

1767

RI/RISK ASSESSMENT O.U. 4

10-02-90

**OEPA/DOE-FMPC
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LETTER**



State of Ohio Environmental Protection Agency

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To BOBBY DAVIS

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 Richard F. Geisler
 Governor

October 2, 1990

Re: RI/RISK ASSESSMENT
O.U.4

Jack
1767

Mr. Bobby Davis
U.S. DOE-FMPC
P.O. Box 398705
Cincinnati, Ohio 45239

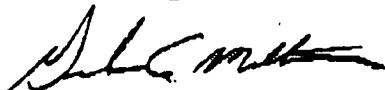
Dear Mr. Davis:

Attached are Ohio EPA's comments on the Remedial Investigation Risk Assessment for O.U.4. The major deficiency in this document is the lack of data. The failure to complete the residue sampling, slant borings, and berm sampling results in so many data gaps that it is impossible to develop conclusions or assess risk. Since these data gaps are not going to be filled for sometime (> 30 days), we suggest that DOE consider it's options to responding to comments and developing another deficient document.

We are planning to discuss Risk Assessment issues and methodology in the near future at a meeting with DOE USEPA and Ohio EPA staff.

If you have any questions about the attached comments please contact me.

Sincerely,



Graham E. Mitchell
DOE Ccordinator

GEM/acp

cc: Tom Winston, Ohio EPA
Jack Van Kley, Ohio AG
Catherine McCord, U.S. EPA, Region 5
Robert Owen, ODH
Lisa August, Geo Trans

OHIO EPA COMMENTS
REMEDIAL INVESTIGATION/RISK ASSESSMENT O.U.4

General Comment 1: The preparation of this report should have been delayed until all of the needed sampling of silo wastes, underlying soils, and berm soils was completed. This report, particularly the risk assessment portion, will likely change significantly when the results from these activities are obtained. To prepare a report with major sampling and waste characterization still needing to be performed is nothing short of an incredible waste of time and resources both on the part of DOE and the regulatory agencies that have to review such an incomplete and deficient document. Further, the use of historical sampling data to characterize silo wastes is of limited value because of the uncertainty in QA/QC procedures used at the time.

General Comment 2: All samples taken within the Operable Unit 4 study area, including Silos 1 and 2, should have been analyzed for Actinium-227 and Protactinium-231. These constituents were found in samples from Silo 3. Actinium-227 was discharged into the Great Miami River from the FMPC at over 200% of DOE's DCG in 1988.

General Comment 3: A section of the report or an appendix should be added which provides a comprehensive list of background levels (soil, surface water) for potential inorganic contaminants in the FMPC region. Such a list would allow the reader to better assess the significance of any contaminant levels detected and reduce searching through the document.

1. Page ES-6, First Paragraph: Since Actinium-227 is a constituent of the Silos, radiological analysis of the silo contents should have included this isotope. DOE should explain why this isotope was excluded and discuss if future samples will analyze for it.
2. Page ES-7, Second Paragraph: The statement that no conclusion can be drawn that the K-65 silos are the source of groundwater contamination should include a conditional statement referencing the future results from the slant boring program.

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Two

3. Page 1-1, Third Paragraph: The current (August, 1990) Remedial Investigation of Operable Unit 4 does not fulfill the July 1986 Federal Facilities Compliance Agreement (FFCA) referenced on Page 1-1, paragraph 3, which was "intended to ensure that environmental impacts associated with past and present activities at the FMPC are thoroughly and adequately investigated so that appropriate remedial response actions could be formulated, assessed and implemented." Results from the Berm Soil Sampling, Slant Boring Program, and additional Silo Content Sampling, which are not included in this document, may have a significant effect on site characterization and the conclusions of this Draft Remedial Investigation.
4. Page 1-1, First Paragraph: The Executive Summary on page ES-1 indicates that the FMPC is located 20 miles northwest of Cincinnati, whereas this section indicates 15 miles.
5. Page 1-6, Section 1.1, First Paragraph: Contrary to what is stated in the first sentence, this RI report does not "serve to document the data collection and analysis phase of the RI/FS for Operable Unit 4" because this phase is incomplete.
6. Page 1-7, Last Paragraph: This paragraph states that any underlying soils or perched water under Silos 1, 2, and 3 will be incorporated into the remedial action program for Operable Unit 4. Page ES-2, third paragraph, suggests these areas will be addressed during the Operable Unit 5 FS. Please clarify under which Operable Unit(s) these areas will be addressed.
7. Page 1-7, Second Paragraph: Further explanation of "quantifiable", levels of uranium isotopes and inorganic chemicals is needed. Page ES-2, paragraph 2 states that radiological and chemical analysis of standing rain water in silo 4 indicates the presence of uranium below "levels of concern".
8. Page 1-7, Third Paragraph: Why are the underground decant sump and piping beneath the solos not included?
9. Page 1-11, Third Bullet: Should read "quantification".
10. Table 1-1, Page 1-12: Element number 3, related issues, first bullet: potential accumulation of Pb-210 and Po-210 should replace "buildup". Buildup implies present Pb-210 and Po-210.

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Three

11. Page 1-14, Table 1-1: This page is a duplication of Table 1-1 on Page 1-12 and should be eliminated. Also, these tables have two footnotes, "a" and "b", which are used but are not defined anywhere in the table. These footnotes must be defined.
12. Page 1-19, Second Paragraph: Type of solvent used in solvent extraction should be noted.
13. Page 1-20, Second Paragraph: What type of containers are used to "repackage" deteriorated drums, 80-gallon over-pack drums?
14. Page 1-20, Second Paragraph: What type of containment is provided for the "other waste materials stored in drums on contained surfaces"?
15. Page 1-20, Fourth Paragraph: The term "Clearwell" is not clear or defined.
16. Page 1-29, Table 1-2: Milling Process column is blank.
17. Page 1-37, Fourth Paragraph: How did this soil contamination occur? Did this occur over extended periods of time? What, if any, containment or clean-up measures were implemented?
18. Page 1-41, First Paragraph: The Hazen Report is stated to conclude that a "slimes" fraction contained solubilized recrystallized fractions. Are the Radium-contaminated barium sulfate solubilized or crystallized, or is it correct as stated?
19. Page 1-41, Fourth Paragraph: It is indicated that the Metal Oxide silo 4 contains infiltrated rain water. Are the other silo covers and embankments constructed in a similar manner? If so, what does this imply about the isolation of contents of silos 1, 2, and 3? What does this imply, if anything, about the structural conditions of the silos?
20. Page 1-47, Third Paragraph: What is the date of this Weston Study?
21. Page 2-3, Section 2.1.3: Only Silo 3's contents were analyzed for Actinium-227 and Protactinium-231. The contents of Silos 1 and 2 as well as the subsurface soils should be analyzed for these radio-isotopes.

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Four

22. Page 2-7, Section 2.2.3: See Comment #21 above.
(18) Page 2-12, Third Paragraph: A technical or trade name should be used instead of "cookie-cutter" sampler, if one exists.
23. Page 2-17, Section 2.5.3: It is unclear how leachable iron and manganese can be indicators of contaminant migration and attenuation at the FMPC.
24. Page 2-22, Third Paragraph: It is stated here that because of the high water level in the 3000-series wells in the O.U.4 area, it was not possible to install a bentonite pellet seal, and hence these wells have no bentonite seal. How were these wells sealed then? This statement requires some clarification as it suggests that no bentonite seal was used at all. This appears to be contradicted by Figure 2-6 which shows that the 3000-series wells were indeed sealed with a bentonite grout and that only the bentonite pellet seal was eliminated.
25. Page 2-22, Fifth Paragraph: Does figure 2-7 show "all the wells that were sampled during the RI" or all the wells within the Operable Unit 4 study area?
26. Page 3-4, Third Paragraph: Effluent discharge to Great Miami River is not indicated on Figure 3-2.
27. Page 3-6, Third Paragraph: Vertical seepage rates through the storm sewer outfall ditch is compared to that of Paddys Run stream bottom. Neither of the vertical seepage rates are presented.
28. Page 3-6, Fourth Paragraph: Paragraph Four states that the storm sewer outfall ditch historically conveyed surface water run-off from the production area to Paddys Run. Are approximate dates available? How recent were the storm water retention basins constructed? Has runoff from a 10-year, 24-hour rainfall event occurred since the date of construction?
29. Page 3-16, Second Paragraph: Well 1034 is not indicated on the Glacial Overburden Fence Diagram in pocket.
30. Page 3-27, Section 3.7, Second Paragraph: Reference to the "Town of Hamilton" should be the "City of Hamilton."
31. Page 3-28, Second and Fourth Paragraph: Paragraph two suggests that FMPC contains eight mammal species while

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Five

- paragraph four lists thirteen mammal species on FMPC. This inconsistency should be corrected.
32. Page 4-6, Figure 4-4: The significance, if any, of sample colors should be addressed in the text.
 33. Page 4-7, First Paragraph: Are core sample recovery percentages for each boring in Figure 4-4 for silo 3 reported as percent of each boring or percent of depth of contents of silo 3? If percentages reported are for individual borings, then why are the percentages (28-35%) considered adequate to characterize the contents of Silo 3?
 34. Page 4-8, Table 4-1: Clarification is needed in this table as to which silo(s) the "NLO (1980)" characteristics column is supposed to be under. Proper centering of the silo 1 and 2 and silo 3 headings would provide this clarification.
 35. Page 4-12, First Paragraph: The ODH, 1988 report appears to provide dissimilar conclusions to the of Gels, 1989 referenced on Page 4-12, Third Paragraph.
 36. Page 4-13, Table 4-3: Results from the Vogel (1989) report on Silos 1 and 2 are incorrectly listed under the Silo 3 portion of the table.
 37. Pages 4-14 and 4-15, Tables 4-4 and 4-5 (in addition to several other data tables distributed throughout the report): Again, this RI report should not have been prepared on data that still has not been validated.
 38. PAGE 4-16, Second Paragraph: PCB concentrations reported in this paragraph do not correspond to values reported in Table 4-5 for Silos 1 and 2. This paragraph also states that Toluene was the only organic constituent observed in Silo 3 at concentrations above the respective laboratory blank. Results reported in Appendix B conflict with those reported in this paragraph. Appendix B results also list levels of Chloroethane, Acetone, Styrene, Total Xylenes, 4-Methyl-2-Pentanone, Trichloroethane, and Toluene present in various silo samples and whose respective blanks show "no detection." Such inconsistencies between data and text must be corrected as they lead to confusion and suspect conclusions.
 39. Page 4-19, Third Paragraph: The 0.074 mm size designation is the "break" between sand and silt size materials, not between sand, silt and clay.

Ohio EPA Comments
Remedial Investigations/
Risk Assessment O.U.4
Page Six

40. Page 4-28, Second Paragraph: The significance of the 15 pCi/g value for Ra-226 is unclear. Similarly, in the last paragraph on this page, the significance on the 10 pCi/g level of U-238 over which only one sample was found is also unclear. Are these values supposed to represent some sort of action level or are they merely arbitrary selections of concentrations for discussion purposes? Clarification is needed.
41. Page 4-29, 4.5.1, First Paragraph: This section states a "full radiological analysis" was performed on subsurface soil samples. The radiological analysis did not include tests for Ac-227 or Pa-231 even though the presence of these elements have been documented in Silo 3. The wording should be changed to state that selected radiological analysis was carried out.
42. Page 4-35, Table 4-13: The heading "well No." is incorrect as this table lists the results of stream sediment samples.
43. Page 4-37, First Paragraph: Does the statement "any leakage of material from the solos might be detected in well 1032" depend on the assumption that the perched groundwater beneath OU-4 is continuous? If so, it should be stated as such.
44. Page 4-39, Figure 4-9: The map in the lower right-hand corner of this figure is incorrectly contoured in the area of well 2008. Appropriate corrections should be made.
45. Page 5-1, First Paragraph: Cadmium should also be considered a contaminant of concern since at least five wells within the Operable Unit 4 study area (1008, 1034, 2018, 3005, and 3034) have had one or more samples at or above the Safe Drinking Water Act MCL for cadmium. The hazards associated with this contaminant must be included in the baseline risk assessment for Operable Unit 4.
46. Page 5-2, Second Paragraph: The ingestion of contaminated surface water from Paddys Run should also be considered as a potential exposure pathway for the risk assessment. Surface water can be contaminated via surface runoff containing soluble uranium from the Operable Unit 4 study area or through contaminated groundwater seepage from the creek bank.

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Seven

47. Page 5-6, Last Paragraph: Since the Ra-226 present in Silos 1 and 2 is in a rather insoluble form, as suggested previously in the text, using it as an indicator of contamination from the silos is not very promising and the absence of Ra-226 in groundwater samples may simply be a result of its low environmental mobility. Uranium in the silos is in a more soluble form and might cause considerable groundwater contamination prior to significant levels of Ra-226 being detected.
48. Page 5-7, First Sentence: Explain the significance of moisture being detected in the Silo 2 sample. Is the intent here to imply that the higher the moisture content of the silo contents, the higher the potential for the silos to be the source of uranium in the O.U.4 area because of increased mobility?
49. Page 5-7, First Paragraph: Silo 1 and Soil 2 residues were determined to contain 1400 ppm and 1800 ppm uranium respectively (page 4-7, second paragraph). Paragraph one on page 5-7 states that the K-65 silos are not identified as sources of uranium. Should this conclusion state the K-65 silos are not a source of uranium contamination in the groundwater? They are a potential source, but they have not been determined to be a source of groundwater contamination, correct?
50. Page 6-1, Section 6.1: For reasons stated in Comment #45 above, cadmium should also be considered a contaminant of concern.
51. Page 6-2, Section 6.2, Second Paragraph: The definition of a "working level month" should be provided. Lifetime exposure of individuals living in the vicinity of the FMPC boundary should not be considered the same as occupational exposures of those who work at the facility.
52. Page 6-3, Section 6.3: The chemical toxicity of cadmium should be considered in the toxicity assessment for reasons stated previously.
53. Page 6-3, Second Paragraph: "Operable unit action level concentrations of concern . . ." Should this read: "operable unit action level concentrations?" Are these action levels listed?

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Eight

54. Page 6-3, Last Paragraph: Prior to the use of the acronym "Rfd," the text should define it as the "Reference Dose" so the reader can better comprehend the text.
55. Page 6-4, Section 6.4, Risk Characterization: It is inconsistent with USEPA risk assessment methodology to calculate carcinogenic risks in terms of "risks of fatal cancer." USEPA does not separate carcinogenic risks into fatal and non-fatal. DOE's presentation of carcinogenic risk in this manner is very misleading and can give the appearance that carcinogenic risks are smaller than they really are. Total carcinogenic risks (fatal and non-fatal) should be calculated in the risk assessment.
56. Page 7-5, Fifth Paragraph: While it is true that 40 CFR 300 Subpart E gives an acceptable cancer risk range of 1×10^{-4} to 1×10^{-6} , it also states that the 1×10^{-6} risk level shall be used as the point of departure for determining remediation goals when ARARs are not available or are not sufficiently protective.
57. Bullet items on bottom of Page 7-6 and top Page 7-7: The rationale for considering 25% of annual dose limits, MCLs, proposed MCLs, etc. as remedial action objectives should be provided here. (i.e., why is 25% used as opposed to 10%, 50%, 75%, or some other percentage?)
58. Appendix B, Surface Soils Radiological Results: Surface soil should have been analyzed for Ac-227 and Pa-231 for previously stated reasons.
59. Appendix B, Surface Soils Boring/Well Logs: These logs should have a legend that defines the meaning of abbreviations such as "10YR," "5/8," "USCS," "TSF," etc. It must be remembered that this will be a public document when finalized and the public will not know what these things mean. In fact, Ohio EPA is unclear as to the meaning of some of these abbreviations.
60. Appendix C, Tables: Surface Water General Chemical Results: A footnote should be included stating what the letters associated with certain values represent (i.e., "B" and "E"). This will allow the reader to better assess the significance of levels reported.
61. Appendix C, Table: Surface Water Hazardous Substance List Results: Data are provided for only two sites, "ASIT-021" and "W-11". The location of neither of these sites is

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Nine

- provided on Figure 2-4. A description of the location of these two sites should be given in the text or on the figure.
62. Appendix C, Sediments/Analytical Results: The location of sampling point "W-11" should be provided as noted above.
63. Appendix C, Tables: Sediment Hazardous Substance List Results: A footnote should be provided with the table so the reader can tell what letters such as "XU," "B," and "J" stand for.
64. Appendix E, General Comments: The text throughout the risk assessment incorrectly refers to tables and figures as Table 1-1 and Figure 2-1, for example, instead of Tables E1-1 and Figure E2-1. Appropriate corrections should be made to these references in the text. Also, as previously stated, cadmium should be considered a contaminant of concern since at least five wells within the Operable Unit 4 study area (1008, 1034, 2018, 3005, and 3034) have had one or more samples at or above the Safe Drinking Water Act MCL for cadmium. The hazards associated with this contaminant must be included in the baseline risk assessment for Operable Unit 4.
65. Appendix E, Page Exi, Second Paragraph: As previously stated, the ingestion of contaminated surface water from Paddys Run should be also considered as a potential exposure pathway for the risk assessment. Surface water can be contaminated via surface runoff containing soluble uranium from the Operable Unit 4 study area or through contaminated groundwater seepage from the creek bank.
66. Appendix E, various places throughout the risk assessment: It is inconsistent with USEPA risk assessment methodology to calculate carcinogenic risks in terms of "risks of fatal cancer." USEPA does not separate carcinogenic risks into fatal and non-fatal. DOE's presentation of carcinogenic risk in this manner is very misleading and can give the appearance that carcinogenic risks are smaller than they really are. Total carcinogenic risks (fatal and non-fatal) should be calculated in the risk assessment.
67. Appendix E, Page Exiii, Second Paragraph: To state that "There is no indication that leaking is occurring from the silos at the present time." is presumptuous. Historical accounts document leaks from the silos with no accounts of how or if the leaks were fixed. Sampling at present has

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Ten

- not proven that the contamination in area of Operable Unit 4 isn't attributable to the silos. Until such time as sampling proves conclusively that the silos are not leaking, DOE should refrain from making such statements.
68. Appendix E, Page Exiv, Last Paragraph: Few studies have truly researched the effects of chronic doses of radiation on mammals and birds. To state that ". . . Operable Unit 4 does not appear to contribute to ecological risks" is inappropriate, since little knowledge on the chronic effects of radiation on the environment is available. Such exposure on a long-term basis may indeed pose a significant risk to the animal and plant communities around Operable Unit 4.
69. Appendix E, Tables E2-3, E2-5, E2-6, and E2-7: It is unclear how DOE utilized the analytical data for parameters that were below detection limits in its calculation of average concentrations. In obtaining the averages listed in the above-mentioned tables (and other tables throughout the RI and risk assessment documents), the value used to compute averages for those compounds that were below detection limits must be 1/2 of the detection limit, rather than zero. If this was not done, then the average concentrations given in the tables are misleading and must be recalculated using 1/2 of the detection limit of each respective compound.
70. Appendix E, Page E2-6, Second and Third Paragraphs: Ohio EPA does not believe that all of the volatile organic compounds that were detected in silo samples are the result of blank contamination and/or are lab contaminants and can consequently be dismissed. Appendix B results show levels of Chloroethane, Acetone, Styrene, Total Xylenes, 4-Methyl-2-Pentanone, Trichloroethane, and Toluene to be present in various silo samples where respective blanks show "no detection." These compounds must be considered in the risk assessment.
71. Appendix E, Page E2-20, Last Paragraph: As previously mentioned, using Ra-226 as an indicator of contaminants originating from the silos is questionable due to its relative insolubility in its present state.
72. Appendix E, Page E2-25, First Sentence: The sentence starting "No wells . . ." is incorrect and should be removed. Table E2-11 shows one 2000 series well within the vicinity of Operable Unit 4 having Ra-226 levels of 4.3 pCi/L, approximately 4 times the background level reported.

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Eleven

- 73. Appendix E, Page E2-25, Second Paragraph: The sentence starting "No other overburden wells . . ." is false and should be removed. The results in Table E2-11 reveal that at least one overburden (1000 series) well exhibited concentrations above background and 95% tolerance levels for the following metals: barium, cadmium, chromium, lead, manganese and mercury. Such blatant discrepancies between the data and the text are quite disturbing and suggest that DOE is somewhat careless in its preparation of this document.
- 74. Appendix E, Page E2-25, Third Paragraph: Why is the average background total uranium concentration for surface water in the vicinity of FMPC based on samples from the Great Miami River? Background samples should either be collected from Paddys Run upstream of any FMPC effects or from a tributary of comparable size and drainage area in the region. The GMR has a much larger drainage area and receives numerous industrial and municipal discharges, some of which discharge uranium (e.g., DOE MOUND). Using background samples from the GMR to assess levels found in Paddys Run is inappropriate.
- 75. Appendix E, Table E3-1: Ohio EPA does not agree with DOE's definition of future land use being defined as that land use 100 years from the present. Future use is any land use that occurs in the immediate future and beyond and which under a no action scenario could expose populations to contaminants. Therefore, the assumptions made in the risk assessment relating to the 100-year future use must be changed to be consistent with a traditional future use scenario.
- 76. Appendix E, Pages E3-15 and 16, Table E3-3: Please explain the significance of using an FI (defined as the time spent as waking or sleeping hours) of 1 for the exposure pathways listed on these pages.
- 77. Appendix E, Pages E3-23 and E3-24: The ingestion rate of contaminated drinking water is not given. The ingestion rate should be 2 l/day for both radiological and chemical contaminants.
- 78. Appendix E, Page E3-32, First Paragraph, Last Sentence: This sentence should state ". . . would be exposed to acute toxic concentrations . . ." As it stands, the sentence implies that chronic doses will not be encountered. Chronic toxic doses for aquatic organisms have not been

Ohio EPA Comments
Remedial Investigation/
Risk Assessment O.U.4
Page Twelve

well documented, making any statements about them questionable. Effects other than acute lethality can result in aquatic community degradations and this should be pointed out in the text. Factors such as decreased fertility or growth can decrease biotic integrity.

79. Appendix E, Page E4-6, Table E4-1: Footnotes need to be added to this table defining what the letters "NG" and "d" mean so that the reader can understand the table better.
80. Appendix E, Page ER-7: DOE should use the most current USEPA Health Effects Assessment Summary Tables volume. The volume referenced here has been superseded by at least three updates.

/acp