noted in the above referenced response, the Cell 1 LDS accumulation rate is near the top of the expected range; therefore, this parameter requires increased attention. This includes hourly measurements of the water level in the inner containment vessel for Cell 1, to which fluids in the LDS drain. These hourly measurements are currently converted to

11. Commenting Organization: Ohio EPA Commentor: DSW
 Section #: 2.2 Pg. #: 2-2 Line #: 33 Code: C
 Original Comment #:
 Comment: Loading and shipping of trains could also potentially impact Paddys Run and location SWP-02.
 Response: DOE acknowledges the comment.
 Action: If loading and shipping of trains is identified as an activity in future IEMP quarterly status reports, then SWP-02 will be identified as a location that could be impacted.
12. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 3.2 Pg. #: 3-2 Line #: 21-31 Code: C
 Original Comment #:
 Comment: The assumption that equilibrium between Th-232 and daughters is a good assumption, but stating that this supported by background results is not a good idea. Background results are assumed to be not affected by site emissions, where as fence line monitors are affected. The assumptions should be based on the results from fencing monitors only, and should only be used when laboratory results are rejected.
 Response: DOE agrees that, when necessary, fenceline data should be used to support assumptions about missing or rejected fenceline data and available background data should be used to support missing or rejected background data. The assumption that thorium-228 was in equilibrium with thorium-232 at AMS-24 and AMS-25 is supported by the thorium-228/thorium-232 equilibrium conditions which occurred at the other fenceline monitors during the second quarter. The assumption that thorium-228 was in equilibrium with thorium-232 at the background monitors during the second quarter is supported by the thorium-228/thorium-232 equilibrium conditions which occurred during 1998 as reported in the 1998 National Emissions Standards for Hazardous Air Pollutants (NESHAP) annual report. DOE recognizes that support for assumption of thorium equilibrium at the background monitors was missing from the text within the Integrated Environmental Monitoring Status Report for Second Quarter 1999.
 Action: No action required.
13. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 3.2 Pg. #: 3-2, 3-3 Line #: 33-48, 1-4 Code: C
 Original Comment #:
 Comment: The fact that at the present time, thorium is the leading contributor to dose is interesting. Has any research been performed that would support that ambient air provides a higher thorium dose than uranium? Or is this an artifact of sampling with very low yields? If the trend persists, what type of changes may be expected in the IEMP?
 Response: Environmental studies have shown the average total thorium concentration in air for background to be 0.3 ng/m³ and 0.3 fCi/m³ for total uranium²³². Given certain assumptions, an average air inhalation background dose equivalent can be calculated. The average thorium dose calculated (based solely on thorium-232) was 0.53 millirem (mrem) while the total uranium dose was 0.38 mrem. Therefore, thorium would contribute 40 percent more dose than uranium at the background locations. As the contributions from background levels of thorium-230 and thorium-228 are factored in, the thorium contribution to dose sharply increases. Based on a review of second quarter data, the contributions and relative ranking of contributors to dose suggests that the fenceline monitors are measuring fugitive emissions that are representative of background (i.e., non-contaminated) soil.

19. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 3.2 Pg. #: Figures 3-10 & 3-11 Line #: na Code: C
 Original Comment #:
 Comment: Plot the four locations: WPTH-1, WPTH-2, AMS-12, and AMS-16 on same graph for each isotope of thorium. This will aid in efficient review of data.
 Response: The WPTH-1 and WPTH-2 monitors are fenceline locations used to monitor biweekly thorium concentrations, specifically for the purpose of providing a frequent assessment of thorium-230 emissions from the excavation of the waste pits. AMS-12 and AMS-16 are background locations, which provide biweekly uranium and particulate data and quarterly isotopic uranium, isotopic thorium, and radium-226 data, used to account for the background concentration of radionuclides in air. Because of their different locations (fenceline vs. background/off site), different sample analysis programs, and differences in the end use of data, plotting data from these different monitors on the same graph is not likely to aid in the efficient review of data.
 Action: No action required.

20. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 3.2 Pg. #: Figure 3-17 Line #: na Code: C
 Original Comment #:
 Comment: This graph indicates that the direct radiation measurement's AMS-6 continue to increase, but the silo concentrations during the same period have decreased. DOE has maintained that direct radiation readings at AMS-6 are due to silo head space concentrations. This inconsistency, evidenced this quarter, warrants a closer look at the silo radon measurement instrumentation. Please investigate any inconsistencies with the silo radon instrumentation. Small factors, such as moisture, daughter plate out on the lucas cell, and leaking sample lines could affect the measurement.
 Response: Several factors impact the comparison and correlation of small increases in thermoluminescent dosimeter (TLD) readings at AMS-6 with changing silo headspace concentrations. First, the below average rainfall in May could have impacted dose contribution from terrestrial radiation and caused the ambient dose levels recorded by the TLDs to be higher. Second, head space concentrations trended over time exhibit seasonal fluctuations similar to ambient levels (with minimums occurring during the second quarter and maximums in the third or fourth quarters). This cyclical pattern, combined with associated errors in the counting equipment and sampling technique, may at times mask the overall upward trend in the head space radon levels. These factors may cause discrepancies when quarterly comparisons are performed relative to long-term trending. However, as noted in the comment, the continuous radon monitoring system could be affected by other factors and DOE will examine its operation.
 Action: DOE will investigate sampling equipment and methodology associated with the silo radon instrumentation and report any discrepancies in future IEMP quarterly status reports.

21. Commenting Organization: Ohio EPA Commentor: DSW
 Section #: 4.0 Pg. #: 4.3 Line #: 5-11 Code: C
 Original Comment #:
 Comment: This states that turbidity greater than that in Paddys Run was observed in the northern drainage ditch. This indicates potential problems up gradient with storm water controls or soil stabilization. Were any observations made of controls upgrading to determine the cause of the increased turbidity? What were the outcomes of these

observations if they occurred and if they were not made, are their plans to make such observations in the future?

Response: The observation on April 9, 1999 was made approximately six hours after over one inch of rain fell within a one hour period. With the intensity of the precipitation and the timing of the observation, turbid conditions were expected. Such an intense storm event could have caused increased turbidity through runoff from exposed cut banks downstream (and unassociated with) construction activities and related sedimentation controls. Since the follow-up survey on Monday, April 12 revealed that the turbid conditions were no longer present, no further action was required. This approach is set forth in Appendix D of the IEMP, Revision 1.

Action: No action required.

22. Commenting Organization: Ohio EPA Commentor: DSW
Section #: Data disk Pg. #: Surface waterline #: 35, 215, 218, 229, 230, 231, 232, 352. Code: C
Original Comment #:
Comment: The following observations were made on the surface water data provided:

On 5/26/1999 there was an unusually high nitrate/nitrite result at PF. 4000 (line 35). Has the reason for this been determined?

A) The results for Technetium-99 (lines 215, 229, and 352) show up in the top 10 (of 91) results since the third quarter of 1997. The results are for SWP-02, SWD-02, and SWD-03. Additionally the total uranium results for SWD-02 and SWD-03 (lines 218, 230, 231, 232) are in the upper end of the results from these sites. As isolated results, these are not of much concern, however taken together they may indicate an upward trend. Has any investigation been done to see if there may be a readily identifiable cause of these results?

Response: A) The result should have been marked on the data disk as invalid as it was reported in the May 1999 Discharge Monitoring Report. The sample concentration was identified in this report as being invalid because nitric acid (a preservative used for metals and radiological samples) was suspected of being incorrectly placed in the sample container.

B) Trend analysis is performed on a yearly basis and included in IEMP annual integrated site environmental reports; however, as the data are available throughout the year, it is reviewed and assessed against final remediation levels (FRLs) and benchmark toxicity values. It should be noted that the above referenced concentrations are significantly below the surface water FRLs for technetium and total uranium (150 pCi/L and 530 µg/L, respectively). As for the technetium results reported in the first quarter at locations SWD-02, SWD-03, and SWP-02 that were approximately 20 pCi/L, these concentrations have decreased to non-detectable, approximately 8 pCi/L, and non-detectable, respectively during the second quarter. The total uranium concentrations from SWD-02 appear to be consistent with historical results. The concentration from this location in March was the highest during the quarter at 38 µg/L; however, it should be noted that concentrations during the second quarter were approximately 7 to 15 µg/L. Total uranium concentrations from SWD-03 during the first quarter were around 80 µg/L, which is also consistent with historical results. For instance, this location had a concentration of approximately 108 µg/L in October of 1998. During the

second quarter, total uranium concentrations from this location ranged from approximately 35 to 74 $\mu\text{g/L}$.

Based on the evaluation presented above, DOE does not believe that an increasing trend is present in the data set. Rather, the first quarter 1999 data reflects the fluctuation in contaminant concentrations that can be expected as active remediation proceeds at the Fernald Environmental Management Project (FEMP). DOE will continue to evaluate the data as defined under the IEMP to ensure that FEMP activities do not result in an unacceptable environmental impact.

- Action:
- A) Data will be reported consistently in the future.
 - B) No action required.