

4909

**OHIO EPA COMMENTS ON THE O.U. 4
FEASIBILITY STUDY AND PROPOSED PLAN**

11/09/93

**USEPA/DOE-FN
66
COMMENTS
OU4**



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

H-3782
AR-0001
4909

REPLY TO THE ATTENTION OF:

NOV 09 1993

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

HRE-8J

RE: Disapproval of the 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 Operable Unit (OU) 4 Feasibility Study (FS) Report and the Proposed Plan (PP). Generally, the FS adequately documents both the alternatives development and evaluation. However, U.S. EPA has identified numerous deficiencies that must be addressed.

Therefore, U.S. EPA disapproves the OU 4 FS Report and the PP pending incorporation of responses to the attached comments into the documents. Considering U.S. EPA's extensive comments, and the fact that this Report is a primary document as defined in the 1991 Amended Consent Agreement, U.S. EPA recommends that the United States Department of Energy be prepared to address any outstanding issues at the November 17, 1993, meeting. In addition to the attached deficiencies the PP is too long, not in a format recommended by U.S. EPA guidance, and introduces information not fully developed in the FS. U.S. EPA recommends that the modified document correct these problems.

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-HDQ
Nick Kauffman, FERMCO
Jim Theising, FERMCO
Paul Clay, FERMCO

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

U.S. EPA Region 5 Radiation Section

October 1993

Commenting Organization: U.S. EPA, Radiation Section

Section #: 3.2 Page #: 15 Bullet #: 2 (of page) Code: C

Original Comment #: 1

Comment: The direct-penetrating radiation fields in the vicinity of the silos are probably due to the silos themselves, please revise.

Response:

Action:

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:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2 Page #: 21 Para. #: 1 Code: C

Original Comment #: 3

Comment: Rather than merely saying that radon is a radioactive element, it would be appropriate to add that radon is a colorless, odor-less, radioactive noble gas that further decays into a series of radioactive progeny.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2 Page #: 44 Line #: N/A Code: C

Original Comment #: 4

Comment: Please explain the status of previously discussed alternatives that involved in-situ containment and chemical extraction of the Silo 1, 2, and 3 residues.

Response:

Action:

10001
4909

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.1 Page #: 45 Para. #: 4 (bottom) Code: C

Original Comment #: 5

Comment: It would be useful if an illustration of the material removal work platform was included in this document.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.1 Page #: 47 Para. #: 1 Code: C

Original Comment #: 6

Comment: It is stated that the molten glass would be poured directly into containers, but the container type is not stated. Also, please state why the glass product is being poured directly into containers rather than formed into beads (marbles) as discussed in the past.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.1 Page #: 47 Para. #: 2 Code: C

Original Comment #: 7

Comment: Please explain whether the radon treatment system (RTS) discussed here is the same as the RTS already in place in operable unit 4.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.1 Page #: 48 Line #: 6 Code: E

Original Comment #: 8

Comment: Five (5) meters is equal to 16.4 feet, not 15 feet as stated.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.1 Page #: 48 Para. #: 4 Code: C

Original Comment #: 9

Comment: Would this vault and multimedia cap allow managed retrieval without a major excavation effort; would entry points into the vault (through the cap) be clearly marked?

Response:

Action:

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Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.2 Page #: 49 Para. #: 3 (bottom) Code: C

Original Comment #: 10

Comment: Please explain what kind of disposal boxes would be used for containing and curing the cement-slurried K-65 residues.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.3 Page #: 51 Para. #: 1 Code: C

Original Comment #: 11

Comment: Under this alternative, the Nevada Test Site would be used for final disposal of processed Silo 1 and 2 contents. If at some later time the processed material would not be allowed into Nevada, are there alternative sites for disposal, such as Envirocare, or would on-site disposal be a necessity?

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.3.3 Page #: 55 Para. #: 5 (bottom) Code: C

Original Comment #: 12

Comment: Under this alternative, the Nevada Test Site would be used for final disposal of processed Silo 3 contents. If at some later time the processed material would not be allowed into Nevada, are there alternative sites for disposal of thorium wastes, such as Envirocare, or would on-site disposal be necessary?

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.4.1 Page #: 58 Para. #: 3 Code: C

Original Comment #: 13

Comment: This paragraph discussing silo demolition initially states, relative to the other three silos, that the Silo 4 dome will be dismantled first, later stating that the Silo 4 dome will be dismantled last; which is it?

Response:

Action:

4900

Commenting Organization: U.S. EPA, Radiation Section
Section #: 5.4.1 Page #: 59 Para. #: 3 Code: M
Original Comment #: 14

Comment: There is not enough information presented to support the proposed radionuclide remediation levels listed in Table 5-2. Using default residential soil scenario factors, the proposed remediation levels for radium-226, radium-228, thorium-228, and uranium-228 individually pose risks that exceed 1×10^{-4} with a total risk of approximately 1×10^{-3} . The proposed remediation levels should either be reevaluated so that an acceptable risk level is attained, or looked upon as interim levels pending the final site-wide (OU5) remediation.

Response:
Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 5.4.1 Page #: 59 Line #: 27 Code: M
Original Comment #: 15

Comment: How can it be said that the proposed remediation levels are considered protective of all reasonable future receptors, including hypothetical on-property residents, when the 60 pCi/g level for uranium-238 was derived assuming the recreational user, as stated in Section 2.2.2.3 of the Feasibility Study for OU4 (FS); please explain. The FS states a proposed remediation goal of 0.47 pCi/g for U-238 in soil when considering the on-site resident farmer scenario.

Response:
Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 5.4.1 Page #: 60 Table #: 5-2 Code: M
Original Comment #: 16

Comment: The Proposed Remediation Levels in Soils table fails to list remediation levels for the actinium series radionuclides (uranium-235, actinium-227), thorium-230, and uranium-234. These radionuclides are known constituents of the K-65 residues as well as contaminants of surrounding soils; please propose remediation levels that take into account all constituents of the K-65 materials.

Response:
Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 5.4.1 Page #: 59 Para. #: 4 Code: M
Original Comment #: 17

Comment: It is stated that following excavation, affected areas will be returned to original grade with the placement of clean backfill and seeded. Being that this contaminated soil excavation will not be the final excavation conducted in OU4, please explain the purpose temporarily backfilling with clean soil, an action which may only increase the volume of waste generated during the final OU5 remedial action. It would seem appropriate to only seed, with very minimal or no additional soil cover, the excavated areas prior to a final cleanup level decision.

Response:
Action:

0005

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Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.4.3 Page #: 63 Para. #: 1 Code: C

Original Comment #: 18

Comment: This stated alternative features off-site disposal at a facility near Clive, Utah, yet this facility is not yet fully licensed to receive by-products materials such as those in Subunit C. Please state what licenses still need to be obtained, the timeframe by which this is expected to occur, and whether this is compatible with scheduled activities under this alternative. Are there any disposal

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 6.2.1.1 Page #: 71 Para. #: 2 Code: C

Original Comment #: 19

Comment: It is stated that the vitrified or cement stabilized residues would resist leaching; please explain which of the two technologies offer greater leaching resistance for the Silos 1 and 2 contaminants.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 6.2.1.1 Page #: 73 Para. #: 2 Code: C

Original Comment #: 20

Comment: It is stated that all surface water releases via the vault leachate collection/detection system would be directed to the FEMP Advanced Wastewater Treatment Facility (AWWT) for treatment and released. This feature assumes the continued operation of the FEMP AWWT, probably beyond the 30 or so years required for site remediation, an active operation that is more demanding than simply placing deed restrictions and boundary markers on the vault area. Please elaborate on the intended operational life of the AWWT and where else vault-generated leachate may be treated in the absence of the AWWT.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 6.2.1.2 Page #: 75 Para. #: 5 (bottom) Code: C

Original Comment #: 21

Comment: It is stated that vitrification would be effective in reducing radon emanation and in minimizing the leaching of constituents, while cement stabilization would be effective in preventing the movement of constituents from the stabilized form. Please explain the effectiveness of cement stabilization in controlling radon emanation and minimizing the leaching of constituents. Also, present a comparison of both technologies and their ability to control radon emanation and leaching.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 6.2.1.2 Page #: 75 Para. #: 5 (bottom) Code: C

Original Comment #: 22

Comment: Please elaborate on the "not-irreversible" nature of the cement stabilization process and the consequences that may effect the long-term durability of cement-stabilized forms.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 6.3.1 Page #: 93 Para. #: 2 Code: C

Original Comment #: 23

Comment: On page 91 of this document, U.S. DOE proposes that the decision regarding the type and location of the final disposition of the Operable Unit 4 soil and debris be placed in abeyance to facilitate the proper integration of this decision with forthcoming decisions for Operable Units 3 and 5. In light of this proposal, it is inappropriate to plan for the on-property disposal in the event that the operable unit coordination efforts become infeasible. Therefore, off-site disposal and release of the soil and debris should not be ruled out at this time.

Response:

Action:

490:9

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

U.S. EPA Region 5 Radiation Section

October 1993

Commenting Organization: U.S. EPA, Radiation Section

Executive Summary Page #: ES-6 Line #: 23 Code: C

Original Comment #: 1

Comment: Due to recent findings regarding the K-65 Silos, there is no solid basis for stating that a 99 percent Rn-222 concentration reduction occurred in the headspace of the silos following the application of the bentonite clay. It was only this year when it was discovered that the Pylon radon monitors were not properly measuring the headspace concentrations, grossly underestimating headspace concentrations by a factor of 10 as discovered when modifications to the scintillating cells were made. Recent measurements reveal that Silo 2 headspace concentrations are increasing, with a recently cited value of over 4,000,000 pCi/l. Compared to the pre-bentonite radon concentration of 30,000,000 pCi/l, this suggests only an 85 percent headspace reduction, provided that the initial pre-bentonite headspace concentration data is correct.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 1.4.2.1 Page #: 1-34 Line #: 24 Code: C

Original Comment #: 2

Comment: Please include information on the application of the foam coating to the domes, its purpose, and its intended and/or eventual effect.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 1.4.1.1 Page #: 1-25 Line #: 17 Code: E

Original Comment #: 3

Comment: This background information section, Population and Land Use, focuses on local land use, but lacks information on population, specifically on population densities in areas surrounding the Fernald site; please revise.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 1.4.2.1 Page #: 1-33 Line #: 19 Code: E

Original Comment #: 4

Comment: Please include a description of "gunite" and the purpose it serves as a covering on the K-65 silo sides.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 2.2.2.1 Page #: 2-13 Line #: 11 Code: C

Original Comment #: 5

Comment: The general principles used to develop PRGs for carcinogenic constituents should be the same whether the carcinogenicity is due to the radioactive or chemical nature of the constituent. Specifically, exposures to radionuclides should either not result in an ILCR of more than 10^{-6} to 10^{-4} , or be reduced to levels as low as reasonably achievable (ALARA) as limited by the natural presence of radionuclides in soil and groundwater.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 2.2.2.3 Page #: 2-17 Line #: 16 Code: M

Original Comment #: 6

Comment: Please explain why preliminary remediation goals (PRGs) for actinium-227, protactinium-231, thorium-230, thorium-232, uranium-234, and uranium-235 in soils were not developed and presented in Table 2-5. These radionuclides are known contaminants in surrounding soils and pose considerable risks, as do their progeny.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 2.2.2.4 Page #: 2-31 Line #'s: 10 and 11 Code: C

Original Comment #: 7

Comment: Being that this section concerns preliminary remediation goals for groundwater, please review these two lines to ensure accuracy in context as far as units used and what type of PRG is being derived.

Response:

Action:

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Commenting Organization: U.S. EPA, Radiation Section

Section #: 2.2.3.1

Page #: 2-33

Line #: 26

Code: C

Original Comment #: 8

Comment: This remedial action objective for waste material should include that emissions of radionuclides to the ambient air shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/year, per radionuclide NESHAP Subpart H.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 2.2.3.3

Page #: 2-39

Line #: 9

Code: C

Original Comment #: 9

Comment: This remedial action objective for soils within the Operable Unit 4 boundaries should include that emissions of radionuclides to the ambient air shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/year, per radionuclide NESHAP Subpart H.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.1.2.2

Page #: 4-6

Line #: 26

Code: M

Original Comment #: 10

Comment: A potential chemical-specific ARAR that must be included in this list is radionuclide NESHAP 40 CFR 61 Subpart H, which covers emissions of radionuclides other than radon from U.S. DOE facilities.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2.2

Page #: 4-15

Line #: 19

Code: C

Original Comment #: 11

Comment: It is mentioned that the berm material opposite the silo wall would be removed to ensure the forces are balanced, as the contents are removed from the silos. Please explain what effect this balancing may have on the two load-spreading dome covers and their effectiveness in containing the silos' contents in the event of a silo dome collapse.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 4.2.2 Page #: 4-18 Line #: 25 Code: C
Original Comment #: 12

Comment: It has been previously mentioned that the molten glass product would be formed into small, marble-like pieces. Please discuss this change as it would seem that a more effective, observable, and controllable cure would be achieved with a smaller form than with a larger, poured form.

Response:
Action:

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:
Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 4.2.2 Page #: 4-18 Line #: 28 Code: C
Original Comment #: 14

Comment: Please explain whether continuous radionuclide emission monitoring would be performed at the exhausts of the off-gas treatment system and the radon treatment system.

Response:
Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 4.2.2 Pages #: 4-20 and 4-21 Code: E
Original Comment #: 15

Comment: Please do something to make the Figure 4-4 and 4-5 process flow diagrams readable, maybe print the diagrams on 11" x 17" paper or use a bigger font size.

Response:
Action:

Commenting Organization: U.S. EPA, Radiation Section
Section #: 4.2.2 Page #: 4-22 Line #: 7 Code: C
Original Comment #: 16

Comment: Specify the meaning of "disposed of appropriately" with regard to the decontamination and decommissioning of the facilities and equipment used in the vitrification process. Also, explain whether "uncontaminated" materials includes those materials that were previously decontaminated, as well as what criteria would be used for the unrestricted release of materials.

Response:
Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2.2

Page #: 4-26

Line #: -14

Code: C

Original Comment #: 17

Comment: Explain somewhere in this document what will happen to collected leachate from the vault and multimedia cap combination once construction of the disposal vault is complete.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2.2

Page #: 4-26

Line #: 17

Code: C

Original Comment #: 18

Comment: The Proposed Plan for Remedial Actions at Operable Unit 4 describes a multimedia cap that would provide for a minimum 5 meter (16.4 feet) cover over the disposed wastes, while Figure 4-6, Above Grade Disposal Vaults, indicates a 2.74 meter (9 foot) cover; please explain.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2.2

Page #: 4-26

Line #: 20

Code: C

Original Comment #: 19

Comment: Regarding the multimedia cap, please explain whether the uncompacted vegetative layer would have a feature to inhibit tree growth which could damage the geotextile membrane and the drainage layer underneath.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2.2

Page #: 4-27

Line #: 9

Code: C

Original Comment #: 20

Comment: The perimeter of institutional control should ensure that gamma measurements at the fenceline are indistinguishable from background, and should probably include the monitoring well areas as a matter of access convenience.

Response:

Action:

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:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.2.4 Page #: 4-75 Line #: 18 Code: C

Original Comment #: 22

Comment: Under this alternative, the Nevada Test Site would be utilized for the final disposal of processed silos contents. If at some later time the processed silo material is not be allowed into Nevada, are there alternative sites for disposal, such as Envirocare, or would on-site disposal or long-term interim storage of the processed silo material be necessary?

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.4.2 Page #: 4-157 Line #: 31 Code: C

Original Comment #: 23

Comment: Please explain how backfilling will be performed, whether clean soil of standard depth will be applied or a return to original grade following excavation.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.4.2 Page #: 4-158 Table #: 4-10 Code: M

Original Comment #: 24

Comment: In Table 4-10, Proposed Remediation Levels in Soils - Radionuclides, notes "(a)" and "(c)" indicate that the risk to the on-property farmer was calculated assuming that the placement of six inches of clean fill precludes direct radiation (a only), incidental ingestion (a and c), and dermal contact (a only). Six inches of fill is a rather thin considering a farmer disturbs soil depths of several feet during normal crop work; NUREG-0706, the FGEIS on uranium milling, recommends a minimum cover thickness of 10 feet. Unless this depth of clean backfill will be used, it seems inappropriate to rule out direct radiation, incidental ingestion, and dermal contact pathways for the on-property farmer.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.4.2 Page #: 4-158 Table #: 4-10 Code: M

Original Comment #: 25

Comment: The Proposed Remediation Levels in Soils (radionuclides) table fails to list remediation levels for the actinium series radionuclides (uranium-235, actinium-227), thorium-230, and uranium-234. These radionuclides are known constituents of the K-65 residues as well as contaminants of surrounding soils; please propose remediation levels that take into account all constituents of the K-65 materials.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.4.2

Page #: 4-158

Table #: 4-10

Code: C

Original Comment #: 26

Comment: Considering the on-property farmer scenario and the fact that some exposure pathways were left out to develop the risk numbers (direct radiation, incidental ingestion, dermal contact), the proposed remediation levels do not seem adequately protective for the on-property farmer. Also, since ultimate future use of the land has not yet been determined, it would be appropriate to include risk values for commercial/industrial and residential scenarios.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 4.4.2

Page #: 4-160

Line #: 3

Code: C

Original Comment #: 27

Comment: There is not enough information presented to support the proposed radionuclide remediation levels listed in Table 5-2. The total risk to the on-property farmer exceeds 1.5×10^{-3} with the given information. The proposed remediation levels should either be reevaluated so that a total risk of less than 10^{-4} is attained, or looked upon as interim levels pending the final site-wide (OU5) remediation.

Response:

Action:

Commenting Organization: U.S. EPA, Radiation Section

Section #: 5.2.1.1

Page #: 5-7

Table #: 5-4

Code: C

Original Comment #: 28

Comment: For Alternative 3B, the transport environmental impact has a stated ILCR of 9×10^{-12} along the route to NTS, please reexamine.

Response:

Action:

ENCLOSURE 1
TECHNICAL REVIEW COMMENTS ON
OPERABLE UNIT 4 DRAFT FEASIBILITY STUDY

(29 Pages)

Commenting Organization: U.S. EPA
 Section #: Subunit 3 Waste Page #: NA
 Original General Comment #10

Commentor: Saric
 Line #: NA

Comment: The FS and the Proposed Plan present significantly different approaches for treatment and disposal of Subunit 3 waste. The FS should discuss all alternatives in detail, whereas the Proposed Plan should summarize the alternatives. A separate alternative describing the Proposed Plan approach of storing Subunit C wastes in interim storage and addressing these wastes under OU3 and OU5 should be added to the OU4 FS and then should be summarized in the Proposed Plan.

SPECIFIC COMMENTS

Commenting Organization: U.S. EPA
 Section #: 1.4.1.1 Page #: 1-21
 Original Specific Comment #1

Commentor: Saric
 Line #: 19 to 25

Comment: This section of the FS discusses the site-wide hydrogeology and points out that the Great Miami Aquifer is a sole source aquifer. A sentence should be added to this discussion to explain that because the Great Miami Aquifer is a sole source aquifer it is categorized as a Class I aquifer according to the U.S. EPA groundwater protection strategy. This designation significantly affects the cleanup level of the aquifer required by the Superfund program. The designation also potentially affects cleanup of contaminated soil that may leach contaminants to the groundwater.

Commenting Organization: U.S. EPA
 Section #: 2.2.2.4 Page #: 2-27
 Original Specific Comment #2

Commentor: Saric
 Line #: NA

Comment: This table lists the preliminary remediation goals (PRG) and ARARs and other advisories or criteria to be considered (TBC) for OU4 contaminants of potential concern. The ARAR/TBC for lead is listed as having a maximum contaminant level goal (MCLG) of zero and the state standard is listed as 0.05 milligrams per liter (mg/L). The ARAR/TBC for lead should be 15 micrograms per liter ($\mu\text{g/L}$), which is the promulgated action level for lead. This action level is being used by the Superfund program as the groundwater cleanup level for lead. The table should be revised accordingly.

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Commenting Organization: U.S. EPA
Section #: 2.2.2.4 Page #: 2-27
Original Specific Comment #3

Commentor: Saric
Line #: NA

Comment: This table lists the PRGs and ARAR/TBCs for OU4 contaminants. The table erroneously identifies the maximum contaminant level (MCL) as the federal ARAR for thallium. The MCLG for thallium should be used as the ARAR/TBC instead of the MCL because the NCP states that non-zero MCLGs will be considered ARARs for groundwater. The table should be revised accordingly.

Also in this table, the MCLG of 1.3 mg/L is listed as the ARAR for copper. The value listed for copper is an action level, not an MCLG. The table should be revised accordingly.

Commenting Organization: U.S. EPA
Section #: 2.2.2.4 Page #: 2-28
Original Specific Comment #4

Commentor: Saric
Line #: NA

Comment: This table lists the PRGs and ARAR/TBCs for OU4 contaminants. An ARAR/TBC is not listed for the compound bis(2-ethylhexyl)phthalate. An MCL should also be listed for this compound as it has an MCL of 0.006 mg/L. The proposed MCLs for chrysene and dibenzo(a,h)anthracene are not listed on the table. The table should be revised to include this information.

Commenting Organization: U.S. EPA
Section #: 2.2.2.4 Page #: 2-29
Original Specific Comment #5

Commentor: Saric
Line #: NA

Comment: This table lists the PRGs and ARAR/TBCs for OU4 contaminants. The MCL for indeno(1,2,3-cd)pyrene is not listed. This compound has a proposed MCL and an MCLG. The table should be revised accordingly.

Commenting Organization: U.S. EPA
Section #: 2.2.2.4 Page #: 2-30
Original Specific Comment #6

Commentor: Saric
Line #: NA

Comment: This table lists the PRGs and ARAR/TBCs for OU4 contaminants. The footnote definition section of the table contains a definition of footnote "1." Footnote "1" does not appear on the table. This discrepancy should be corrected.

Commenting Organization: U.S. EPA
Section #: 2.2.3 Page #: 2-32 to 2-39
Original Specific Comment #7

Commentor: Saric
Line #: NA

4909

Comment: This section discusses remedial action objectives (RAO) for the OU4 response. None of the RAOs presented discusses migration of contamination to surface water. Each medium discussed in this section should have an RAO that prevents migration of surface contamination which would result in a discharge to surface water in excess of state discharge requirements. The RAOs should be revised to include the prevention of migration of contaminants to surface water.

Commenting Organization: U.S. EPA
Section #: 2.5.6.1 Page #: 2-58
Original Specific Comment #8

Commentor: Saric
Line #: 25 to 29

Comment: This section discusses the various in situ treatment technologies considered for the three subunits comprising OU4. The text states that the technologies apply to Subunit A (contents of Silo 1 and 2), Subunit B (contents of Silo 3), and soils in Subunit C (silo structures, piping, sump tank, and contaminated soil and debris). This paragraph should explain how in situ options can be considered for Subunits A and B, but not for the Subunit C silo structures themselves. Because the silos now contain the waste to be treated in situ, they would need to be considered for purely in situ treatment technologies. This discrepancy needs to be resolved.

Commenting Organization: U.S. EPA
Section #: 2.5.6.1 Page #: 2-59
Original Specific Comment #9

Commentor: Saric
Line #: 8 to 13

Comment: This section discusses in situ vitrification as a potential treatment technology. It seems that in situ treatment is only viable for subsurface soils because the other subunit wastes are already ex situ. This paragraph should briefly discuss what happens to the silo structures during vitrification.

Commenting Organization: U.S. EPA
Section #: 2.5.6.6 Page #: 2-56 and 2-57
Original Specific Comment #10

Commentor: Saric
Line #: All

Comment: This section discusses biological treatment technologies as potential treatment options for the OU4 wastes. This technology type should be eliminated from consideration based on the lack of organics associated with the OU4 wastes and the inability of this technology to effectively treat radionuclides and most

inorganic compounds. The text should be revised to eliminate this technology type.

Commenting Organization: U.S. EPA
Section #: 2.6.4.1 Page #: 2-84
Original Specific Comment #11

Commentor: Saric
Line #: 15 to 33

Comment: This section evaluates the effectiveness, implementability, and cost of slurry walls. Slurry walls are most effective if there is a low permeability subsurface feature to key the slurry wall into. An example of this type of subsurface feature is a thick clay layer or bedrock unit. Although the text briefly discusses site geology as a potentially limiting factor, it does not discuss the OU4 area or the proposed on-property disposal facility area. It also does not explain how geology limits or supports the use of slurry walls. The text should be revised to include how site geology, especially in the area of OU4, limits or supports the use of slurry walls.

Commenting Organization: U.S. EPA
Section #: 2.6.4.4 Page #: 2-92
Original Specific Comment #12

Commentor: Saric
Line #: 6 to 23

Comment: This section evaluates the silo rehabilitation process option. Based on statements in the text, it appears that the silos will not be renovated regardless of which remedy is selected. This process option should not be evaluated if silo renovation is not a consideration. Therefore, silo renovation should be deleted from this FS.

Commenting Organization: U.S. EPA
Section #: 2.6.6.6 Pg. #: 2-117 to 2-119
Original Specific Comment #13

Commentor: Saric
Line #: NA

Comment: This section evaluates the decontamination and decommissioning (D&D) process options. The evaluations of the four D&D options are not consistent with one another. Process options that create dust, generate water, or are ineffective in reducing subsurface contamination were eliminated in lieu of other process options that also pose the same problems. The text should be revised to provide consistent evaluations among the D&D process options.

Commenting Organization: U.S. EPA
Section #: 3.2.5.4 Page #: 3-58
Original Specific Comment #23

Commentor: Saric
Line #: 6 and 7

Comment: This section discusses the spatial requirements for Alternative 3B. The text should explain why the spatial requirements for stabilizing Silo 3 contents under Alternative 3B are different than the spatial requirements for stabilizing Silo 3 contents under Alternative 2B even though the stabilization process for each alternative appears to be identical.

Commenting Organization: U.S. EPA
Section #: 3.2.6 Page #: 3-59
Original Specific Comment #24

Commentor: Saric
Line #: 7 to 9

Comment: This section discusses Subunit C preliminary alternatives. It is unclear from the text if the in-place containment alternatives for Subunits A and B include capping Silo 4. The text should clarify if the in-place containment alternative for Subunits A and B would include capping Silo 4. It would be helpful to provide a figure showing the location of the cap proposed for the in-place containment alternatives to help clarify this section.

Commenting Organization: U.S. EPA
Section #: 3.2.6.2 Page #: 3-59
Original Specific Comment #25

Commentor: Saric
Line #: 27 to 30

Comment: This section discusses Alternative C. The text should explain how the soils beneath Silo 1 and 2 and the decant sump will be removed under Alternative 1C. According to Subunits A and B alternatives, the footers and floors of the silos are to remain in place and the decant sump tank is to be emptied of water, filled with grout, and left in place.

Commenting Organization: U.S. EPA
Section #: 3.2.6.2 Page #: 3-64
Original Specific Comment #26

Commentor: Saric
Line #: 17 to 23

Comment: A description of the proposed location of the slurry wall should be provided to clarify the text.

Commenting Organization: U.S. EPA
Section #: 3.2.6.2 Page #: 3-68
Original Specific Comment #27

Commentor: Saric
Line #: 12

Comment: The list of wastes generated does not include decontamination water from the high-pressure water jet. The list of wastes generated should include decontamination water from the proposed high-pressure water jet. This omission should be resolved.

4909
Commenting Organization: U.S. EPA
Section #: 3.3.1.2 Page #: 3-82 and 3-83

Commentor: Saric
Line #: 23 to 28
and 1 to 5

Original Specific Comment #38

Comment: This section summarizes the screening of Alternative 1A. The text needs to be carefully worded to show why the long-term containment proposed here is less desirable than the long-term containment proposed by the other alternatives. The text should emphasize that long-term protectiveness is more difficult to ensure because of the uncertain effectiveness of the LC/DS and because the waste remains untreated making any breach in containment more serious. The need to relocate Paddy's Run also presents short-term environmental impacts not presented by the other "action" alternatives. The phrase regarding siting ARARs should be deleted because it is inaccurate. Disposal facility siting requirements would not be considered ARARs.

Commenting Organization: U.S. EPA
Section #: 3.3.1.3 Page #: 3-83

Commentor: Saric
Line #: NA

Original Specific Comment #39

Comment: As stated in General Comment No. 4, evaluation of each alternative should include a discussion of ARARs. Specifically, disposal facility siting ARARs would need to be addressed under this alternative.

Commenting Organization: U.S. EPA
Section #: 3.3.1.3 Page #: 3-84

Commentor: Saric
Line #: 5 to 7

Original Specific Comment #40

Comment: This section evaluates the effectiveness of Alternative 2A. In regard to the treatment of radioactive wastes, a statement should be added to the text explaining that there is no treatment technology to reduce the direct radiation from radioactive materials and that natural decay is the only known process that reduces direct radiation.

Commenting Organization: U.S. EPA
Section #: 3.3.1.3 Page #: 3-84

Commentor: Saric
Line #: 9 and 10

Original Specific Comment #41

Comment: This section evaluates the effectiveness of Alternative 2A. To fully support the evaluation of the long-term protectiveness of Alternative 2A, a statement should be added to the text to explain the redundant safety features associated with the on-property disposal system. The text should note that these features make infiltration into and migration from the disposal unit much more difficult. The safety features also make

Commenting Organization: U.S. EPA
 Section #: 3.3.2.2 Page #: 3-97
 Original Specific Comment #54
 Comment: See Specific Comment No. 35.

Commentor: Saric
 Line #: 25 and 26

Commenting Organization: U.S. EPA
 Section #: 3.3.2.2 Page #: 3-98
 Original Specific Comment #55
 Comment: See Specific Comment No. 36.

Commentor: Saric
 Line #: 10 to 14

Commenting Organization: U.S. EPA
 Section #: 3.3.2.2 Page #: 3-98
 Original Specific Comment #56
 Comment: See Specific Comment No. 37.

Commentor: Saric
 Line #: 19 to 21

Commenting Organization: U.S. EPA
 Section #: 3.3.2.2 Page #: 3-99
 Original Specific Comment #57

Commentor: Saric
 Line #: 5 and 6

Comment: This section evaluates the cost of Alternative 1B. The text should clarify how the cost of Alternative 1B was calculated. Many Alternative 1B components would be conducted under Alternative 1A. The text should explain the interaction of Alternatives 1A and 1B.

Commenting Organization: U.S. EPA
 Section #: 3.3.2.2 Page #: 3-99
 Original Specific Comment #58
 Comment: See Specific Comment No. 38.

Commentor: Saric
 Line #: 13 to 23

Commenting Organization: U.S. EPA
 Section #: 3.3.2.3 Page #: 3-99
 Original Specific Comment #59

Commentor: Saric
 Line #: NA

Comment: As stated in General Comment No. 4, evaluation of each alternative should include a discussion of ARARs.

Commenting Organization: U.S. EPA
 Section #: 3.3.2.3 Page #: 3-100
 Original Specific Comment #60

Commentor: Saric
 Line #: 14 and 15

Comment: This section evaluates the effectiveness of Alternative 2B. The text regarding the slight reduction in toxicity through organic destruction by vitrification should be revised. Based on the representations of U.S. DOE and Fernald Environmental Management Corporation (FERMCO), Silo 3 contains no organic material.

unreadable. The figures should be revised so all the letters and numbers can be read.

Commenting Organization: U.S. EPA
 Section #: 4.2.2 Page #: 4-27
 Commentor: Saric
 Line #: 11 to 13
 Original Specific Comment #86
 Comment: The text states that while the FEMP property would continue to be federally owned, no active controls would be provided for the completed on-site disposal vault. This statement is not consistent with the statement on Page 4-26, Lines 14 to 16, where active leachate collection and treatment are described. This inconsistency should be reconciled.

Commenting Organization: U.S. EPA
 Section #: 4.2.2.1 Page #: 4-28
 Commentor: Saric
 Line #: 7 and 8
 Original Specific Comment #87
 Comment: The text states that the on-site disposal vault would be designed for a life of 1,000 years with no active maintenance. This statement is not consistent with the statement on Page 4-26, Lines 14 to 16, where active leachate collection and treatment are described. This inconsistency should be reconciled.

Commenting Organization: U.S. EPA
 Section #: 4.2.2.1 Page #: 4-28 and 4-29
 Commentor: Saric
 Line #: 27 to 30
 and 1 to 3
 Original Specific Comment #88
 Comment: This section describes how Alternative 2A/ Vitrification, provides overall protection of human health and the environment. This section should explain how long the wastes in Silos 1 and 2 must be contained until radioactive decay renders them "safe."

Commenting Organization: U.S. EPA
 Section #: 4.2.2.2 Page #: 4-32
 Commentor: Saric
 Line #: 28 to 31
 Original Specific Comment #89
 Comment: The text states that through the definition of an area of contamination (AOC) for OU4, the State's disposal facility siting requirements are relevant and appropriate. It is unclear how the definition of an AOC impacts the relevancy and appropriateness of State disposal facility siting requirements. The concept of AOCs has been replaced by CAMU under the new RCRA CAMU rule. The text should describe the CAMU rule, as well as the closely associated TU rule, and discuss how these new rules affect this and other alternatives.

Commenting Organization: U.S. EPA
Section #: 4.2.2.2 Page #: 4-35
Original Specific Comment #90

Commentor: Saric
Line #: 27 to 30

Comment: This section discusses potential ARARs for Alternative 2/Vitrification. The text references a letter from U.S. EPA to U.S. DOE directing U.S. DOE to consider 40 CFR 191 Subpart B a TBC for on-site disposal alternatives. According to the NCP definition of ARAR and TBC, it would be inappropriate to consider a promulgated and generally enforceable standard (such as 40 CFR 191 Subpart B) anything other than a potential ARAR. Because 40 CFR 191 is potentially relevant and appropriate, but not applicable, those subparts of the regulation that are not both relevant and appropriate would not be considered ARARs. This allows great flexibility in deciding which provisions of a regulation are ARARs and which are not. The text should be revised to indicate that 40 CFR 191 Subpart B is a potential ARAR and should identify which provisions of the regulation are or are not relevant and appropriate.

Commenting Organization: U.S. EPA
Section #: 4.2.2.3 Page #: 4-40
Original Specific Comment #91

Commentor: Saric
Line #: 1 and 2

Comment: This section discusses the reliability and adequacy of vitrification. U.S. DOE should anticipate public scrutiny of vitrification based on the recent 60 Minutes television news story on U.S. DOE sites that concluded vitrification was being unsuccessfully tested at the U.S. DOE Savannah River Site (SRS). In anticipation of such scrutiny, it may be prudent to address the problems, if any, with vitrification at SRS and explain why these will not negatively impact the vitrification proposed for OU4.

Commenting Organization: U.S. EPA
Section #: 4.2.2.3 Page #: 4-41
Original Specific Comment #92

Commentor: Saric
Line #: 18

Comment: This section evaluates the long-term environmental impacts of Alternative 2A/Vitrification. The text states that the on-site disposal vault would be actively maintained and monitored. This statement is not consistent with previous statements that report that no active maintenance would be conducted (Section 4.2.2.1, Page 4-28, Lines 7 and 8). This inconsistency should be corrected.

Commenting Organization: U.S. EPA
 Section #: 4.2.2.6 Page #: 4-54
 Original Specific Comment #93
 Commentor: Saric
 Line #: 28 to 30
 Comment: This section evaluates the technical feasibility of Alternative 2A/Vitrification. The text states that a full-scale facility for vitrification of materials similar to the K-65 wastes has never been built. Therefore, the text should explain what type of facility is under construction at SRS, as explained in Specific Comment No. 91.

Commenting Organization: U.S. EPA
 Section #: 4.2.3 Page #: 4-65
 Original Specific Comment #94
 Commentor: Saric
 Line #: 4 to 11
 Comment: This section describes the material processing involved with cement stabilization. Figure 4-11 presents the cement stabilization process flow diagram. The letters and numbers on Figure 4-11 are illegible. Figure 4-11 should be revised so that all numbers and letters are legible.

Commenting Organization: U.S. EPA
 Section #: 4.2.3.2 Page #: 4-68
 Original Specific Comment #95
 Commentor: Saric
 Line #: 1 and 2
 Comment: See Specific Comment No. 90.

Commenting Organization: U.S. EPA
 Section #: 4.2.4.1 Page #: 4-76
 Original Specific Comment #96
 Commentor: Saric
 Line #: 7 and 8
 Comment: This section evaluates the overall protectiveness of Alternative 3.A.1/Vitrification. The text states that the vitrified waste will meet NTS acceptance criteria. This statement appears to be inconsistent with the statement on Page 3-87, Lines 25 and 26, which states that a variance from U.S. DOE Order 5820.A would be needed to take vitrified Silo 1 and 2 wastes to NTS. This inconsistency should be corrected or explained.

Commenting Organization: U.S. EPA
 Section #: 4.2.4.6 Page #: 4-83
 Original Specific Comment #97
 Commentor: Saric
 Line #: 23 to 29
 Comment: This section discusses the administrative feasibility of Alternative 3A.1/Vitrification. The text states that an addendum to the site's current waste shipping application would be necessary. It is unclear if this addendum is the same as the variance to U.S. DOE Order 5820.A mentioned on Page 3-87, Lines 25 and 26. This issue should be clarified. If the addendum is not the

same as the variance, then a discussion of the variance should be added here.

Commenting Organization: U.S. EPA
Section #: 4.2.5.1 Page #: 4-87
Original Specific Comment #98
Comment: See Specific Comment No. 96.

Commentor: Saric
Line #: 19 and 20

Commenting Organization: U.S. EPA
Section #: 4.3.2.3 Page #: 4-104
Original Specific Comment #99

Commentor: Saric
Line #: 25 to 27

Comment: This section evaluates the long-term effectiveness of Alternative 2B/Vitrification. The text states that the risk from leaching of untreated wastes using the Hydrologic Evaluation of Landfill Performance (HELP) model maximum infiltration rate of 15 centimeters per year (cm/yr) is the same as the risk from infiltration of 1.3 cm/yr through a slightly degraded on-site disposal vault cover. This data presents a compelling reason for either not treating the waste or for not containing the waste in such an impermeable on-site disposal vault. However, disposal without treatment was not evaluated in this FS. Based on this risk information and in accordance with the NCP, this FS should fully evaluate a containment option that uses little or no treatment, either in situ containment or containment in an on-site disposal vault without treatment of the waste. See General Comment No. 1.

Commenting Organization: U.S. EPA
Section #: 4.3.2.4 Page #: 4-107
Original Specific Comment #100

Commentor: Saric
Line #: 23 to 30

Comment: This section evaluates the reductions in toxicity, mobility, and volume of contaminants associated with Alternative 2B/Vitrification. The text states that the Silo 3 wastes were reduced in volume by 62 percent and that organic compounds would be destroyed during vitrification. In Section 3.3.2.3, Page 3-100, Lines 14 and 15, a reduction in volume is attributed to organic destruction. However, Silo 3 contains very few organic compounds. The text in this section and in previous sections discussing Alternative 2B/Vitrification should explain why there is a volume reduction despite the fact that the Silo 3 waste is inorganic in nature.

Commenting Organization: U.S. EPA
Section #: 4.3.2.7 Page #: 4-123
Original Specific Comment #101
Comment: This section discusses the assumptions made for estimating the cost of Alternative 2B/Vitrification. The text erroneously lists the vitrification equipment associated with the sludge-like wastes in Silos 1 and 2. The text should be revised to list the vitrification equipment associated with the dry waste in Silo 3.

Commentor: Saric
Line #: 12 to 14

Commenting Organization: U.S. EPA
Section #: 4.3.5.7 Page #: 4-146
Original Specific Comment #102
Comment: This section evaluates the costs of Alternative 3B.1/Cementation. The text erroneously lists the hydraulic removal and transfer system. The text should be revised to list the pneumatic removal and transfer system because pneumatic removal is proposed for this alternative.

Commentor: Saric
Line #: 19 to 22

Commenting Organization: U.S. EPA
Section #: 4.4.1.1 Page #: 4-149
Original Specific Comment #103
Comment: This section evaluates the overall protectiveness of Alternative 0C. The text makes reference to the collapse of Silos 1, 2, and 3. This reference should be revised to note that Silo 1, 2, and 3 may be empty under Alternative 0C. Collapse of these silos, if they were empty, would present much less risk than if they were full.

Commentor: Saric
Line #: 19 to 21

Commenting Organization: U.S. EPA
Section #: 4.5 - 4.9 Page #: 4-190 and 191
Original Specific Comment #104
Comment: These sections discuss items not typically required in an FS. The purpose of these sections should be explained in the text.

Commentor: Saric
Line #: 28 and 29
and 1 and 2

Commenting Organization: U.S. EPA
Section #: 5.2.1.2 Page #: 5-16
Original Specific Comment #105
Comment: See Specific Comment No. 90.

Commentor: Saric
Line #: NA

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.2.2.2 Page #: 5-19 Line #: 8 to 31
Original Specific Comment #106

Comment: This section compares the reductions in toxicity, mobility, and volume of contaminants for Subunit A alternatives. Additions to the text are necessary to identify the key advantages and trade-offs. The following items should be added to the text:
* vitrification significantly reduces volume
* cementation significantly increases volume
* cementation is reversible

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.2.2.4 Page #: 5-21 Line #: NA
Original Specific Comment #107
Comment: See Specific Comment No. 91.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.3.2.2 Page #: 5-32 Line #: 19 to 21
Original Specific Comment #108
Comment: See Specific Comment No. 60.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5.3.2.2 Page #: 5-33 Line #: 1 and 2
Original Specific Comment #109
Comment: This section compares the reductions in toxicity, mobility, and volume of contaminants associated with Subunit B alternatives. The text erroneously states that this criterion is not applicable to the no action alternative. The text should be revised to state that the no action alternative does not provide any reduction in toxicity, mobility, or volume of contaminants.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix C, 1.4.4 Page #: C-1-17 Line #: 14 to 29
Original Specific Comment #110
Comment: This section compares the TCLP leaching of treated and untreated wastes. Silo 1 zone composite samples consisting of barium, boron, selenium, vanadium, and molybdenum had increased concentrations using formulas 1 and 2. Silo 2 zone composite samples consisting of molybdenum, 2-butanone, barium, and chromium had increased concentrations. Silo 3 composite samples consisting of barium had increased concentrations. The study should discuss how these constituents of concern will be processed if reductions are not achieved.

4909

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix C, 1.4.4 Page #: C-1-17 Line #: 25
Original Specific Comment #111

Comment: This section compares the TCLP leaching of treated and untreated wastes. An increase in 2-butanone may indicate that the test data is inaccurate. Typically, 2-butanone totally disappears during the treatment or substantially reduces in quantity. The text should be revised to explain this discrepancy.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix C, 1.5 Page #: C-1-43 Line #: 1 to 3
Original Specific Comment #112

Comment: This section discusses the conclusion of the treatability study for cement stabilization. The conclusion should indicate any existing exceptions because the various formulas show increased concentrations of several contaminants.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix C, 2.4.3 Page #: C-2-16 Line #: 8 to 11
Original Specific Comment #113

Comment: This section discusses the advanced stage of the chemical extraction treatability study. Possible explanations are presented for the increased concentrations of uranium and thorium, but they do not meet the objective of demonstrating the removal of these constituents as described in Section C.2.2, Page C-2-1, Lines 25 and 26. The text should explain in the recommendations section why the increases occurred.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: Appendix F, 4.1 Page #: F-4-2 Line #: 1 and 2
Original Specific Comment #114

Comment: This section discusses why RCRA hazardous waste management regulations are relevant and appropriate to Silo 1, 2, and 3 wastes. The text states that because RCRA is an ARAR the substantive requirements of RCRA Land Disposal Restrictions (LDR) must be met. This statement is no longer true because of the CAMU rule. The text should be revised to explain that the CAMU rule is an ARAR and to describe the impact the CAMU rule has on evaluation of the alternatives. The new RCRA TU rule should also be described and discussed.

Commenting Organization: U.S. EPA
Section #: Appendix F, 4.1 Page #: F-4-3
Original Specific Comment #115
Comment: See Specific Comment No. 90.

Commentor: Saric
Line #: 3 to 5

Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-1a-1
Original Specific Comment #116

Commentor: Saric
Line #: NA

Comment: This table lists chemical-specific ARARs. The ARAR for copper is erroneously identified as the State's secondary MCL. The correct ARAR should be the federal action level. The table should be corrected.

Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-1c-13
Original Specific Comment #117

Commentor: Saric
Line #: NA

Comment: This table lists the action-specific ARARs. The table lists RCRA LDRs as being ARARs. This is no longer correct because of the CAMU rule. The table should be revised to delete LDRs and insert the CAMU rule and TU rule, as appropriate.

Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-1c-17
Original Specific Comment #118
Comment: See Specific Comment No. 90.

Commentor: Saric
Line #: NA

Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-2-7
Original Specific Comment #119
Comment: See Specific Comment No. 117.

Commentor: Saric
Line #: NA

Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-2-9 & 10
Original Specific Comment #120
Comment: See Specific Comment No. 90.

Commentor: Saric
Line #: NA

Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-3-8
Original Specific Comment #121
Comment: See Specific Comment No. 117.

Commentor: Saric
Line #: NA

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Commenting Organization: U.S. EPA
Section #: Appendix F Page #: F.2-4-7
Original Specific Comment #122
Comment: See Specific Comment No. 117.

Commentor: Saric
Line #: NA

Commenting Organization: U.S. EPA
Section #: Appendix G Page #: NA
Original Specific Comment #123

Commentor: Saric
Line #: NA

Comment: This appendix summarizes the comparative analysis of alternatives presented in Section 5.0 of the FS. U.S. EPA comments on Section 5 should be incorporated in the Appendix G tables as appropriate.

ENCLOSURE 2

**TECHNICAL REVIEW COMMENTS ON THE
OPERABLE UNIT 4 DRAFT FEASIBILITY STUDY, APPENDIX K**

(Seven Pages)

provided for use of an IR of 0.83 m³/hr or a revised rate should be developed. 4909

For the exposure scenario of incidental ingestion while wading in water, a groundskeeper or a maintenance worker is not included as a receptor. It seems reasonable to assume that such people could be exposed through this pathway during routine maintenance work. Justification should be provided for excluding on-site maintenance workers as potential receptors or include them as receptors for risk evaluation.

The ingestion rate for the groundskeeper and adult receptors for the exposure pathway of incidental ingestion of soil and sediment is listed as 0.18 gram/day. Justification should be provided for the ingestion rate value, because it is not in agreement with the value listed in the RAWPA.

The absorption factor (ABS) values are listed as chemical-specific values (CSV) in this table. These CSVs should be presented in a separate table for all contaminants of concern (COC).

The fraction of day (FD) outdoor values listed for a groundskeeper and a youth need further clarification, because it is not clear how U.S. DOE obtained these values.

The ingestion rate of vegetables and fruit times the fraction ingested from a contaminated source value for a child needs further clarification. It is not clear how U.S. DOE obtained this value.

Commenting Organization: U.S. EPA

Commentor: Saric

Section #: K.4.4

Page #: K-4-8

Line #: NA

Original Comment #12

Comment: The discussion in this section states that all VOCs were eliminated because they would be lost over the post-remediation time frames. While this may be a reasonable assumption under the future land use scenario, VOCs are expected to be present during the current land use scenario. Therefore, U.S. DOE should include volatiles as COCs under the current land use scenario.

ENCLOSURE 3
TECHNICAL REVIEW COMMENTS ON
OPERABLE UNIT 4 DRAFT PROPOSED PLAN
(Nine Pages)

800
1150

TECHNICAL REVIEW COMMENTS ON
OPERABLE UNIT 4 (OU4) DRAFT PROPOSED PLAN

GENERAL COMMENTS

Commenting Organization: U.S. EPA
Section #: NA
Original General Comment #1

Commentor: Saric
Line #: NA

Page #: NA

Comment: The Proposed Plan (PP) should be a short and concise summary of the remedial investigation and feasibility study (RI/FS). It is not meant to be a substitute for the RI/FS. The operable unit (OU) 4 PP is too long and therefore, should be abbreviated.

Commenting Organization: U.S. EPA
Section #: 1.0
Original General Comment #2

Commentor: Saric
Line #: NA

Page #: NA

Comment: This section provides introductory information on the PP. This section is not formatted in accordance with the U.S. Environmental Protection Agency's (U.S. EPA) "Guidance on Preparing Superfund Decision Documents," July 1989, and does not contain specific information required by the guidance. The purpose of the PP and a reference to Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) should be given in the opening paragraphs of Section 1.0 (see specific comments on Section 1).

Commenting Organization: U.S. EPA
Section #: 2.0
Original General Comment #3

Commentor: Saric
Line #: NA

Page #: NA

Comment: This section presents the Fernald Environmental Management Project (FEMP) site background. Much of the information presented in this section should be deleted because it is not relevant to the decision-making process. At the same time, information on waste disposal and generation, contaminants of concern, contaminated media, and extent of contamination were omitted. The unnecessary information should be deleted and the omitted information should be added in accordance with U.S. EPA guidance (see specific comments on Section 2).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 5 and 6 Pg. #: NA Line #: NA
Original General Comment #4

Comment: Section 5 describes the alternatives evaluated during the detailed analysis of alternatives and Section 6 summarizes the evaluation of the alternatives presented in detail in the OU4 FS. Changes to the OU4 FS from incorporation of U.S. EPA comments will necessitate corresponding changes to the PP. The PP should be revised to incorporate any changes made to the OU4 FS as a result of U.S. EPA comments (also see specific comments on Sections 5 and 6).

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6 Page #: NA Line #: NA
Original General Comment #5

Comment: This section presents the preferred alternative, describes and discusses the nine evaluation criteria, and summarizes the comparative analysis of alternatives presented in detail in the OU4 FS. This section is not formatted correctly and presents information that is much too detailed for the purpose of the PP. This section should be revised in accordance with the specific comments given on Section 6. These revisions are necessary to make the PP conform more closely with U.S. EPA guidance and to shorten the PP.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6.3.1 Page #: 89 to 93 Line #: NA
Original General Comment #6

Comment: This section discusses considerations for FEMP site-wide waste management integration. This section changes the approach for the final disposal of Subunit C wastes from methods discussed in detail in the OU4 FS. This is not appropriate because it does not develop the rationale well enough for the public to comment on the approach and it makes the majority of comments on the OU4 FS which discusses Subunit C irrelevant. A different alternative describing the approach of storing Subunit C wastes in interim storage and addressing these wastes under Operable Units 3 and 5 (OU3 and OU5) should be added to the OU4 FS and then summarized in this PP.

Commenting Organization: U.S. EPA Commentor: Saric
Section #: 6.3.2 Page #: NA Line #: NA
Original General Comment #7

Comment: This section describes the preferred remedial alternative for OU4. Based on the uncertainty

associated with vitrification, U.S. DOE should consider proposing a contingent remedy for the Subunits A and B. The contingent remedy would be implemented if the innovative vitrification technology does not work. The contingent remedy could be any one of the protective and applicable or relevant and appropriate requirements (ARAR)-compliant remedies evaluated in the detailed analysis of alternatives. Such an approach would eliminate the requirement for a Record of Decision amendment if vitrification cannot be used to treat the waste. U.S. EPA advocates this approach if an innovative and unproven technology is proposed as the preferred alternative and has provided guidance on how to propose and document a contingent remedy in the PP.

SPECIFIC COMMENTS

Commenting Organization: U.S. EPA

Commentor: Saric

Section #: 1.0

Page #: 2 and 3

Line #: 33 to 34

and 1 to 15

Original Specific Comment #1

Comment: This section provides introductory information on the PP. The information on the above-referenced pages and lines should be moved to directly follow the first full paragraph of the PP. In accordance with U.S. EPA's, "Guidance on Preparing Superfund Decision Documents," July 1989, the introduction of the PP should describe the purpose of the PP. A statement should be added explaining that this PP is not a substitute for the information contained in the OU4 RI/FS. In addition, a reference to Section 117(a) of CERCLA should be added to this initial discussion.

Commenting Organization: U.S. EPA

Commentor: Saric

Section #: 1.0

Page #: 2

Line #: 20 to 27

Original Specific Comment #2

Comment: This paragraph describes the importance of public comment in the CERCLA and National Environmental Policy Act (NEPA) processes. This information should be moved to directly follow the purpose of the PP (see Specific Comment No. 1). The explanation of CERCLA and NEPA integration should follow the introductory information described in this specific comment and in Specific Comment No. 1.

Commenting Organization: U.S. EPA
 Section #: 1.0 Page #: 4
 Commentor: Saric Line #: 9 to 18
 Original Specific Comment #3
 Comment: This paragraph describes the importance of public comment in the decision making process. This paragraph should be moved to follow the information referenced in Specific Comment No. 2. This change should be made to make the PP conform more closely with U.S. EPA guidance.

Commenting Organization: U.S. EPA
 Section #: 1.0 Page #: NA
 Commentor: Saric Line #: NA
 Original Specific Comment #4
 Comment: The remainder of the information contained in Section 1.0 of the PP which is not referenced in Specific Comments No. 1 through 3, is not necessary and should be deleted with one exception. The information provided on Page 4, Lines 19 to 32, regarding the content of the PP, should remain in the introductory section. The preferred alternative does not need to be introduced in the introductory section, nor does the introductory section need to describe the site problems or risks. This information is presented in later sections of the PP. These changes are necessary to shorten the PP and to make it conform more closely with U.S. EPA guidance.

Commenting Organization: U.S. EPA
 Section #: 2.1 Page #: 5 and 6
 Commentor: Saric Line #: 1 to 30 and 1 to 4
 Original Specific Comment #5
 Comment: This information describes FEMP's production activities. Most of the information contained in this section should be deleted. The information should be summarized in one or two paragraphs. This change is necessary to shorten the PP in order to make it conform more closely with U.S. EPA guidance.

Commenting Organization: U.S. EPA
 Section #: 2.1.2 Page #: 7
 Commentor: Saric Line #: All
 Original Specific Comment #6
 Comment: This information describes the operating history of FEMP. Most of the information in this section should be deleted because it is unnecessary. For example, the rate of uranium production in the various years of operation is secondary to the issue at hand. This section should be summarized in one paragraph. This change is necessary to shorten the PP and to present

"Actual or threatened releases of hazardous substances from this site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare, or the environment."

This statement needs to only appear once at the end of Section 4.0. This statement should be added to the conclusion of Section 4.5 on Page 41.

Commenting Organization: U.S. EPA
Section #: 5.0 Page #: 43
Original Specific Comment #11

Commentor: Saric
Line #: NA

Comment: This table summarizes the alternatives for Subunits A, B, and C. In accordance with General Comment No. 1 on the OU4 FS, additional alternatives should be added to Subunits A and B which rely on containment with little or no treatment.

Commenting Organization: U.S. EPA
Section #: 5.1 through 5.4 Page #: 44 to 64
Original Specific Comment #12

Commentor: Saric
Line #: NA

Comment: These sections describe the alternatives evaluated in the detailed analysis of alternatives. These sections provide more detail than is required according to U.S. EPA guidance. Appendix A of the U.S. EPA's "Guidance on Preparing Superfund Decision Documents," July 1989, provides examples of the degree of detail necessary for these sections. In addition, the descriptions of the alternatives do not identify the major ARARs associated with each option as required by U.S. EPA guidance. The narrative descriptions should be reduced in length and the major ARARs for each alternative should be identified. U.S. EPA strongly suggests that the description of the alternatives be presented in the format of above-referenced Appendix A. This would involve presenting a summary of costs and the time necessary to implement each alternative below the title of the alternative and above the narrative.

Commenting Organization: U.S. EPA
Section #: 6.1 Page #: 65 and 66
Original Specific Comment #13

Commentor: Saric
Line #: All

Comment: This section describes the nine evaluation criteria and discusses how they are used in the Superfund program. In accordance with U.S. EPA guidance, this section should be the second subsection in Section 6. This

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section should be moved and renamed to become
Subsection 6.2 in Section 6.

Commenting Organization: U.S. EPA
Section #: 6.1 Page #: 66
Original Specific Comment #14
Comment: This paragraph describes the modifying criteria, state and community acceptance. The text states that the modifying criteria will be addressed in the Record of Decision. In accordance with U.S. EPA guidance, state acceptance and community acceptance should be addressed in the PP based on information that is available at the time (see General Comment No. 6 on the OU4 FS). Sections discussing these criteria should be added.

Commentor: Saric
Line #: 18 to 25

Commenting Organization: U.S. EPA
Section #: 6.2 Page #: 66 to 88
Original Specific Comment #15
Comment: This section summarizes the comparative analysis of alternatives presented in detail in the OU4 FS. In accordance with U.S. EPA guidance, this subsection should be the third subsection in Section 6. Subsection 6.2 should be moved to become Subsection 6.3 in Section 6 of the PP.

Commentor: Saric
Line #: All

Commenting Organization: U.S. EPA
Section #: 6.2 Page #: 66 to 88
Original Specific Comment #16
Comment: This section summarizes the comparative analysis of alternatives presented in detail in the OU4 FS. The information in this section is too detailed for purposes of the PP. According to U.S. EPA guidance, "The discussion in this section of the PP should develop initial rationale for the preferred alternative; however, it need not provide a comprehensive analysis of each alternative in relation to each of the nine criteria . . ." This section should be revised to provide rationale for the preferred alternative by profiling it against the nine criteria and highlighting how the rationale compares to the other alternatives by comparing major advantages and disadvantages. Appendix A of U.S. EPA's guidance provides a good example of the level of detail necessary in this section.

Commentor: Saric
Line #: NA

0060

Commenting Organization: U.S. EPA
 Section #: 6.2.1.1, Page #: NA
 6.2.2.1, and 6.2.3.1

Commentor: Saric
 Line #: NA

Original Specific Comment #17

Comment: These sections describe how the various subunit alternatives provide overall protection of human health and the environment. These sections also describe how the alternatives comply with applicable or relevant and appropriate requirements (ARAR). Summary statements in these sections erroneously state that the preferred alternative provides a greater degree of overall protectiveness. Overall protectiveness is a threshold criterion and cannot be measured in degrees because an alternative either does or does not provide overall protection. Statements referring to degrees of protectiveness should be corrected.

The text lists and discusses nearly all the ARARs for each alternative. This degree of detail is not necessary. Key alternatives should be identified and very briefly discussed; and the issue of whether any ARAR waivers would be required should be discussed. These changes should be made to the ARARs discussions in these sections.

Commenting Organization: U.S. EPA
 Section #: 6.3 Page #: 88 and 89
 Original Specific Comment #18

Commentor: Saric
 Line #: All

Comment: This section identifies the preferred alternative. In accordance with U.S. EPA guidance, this section should be the first subsection in Section 6. This section should be moved and renamed to become Subsection 6.1 in Section 6.

Commenting Organization: U.S. EPA
 Section #: 6.3.1 Page #: 89 to 93
 Original Specific Comment #19

Commentor: Saric
 Line #: NA

Comment: See General Comment No. 6 on the PP.

Commenting Organization: U.S. EPA
 Section #: 6.3.2 Page #: NA
 Original Specific Comment #20

Commentor: Saric
 Line #: NA

Comment: See General Comment No. 7 on the PP.

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Commenting Organization: U.S. EPA
Section #: 6.3.2 Page #: 96
Original Specific Comment #21

Commentor: Saric
Line #: 23

Comment: This paragraph discusses the statutory findings required for remedy selection. The text states that the preferred alternative will "comply with all regulatory requirements." The text should be revised to state that the preferred alternative will "comply with ARARs." This change is necessary to conform with U.S. EPA guidance. In addition, this paragraph should reference CERCLA Section 121.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: October 28, 1993

SUBJECT: Review of Feasibility Study Report for Operable Unit 4, Fernald Environmental Management Project (FEMP), Fernald, OH, September 1993

FROM: Pat Van Leeuwen, Toxicologist *PVL*
Technical Support Unit

TO: Jim Saric
Project Manager

I have reviewed the sections of the Feasibility Study that address risk assessment issues (primarily Section 1.6, Section 2.2 and Appendix D) for Operable Unit 4 of the Fernald Environmental Management Project (FEMP), dated September 1993. The review of Appendix K, Comprehensive Response Action Risk Evaluation (CRARE), will be presented separately as no immediate action on this report is expected. I have a number of comments on the FS Report, many of which address inconsistencies between the RI risk assessment and the discussions in the FS Report. Also, all review comments on the RI report apply to the FS report; these should be reviewed again and applied as appropriate to the FS Report for accuracy and consistency. My comments on the FS report follow. It would be helpful if all changes to this report could be indicated in bold print. This would greatly speed up reviews.

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 I see again the use of "BRA" in reference to the Baseline Risk Assessment. I still think that this acronym may be offensive to the public and should not be used in a public document. Please devise another acronym.

2) Page 2-10, line 27 This statement is not quite correct. The $1e-4$ value is not a discrete limit. Sites with a total estimated ILCR in the $1e-4$ to $1e-6$ range may be subject to remedial action; total-residual risk must be less than $1e-4$ after remedial action.

3) Page 2-13, lines 1-7 This is a biased statement. See above. Risks above $1e-4$ might be acceptable or risks below

that level might be unacceptable, based on site-specific conditions.

4) Page 2-14, line 6 I usually suggest that PRGs be calculated for the $1e-6$, $1e-5$ and $1e-4$ risk levels to enable flexibility in the remedial decisions and save calculations by the risk manager and public. Tables should present all three numbers, as well as the Dection Limits for each chemical.

5) Page 2-10, line 1/page 2-14, line 13 I usually suggest calculation of concentration levels at the HQ = 0.1 and 1.0 levels, unless there are few non-carcinogens. Using a HQ of 0.2 only allows a combo of 5 chemicals plus 5 pathways before the HI of 1.0 is exceeded. This is especially important if remedies for different media/operable units are considered separately.

6) Page 2-16, lines 15-17 and throughout FS Labels are not consistent with the RI and serve to confuse the reader. The "Future Land Use With Federal Controls" is not a change in land use; this is the Current Land Use With Controls described in the RI. The "Future Land Use Without Federal Controls" is the Future Land Use in the RI. The scenarios and exposure parameter values should be identical.

7) Table 2-5, page 2-19 What is the basis for the PRGs for the carcinogenic PAHs? Are they based on Benzo(a)pyrene? There are no toxicity values for the dermal exposure pathways for PAHs. Describe how these values were calculated and modified to include dermal considerations.

8) Page 2-22 through 2-23; calculations I know it does not matter whether you calculate the soil PRG based on an Air PRG (do Air calculation first) or calculate the soil PRG based on the total unit risk. However, the methods used for the calculation of the soil PRGs for the on-site farmer and the off-site farmer should be identical for clarity. Not everyone will understand your logic. Please revise the off-site farmer calculations to be consistent with the other scenario calculations presented.

9) Page 2-23, lines 24-27 There seems to be a major problem here. I am concerned with the calculation of PRGs that are "2.6 and 36 times less than background". Risks from exposure to radionuclides were to be based on concentrations above background, so PRGs based on these same concentrations should not present unrealistic levels of attainment.

10) Page 2-23, lines 28... The mill tailings standards refered to here are not risk-based and are not considered protective for Superfund; Region V (Larry Jensen) has been working on new guidelines for clean-up of radionuclides in soil. Should discuss these also.

11) Page 2-23, lines 11-15 The description of the recreational scenario presented here does not match the description

presented on page 2-16, lines 3-14. Where are the Unit Risk Factor calculations for this exposure scenario? If not in the RI, reference the appropriate section in the FS.

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

- a) Identify the scenario used as the basis of PRGs.
- b) It is not clear what the units are for the ARAR-based PRGs.
- c) List CRQLs for all chemicals; add 1e-5 risks to table.

13) Page 2-31, lines 10, 11

The PRG is identified as the Soil PRG; it should be the Groundwater PRG.

14) Page 2-31, lines 12-17

Regarding the discussion of MCLs, indicate that MCLs are not risk-based, but are based on technology and economics. They are also based on a single pathway of exposure. Therefore, PRGs often are lower than MCLs. The CRQLs used may not be appropriate for this site if they cannot be used to characterize the risk.

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

- a) It does not seem reasonable to calculate risks from exposure of berm removal to the non-remediation worker using an exposure duration of 3 years if this activity is expected to be completed in a shorter time period, e.g., one work season. The method used averages the risk over a longer time period than the actual exposure and may underestimate the risk to this receptor. If the work is expected to take 750 hours, an exposure period of 8hrs/day x 94 days would be more appropriate. I recommend doing and discussing alternate exposure periods in section D.3.4.1.2.
- b) The SA value for the Dermal Contact pathway is the CT value, not the RME (95th percentile) value. This SA was also addressed in the RI review.

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

Problem with consistency between RI and FS reports in the labeling of scenarios. Again, the basis of notation should be land use, not time. The scenarios described here change with land use and federal control. They should be identical to scenarios developed in the RI, as these are the scenarios to be addressed in the FS. This change in emphasis confuses the reader. See discussion of this point in comment #6.

17) Table D.3-6

The SA values presented for the Dermal Contact While Bathing pathway are CT values, RME values. See discussion in the RI review also.

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

- a) Where did the Cancer SF of 17 for the carcinogenic PAHs come from? There are no Cancer SFs for dermal exposure to PAHs. This exposure is expressed in a semi-quantitative manner; in general, it is assumed that the risk from dermal exposure to PAHs is at least as great as the risk from oral exposure.
- b) I do not understand the value or discussion of the cadmium

oral RfD. Who did these calculations? Who reviewed the values? The HEAST office in ECAO, Cincinnati, reports that the IRIS value of $5e-4$ is the only verified RfD for cadmium.

c) The RfD for fluoranthene (IRIS) is $4e-2$, not $4e-1$.

d) What is the basis of the RfD calculation for thallium? Most thallium salts have RfDs in the $7-9e-5$ range.

e) Re the use of "QUAL", this should only be used if the contaminant is indeed discussed qualitatively. It makes no sense to discuss qualitatively carcinogenic effects from exposure to non-carcinogens. Reserve the designation for valid applications.

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.