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**RESPONSES TO U.S. & OEPA COMMENTS
ON THE
1997 INTEGRATED SITE ENVIRONMENTAL REPORT**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**

SEPTEMBER 1998

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

1

Action: The text in the IEMP will be revised through the biennial revision to clarify the reporting of project-specific monitoring data within the IEMP quarterly and annual reporting scheme.

Specific Comments

1741

4. **Commenting Organization:** U.S. EPA **Commentor:** SARIC
Section#: 5 **Pg.#:** 87 **Line#:** NA **Code:**
Original Specific Comment# 1
Comment: The text includes a summary of results for the annual composite samples obtained from radiological air particulate samples collected throughout the year. The annual composite samples are analyzed for uranium isotopes and several other radionuclides. The text states that on average, uranium isotopes accounted for 94 percent of the dose in the annual composite samples. However, this statement cannot be verified based on the annual composite data presented in Appendix C of the annual report. Table C.1-4 presents the concentrations of individual radionuclides found in composite samples in units of picocuries per cubic meter, but the table does not convert these concentrations to dose equivalents. Future annual reports should present both the measured concentrations and the dose equivalents for the annual composite samples.
Response: Future annual reports will present both the radionuclide-specific measured concentrations and the ratios of the measured concentrations to the corresponding National Emissions Standards for Hazardous Air Pollutant (NESHAP) 40 CFR 61 Subpart H, Appendix E, Table 2 values. From the ratio, the individual radionuclide contribution to dose can be determined by multiplying by 10. The Integrated Environmental Monitoring Status Report for First Quarter 1998, Table 3-3, contains an example of the ratios. In addition to the tabular information, an electronic version of the spreadsheet used to calculate the measured concentrations and ratios will be forwarded along with the annual report. The electronic file should aid in the verification of the tabular data.
Action: Both analytical concentrations and dose equivalents will be provided in future annual reports.
5. **Commenting Organization:** U.S. EPA **Commentor:** SARIC
Section#: 5 **Pg.#:** 95 **Line#:** NA **Code:**
Original Specific Comment# 2
Comment: The discussion of monitoring for direct radiation could be improved by briefly describing the frequency (quarterly) and the purpose (to assess the direct radiation component of the air pathway dose) of the measurements as is done for other components of the air monitoring program. This approach should be considered for future annual reports.
Response: DOE agrees with the comment.
Action: The frequency and purpose of direct radiation monitoring will be included in future annual reports.
6. **Commenting Organization:** U.S. EPA **Commentor:** SARIC
Section#: Table 5-7 **Pg.#:** 101 **Line#:** NA **Code:**
Original Specific Comment# 3
Comment: Some of the information in Table 5-7 is not clearly presented. Based on information in Table C.4-1 of Appendix C, the "number of samples" column in Table 5-7 includes both background and nonbackground samples. Because this column does not distinguish between background and nonbackground samples, the number of samples of each type cannot be determined, even when the reader refers to the text. Such information should be more clearly presented when biota sampling data is next included in an annual report.

Response: DOE agrees with the comment.
Action: Biota data will be more clearly presented in future annual reports in order to better distinguish between background and non-background samples.

7. **Commenting Organization:** U.S. EPA **Commentor:** SARIC
Section#: Attachment A.1 **Pg.#:** A.1-2 and A.1-3 **Line#:** NA **Code:**
Original Specific Comment# 4

Comment: The text on these pages discusses the occasions when extraction wells were out of service. Future annual reports should briefly discuss how an extended out-of-service period for a well, such as the 81 days for extraction well 3925, impacts extraction system performance.

Response: DOE agrees with the comment that extended out-of-service periods for extraction wells should be presented and discussed with respect to impacts on extraction system performance. The 81 day extended out-of-service period for extraction well 3925 was included in Table A.1-2 in calculating the operational percent for this well for the year and was specifically called out in the footnote at the bottom of the table. Additionally, this out-of-service period was discussed in the last bullet on page A.1-2 where it was pointed out that changes in well maintenance procedures were made to ensure that well rehabilitation activities will be initiated sooner so that out-of-service periods of this length can be avoided in the future. However, given the long term (i.e., 10 years) operation of the aquifer remedy and the relatively slow rate at which uranium contamination moves in the aquifer, specific quantitative predictions of impacts to system performance from out-of-service events beyond those presented would not be meaningful.

Action: DOE will continue to report out-of-service periods for each extraction well through the extraction well operational summary sheets provided in the IEMP quarterly status and annual reports and will reflect impacts to the extraction well performance via the operational percent calculation at the top of these summary sheets.

8. **Commenting Organization:** U.S. EPA **Commentor:** SARIC
Section#: A.2 **Pg.#:** NA **Line#:** NA **Code:**
Original Specific Comment# 5

Comment: The text in this attachment describes the total uranium concentrations in some monitoring wells. Future annual reports should briefly discuss monitoring wells such as 2624 and 3062, which exhibited concentrations greater than the final remediation level before 1997 but for which no 1997 data is presented.

Response: DOE has been unsuccessful in all attempts to renegotiate the access agreement for Monitoring Well 2624 with the current property owner. Therefore, DOE is recommending in the upcoming IEMP biennial revision that this well be eliminated from the IEMP monitoring well list. Because Monitoring Well 2624 is north of the South Plume Extraction Module, it is within the capture zone of the pumping system. Furthermore, DOE believes that additional monitoring wells located between Monitoring Well 2624 and the South Plume Extraction Module (i.e., Monitoring Wells 21194 and 2125) provide sufficient coverage to monitor remedy performance.

Monitoring Well 3062 was previously the water supply well for Albright and Wilson, Inc. before DOE installed the alternate water supply wells. Recent attempts to sample this well have been unsuccessful because of electrical malfunctions when attempting to start the pump. Because the well is owned by Albright and Wilson, Inc., and is no longer in use, DOE is recommending in the upcoming IEMP biennial revision that this well be eliminated from the IEMP monitoring well list. DOE believes that remedy performance in this area can be tracked with Monitoring Wells 2552 and 3552 to the southwest of

5

effectiveness of sitewide emission controls relative to historical performance and the NESHAP regulatory limit. Through this process, the need for corrective actions can be identified early and implemented long before site emissions exceed the health protective compliance limit.

Action: No action required.

1741

15. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Executive Summary/Radon Monitoring Pg.#: ES-5 Line#: Code: C
Original Comment# 6
Comment: The text states that the radon concentrations in the headspace of Silos 1 and 2 have increased but that the concentrations remain 60% lower than the values measured prior to the addition of bentonite. The word "remain" misleads the reader into thinking that silo headspace concentration is no longer increasing. It would be appropriate to show the concentration pre-bentonite, and subsequent concentrations indicating the upward trend in headspace concentration.
Response: DOE acknowledges the comment. DOE did not intend to mislead readers into believing radon concentrations within Silos 1 and 2 head space were no longer increasing. The increasing trend in radon concentrations in Silos 1 and 2 head space is acknowledged and further discussed in Chapter 5. In addition, this information is included in the IEMP quarterly status reports.
Action: The text in future annual reports will be clearer in acknowledging the increasing trend in radon concentrations within Silos 1 and 2 head space and will include an assessment of the increasing trend, as appropriate.

16. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Executive Summary/Direct Radiation Monitoring Pg.#: ES-5 Line#: Code: C
Original Comment# 7
Comment: Again the use of the word "remain" misleads the reader into thinking that the dose from the silos is not increasing. Rather than stating that doses remain 67% lower than pre-bentonite, add text that states the pre-bentonite dose and show subsequent dose rates to present.
Response: See Comment Response #15.
Action: See Action #15.

17. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Executive Summary/Estimated Dose for 1997 Pg.#: ES-6 Line#: Code: C
Original Comment# 8
Comment: The estimated dose to the MEI was stated as approximately 1.5 mrem. How does this compare to the maximum fence line dose? How does this compare to post-production MEI doses?
Response: Based on measurements taken from the fenceline air monitoring stations (AMS), the maximum air inhalation dose was approximately 0.4 millirem (mrem) at AMS-3 in 1997. This dose is lower than the 1.4 mrem reported for the maximally exposed individual (MEI) using CAP88-PC computer code due to the conservatively high estimates of fugitive emissions from site remediation activities. These emission estimates, used as inputs to CAP88-PC, resulted in a higher dose to the MEI.

All pathway MEI doses during the post-production period (1990 through 1995) ranged from a high of 10 mrem in 1990 to a low of 0.7 mrem in 1994. A large fraction (9 mrem) of the all pathway MEI dose in 1990 was due to direct radiation from Silos 1 and 2. The addition of bentonite to the silos in late 1991 essentially eliminated the dose

from direct radiation. Dose to the MEI in 1997 is therefore within the range of post-production MEI doses. Figure 6-2 shows a slight upward trend in MEI doses. The upward trend is attributed to the increase in remediation activities at the site.

Action: No action required.

18. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 1/EMP Pg.#: 8 Line#: Code: C
Original Comment# 9
Comment: The text describes that data evaluation and decision-making will take place for each environmental media so that corrective actions can be identified before an unacceptable condition is reached. What are the unacceptable conditions? Are they regulatory based, or do they maintain ALARA concepts for workers and the public?
Response: See Comment Response #14.
Action: No action required.
19. Commenting Organization: Ohio EPA Commentor: DSW
Section#: Chapter 1 Pg.#: 17 Line#: Code: C
Original Comment# 10
Comment: Although you have covered many of the important values of natural resources to the United States in the first sentence of this section, I would encourage you to add the economic value of natural resources here. This particular value is increasingly significant to a rural population such as that found around the FEMP.
Response: DOE agrees with the comment.
Action: Future integrated site environmental reports will state that natural resources have an economic value.
20. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 1/Figure 1-8 Pg.#: 18 Line#: Code: C
Original Comment# 11
Comment: The wind rose data are difficult to read with the shading used. Also, a comparison with the cumulative 5 year wind rose would be beneficial, since that is the data used for most modeling.
Response: DOE acknowledges the comment.
Action: An effort will be made to improve the quality of the black and white version of the figure portraying wind rose data. In addition, the five year wind rose data will be included in future IEMP integrated site environmental reports.
21. Commenting Organization: Ohio EPA Commentor: DSW
Section#: Chapter 1 Pg.#: 18 Line#: Figures 1-7 & 1-8 Code: E
Original Comment# 12
Comment: The percentage bar on the wind roses are difficult to discern. It appears as though they may have been drawn in color originally and did not transfer well to black and white.
Response: See Comment Response # 20.
Action: See Action # 20.
22. Commenting Organization: Ohio EPA Commentor: DSW
Section#: Chapter 1 Pg.#: Between 19 and 20 Line#: Code: E
Original Comment# 13
Comment: A blank page exists between page 19 and 20.
Response: DOE acknowledges the comment.

site's best available technology for fugitive dust control, air particulate and radionuclide concentrations at the site fenceline are expected to fluctuate above background throughout most of the remediation process. This is due to the aggressive schedule of excavation, demolition, and waste processing activities occurring at the site. The impact associated with increased air particulate concentrations in relationship to background concentrations is difficult to assess because there are no applicable regulatory benchmarks for this comparison. Additionally, see Comment Response #14.

Action: No action required.

26. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 5/IEMP Rad Air Particulate Monitoring Design Pg.#: 83 Line#: Code: C
Original Comment# 17

Comment: A comparison between modeled dose at the current fence line monitors and the dose from measured concentrations at these monitors would be beneficial with the upcoming change in compliance methodology.

Response: Due to the conservative assumptions associated with modeling fugitive emissions from diffuse sources, DOE does not believe a comparison of this type would provide useful information. Because the FEMP relies on monitoring results for demonstrating NESHAP compliance and assessing off site impacts, this type of comparison would result in complicating the data evaluation process. The difference between modeling outputs and monitoring results would require analysis and explanation with no clear benefit in the result. It is unclear how the comparison of a model predicted dose to a measured dose at the site fenceline would assist in interpreting monitoring data, assessing site compliance, or providing a clearer picture of environmental conditions at the site.

It is DOE's intention to conduct air modeling as necessary, not for comparisons to monitoring results, but to assist in evaluating relative contributions of various remediation projects to site emissions. This evaluation will be used to make decisions regarding project activities if the NESHAP limit appears in jeopardy.

Action: No action required.

27. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 5/Rad Air Part. Results Pg.#: 85 Line#: Code: C
Original Comment# 18

Comment: Ohio EPA conducts high volume air sampling at locations AMS-17A as part of its oversight role, and will continue to sample at this location throughout the remediation of the wastepits.

Response: DOE acknowledges the comment.

Action: No action required.

28. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 5/Radon Monitoring Pg.#: 89 Line#: Code: C
Original Comment# 19

Comment: The text should be revised. Projects do not produce radon, radium produces radon. Projects release radon as consequence of remedial action.

Response: DOE agrees with the comment.

Action: The text in future reports will clearly identify that projects do not produce radon.

12

29. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 5/Figure 5-7 Pg. #: 99 Line#: Code: C
Original Comment# 20

Comment: This figure is unclear in depicting where the stacks are located. Possibly the outline of some of the prominent buildings within the former production area could be used to clarify the picture.

Response: DOE acknowledges the comment.

Action: The figure identifying the stack monitoring locations will be updated in future reports to clarify their locations.

1741

30. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 6/Direct Radiation Dose Pg. #: 105-106 Line#: Code: C
Original Comment# 21

Comment: The conclusion of this section contradicts the conservative nature of your dose estimate. Two methods should be employed to make better conclusions from this data: 1) A rigorous statistical comparison of the means between background locations and fence line locations should be conducted; 2) The conservative method for comparing the two data sets would compare the maximum fence line measurement with the minimum background measurement. Lastly, Ohio EPA believes that the direct radiation dose should be stated as a range from 0 to the maximum possible, described in "2" above.

Response: This comment offers three suggestions on the calculation of direct radiation dose. The comment response will address each suggestion separately.

- 1) DOE will investigate the use of statistical methods for comparing the means between background and fence line locations. The text in the report attempts to explain how the statistical comparison was performed for the 1997 data, however, other methods will be reviewed and considered.
- 2) DOE attempts to make accurate assessments of direct radiation dose using conservative assumptions when necessary. The suggestion to compare the maximum fence line dose with the minimum background dose would result in the maximum possible direct radiation dose; however, this method would not accurately account for the naturally occurring variations in background radiation or limits in the precision and accuracy of environmental thermoluminescent dosimeter data. The suggested method is a simple and straightforward comparison, however, it is not an accurate assessment of dose.
- 3) DOE will consider stating the direct radiation dose as a range of values or as a median dose within a range. A possible shortcoming of this method is the comparatively small number of samples (21 fence line and six background locations) used in calculating the dose. The small sample set may lead to a median dose with a large range of uncertainty (e.g., 1 ± 8 mrem/year).

Action: DOE will assess the current data treatment methods and evaluate if different methodologies are more effective than the conservative standard statistical method in use.

31. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Chapter 6/Total of Doses to a MEI Pg. #: 106 Line#: Code: C
Original Comment# 22

Comment: The dose from radon is missing in this table. Previous environmental reports included a dose estimate from radon. Radon is possibly the largest contributor of dose from the site and should be included in any total dose from the FEMP.

sediment contained clay which has a relatively high natural concentration of aluminum. Subsequent sampling of this location (in 1997 and 1998) shows all sample results below 3 mg/L for aluminum.

Action: No action required.

1741

34. Commenting Organization: Ohio EPA Commentor: DSW
Section#: Attachment B.1 Pg.#: Line#: Code: G
Original Comment# 25

Comment: No radiological parameters are monitored at SWD-01, the northeast drainage. As uranium is the primary constituent of concern and this is the only monitoring point for discharges from this drainage area, it seems prudent to monitor for total uranium at this location.

Response: After a review of surface water modeling and historical site information, the IEMP identified the critical constituents to be monitored at each location for surface water (refer to Table 4-2 of the IEMP). This effort determined that radiological constituents would not be of concern in the northeast drainage area associated with sample location SWD-01. However, DOE agrees that uranium is the primary constituent of concern at the FEMP; for this reason, sampling for total uranium at every surface water sample location will be added to the IEMP biennial revision.

Action: The IEMP biennial revision will identify that total uranium will be monitored at every surface water sample location.

35. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Figure C.1-2 thru 50 Pg.#: Line#: Code: C
Original Comment# 26

Comment: The addition of historical data and/or ALARA goals to the figures would be helpful in interpreting the data.

Response: The addition of historical data to the figures will be considered in the 1998 Integrated Site Environmental Report. Additionally, see Comment Response #14.

Action: No action required.

36. Commenting Organization: Ohio EPA Commentor: OFFO
Section#: Table D-1 Pg.#: D-2 Line#: Sediment Code: C
Original Comment# 27

Comment: Table D-1 shows the comparison of split sediment locations for 1997. One location is designated as G7. However, G4 is described in the IEMP. And during the sediment sampling this year, sediment samples were actually taken at G8, the downstream side of Paddys Run at the confluence. Please correct these inconsistencies.

Response: Table D-1 accurately identifies sediment location G7 (the upstream side of Paddys Run at the confluence of the river) as the split sample location. The commentor's statement regarding G4 being described in the IEMP is unclear. Locations G4, G7, and G9 are all described in the IEMP to the same detail (Section 5.5.2 and Figure 5-1). Additionally, DOE is aware that the 1998 sediment sample was collected at G8.

Action: DOE will ensure that the location is adequately described and depicted in the 1998 Integrated Site Environmental Report.