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Department of Energy
Office of Legacy Management

August 31, 2010

Mr. Timothy Fischer
U.S. Environmental Protection Agency
Region V-SRF-6J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Mr. Thomas A. Schneider
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402

Dear Mr. Fischer and Mr. Schneider:

SUBJECT: **Transmittal of Responses to Ohio Environmental Protection Agency (OEPA) Comments on the 2009 Site Environmental Report**

Reference: 1) Letter, T. Schneider to J. Powell, "Re: Comments 2009 Site Environmental Report," dated August 6, 2010

Enclosed for your review are responses to OEPA comments on the 2009 Fernald Site Environmental Report (Reference 1). Consistent with past practice, the 2009 Site Environmental Report and appendices will not be revised. Comments will be considered during preparation of the 2010 Site Environmental Report.

If you have any questions concerning this report, please call me at (513) 648-3148.

Sincerely,

Jane Powell

Jane Powell
Fernald Preserve Manager
DOE-LM-20.1

Enclosures

cc w/enclosure:
M. Cullerton, Tetra Tech
S. Helmer, ODH
J. Reising, DOE-EM
T. Schneider, OEPA (3 copies of enclosure)
M. Shupe, HSI GeoTrans
T. Tucker, OEPA-Columbus
Project Record File FER030.1(A) (thru W. Sumner)

cc w/o enclosure:
B. Hertel, Stoller
J. Homer, Stoller
F. Johnston, Stoller
G. Lupton, Stoller
T. Pauling, DOE-LM
C. White, Stoller

Response to Ohio Environmental Protection Agency Comments on the 2009 Fernald Preserve Site Environmental Report

Fernald 2009 Site Environmental Report

1 Commenting Organization: Ohio EPA
Section #: 2.1 Pg #: 2-2 Line #: na
Comment: The last bullet on the page states, "There were no instances of breaches...of the institutional controls ..." A deer stand, along with associated materials was observed onsite during an inspection.

Response: Agreed

Action: Instances of unauthorized activities on site will be summarized in future site environmental reports.

2 Commenting Organization: Ohio EPA
Section #: 4.0 Pg #: 4-1 Line #: na
Comment: The "Results in Brief" section notes that there was a 2% increase in uranium discharges in 2009. Neither the text nor the "Results in Brief" section explains the 2% increase.

Response: The 2% increase in the estimated amount of uranium released to the environment is attributed to a net increase of approximately 13 pounds of uranium over the 2008 estimate. The estimated amount of uranium released through the treated effluent pathway increased approximately 27 pounds. The estimated amount of uranium released through uncontrolled runoff decreased by approximately 14 pounds.

Action: An explanation of the changes in the amount of uranium discharged through the surface water and treated effluent pathways will be included in future site environmental reports.

3 Commenting Organization: Ohio EPA
Section #: 5.0 Pg #: 5-1 Line #: na
Comment: The last sentence of this section should be reworded. Concentrations were above background in 2006 and 2007 with same amount of surface contamination. The reason that concentrations are comparable to background is likely due to revegetation of the site preventing wind erosion of soils.

Response: Average values for uranium (pCi/m^3) have been similar to background (within analytical uncertainty) since 2007. Maximum values remain above the maximum background value, but 2009 is the lowest maximum since the site was transferred to LM, and this is likely due to revegetation. Because 2009 was the final year of air monitoring at the site, there will be no future discussion of air monitoring results. The responses to comments are part of the record for the 2009 Site Environmental Report.

Action: None

4 Commenting Organization: Ohio EPA
Section #: 5.1 Pg #: 5-3 Line #: na
Comment: The last sentence of section 5.1 noting the nesting of birds in AMS-8A would better fit in the "Air Monitoring Program Summary for 2009" rather than the "Activities Affecting the Air Pathway" section. The bird nest did not affect the air pathway; however, it did affect the monitoring of the air pathway.

Response: Agreed. Because 2009 was the final year of air monitoring at the site, there will be no future discussion of air monitoring results. The responses to comments are part of the record for the 2009 Site Environmental Report.

Action: None

5 Commenting Organization: Ohio EPA
Section #: 5.4 Pg #: 5-6 Line #: na
Comment: The last sentence on this page should be reworded to remove the phrase, "no significant dose." This phrase should be defined as indiscernible from background. Note that the maximum fenceline appears to be 75% > Bkgd.

Response: Agreed

Action: Future site environmental reports will discuss direct radiation measurements being indiscernible from background measurements.

6 Commenting Organization: Ohio EPA
Section #: 7.0 Pg #: 7-1 Line #: na
Comment: The reference to the "Partial Consent Decree" should be revised to "Consent Decree" as the name of the document was changed as a result of the public comment period and prior to finalization by the Judge Spiegel. This reference occurs elsewhere within the document including Appendix E and should be revised throughout.

Response: Agreed

Action: Future site environmental reports will reference the Consent Decree.

2009 Environmental Summary (Appendices A through E)
Attachment A.2

7 Commenting Organization: Ohio EPA
Section #: A.2.3.2 Pg #: A.2-5/Figure A.2-48 Line #: Last paragraph
Comment: Monitoring well 2900 had an FRL exceedance for uranium in 2009. Looking at Figure A.2-48 there appears to be an increase in uranium since 2003. DOE suggests that direct-push sampling will be done in the future if the uranium continues to increase. Have 2010 concentrations exceeded the FRL? If "yes", has a direct push sampling work plan been drafted to address the FRL exceedance?

Response: The sample collected on April 27, 2010 had a uranium concentration of 10.7 ug/L. No direct push sampling is planned at this location at this time, but if future FRL exceedances are measured, the use of direct push sampling will be re-considered.

Action: None.

8 Commenting Organization: OEPA
Section #: Attach. A.2 Pg #: A.2-6 Line #: 17
Comment: The average pumping rate for 2009 was 252 gpm.

Response: Agreed. The average pumping rate of 286 gpm listed on this line was incorrect.

Action: None.

9 Commenting Organization: Ohio EPA
Section #: Table A.2-4 Pg #: A.2-15 Line #: na
Comment: Consider adding a key or footnote to spell out the abbreviations used in this table.

Response: Agreed. A footnote that spells out the abbreviations used in this table will add value to the report.

Action: A footnote that spells out the abbreviations used in this table will be added to future site environmental reports.

Attachment A.5

10 Commenting Organization: Ohio EPA
Section #: A.5.1.1 Pg #: A.5-3 Line #: na
Comment: Fernald should consider installing their own precipitation monitoring to be used instead of data from Butler County airport. Differences of a few inches and especially daily differences due to measurement location may influence the interpretation of data reported at the site.

Response: Data obtained from the Butler County Regional Airport is accurate enough for use at Fernald.

Action: None.

11 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-7 Line #: 29
Comment: As noted, the parameter selection process was applied to Cell 1, 2, and 3 LCS data and was reported in the 2007 SER. Cell 1, 2, and 3 LCS data collection for Appendix IX and PCBs continues. For parameters that have been detected more than 25 percent detected values, DOE should calculate and report trends to verify the assumption that leachate concentrations for these parameters are either stable or decreasing. Any Cell 1, 2, and 3 parameters with increasing detection frequencies or upward trends will require retesting using the parameter selection process.

Response: Annual LCS sampling in Cells 1, 2, and 3 has already transitioned from the full list of regulatory default Appendix I and PCB parameters (listed in OAC 3745-27-10) to a composite list of constituents consisting of initial baseline parameters, sulfate, Appendix I metals and inorganics. As shown in Table A.5-3 of the 2009 SER, there are very few parameters that have been detected at least 25% of the time that are not being sampled for on a quarterly frequency. As proposed in the 2009 SER appendix (bottom of page A.5-7), once the parameter selection process has been completed for all eight cells, DOE plans on conducting a final comprehensive look at all cells to determine if the list of quarterly monitoring parameters can be further optimized. Any parameter detected at least 25% of the time, with increasing detection frequencies or upward trends, but not routinely tested for quarterly, will be retested statistically at that time.

Action: As stated in response.

12 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-8 Line #: 10
Comment: In accordance with Figure 3-3 of Appendix E of the Groundwater Leak Detection and Leachate Monitoring Plan, the text should be revised to indicate that a non-parametric method (Wilcoxon rank sum test) will be used if the number of detections for an analyte is between 50 and 85 percent.

Response: At issue is when to use the Poisson test and when to use the Wilcoxon Rank Sum test based on the percentage of nondetects in the data sets. DOE limited the use of the Poisson test, for reasons discussed below, and increased the use of the Wilcoxon-Rank Sum test to compensate. The bottom line is a better non-parametric test method needs to be selected for use on data sets that contain a large amount of left censored data.

As reflected in Comments 16, 17, and 18, OEPA also considers the Poisson method to be unreliable due to scaling independence issues. New guidance by EPA, "*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance* [EPA, 2009]" no longer recommends the use of the Poisson method. EPA's New Unified Guidance recommends the use of the Tarone-Ware Two Sample Test for Censored Data when the data sets have a moderate to large fraction of non-detects. In Comment 18, OEPA requested that DOE use the Tarone-Ware Test to re-sample technetium-99 data. DOE will investigate the use of this method as an alternative method for both the Poisson and the Wilcoxon Rank Sum/Quantile tests for data sets that contain a large amount of left censored data. If the use of the Tarone-Ware Test is adopted, then the Parameter Selection Approach process presented in Figure A.5-4 of the SER, and Figure 3 in Appendix E of the Attachment C of the LMICP will be revised accordingly to show when each method is applied based on the percentage of non-detects.

Action: As stated in the response.

13 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-8 Line #: 10
Comment: In accordance with Figure 3-3 of Appendix E of the Groundwater Leak Detection and Leachate Monitoring Plan, the text should be revised to indicate that an approved non-parametric method will be used if the number of detections for an analyte is greater than 50 percent.

Response: This comment is similar to Comment 12. Please see response to Comment 12.

Action: Please see action to Comment 12.

14 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-8 Line #: 10
Comment: It should be noted that although data set normality is not required for application of the Wilcoxon rank sum test, there are several assumptions critical to the appropriate application of this test, namely, that both populations being compared follow the same (not necessarily known) distribution and that both population variances are equal.

Response: Comment acknowledged.

Action: None.

15 Commenting Organization: Ohio EPA
Section #: A.5.2.5 Pg #: A.5-9 Line #: na
Comment: The last sentence on the page states that parameters list should be adequate to detect a leak from the facility. An explanation as to why these parameters might be able to detect a leak is appropriate here. Are these parameters typically mobile in solution? Typical of C&D landfill parameters? Etc.

Response: These are the parameters that are most frequently detected in the LCS at concentrations large enough to be measured if a leak from the facility were to occur. They have been detected at least 25% of the time in the LCS, and shown statistically to have a mean concentration in the LCS that is larger than the mean concentration of pre-design or background data sets.

Action: None.

16 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-10 Line #:.16
Comment: The Poisson prediction limit statistical analysis was unable to distinguish differences in the background and LCS samples because of bias introduced through the handling of non-detects. The conclusions stated in the referenced text regarding LCS technicium-99 concentrations in comparison to background are unreliable.

Response: DOE agrees that the handling of non-detects is challenging and that the Poisson prediction limit test has recognized scaling independence issues. As stated in response to Comment 12, DOE will investigate using the Tarone-Ware test as a replacement for the Poisson test. Once an alternate test method has been agreed upon statistics on technetium-99 will be re-run.

Action: As stated in the response.

17 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-10 Line #: 39
Comment: In accordance with the Poisson prediction limit testing procedure described in Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance (EPA, 1992), non-detects are handled by substituting half of the detection limit for the concentration of technetium-99 in the prediction limit calculation. Using the value of 15 pCi/L for all non-detects creates a positive bias in the background calculation which results in a bias against rejecting the null hypothesis. At a minimum, therefore, the analysis should be redone using half the detection level for non-detects. In addition, because of problems identified with the Poisson prediction limit test (Loftis et al, 1999), DOE should use an alternative method to test the technecium-99 data against background.

Response: As discussed in response to Comment 12, DOE will investigate replacing the Poisson test with the Tarone-Ware Test. Once an alternative method has been agreed upon for data sets with large amounts of left censored data (e.g., Tarone-Ware Test or some other test), DOE will discuss with OEPA what value to assign to non-detect data.

Action: As stated in response.

18 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-10 Line #: 33
Comment: Loftis et al. (1999) indicate that problems exist with the Poisson prediction limit procedure indicated in EPA (1992). They show that this approach is inappropriate for modeling concentration data since the Poisson distribution does not scale appropriately with changing units of measurement. When sufficient background concentration data is available, other non-parametric procedures should be used. Accordingly, given that 29 technicium-99 samples constitute the background dataset for perched groundwater, ample background is available. More up-to-date EPA guidance (*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance* [EPA, 2009]) recommends that the Tarone-Ware two-sample test be used for the comparison of two samples with many non-detects. DOE should use this method to reanalyze the technecium-99 data.

Response: This comment is similar to Comments 16 and 17, and is touched upon in Comment 12. Please see responses to Comments 12, 16, and 17.

Action: Please see actions to Comments 12, 16, and 17.

19 Commenting Organization: Ohio EPA
Section #: A.5.2.7 Pg #: A.5-11 Line #: na
Comment: (Aquifer Groundwater Background Data) The assignment of an arbitrary value of 15 pCi/L for nondetect data of Tc-99 appears to be inappropriate for statistical analysis. The use of the actual result should usually be used or the MDA. An explanation of the use of 15 pCi/L is requested.

Response: The technetium-99 data had varying detection limits. When statistics were done for Cells 1, 2, and 3 (reported in the 2007 SER) the MDL used for the statistics was set at 30 ug/L to accommodate the varying detection limits. According to our agreed upon approach, half the MDL was used in the statistical analysis (15 ug/L). To be consistent with the earlier statistics done for Cells 1, 2, and 3, the same agreed to procedure was used for the statistics concerning Cells 4 and 5. As stated in the response to Comments 12, 16 and 17, DOE agrees that the Poisson method should be replaced. DOE will consult with OEPA prior to conducting new technetium-99 statistics to ensure that we are in agreement on the method selected and value assigned to non-detect data.

Action: As stated in the response.

20 Commenting Organization: Ohio EPA
Section #: A.5.3 Pg #: A.5-13 Line #: last paragraph
Comment: The Fernald Preserve website, http://www.lm.doe.qov/fernald/Sites.aspx does not allow the user to access the inspection reports as of Jul 30, 2010. In general, the site websites are not easy to navigate and it is difficult to access information. A better description of how to access specific information from the website should be included in this report.

Response: The Fernald Preserve website does allow access to inspection reports (see **http://www.lm.doe.gov/Fernald/reports/**). DOE will continue to refine the layout of the Fernald Preserve website taking into account user feedback.

Action: As stated in the response.

21 Commenting Organization: Ohio EPA
Section #: A.5.4 Pg #: A.5-14 Line #: na
Comment: (Performance/Findings) Bullet 1: The fact that the engineered drainage features produce data that meets the design criteria does not mean the cell is not leaking. Water quality data could be interpreted as indicating the OSDF is leaking.

Response: It would be difficult to accept such an interpretation after the water quality data is examined in context with: the flow data measured from the facility, what is known about pre-existing water quality conditions beneath the facility, and the bivariate plots shown for uranium-sodium in the LCS, LDS, HTW and GMA wells of each cell.

Bullet 1 does not state that a leak is not occurring. It only states that a leak from the facility is not occurring based on LCS and LDS flow data, and the finding that engineered drainage features within the OSDF continue to perform as design.

The third to last bullet presents the finding that 50 increasing concentration trends were identified in the HTW and/or downgradient GMA wells of Cells 1-8 in 2009. Based on the bivariate plots for uranium-sodium in the LCS, LDS, HTW, and GMA wells of each cell, the increasing concentration trends are attributed to fluctuating background concentrations.

Action: None.

22 Commenting Organization: Ohio EPA
Section #: A.5.4 Pg #: A.5-14 Line #: na
Comment: (Performance/Findings) Bullet 7: The fact that a result is less than CRDL is an administrative qualifier for data. It has no bearing on the integrity of the result. Mentioning that a result is less than CRDL is not necessary in a report as the SER.

Response: For acetone; 1,1-Dichloroethene; and toluene the CRDL is actually the Practical Quantitation Limit/Limit of Quantitation (PQL/LOQ) and not an administrative detection limit. The point is that there is a lot of analytical variability in analytical results that are close to the detection limit – in this case, results below the PQL/LOQ. Since the data represent the first time a "detection" had occurred at the location, it is likely that the result is noise and not an actual detection.

Action: In future site environmental reports, the reference to the CRDL will be changed to PQL/LOQ.

23 Commenting Organization: Ohio EPA
Section #: Table A.5-5 Pg #: A.5-21 Line #: na
Comment: The detection limit for Tc-99 appears too high for the intended use of the data. Ohio EPA suggests that the RDL for Tc-99 be lowered to reflect the need for environmental measurements of Tc-99 for leak detection purposes. (Comment refers to this table and all subsequent Tc-99 result tables).

Response: This comment is very similar to Comment 19. Please refer to the response to that comment. In addition, because each radiochemical analysis generates its own detection limit (i.e., per data point), the RDL of 15 pCi/L represents a maximum contractually allowed detection limit and is in line with what this method is assumed to be able to achieve. The actual, per analysis, detection limit has more recently achieved detection limits below 15 pCi/L.

Action: See action for Comment 19.

24 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5-34 Line #: NA
Comment: The top left decision box on this figure (Fig. A.5-5B) should read "Do Datasets Contain <15% and =50% Non-Detects?"

Response: This comment is similar to Comment 12. Please see response to Comment 12.

Action: Please see action to Comment 12.

25 Commenting Organization: Ohio EPA
Section #: A.5.1 Pg #: A.5.1-1 Line #: na
Comment: DOE may want to consider calculating liner efficiencies quarterly rather than monthly to correlate with quarterly water quality data. (Comment applies to all cells).

Response: Agreed.

Action: Beginning in the next site environmental report, liner efficiencies will be calculated quarterly.

26 Commenting Organization: Ohio EPA
Section #: A.5.1.1 Pg #: A.5.1-I Line #: na
Comment: The phrase used to describe GMA water concentration, "...due to fluctuating background concentrations", is inaccurate. The GMA wells in the vicinity of the OSDF do not reflect background aquifer concentrations. Ohio EPA suggests that the phrase be changed to state that the increasing trends in concentrations may be due to fluctuations in ambient concentrations.

Response: Agreed.

Action: In future site environmental reports, care will be taken to refer to ambient concentrations rather than background concentrations.

27 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5.1-1 Line #: 37
Comment: The use of the term "average" here and in similar text both in this section (Section A.5.1) and the other seven OSDF sections should be changed to language that is less specific. A better term to use would be "typical." Necessarily, these sections discuss detailed statistical analyses. Because of this, the way this term is used is misleading because, in a strict technical sense, it implies specific assumptions regarding variance and distribution are valid for the data sets from the various monitoring horizons. As has been demonstrated, the data from these horizons are usually right-skewed. The resulting arithmetic averages calculated from the sample data are frequently distorted by extreme values and therefore will be unreliable for drawing comparisons between the horizons.

Response: The averages reported relate back to information presented in Table A.5-1 of the appendix. As shown in Table A.5-1 (for each cell of the OSDF) the reported averages were determined based on the distribution assumption of the data set. The distribution types were determined using a Shapiro-Wilks statistic test (95% CI). The medium was reported for data sets with undefined distributions. In future reports reference will be made to Table A.5-1 to show the reader that these issues were considered, and to provide the link needed for the reader to determine how the comparison is being made.

Action: As stated in response.

28 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: A.5.1-2 Line #: 9
Comment: Removing the early boron data is a reasonable approach, given the site conditions and the length of the period of record since the upward trend dissipated. Please note, however, that estimates of distributional parameters rely on a stationary (that is, non-trending) mean. It is assumed that the normal distribution referred to for the down-trending data was determined using the boron residuals obtained from a computed trend through the data.

Response: Yes, the Mann-Kendall test was run using the reduced data set.

Action: None.

29 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: na Line #: na
Comment: There appears to be a discrepancy in the way the data is being reported on the site data base. Two database fields, "LAB-QUALIFIERS" and "DATA VALIDATION-QUALIFIERS" are inconsistent with previous data entries. Some of the data was collected under DOE-EM and some of the data has been collected under DOE-LM. The use of these two fields during these management periods are different and causes confusion; as well as, different interpretations of the data. Below are three comments illustrating these issues.

Response: When Fernald was under the management of the DOE Office of Environmental Management (EM), the Sitewide Environmental Database (SED) was used to store Fernald specific environmental data. Users of the SED were instructed to use the "VALIDATION_QUALIFIER" (VQ) field for the "final" qualifier unless the VQ was marked "NV" (i.e., not validated). If the VQ was marked NV, then the user was instructed to use the "LAB_QUALIFIER" (LQ) in place of the VQ.

When Fernald oversight was transferred to the DOE Office of Legacy Management (LM), the environmental data that had been stored in the SED were transferred to LM's existing environmental database (i.e., SEEPro). The SED data were adjusted to fit the SEEPro structure that stores data of more than 56 LM sites. The integrity of the SED data was maintained during the transfer to SEEPro.

SEEPro data are accessible to the public through the Geospatial Environmental Mapping System (i.e., GEMS). The interpretation of the data qualifiers in SEEPro is different from the SED. In SEEPro, the data user needs to consider the LQ and the VQ together to determine the quality of the data. For example, all of the results below are nondetects. For zinc and boron, the validator considered the results to be nondetects and assigned a U qualifier. (Note that the lab was not in error here. Validation procedures provide a more conservative evaluation of the data.) For cobalt and mercury, the validator agreed with the lab that the results were nondetects, and the validator added a J qualifier to the lab's UN qualifiers on the mercury result.

LOCATION_CODE	ANALYTE	DATE_SAMPLED	RESULT	LQ	VQ
22198	Zinc	16-Nov-09	0.00681	B	U
22198	Boron	09-Jun-09	0.0612		U
22198	Cobalt	10-Aug-09	0.001	U	
12339C	Mercury	17-Aug-09	6.6E-05	UN	J

This discussion should clarify the misunderstanding that OEPA has regarding the number of detected results appearing in the database identified in the three comments below.

Action: None

Comment 29 (continued)

Section #: Attach. A.5 Pg #: A.5.1-3 Line #: 4
Comment: The text is incorrect in stating that Table A.5.1-3 shows annual LCS sampling results for all parameters "ever" detected. It is missing the six parameters that Table A.5.1-2 indicates are detected in the LCS (total uranium, sulfate, total organic carbon, total organic halogens, boron, and lithium). In addition, a review of the Cell 1 LCS data from the site database indicates that there are 116 parameters with at least one detect (thus qualifying as "ever" being detected). At a minimum, the table should include all analytes that have ever exceeded perched water background or the FRL. This same comment applies to equivalent tables for the seven other cells (Tables A.5.2- 3, A.5.3-3, A.5.4-3, A.5.5-3, A.5.6-3, A.5.7-3, and A.5.8-3). The numbers of detected parameters listed in these tables range from 23 to 29 while the database shows that the numbers of detected parameters ranges from 116 to 118. DOE should explain this inconsistency.

Response: DOE agrees that the text needs to be clarified. The subject sentence should read as follows: "Annual LCS Appendix I and PCB sampling results for Cell 1 are provided in Table A.5.1-3 for those parameters that have ever been detected, and are not already being sampled for quarterly in the LCS, LDS, HTW, and GMA wells of each cell.

Of the six missing constituents called out in the comment (total uranium, sulfate, TOC, TOX, boron and lithium) five are already sampled for quarterly in the LCS, LDS, HTW, and GMA wells of each cell (total uranium, sulfate, TOC, TOX, and boron). The sixth constituent (lithium) is not an Appendix I constituent. It was added to the quarterly monitoring program based on results of the Common Ion Study. In next year's site environmental report, DOE will ensure that constituents that are sampled for quarterly in the LCS, LDS, HTW, and GMA wells of each cell do not appear on Table A.5.1-3 and the equivalent tables for the seven other cells.

Action: As stated in the response.

Section #: Attach. A.5 Pg #: Fig A.5.4-3 Line #: 21
Comment: The text indicates that statistics were run on nine parameters but does not discuss how these nine were chosen. A cursory evaluation of the site database suggests that many more parameters were sampled at least eight times and were detected in more than 25 percent of the samples. For example, trichloroethene was detected in four out of 15 samples for a detection frequency of 26 percent. The list of 225 percent detects includes approximately 13 other chlorinated VOCs as well as other parameter types. DOE should summarize all parameters that meet the threshold for consideration as a monitoring parameter and provide the rationale for excluding any of these parameters from statistical screening.

Response: A discussion on how the nine parameters were chosen is presented in Section A.5.4.3 on page A.5.4-2 of the appendix.

Action: None.

Comment 29 (continued)

Section #: Attach. A.5 Pg #: Fig A.5.5-3 Line #: 26
Comment: The text indicates that statistics were run on 10 parameters but does not discuss how these 10 were chosen. A cursory evaluation of the site database suggests that many more parameters were sampled at least eight times and were detected in more than 25 percent of the samples. For example, 1,1-dichloroethane was detected in three out of nine samples for a detection frequency of 33 percent. The list of =25 percent detects includes approximately 18 other chlorinated VOCs as well as other parameter types. DOE should summarize all parameters that meet the threshold for consideration as a monitoring parameter and provide the rationale for excluding any of these parameters from statistical screening.

Response: This is the same discussion that pertains to the data qualifier discussion above.

Action: None.

30 Commenting Organization: Ohio EPA
Section #: Figure A.5.1-22 Pg #: A.5.1-27 Line #: na
Comment: Provide a detailed explanation of the CUSUM control charts explaining what each of the lines represent, such as, "h", "SCL", "CUSUM", "Standardized Mean", etc.

Response: A discussion on the control charts is provided at the top of Page A.5-7 of the appendix. As presented in the EPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance* [EPA, 2009] a Shewart-CUSUM control chart works as follows. Appropriate background data are used to define a baseline for the well. The baseline parameters for the chart, estimates of the mean, and standard deviation are obtained from the background data. These baseline measurements characterize the expected background concentrations at the well. As future compliance concentrations are collected, the baseline parameters are used to standardize the newly gathered data. After these measurements are standardized and plotted, a control chart is declared "out-of-control" if future concentrations exceed the baseline control limit. This is indicated on the control chart when either the Shewart or CUSUM plot traces begin to exceed a control limit. The limit is based on the rationale that if the well remains unchanged from the baseline condition, new standardized observations should not deviate substantially from the baseline mean. If a change occurs, the standardized values will deviate significantly from baseline and tend to exceed the control limit.

Action: The additional information presented in the response concerning how a control chart works will be added to future site environmental reports.

31 Commenting Organization: Ohio EPA
Section #: A.5.2.1 Pg #: A.5.2-2 Line #: na
Comment: The statement, "Arsenic is not detected in the LDS of Cell 2", is inaccurate. The LDS of Cell 2 was not sampled. It is dry.

Response: Comment acknowledged. In future site environmental reports, if a constituent was not detected because the sampling point was dry, the fact that the sampling point was dry will be reported also.

Action: As stated in the response.

32 Commenting Organization: Ohio EPA
Section #: Table A.5.2-3 Pg #: A.5.2-7 Line #: na
Comment: What is the definition for "Z" qualified data?

Response: The "Z" qualifier code was formerly used in the SED (before 2007) when there was a better result for the data point. For example, if volatile organics are analyzed and one analyte was greater than the calibration range of the instrument, a dilution and reanalysis would be performed. For benzene, the second analysis represented a better result. Therefore, the first analysis result would be given a Z qualifier to represent that there is a better result in the database. Once the data was transferred to SEEPro, all Z qualifiers were change to R qualifiers indicating that the data point should not be used, since there was a better result.

The Z qualifier code is no longer used in the database (SEEPro).

Action: In future SERs the reference in the footnote to the Z qualifier will be removed.

33 Commenting Organization: Ohio EPA
Section #: Figure A.5.2-2 Pg #: A.5.2-9 Line #: na
Comment: The figure indicates water in the Cell 2 LDS in 2006. Previous text indicates that Cell 2 LDS has been dry since 2005. Correct accordingly.

Response: The text on Page A.5.2-2 is in error. The Cell 2 LDS has been dry since 2006 not 2005.

Action: None.

34 Commenting Organization: Ohio EPA
Section #: Figure A.5.2-2 Pg #: A.5.2-11 Line #: na
Comment: Put the upgradient and downgradient GMA wells on the same figure when showing uranium concentrations. (Comment applies for all cells).

Response: The upgradient and downgradient GMA wells will be placed on the same figure for each cell, but the pre-sample water levels will be removed from the figure.

Action: As stated in the response.

35 Commenting Organization: Ohio EPA
Section #: Figure A.5.2-21 Pg #: A.5.2-27 Line #: na
Comment: Provide sample dates for the two closest data points on the bivariate plot

Response: Agreed.

Action: In future bivariate plots the two closest points will have sample dates posted for them.

36 Commenting Organization: Ohio EPA
Section #: Figure A.5.3-2 Pg #: A.5.3-9 Line #: na
Comment: The figure indicates water in Cell 3 LDS, the text states that it was dry. Correct accordingly.

Response: The text is in error. The Cell 3 LDS was essentially dry (approximately 1 gallon) but it was not completely dry. Future site environmental reports will report that the Cell 3 LDS has not yielded enough water to collect a sample since 2007, which indicates that a leak is probably not occurring.

Action: As stated in the response.

37 Commenting Organization: Ohio EPA
Section #: Figure A.5.3-21 Pg #: A.5.3-27 Line #: na
Comment: Provide sample dates for the two closest data points on the bivariate plot.

Response: This comment is the same as Comment 35.

Action: Please see action for Comment 35.

38 Commenting Organization: Ohio EPA
Section #: A.5.4.2 Pg #: A.5.4-2 Line #: last paragraph
Comment: Cell 3 is referred to in this paragraph where this section is on Cell 4. Correct the typo.

Response: Text will be revised in future site environmental reports.

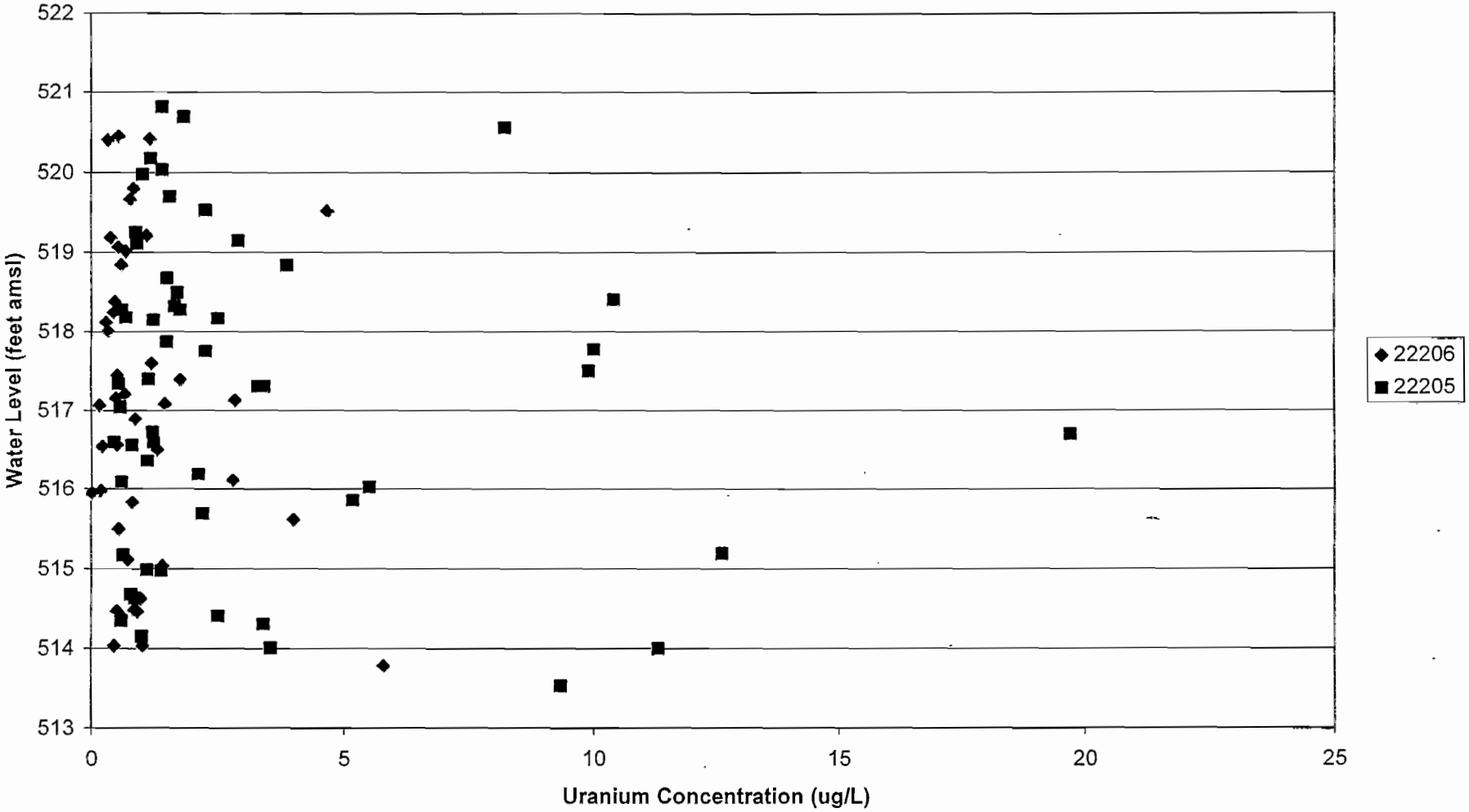
Action: As stated in the response.

39 Commenting Organization: Ohio EPA
Section #: Figure A.5.4-4 Pg #: A.5.4-11 Line #: na
Comment: There appears to be a correlation between water level and uranium concentration. A bivariate plot may be appropriate for trending upgradient and downgradient GMA wells. This may be a useful tool in evaluating fluctuating uranium concentrations. This plot is not necessary to be included in the SER.

Response: A bivariate plot for uranium concentrations and water levels at wells 22206 and 22205 is attached. These are the upgradient and downgradient GMA wells for Cell 4. The plot does not indicate a correlation between water level and uranium concentration.

Action: None.

For Response to OEPA Comment 39
Bivariate Plot for Uranium and Water Level
Wells 22206 (upgradient) and 22205 (downgradient)



40 Commenting Organization: Ohio EPA
Section #: Figure A.5.4-29 Pg #: A.5.4-31 Line #: na
Comment: Iron results appear "out of control". An explanation is warranted.

Response: Movement of the CUSUM is more gradual than movement of the standardized mean. This is due to the nature of the CUSUM statistic. If the next sample shows a standardized mean that is again below the SCL the CUSUM should also drop further, but in a more gradual manner.

Action: None.

41 Commenting Organization: Ohio EPA
Section #: Figure A.5.6-14A Pg #: A.5.6-20 Line #: na
Comment: The iron results appear to be very chaotic. Explain the high variability in the results.

Response: The cause for the high variability in iron concentrations measured in the LCS, LDS, and HTW of Cell 6 is not known. The data indicates that shortly after cap completion, the iron concentration in the LCS and LDS decreased and the iron concentration in the HTW increased.

Action: None.

42 Commenting Organization: Ohio EPA
Section #: A.5.7.1 Pg #: A.5.7-2 Line #: 1" & 2" paragraphs
Comment: The text is referring to Cell 5, where it should refer to Cell 7. Please correct.

Response: Text will be revised in future site environmental reports.

Action: As stated in the response.

43 Commenting Organization: Ohio EPA
Section #: Figure A.5.7-21 Pg #: A.5.7-27 Line #: na
Comment: Provide dates for the three LCS results that appear to be different from the rest of the data points.

Response: The three LCS data points that appear to be different from the rest of the LCS data points in Figure A.5.7-21 were all measured in 2005 during the time that waste placement was taking place in Cell 7.

Action: None.

44 Commenting Organization: OEPA
Section #: Attach. A.5 Pg #: Fig A.5.8-7 Line #: NA
Comment: This figure shows a plot of total uranium concentrations and water levels for Cell 8 Downgradient Monitoring Well 22216/22217, From the title, therefore, data from two wells should be displayed. Only data from one well is plotted, however. DOE should clarify what well is plotted on this figure. In addition, it is unclear where Well 22216 is and what the relevance of this well is to Cell 8.

Response: Monitoring well 22216 was plugged and abandoned in April 2006. Monitoring well 22217 is its replacement. A footnote will be added to this figure in future reports to preserve this information.

Action: As stated in response.

Appendix B

45 Commenting Organization: Ohio EPA
Section #: 6.2 Pg #: B.2-1 Line #: last paragraph
Comment: The FRL for uranium in sediment is 210 mg/kg. Please change the 200 to 210.

Response: Agreed.

Action: The FRL for uranium is sediment will be corrected in future site environmental reports.

Appendix C

46 Commenting Organization: Ohio EPA
Section #: C.1.1 Pg #: C.1-7 Line #: na
Comment: The fact that site soils have been remediated to below FRLs is one reason the air concentrations are indistinguishable from background. The primary reason, however, is that vegetative cover on the site is preventing wind erosion of soils. See air monitoring results from 2006-2008. The soil concentrations have not changed over the past three years.

Response: See response to Comment 3.

Action: None

47 Commenting Organization: Ohio EPA
Section #: C.3.0 Pg #: C.3-1 Line #: na
Comment: Ohio EPA suggest that DOE consider measuring precipitation data onsite. Local data may be useful in interpreting SSOD data as well as OSDF data.

Response: See response to Comment 10.

Action: See action to Comment 10.

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Appendix E

48 Commenting Organization: Ohio EPA
Section #: E1.0 Pg #: E-2 Line #: na
Comment: Revise "National" to "Natural.

Response: Agreed.

Action: Text will be revised in future site environmental reports.