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**CONDITIONAL APPROVAL OF THE DRAFT
FINAL OU 4 FEASIBILITY STUDY REPORT AND
PROPOSED PLAN**

02/09/94

**USEPA/DOE-FN
18
COMMENTS
OU4**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION 5
 77 WEST JACKSON BOULEVARD
 CHICAGO, IL 60604-3590

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REPLY TO THE ATTENTION OF:

FEB 09 1994

Mr. Jack R. Craig
 United States Department of Energy
 Feed Materials Production Center
 P.O. Box 398705
 Cincinnati, Ohio 45239-8705

HRE-8J

RE: Conditional Approval of the
 Draft Final OU 4 Feasibility
 Study Report and Proposed Plan

Dear Mr. Craig:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Draft Final Operable Unit (OU) 4 Feasibility Study (FS) Report and the Proposed Plan (PP). Generally, the FS adequately addressed the majority of U.S. EPA's previous comments. However, there are several comments, predominantly relating to risk assessment, that must be addressed.

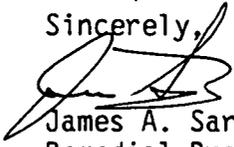
The Draft Final FS and associated responses to comments (RTC) did not adequately indicate where changes to the text were made in the document. Also, there were changes made to the document which were not indicated in the RTC. This has resulted in changes to both the risk assessment methodologies and calculations, as well as the Preliminary Remediation Goals. U.S. EPA has met with the United States Department of Energy (U.S. DOE) on numerous occasions to provide guidance and assistance in conducting risk assessments. This document does not appear to concur with information provided and issues previously discussed between the agencies.

On February 1, 1994, U.S. EPA sent draft comments to U.S. DOE, and subsequently held teleconferences on February 2, 7, and 9, 1994, discussing outstanding issues and exchanging draft responses. As a result, U.S. EPA believes the outstanding issues can be resolved. Therefore, U.S. EPA approves the Draft Final OU 4 FS Report and the PP pending incorporation of responses to the attached comments into the documents. U.S. DOE must incorporate these responses and submit changed pages within thirty (30) days receipt of this letter.

ATTENTION
 PARTIAL
 REVIEW RESPONSE
 TO R-0030
 (7392)

Please contact me at (312) 886-0992 if you have any questions.

Sincerely,



James A. Saric
Remedial Project Manager

Enclosures

cc: Graham Mitchell, OEPA-SWDO
Pat Whitfield, U.S. DOE-HQ
Don Ofte, FERMCO
Jim Theising, FERMCO
Paul Clay, FERMCO

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: January 27, 1994

SUBJECT: Review of the Draft Final FS Report for Operable Unit 4, Fernald Environmental Management Project (FEMP), Fernald, OH, December 1993

FROM: Pat Van Leeuwen, Toxicologist
Technical Support Unit

TO: Jim Saric
Project Manager

I have reviewed the responses to my comments on sections of the Feasibility Study that address risk assessment issues for Operable Unit 4 of the Fernald Environmental Management Project (FEMP), dated December 1993.

I found it difficult to determine if all comments were addressed satisfactorily because changes in the document were not indicated in any manner, and the response to comments provided by DOE failed to indicate where in the text specific changes provided in the "Response" and "Action" sections were made. This lack of response sets up a mechanism for perpetual review of all document submissions, and makes it impossible to approve anything in a timely manner. It is also obvious that many additional changes were made to the document, including a reduction of the list of Chemicals of Concern (COCs) and changes in the methodology for the risk calculations. These changes are of concern to me as they have resulted in very different PRGs for this OU. A presentation of all changes made in this version of the report and a justification and discussion of these changes is warranted.

If you have any questions on these comments or any section of the risk assessment, please contact me at 886-4904.

- 1) Page 2-4, lines 16 and 27/Page 2-14. line 15/Appendix D.2.0
The response to this comment is acceptable.
- 2) Page 2-10, line 27
The response to this comment is acceptable.
- 3) Page 2-13, lines 1-7
The response to this comment is acceptable.
- 4) Page 2-14, line 6
The response to this comment is acceptable. However, U.S. DOE should be aware that the site managers may not know when PRGs are below the Dection Limits for particular contaminants in a particular medium without this information and thus may choose unsuitable cleanup levels for some chemicals. This inclusion would help to direct cleanup goals to an achievable level.
- 5) Page 2-10, line 1/page 2-14, line 13
The response to this comment is acceptable.
- 6) Page 2-16, lines 15-17 and throughout FS
The additional land use scenario, Future Land Use with Continued Federal Owership, is sufficiently described in section D.3.2.2.3 to eliminate the confusion apparent in the prior draft, and the scenario is well justified. The response to the comment is acceptable, but review also the response in comment # 16.
- 7) Table 2-5, page 2-19
The original comment here was not a request for a recalculation, but for a description of the methodology used to calculate the PRGs for PAHs and how dermal considerations were incorporated in the calculation. The text gives a detailed description of the approach for radionuclides, lead and PCBs, but does not address PAHs. My understanding is not furthered by the recalculation.
- 8) Page 2-22 through 2-23; calculations
After reviewing the revised table 2-5, I am now truly confused. The PRGs in this draft sometimes differ from those presented in the prior draft by orders of magnitude - e.g., the new PRG for 2-butanone (at the HI = 0.2 level) is 15 mg/kg for the future resident farmer, while the PRG in the previous draft was 0.21 mg/kg. Large differences are also apparent for PB-210, antimony, barium, chromium, benzo(a)pyrene and some other contaminants in this exposure scenario; large differences can also be seen in other exposure scenarios. What changes in the risk calculations were made in this scenario (I see only the addition of two new exposure pathways) and other scenarios to result in orders

of magnitude difference in the calculated PRGs? Such changes in methodology warrant further review.

9) Page 2-23, lines 24-27

I think that the argument can be made that the PRGs proposed under this scenario would require remediation of soils to background, which may not be practical. However, the ARAR for Ra-226 + progeny is not risk-based and would actually increase the risk to greater than 10 e-3; its use may not be consistent with CERCLA guidelines.

10) Page 2-23, lines 28...

This discussion should point out that the mill tailings standards are not directly applicable to Superfund goals and that their application would result in an increased risk over background.

11) Page 2-23, lines 11-15

I noticed that a lower EF value (110 days/year) was chosen rather than the original value of 120 days/year. What was the rationale for this choice?

Both U.S. EPA and Ohio EPA had noted in the prior review that the parameter values for the recreational scenario are not very conservative. U.S. EPA expected to see the development of the expanded trespasser scenario reflect a more conservative approach, as we discussed at the December 1, 1993 meeting. We did not expect that our agreement to a tiered approach and inclusion of an expanded trespasser scenario constituted acceptance of the minimal exposure values presented here.

A casual glance at any exposure pathway shows that the Expanded Trespass scenario does not represent much increase over the Current Land Use trespass scenario - e.g. a look at the Incidental Ingestion of Soil/Sediment pathway shows that the total soil ingestion (15.6 gm) of the adolescent in the Current Land Use Trespass scenario has been reduced to 13.2 gm in the Adolescent (Child) Expanded Trespasser scenario, so that the total exposure by ingestion for trespassers aged 6-50 represents only a 20% increase over the original exposure scenario. For non-carcinogens, this will result in a less conservative exposure and less risk.

12) Table 2-6, pp 2-26 thru 2-30

- a) Did I miss something? I did not see the change in the table title as indicated in the "Action".
- b) The response to this comment is acceptable.
- c) The response to this comment is acceptable, but see also the response to comment #4 above.

13) Page 2-31, lines 10, 11

The comment is no longer applicable; the calculation section was removed.

14) Page 2-31, lines 12-17

The response to this comment is acceptable.

15) Appendix D, Table D.3-4, page 3-13

a) Explain in footnote "c"/section D.3.4.1.2 that the berm soil will be removed in stages during the waste removal/treatment operations that will occur over a period of 3 years.

b) The response to this comment is acceptable.

16) Page D-3-19, section D.3.2.2.3

The additional land use scenario, Future Land Use with Continued Federal Ownership, is sufficiently described in section D.3.2.2.3 to eliminate the confusion apparent in the prior draft, and the scenario is well justified. However what is missing in the scenario description is the basis of the scenario - deed restriction for 1000 years (i.e. essentially forever). This assumption should be discussed in the presentation of the scenario. Whether this restriction also precludes the use of the site for future commercial/industrial/federal purposes (worker exposure was not evaluated) should also be discussed. It should also be pointed-out that this scenario was developed for this OU, and may not be appropriate for all OUs at the Fernald site.

I continue to hope that remediation of some portions of the site will be sufficient to restore some land to public use, whether it be at the residential, recreational, commercial or industrial level of use. I think that it will be difficult to say to residents of the area that the federal government so contaminated this site that it will cost millions of public dollars to clean it up to a level where it must be left unused, forever, to avoid presenting a health risk to area residents.

17) Table D.3-6

I am confused by the response. I did not see the indicated change in the SA values presented for the Dermal Contact While Bathing pathway in Table D.3-5.

I also reviewed the added Dermal Contact with Soil/Sediment parameter values presented in the same table. The SA values for the last 4 receptor populations (RME On-Property Farmer through Off-Property Resident Farmer) are total body surface area values; it appears that the CT Water Contact values were used instead of the RME Soil Contact (should be 25% of SA) values.

18) Table D.3-9, page D-3-35

a) The response to this comment is acceptable.

b) The response to this comment is acceptable.

c) Fluoranthene, as well as many other chemicals, was eliminated as a COC in the revised table D.3-9. Actually, the list of 34 COCs was reduced to 19 in the revision. What is the basis for the elimination of all these contaminants at this stage

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of the document?

- d) The RfD for thallium appears plausible.
- e) The response to this comment is acceptable.

19) Page D-3-34, lines 14-17 I have previously commented that inhalation RfCs should be used when provided; contractors should not calculate RfDs from RfCs. It is apparent that this calculation presents an opportunity for error.

This document, page D-3-43, lines 8-10, indicated that RfD values were derived from RfC values by multiplying the latter by the default inhalation rate of 20 m³/day. HEAST, March 1993, page 27, indicates that the RfC may be converted to a corresponding inhaled RfD by dividing by 70 kg, multiplying by 20 m³/day and adjusting by an appropriate absorption factor. HEAST further stated that "this conversion, however, may often be technically incorrect, and the appropriateness of doing this must be evaluated on a case-by-case (read chemical-by-chemical) basis". It is clear that the method described in the FS, section D.3 is incorrect; it is not clear whether the RfD values derived in the RI report are in error. At the least, this potential problem with derived inhalation RfD values should be discussed in the document.

Additional A) Page 2-26, line 27

EPA's benchmark level for blood lead in children is 10 ugm/dl in 95% of the children under the age of six.

Additional b) Page D-3-12, line 10 How was frequency of detection used in the selection of COCs for evaluation in the FS report? Was it used to reduce the list of CPCs considered in the Baseline Risk Assessment for this OU? A discussion of this point is lacking in this report.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

AIR AND RADIATION DIVISION
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

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DATE: JAN 19 1994

SUBJECT: Review of the "Feasibility Study (FS) Report for Operable Unit 4 - December 1993 Draft Final"
Fernald Environmental Management Project, Fernald, Ohio

FROM: Gene Jablonowski, Environmental Engineer
Radiation Section (AT-18J)

TO: James Saric, Remedial Project Manager
RCRA Enforcement Branch (HRE-8J)

The draft final "Feasibility Study Report for Operable Unit 4," and the U.S. Department of Energy's response to comments on the September 1993 draft have been reviewed and two outstanding comments remain. The first comment concerns the containers to be used to contain the vitrified silo materials. Previously, the vitrified product was supposed to be in the form of small glass spheres, like marbles; the FS now discusses pouring the vitrified product into "7A Type A" containers. It remains unclear whether these containers are capable of withstanding a roughly 4000 lb direct pour of molten glass, and whether DOE's glass monolith studies were performed under conditions of similar containment.

The second comment concerns Alternative 2A/Vit, where DOE is attempting to estimate radiation dose from treated silo residues (stored on-site) to an intruder. This dose estimate is important when considering the risk of disposal of treated silo residues on site, as well as the occupational risk to remediation workers and material transporters.

In the draft FS, DOE originally estimated the dose to the intruder from the treated silo residues to be 1.5 rem/hr, supporting this estimate with values and units that seemed to be in error in comparison to the estimate; a comment concerning this was made. DOE responded not by making corrections based on their original assessment method, but by changing their dose assessment method to one based on untreated silo material, which seems inappropriate. DOE also stated text revisions, but those did not appear in the draft final FS. The need for having this comment addressed is dependent upon the need for having this information in this FS, or whether its appropriate for a subsequent OU4 document.

If you have any questions, please contact me at (312) 886-0169 or at (202) 233-9712.

Enclosure

Comments on the December 1993 Draft Final "Feasibility Study Report for Operable Unit 4"

U.S. EPA Region 5 Radiation Section

January 1994

Commenting Organization: U.S. EPA, Radiation Section
Section #: 4.2.2 Page #: 4-18 Line #: 25 Code: C
Original Comment #: 13

Comment: Please describe in text the DOT specification 7A Type A packaging to be used to contain the poured molten glass, specifically the container volume, material, and its ability to withstand molten glass temperature and contact without degradation.

Response: Information describing the packaging is provided in Section 2.5.7.1 and again in the packaging section of Section 4.2.2.7. The containers would be constructed of carbon steel. The containers and the packaging system would be designed so that the containers would not be damaged during the direct pours. The highest melting temperatures of the glass would still be approximately 300°F below that of the melting point of the carbon steel.

Action: Text will be added emphasizing the point that the containers would not be damaged by the direct pour. Additional information will be provided in Section 2.5.7.1 that the containers will be constructed of carbon steel.

2nd Comment: A more detailed description of the 7A Type A container is essential; the assumption cannot be made that the reader is as familiar with 7A Type A containers as 55-gallon drums and sea/land containers. DOE's description lacks specifics on container construction as well as the typical uses for such a container. In addition to stating that the containers are made of carbon steel, it's important to note specifics about construction (solid cast metal, formed from carbon steel plate, etc.) and actual thickness of the carbon steel material used. It would also be relevant to note whether such containers have been historically used to contain direct molten glass pours, and whether glass monolith studies performed were conducted with 1 m³ volumes of molten glass poured into 7A Type A or similar carbon steel containers.

Commenting Organization: U.S. EPA, Radiation Section
Section #: 4.2.2.3 Page #: 4-40 Line #: 8 Code: C
Original Comment #: 21

Comment: It is stated that the maximum expected effective dose equivalent associated with the treated K-65 residues would be 1.5 rem/hour. Please explain how this exposure rate was derived and where an individual would have to be, relative to the solidified waste form, to receive this maximum dose.

Response: "The referenced text is incorrect and will be revised."

Action: DOE states that 2 sentences will be deleted, inserting statements supporting a dose rate assessment based upon untreated silo contents.

2nd Comment: Note: this comment concerns DOE's estimation of radiation dose from treated silo residues to an intruder.

First, it does not appear that the text of the draft final document was revised to address my original comment, as DOE stated in the response to comments. Secondly, the original comment asked that the derivation of 1.5 rem/hr dose to the intruder be explained, a polite way of requesting that the math and the unit balance be corrected. DOE instead responded by changing the method used to estimate dose to the intruder, now basing dose on untreated silo contents instead of the treated material as it had done in the draft FS. This change in dose assessment method reduces the dose to the trespasser by a factor of about 428, greatly altering estimates of residual risk.

Due to the lack of information provided, as well as the subsequent change in dose assessment methodology, the validity of the intruder dose rates and derivation methods provided are in question. Estimated radiation dose from the treated silo material should be based on treated silo material, not untreated material. Revision of the text should have been as simple as reviewing the values and units used in the draft FS to produce the "1.5 rem/hr" value, but the change in assessment method raises questions about DOE's ability to perform that assessment, as well as assess residual risk due to on-site storage of treated silo residues.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: January 29, 1994

SUBJECT: Review of Feasibility Study Report for Operable
Unit 4, Appendix K, Comprehensive Response Action Risk
Evaluation (CRARE), Fernald Environmental Management
Project (FEMP), Fernald, OH, December 1993

FROM: Pat Van Leeuwen, Toxicologist
Technical Support Unit

TO: Jim Saric
Project Manager

I have reviewed Appendix K of the Feasibility Report for Operable Unit 4, which constitutes the Operable Unit CRARE. I still have a number of questions and many of the comments raised in the review of the FS report also apply to the CRARE. My specific comments follow.

If you have any questions on these comments, please contact me at (312) 886-4904.

1) Land Use Scenarios

The response to this comment is acceptable.

2) Other Consistency Issues

I still think that the distinction between "potential COCs" and "COPCs (Chemicals of Potential Concern)" is rather fuzzy and assumes that the reader understands how these lists of chemicals have changed in each report. Wouldn't it be simpler to merely discuss the "COCs" or "potential COCs" in each report.

3) Population Demographics

Your response is logical. However, the comment was addressed at the second bullet under Demographics: "The population density will remain at present levels for the 1000-year evaluation period per Appendix I of this FS report." This assumption is not only unrealistic, it appears to be irrelevant. I don't see the need to include it here or in the FS report.

4) Use of MCLGs to eliminate COCs

The response to U.S. EPA (Saric) CRARE comment # 8 is acceptable.

5) HI Benchmark Value

The response to this comment is acceptable.

6) Farmer Soil Ingestion Rate

Regarding the response to U.S. EPA (Saric) CRARE comment #11-3, I did not see a reference to the discussion in section K.3.3 in the footnotes to Table K.3-1. The problem with the discussion of the farmer exposure described in section K.3.3, page K-3-12, was noted in the comments from the OU 4 RI review: the exposure for the additional 250 days/year during the 50 year farming period is not included in the exposure description, leaving the reader to speculate how the total soil ingestion of 4560 gm was derived. I previously asked that this be corrected in the RI report; I assumed that it would also be corrected in all OU 4 reports.

7) Selection of PRG for U-238

The inclusion of Attachment D.II in the FS report and the discussion and reference to this attachment in section K.3.1 provide a better understanding of the decision here. The response to the comment is acceptable.

8) Recreational User Definition

Both U.S. EPA and Ohio EPA had noted in the prior review that the parameter values for the recreational scenario presented in Table K.3-1 were not very conservative. U.S. EPA expected to see the development of the expanded trespasser scenario reflect a more conservative approach, as we discussed at the December 1, 1993 meeting. We did not expect that our agreement to a tiered approach and inclusion of an expanded trespasser scenario constituted acceptance of the minimal exposure values presented here and in the FS report. A casual glance at any exposure pathway shows that the Expanded Trespass scenario does not represent much increase over the Current Land Use trespass scenario - e.g. a look at the Incidental Ingestion of Soil/Sediment pathway shows that the total soil ingestion (15.6 gm) of the adolescent in the Current Land Use Trespass scenario has been reduced to 13.2 gm in the Adolescent (Child) Expanded Trespasser scenario, so that the total exposure by ingestion for trespassers aged 6-50 represents only a 20% increase over the original exposure scenario. For non-carcinogens, this would result in a less conservative exposure and less risk.

9) Tables, Section K.4.0 The methodology is much clearer with the changes made in this section.

- a) The response is acceptable.
- b) The response is acceptable.
- c) The response is acceptable.

10) Discussion of the RME

The response to this comment is acceptable.

11) "Home-builder" Receptor

The changes on page K.5-11, lines 21-23 are acceptable.

12) Toxicity Values

The response to this comment is acceptable.

13) Toxicological Profiles

The inclusion to the Lead Tox Profile is acceptable.

Regarding a Tox Profiles for PAHs, I am not certain I understand the elimination of PAHs in the final screening, as it cannot be determined whether any or all PAHs will degrade. PAHs continue to be major COCs at most Superfund sites because they often do not degrade appreciably, especially if they are tightly bound to the soil or if other chemicals toxic to microorganisms are also present in the soil. The presentation here seems to indicate that PAHs need not be considered for remediation.

Management Project (FEMP) reports, often without "site-specific" variables; instead, default or estimated values were used. Likewise, default or estimated residential exposure variables could be used in the uptake/biokinetic model. Second, U.S. DOE has already developed or assumed many of the necessary residential exposure variables, such as soil ingestion and inhalation rates. U.S. DOE should revise the Operable Unit 4 CRARE report to include an evaluation of lead toxicity using the uptake/biokinetic model developed by U.S. EPA.

Comments on the
"Proposed Plan for Remedial Actions at Operable Unit 4 - Response to Comments"

U.S. EPA Region 5 Radiation Section

January 1994

Commenting Organization: U.S. EPA, Radiation Section

Section #: 3.2

Page #: 15

Para. #: 3

Code: C

Original Comment #: 2

Comment: It is stated here that Silo 3 has a significantly lower radon emanation rate than Silos 1 and 2. However, according to the Remedial Investigation Report for Operable Unit 4, the Silo 3 annual radon release rate and emission flux is greater than that of Silo 1; a radon emission flux of 108 pCi/m²-sec is not insignificant.

Response: Generally, DOE responds by stating that the Silo 3 radon flux rate is in fact 20 pCi/m²-sec, and that the radon source term ILCR is insignificant as compared to all of the constituents of concern under the current source-term scenario.

Action: DOE states "none required."

2nd Comment: Being that Silo 3 will be dismantled and its contents processed and shipped, the radon flux rate is ultimately irrelevant. What is disturbing are the general statements that are made without supporting data, as well as DOE's adjustment of RI data as the need arises. The fact that data from the RI can be easily adjusted undermines the credibility of the RI in presenting source term information.