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**RESPONSES TO U.S. EPA & OEPA COMMENTS
ON THE INTEGRATED ENVIRONMENTAL MONITORING
STATUS REPORT FOR FIRST QUARTER 1998**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**

SEPTEMBER 1998

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

1

**RESPONSES TO U.S. EPA ON THE
INTEGRATED ENVIRONMENTAL MONITORING
STATUS REPORT FOR FIRST QUARTER 1998**

Specific Comments

- 1742

1. **Commenting Organization:** U.S. EPA **Commentor:** Saric
Section#: 1.0 **Pg.#:** 1-2 **Line#:** 27 and 28 **Code:**
Original Specific Comment# 1
Comment: The text cites Figures 1-19 and 1-20, which present the limits of the estimated groundwater capture zone. Because the extent of the capture zone is an estimate, its limits are open to interpretation. However, the line depicting the limit of the capture zone in the southeastern and southwestern portions of the plume (especially in Figure 1-20) is not perpendicular to the groundwater elevation contours as it should be. Therefore, as the figures are drawn, they slightly overestimate the extent of the capture zone. Although moving the line depicting the limit of the capture zone will not significantly affect the conclusions stated in the text, it would more accurately reflect the field data.
Response: The U.S. Department of Energy (DOE) agrees with the comment. The capture zones on the detailed groundwater elevation maps shown in Figures 1-19 and 1-20 were developed from the full-scale groundwater elevation maps shown in Figures 1-17 and 1-18. Because the groundwater elevation contours were adjusted in the detailed maps of Figures 1-19 and 1-20 to more faithfully represent the data at that scale, the capture zones from the full-scale maps were not perpendicular to the elevation contours at all points.
Action: Future capture zones interpreted from groundwater elevation data will be developed from the detailed groundwater elevation maps then transferred to the full-scale maps so as to be more consistent with groundwater elevation contours.
2. **Commenting Organization:** U.S. EPA **Commentor:** Saric
Section#: 1.0 **Pg.#:** 1-2 **Line#:** 30 **Code:**
Original Specific Comment# 2
Comment: The text cites Figure 1-21, which presents the groundwater flow direction indicated by the borescope data. The groundwater flow direction indicated by these data is not consistent with the flow direction indicated by the groundwater elevation data for the area of groundwater monitoring wells 2552 and 3552. This discrepancy may be a result of measuring groundwater flow direction at a point as opposed to measuring it over a larger area. In any case, the reason for any such discrepancies should be clearly explained in future quarterly reports.
Response: DOE agrees with the comment. The commentor correctly points out that borescope data will occasionally disagree with flow data interpreted from groundwater elevation contours because the elevation contours are interpreted from point measurements taken over an extended area while the borescope direction measurements are interpreted on a point-by-point basis.
Action: Additional discussion will be added in future quarterly status reports clarifying the differences between borescope flow direction measurements and flow directions inferred from groundwater elevation contours.

3. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 1.0 Pg. #: 1-2 and 1-3 Line#: Not Applicable (NA) Code:
Original Specific Comment# 3

Comment: The discussion of the borescope data on these pages indicates that the borescope data for the shallow portion of the aquifer (less than 3 feet below the water table) are not representative of the bulk groundwater flow in the area. To ensure that the monitoring of the aquifer with the borescope yields usable data, the U.S. Department of Energy (DOE) should modify its monitoring scheme to collect borescope data at consistent shallow, medium, and greater depths within the aquifer. This modification should be reflected in future quarterly reports.

Response: DOE does not agree that the borescope monitoring scheme needs to be modified. The borescope observations are made within the monitoring well screen which is set at a specific depth depending upon whether the monitoring well is a Type 2 or a Type 3 well. Flow observations are made where preferential flow zones are observed at well-specific depths within the screen interval. These well-specific depths are identified when a monitoring well is first scoped; the same observation depth is used for all subsequent measurements.

The text referred to reinforces the idea that the northeast lobe of the total uranium plume appears to be very close to being within the current capture zone imposed by the South Plume Extraction Module. This interpretation is based on the observation that groundwater flow direction shifts with depth below the water table from the southwest toward the South Plume pumping wells to the east or southeast. Therefore, this area is anticipated to almost certainly be within the expanded capture zone which will result when the South Field Extraction, Re-Injection Demonstration, and South Plume Optimization Modules are operating.

Action: Monitoring data will be collected in the area of the northeastern lobe of the total uranium plume after the South Field Extraction, Re-Injection Demonstration, and South Plume Optimization Modules are operational to see if the northeastern lobe of the plume is indeed within the capture zone imposed by operation of the combined modules. If the monitoring data indicate the northeastern lobe of the plume is not within the capture zone imposed by the combined modules, then operational changes to the aquifer remedy may be recommended.

DOE is currently evaluating the possibility of installing additional monitoring wells in the South Plume area which will be screened between the Type 2 and Type 3 monitoring well depths in order to more effectively track the leading edge of the plume.

4. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3.2 Pg. #: 3-1 Line#: 37 to 39 Code:
Original Specific Comment# 4

Comment: The text states that "total uranium and total particulate concentrations...did not exhibit any increasing trends during first quarter 1998." This statement is not completely supported by data presented in Table 3-1. The average total uranium concentrations for five locations increased significantly (from 29 to 116 percent) during the first quarter of 1998 as compared to the 1997 average concentrations. These locations include AMS-5, AMS-22, AMS-25, AMS-26, and AMS-27. Except for AMS-22, these locations lie along the southern or western fenceline. If a similar trend is observed in the second quarter of 1998, the trend should be identified in the quarterly status report.

Response: If a trend is identified with the addition of second quarter results, then it will be evaluated and discussed in the quarterly status report. The data will be evaluated in

light of historical results, on-going project activities, meteorological conditions observed during the period, and the applicable compliance standard. While the quarterly average results have increased at the five monitors mentioned in the comment, graphs of the data over time, as shown in Figures 3-3 through 3-12, do not reveal a positive trend across the first quarter. The lack of an upward trend in the first quarter data was the basis for stating "concentrations...did not exhibit any increasing trends during the first quarter."

Action: Trend evaluations will continue to be conducted as described in Section 6.6.1 of the Integrated Environmental Monitoring Plan (IEMP).

5. **Commenting Organization:** U.S. EPA **Commentor:** Saric
Section#: 3.2 **Pg.#:** 3-4 **Line#:** 8 to 10 **Code:**
Original Specific Comment# 5

1742

Comment: The text states that direct radiation monitoring data for the first quarter of 1998 "indicate a slight positive trend at the site fenceline, specifically at thermoluminescent dosimeter (TLD) location 6." This statement is not supported by data presented in Table 3-5. For 20 of the 21 fenceline locations represented in the table, the measured direct radiation values for the first quarter of 1998 are between 26 and 28 percent of the 1997 annual values rather than the expected 25 percent. Although the data suggest a very slight positive trend, there is no evidence that the trend for TLD location 6 is different than that for the 19 other fenceline locations. If the trend reflected in Table 5-3 continues during the second quarter of 1998, it should be reported as a general trend rather than as a specific observation for TLD location 6.

Response: Due to its close proximity to the K-65 Silos, thermoluminescent dosimeter (TLD) location 6 is considered to be a highly sensitive monitoring location for detecting increases in environmental direct radiation levels. Therefore, this location has been used as an indicator and closely tracked against background concentrations and graphically presented in the IEMP reports. Figure 3-16 depicts that the slight positive trend at TLD location 6 is not based on a single quarterly measurement, but on years of data. The scale in Figure 3-16 does not allow the trend to be easily detected. However, this figure will be modified in future quarterly status reports to elucidate the trend. Additionally, the existence of a general trend at the site fenceline will be addressed through continued trending.

Action: This figure's scale will be modified to allow the slight upward trend at TLD location 6 to be more easily identified. (For the Integrated Environmental Monitoring Status Report for Second Quarter 1998, see Figure 3-18.)

6. **Commenting Organization:** U.S. EPA **Commentor:** Saric
Section#: 3.2 **Pg.#:** 3-4 **Line#:** 30 to 33 **Code:**
Original Specific Comment# 6

Comment: The text states that first-quarter emission monitoring results for the laboratory, laundry, and T-hopper stacks are "within historical ranges" or "within the expected range of results," but the report presents no data to support these statements. Future quarterly reports should include a numerical summary of the stack emission monitoring results.

Response: Historically, the stack monitoring data have had very few detectable concentrations. Therefore, in lieu of a numerical summary, DOE will provide more detail in the text discussion to summarize the analytical results. DOE will continue to provide the emission summary table within the report and the analytical results on data disk.

Action: A more detailed discussion of analytical detections will be included within the text summarizing the stack results.

7. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3-3 Pg.#: 3-7 Line#: NA Code:
Original Specific Comment# 7

Comment: Table 3-3 presents the analytical results for quarterly composite samples collected from the 16 fence-line monitoring locations that will be used to demonstrate compliance with National Emissions Standards for Hazardous Air Pollutants Subpart H beginning in 1998. The data in this table show that much of the measured dose is contributed by isotopes other than uranium. Specifically, at five of the 16 locations (AMS-4, AMS-22, AMS-24, AMS-25, and AMS-28), uranium isotopes contribute no more than 30 percent of the measured dose; most of the dose at these locations is contributed by radium and thorium isotopes. At five other locations, uranium isotopes contribute between 64 and 85 percent of the measured dose. At the remaining six locations, uranium isotopes account for between 97 and 100 percent of the measured dose. This trend appears to differ significantly from previous results presented in the 1997 annual report, which states on Page 87 that "on average, uranium isotopes contribute 94 percent of the dose." If this trend continues, it should be identified and discussed in future quarterly reports and in the 1998 annual report.

Response: As mentioned in the 1997 Integrated Site Environmental Report, uranium isotopes contributed 94 percent of the annual dose equivalent based on the 1997 composite data. For the first quarter of 1997, uranium isotopes only accounted for an average of 69 percent of the dose component. This difference could be an anomaly, a trend, or a seasonal variation in the data. With only a single set of quarterly composite data, it is difficult to determine if the first quarter 1998 data will lead to significantly different radionuclide dose contributions than those in 1997 or from previous years (1990 through 1995) in which uranium accounted for between 62 and 94 percent of the annual dose. However, based on the excavation activities planned over 1998, uranium is expected to continue to be the primary contributor to dose. If the dose contribution from uranium continues to vary from historical contributions, then this trend will be identified and discussed in future IEMP quarterly status and annual reports.

Action: Evaluation of the radiological air particulate data will continue in order to determine the contribution to dose from the target radionuclides.

8. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3-14 Pg.#: 3-24 Line#: NA Code:
Original Specific Comment# 8

Comment: The figure shows the silo headspace radon activities for January 1997 through March 1998. The curves look like a combination of an annual cycle, with lows in the second quarter and highs in the fourth quarter, and a secular trend upward. If later data, especially the second- and third- quarter 1998 data, confirm the cyclic effect, DOE should consider separating the effect of the annual cycle on the upward trend. The results of this effort would be very useful for predicting when mitigation action will be necessary and whether a new factor will affect the trend.

Response: DOE will modify the existing graph to show an update using quarterly average head space data and will also include historical data from 1992 through 1997. The use of quarterly average data significantly reduces the cyclic effect in the graph. These data will continue to be updated in future IEMP quarterly status reports to graphically depict the increasing trend in head space concentrations.

Action: The graph will be modified per the comment response. (For the Integrated Environmental Monitoring Status Report for Second Quarter 1998, see Figure 3-15.)

9. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3-18 Pg.#: 3-28 Line#: NA Code:

1742

Original Specific Comment# 9

Comment: Figure 3-18, which highlights data that will be presented in the second-quarterly report for 1998, omits alpha track-etch cup data for radon monitoring. Although these data are used to evaluate compliance with annual on-site and fence line limits, the "Integrated Environmental Monitoring Plan" states on Page 6-39 that basic statistics for alpha track-etch cup data "will be generated on a semi-annual basis." Alpha track-etch cup data for the first 6 months of 1998 should be summarized and included in the second quarterly report. If the data are not available when the second quarterly report is prepared, the omission of these data should be noted in the report.

Response: At the time of the first quarter status report, it was not yet known as to whether the data from the alpha track-etch radon cups would be available for inclusion in the second quarter status report. Therefore, as Figure 3-18 shows, these data were not included. However, the data are now available. (For the Integrated Environmental Monitoring Status Report for Second Quarter 1998, see Table 3-6.)

Action: No action required.

**RESPONSES TO OHIO EPA ON THE
INTEGRATED ENVIRONMENTAL MONITORING
STATUS REPORT FOR FIRST QUARTER 1998**

General Comments

10. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section#: Pg.#: Line#: Code: G
Original Comment# 1
Comment: The water level maps and boroscope results are much improved over past IEMP reports. In addition, the presentation of what data is included in the current document and what will be provided in the next report has been made clearer.
Response: DOE acknowledges comment.
Action: No action required.

Specific Comments

11. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section#: 1.0 Pg.#: 1-3 Line#: 21 Code: C
Original Comment# 1
Comment: In previous IEMP and DMEPP reports, concern has been expressed regarding upward trending total uranium concentrations in well 2551 located on the west bank of Paddy's Run. FEMP has indicated that boroscope measurements would be taken in this well but has been experience difficulty accessing the well. What is the current status of the well 2551 boroscope measurement task and associated Paddys Run gauging?
Response: Monitoring Well 2551 was borescoped for the first time on June 1, 1998. Mike Proffitt from the Ohio Environmental Protection Agency (OEPA) was present to observe the measurement. A flow at 89.6 degrees (due east) was observed in the well at 6.7 feet below the top of the water table.
Action: Monitoring Well 2551 has been added to the list of wells for routine quarterly borescope observations and will be monitored for a period of one year to evaluate seasonal variations. Results will continue to be reported in future IEMP quarterly status reports. (For the Integrated Environmental Monitoring Status Report for Second Quarter 1998, see Table 1-7.)
12. Commenting Organization: Ohio EPA Commentor: HSI GeoTrans, Inc.
Section#: 1.0 Pg.#: 1-22 Line#: NA Code: C
Original Comment# 2
Comment: The particle traces shown on this figure should terminate at the pumping well locations.
Response: This comment was addressed in Responses to U.S. & OEPA Comments on the Draft Integrated Environmental Monitoring Status Report for Third Quarter 1997, specifically in Comment Response #8 to OEPA. The response is repeated here for convenience:

"The forward particle tracks are defined with respect to the SWIFT model velocity flow field. Therefore, the particles leave the model grid around the center of a model block [because SWIFT assumes the extraction wells are block centered]. The recovery wells however, are plotted at their actual surveyed locations and therefore are not necessarily centered with respect to the model blocks. To correct the figure would mean changing the surveyed location of the recovery wells or arbitrarily shifting the particle track

locations to terminate off center of the model blocks. DOE does not believe that either change is warranted."

Action: No action required.

13. Commenting Organization: Ohio EPA Commentor: OFFO

Section#: Figure 1-1 Pg.#: 1-12 Line#: Code: C

Original Comment# 3

Comment: The quarterly private well monitoring is not included on Figure 1-1. Please include this, since monitoring is done on a quarterly basis.

Response: Per the established reporting schedule, analytical data from the private well monitoring program for the first quarter of 1998 are included in the Integrated Environmental Monitoring Status Report for Second Quarter 1998. The quarterly private well monitoring data from the fourth quarter were reported in the 1997 Integrated Site Environmental Report.

Action: No action required.

14. Commenting Organization: Ohio EPA Commentor: DSW

Section#: 2.2 Pg.#: 2-1 Line#: 27-29 Code: C

Original Comment# 4

Comment: This statement implies that storm water was monitored and in compliance during the first quarter of 1998 ("Wastewater and storm water discharges...were in compliance 100 percent of the time during first quarter 1998"). The storm water discharges at NPDES sampling points IIO00004003, IIO00004004, IIO00004005, and IIO00004006 (IEMP monitoring locations STRM 4003, STRM 4004, STRM 4005, and STRM 4006 respectively) are required to be sampled 2 times per year. There is no data on the disks submitted with the status report to indicate that those locations were sampled during the first quarter of 1998.

Response: DOE acknowledges the statement could have been made clearer by stating wastewater discharges were in compliance 100 percent of the time and that storm water discharge monitoring points were not sampled for National Pollutant Discharge Elimination System (NPDES) compliance during the first quarter. The locations referenced above are sampled twice a year for the NPDES permit. Specifically, the locations are sampled in June and December. For this reason, no NPDES data were provided for these locations for the first quarter report. The data collected in June 1998 are provided in the Integrated Environmental Monitoring Status Report for Second Quarter 1998.

Action: No action required.

15. Commenting Organization: Ohio EPA Commentor: DSW

Section#: 2 Pg.#: 2-8 Line#: 2-5 Code: C

Original Comment# 5

Comment: None of the IEMP characterization data from the first quarter of 1998 is included in this report. Realizing that sample processing and data validation can be a timely process, it would be very useful to have data from samples taken in the first quarter in the first quarter report. This report comes out in June and the next quarterly report wont be available until September. This is a long time to wait for results from samples taken in the first quarter. Can anything be done to provide data from samples taken in the specific quarter to which the status report applies?

Response: DOE is continuing to evaluate ways to streamline the analytical and data management processes to support more timely reporting. However, with the current constraints of laboratory turn-around times, resolution of analytical issues with the off-site laboratories, and the limited number of data management resources available to handle

the large volume of data generated at the Fernald Environmental Management Project, it is doubtful that significant improvements can be realized in the near future.

Action: DOE will continue to evaluate ways to accelerate data reporting.

16. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: 3.2 Pg.#: 3-3 Line#: 15-23 Code: C

Original Comment# 6

Comment: The text states that there were two days where 100 pCi/L limit was exceeded during the first quarter. What were the actual concentrations, what were the days, and what was the time for these exceedances? This information should be included in a table or figure.

Response: The two days referenced for exceeding the 100 picoCuries per liter (pCi/L) limit were January 28 and February 1, 1998. The exceedances lasted for approximately one hour each morning at 03:00. The concentration was 102.2 pCi/L in January and 100.8 pCi/L in February. Both exceedances occurred at the K-65 northeast location on the silo exclusion fence.

Action: Future IEMP quarterly status and annual reports will contain tables listing any observed concentrations exceeding the 100 pCi/L limit.

17. Commenting Organization: Ohio EPA Commentor:
Section#: 3.2 Pg.#: 3-3 Line#: 35-41 Code: C

Original Comment# 7

Comment: The increase in radon concentrations over the first quarter during 1997 are these increases possibly due to other remedial activities occurring on-site? Additionally, are radon concentrations expected to continue increasing and if so, what measures will be taken to correct this?

Response: There were no other project related activities conducted during the first quarter of 1998 associated with significant quantities of radon emitting sources. It is probable that radon concentrations at the site fenceline will slightly increase in response to increasing radon emissions from the K-65 Silos as the effectiveness of the bentonite layer within the silos continues to diminish. However, it should be noted that radon emissions from the K-65 Silos will be mitigated through implementation of the Accelerated Waste Retrieval Project which includes the construction of a radon treatment system for reducing radon concentrations in the silo head space. The radon treatment system is scheduled to be operable in 2000. Based on an evaluation of radon head space concentration data, the system may be initiated before the removal of silo materials to reduce radon head space concentrations.

Action: No action required.

18. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: 3.2 Pg.#: 3-4 Line#: 3-14 Code: C

Original Comment# 8

Comment: An increased statistical effort should be made to try to determine differences between background and fenceline direct radiation measurements. It appears that the local offsite average is 16.5 mrem, while fenceline doses average greater than 18 mrem.

Response: The background direct radiation measurement locations are being evaluated through the IEMP biennial revision. The results will be incorporated into the 1998 IEMP biennial revision. In addition to this review, an assessment of the statistical methods used in comparing direct radiation measurement data (background versus fenceline) will be performed.

9

Action: Background locations used for direction radiation will be reevaluated for the biennial revision of the IEMP. The current data treatment methods will be reviewed to determine if different statistical methods provide a more useful comparison.

19. **Commenting Organization:** Ohio EPA **Commentor:** OFFO
Section#: Table 3-3 **Pg.#:** 3-7 **Line#:** na **Code:** C **1742**
Original Comment# 9

Comment: The actual isotopic data for the quarterly filter analysis should be included. Individual total uranium results should also be included. This data is necessary for the regulators to independently verify DOE conclusions.

Response: The isotopic data from the quarterly composite samples are submitted to the agencies electronically (on data disk) and are summarized in the IEMP quarterly status and annual reports.

Action: No action required.

20. **Commenting Organization:** Ohio EPA **Commentor:** OFFO
Section#: Table 3-4 **Pg.#:** 3-8 **Line#:** **Code:** C
Original Comment# 10

Comment: The data included in this report is not inclusive compared to the data provided in the FFA quarterly report. Please include the pertinent data from the FFA report.

Response: As identified in the transmittal letter for the first quarter status report, "Information formerly reported through the FFA/FFCA will be provided as either text or tables within the IEMP status report or within the accompanying data disks. For example, continuous radon monitoring data are provided in the same format as previous FFA/FFCA submittals, but are contained in the data disks accompanying the IEMP status report. In addition, a summary table of environmental radon data and a graphical display of silo head space data are provided in the body of the IEMP status report." Therefore, as identified above, all FFA radon data are provided electronically.

Action: No action required.

21. **Commenting Organization:** Ohio EPA **Commentor:** OFFO
Section#: Table 3-5 **Pg.#:** 3-9 **Line#:** n/a **Code:** C
Original Comment# 11

Comment: An evaluation of the background locations used for direct radiation measurements needs to be conducted. The local offsite locations have lower measurements than the background locations. It appears that some of the current background locations do not adequately represent the unaffected dose rates for the immediate Fernald area.

Response: See Comment Response #18.

Action: See Action #18.

22. **Commenting Organization:** Ohio EPA **Commentor:** OFFO
Section#: 4.0 **Pg.#:** **Line#:** **Code:** C
Original Comment# 12

Comment: Although the details of natural resource monitoring were only discussed at one meeting of the Natural Resources Trustees, the Ohio EPA has concerns with the wholesale removal of this section from the quarterly reports. Considering DOE has only "tentatively accepted" the proposed settlement, Ohio EPA believes that continued quarterly monitoring of natural resource impacts is warranted. Ohio EPA agrees this monitoring should be less detailed than in previous reports. We would recommend a narrative description of newly impacted or restored areas in each quarterly report with a quantitative assessment provided in the annual report. Since no discussions regarding

10

the change to this section of the IEMP have occurred since the April 16, 1998, at which it was briefly discussed, Ohio EPA recommends additional discussions priors to drafting the next quarterly report.

Response: DOE agrees that narrative descriptions of newly impacted or restored areas should be provided in IEMP quarterly status and annual reports. However, because the tentative agreement identifies that DOE will be restoring approximately 850 acres, it is not considered necessary to quantitatively assess these impacts.

Action: DOE will provide narrative descriptions of newly impacted or restored areas in IEMP quarterly status and annual reports. In addition, the biennial revision of the IEMP will be modified to reflect this approach.

