U-004-306.6

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OPERABLE UNIT 2 (OU 2) TREATABILITY STUDY WORK PLAN

12-31-91

DOE-592-92
DOE-FO/EPA
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LETTER

[redacted]

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

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DEC 3 1 1991
DOE-592-92

Mr. James A. Saric, Remedial Project Director
U. S. Environmental Protection Agency
Region V - 5HR-12
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Graham E. Mitchell, DOE Coordinator
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

OPERABLE UNIT 2 (OU 2) TREATABILITY STUDY WORK PLAN

Reference: 1. Letter, G. E. Mitchell to J. R. Craig, "Conditional Approval OU 2 Treatability Study Work Plan," dated November 7, 1991

2. Letter, J. A. Saric to J. R. Craig, "Approval of Revised Treatability Study Work Plan for OU 2," dated November 25, 1991

This correspondance transmits responses to comments received from the U.S. Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency (OEPA) in the referenced letters.

A thorough review of the document was performed and based on the review, it was determined that the October 1991 document had been revised in accordance with the responses to comments.

Responses to OEPA comments and the revised pages (based on OEPA comments) to the document are enclosed for insertion into the OU 2 Treatability Study Work Plan.

If you or your staff have any questions, please contact Johnny Reising at (513) 738-9083.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FO:Reising

Enclosure: As stated

cc w/encl.:

J. J. Fiore, EM-42, TREV
K. A. Hayes, EM-424, TREV
J. Benetti, USEPA-V, 5AR-26
M. Butler, USEPA-V, 5CS-TUB-3
K. Davidson, OEPA-Columbus
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J. P. Hopper, WEMCO
J. D. Wood, ASI/IT
J. E. Razor, ASI/IT
AR Coordinator, WEMCO

REVISED WORK PLAN

1. Commenting Organization: OEPA Commentor:
Pg. # 10 Section # 1.2.6 Paragraph # Sent./Line # Figure 1-2
Original Comment #

Comment: In addition to MCLs as Remedial Action Objectives, non-zero MCLGs should be included. The NCP's support of MCLGs has been previously emphasized by Ohio EPA in our comments on a number of documents.

Response: Although we have made the changes as requested by Ohio EPA, only noncarcinogens have non-zero MCLGs. Furthermore, with the exception of three compounds (all in the Aldicarb family), the value of the MCLG is equal to the MCL for all noncarcinogens. Therefore, inclusion of "non-zero MCLGs" does not change the Remedial Action Objectives for OU2.

Action: Figure 1-2 has been revised (See Attachment).

2. Commenting Organization: OEPA Commentor:
Pg. # 3 Section # 3.0 Paragraph # Sent./Line # Table 3-1
Original Comment #

Comment: Include Myrick, T.E., et al. (1983) in the list of references.

Response: The reference should read "Myrick, T.E., B.A. Benien, and F.F. Haywood, 1983. "Determination of Concentrations of Selected Radionuclides in Surface Soil in The U.S.," Health Physics, Vol. 45:3, pp. 631-642.

Action: The reference has been added to the reference list (See Attachment).

3. Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 3.0 Paragraph # Sent./Line # Table 3-3
Original Comment #

Comment: DOE should provide justification for the limited number of constituents listed in this table.

Response: The constituents listed in Table 3-3 are those that were measured in the groundwater samples taken for OU2. Only those constituents measured above background tolerance levels were included in the table. The background levels used are consistent with those in the baseline risk assessment for OU2.

Action: None required.

MEDIA		REMEDIAL ACTION OBJECTIVE
1. WASTES		For Human Health:
	1-1	Prevent exposure to non-carcinogens which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as a point of departure.
	1-2	Prevent migration of contaminants which would result in groundwater concentrations greater than the MCLs or non-zero MCLGs or that would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as a point of departure.
	1-3	Prevent current and future direct radiation doses from exceeding 100 mrem/yr.
		For Environmental Protection:
	1-4	Prevent migration of contaminants that would result in surface water levels greater than ambient water quality criteria.
	1-5	Prevent current and future direct radiation doses from causing detectable chronic effects.
2. AIR		For Human Health:
	2-1	Prevent inhalation of contaminants which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as a point of departure.
	2-2	Prevent doses from radionuclide emissions at the FEMP from exceeding a 10 mrem/yr dose, and radon flux from exceeding 20 pCi/square meter/second.
	2-3	For Environmental Protection: Prevent current and future radiation emissions from causing detectable chronic effects.

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FIGURE 1-2. SITE-WIDE REMEDIAL ACTION OBJECTIVES

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MEDIA		***REMEDIAL ACTION OBJECTIVE***
3. SOILS		For Human Health:
	3-1	Prevent inhalation of/ingestion of/direct contact with soils surrounding the OU2 wastes which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as a point of departure.
	3-2	Prevent migration of contaminants which would result in groundwater concentrations greater than the MCLs or non-zero MCLGs or that would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as the point of departure.
	3-3	Prevent radium concentrations from exceeding 5 pCi/g in the first 15 cm of soil, and 15 pCi/g at lower depths. Prevent concentrations of other nuclides from exceeding levels that would result in doses greater than 100 mrem/yr.
		For Environmental Protection:
	3-4	Prevent migration of contaminants that would result in surface water contamination levels greater than ambient water quality criteria.
4. SEDIMENTS		For Human Health:
	4-1	Prevent ingestion of/direct contact with sediment contaminants which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as the point of departure.
		For Environmental Protection:
	4-2	Prevent releases of contaminants from sediments that would result in surface water contamination levels greater than ambient water quality criteria.

602 A FND290E OU2 TK05 OR

FIGURE 1-2. SITE-WIDE REMEDIAL ACTION OBJECTIVES (continued)

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MEDIA		***REMEDIAL ACTION OBJECTIVE***
5. SURFACE WATER	5-1	For Human Health: Prevent exposure to non-carcinogens which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as the point of departure.
	5-2	For Environmental Protection: Restore surface water to below ambient water quality criteria.
6. GROUNDWATER	6-1	For Human Health: Prevent ingestion of water having contaminant levels greater than the MCLs, non-zero MCLGs or TBCs, or which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than 1.0E-04, using 1.0E-06 as the point of departure.
	6-2	For Environmental Protection: Restore groundwater aquifer to contaminant concentrations below the MCLs.

602 A FND290F OU2 TK05 OR

FIGURE 1-2. SITE-WIDE REMEDIAL ACTION OBJECTIVES (continued)

LIST OF REFERENCES

Conner, J.R., 1990, Chemical Fixation and Stabilization of Hazardous Wastes, Van Nostrand Reinhold, New York, NY.

dePercin, P.E., E. Bates and D. Smith, 1991, "Designing Treatability Studies for CERCLA Sites: Three Critical issues," Journal of the Air and Waste Management Assn., Vol. 41, No. 45.

Myrick, T.E., B.A. Benien, and F.F. Haywood, 1983. "Determination of Concentrations of Selected Radionuclides in Surface Soil in the U.S.," Health Physics, Vol. 45:3, pp. 631-642.

Troxell, G.E., H.E. Davis, and J.W. Kelley, 1968. Composition and Properties of Concrete, 2nd Ed., p.4, McGraw Hil Book Co., New York, NY.

U.S. Dept. of Energy, 1991a, "Initial Screening of Alternatives for Operable Unit 2," DOE, Oak Ridge Operations Office, Oak Ridge, TN.

U.S. Dept. of Energy, 1991b, "Risk Assessment Work Plan Addendum," Fernald Environmental Management Project, DOE, Fernald Office.

U.S. Environmental Protection Agency, Oct. 1985, "Handbook, Remedial Action at Waste Disposal Sites (Revised)," EPA/625/6-85/006, U.S. Environmental Protection Agency, Cincinnati, OH, and U.S. Environmental Protection Agency, Washington, DC.

U.S. Environmental Protection Agency, 1986, "Test Methods for Evaluating Solid Wastes, Method 9100," EPA SW-846, Washington, DC.

U.S. Environmental Protection Agency, 1988, "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA," EPA/540-G-89/104, EPA, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, 1989a, "Guidance for Conducting Treatability Studies under CERCLA," EPA/540/2-89-058, EPA, Office of Emergency and Remedial Response, Washington, DC.

U.S. Environmental Protection Agency, 1989b. "Preparing Perfect Project Plans," EPA/600/9-89/087,- October 1989.

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OHIO EPA COMMENTS

1. Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 7, 9, 43

Comment: The work plan may now document where numbers for background concentrations were obtained; however, as stated in previous Ohio EPA comments and letters, DOE has failed to adequately determine background concentrations of radionuclides and other naturally occurring inorganics at the site. On November 1, 1991, Ohio EPA received the Background Sampling Plan (Work Plan Addendum) which will hopefully address this issue.

Response: Noted.

Action: None required.

2. Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 14

Comment: Durability tests should be run during the advanced phase testing for the stabilization of untreated material. The following is the justification for these tests:

a. Through failure mechanisms such as: desiccation cracks, slope instability, settlement, piping, penetration, erosion, cold climate, earthquakes and construction errors, water can permeate through the facility. Therefore, the waste can become saturated, causing the stabilized waste to erode and possibly contaminate the surrounding area. Therefore, to determine what waste matrix is the most durable (erosion resistant), a wetting and drying test is needed.

b. This radioactive waste has a life expectancy over 1,000 years. There is no data available on the structural longevity of the low level radioactive waste facility. Since this remediation is to be a permanent solution, a durability test would provide data to help choose the most durable solidified waste matrix.

c. From the technical document: Stabilization/ solidification of CERCLA and RCRA Wastes; Physical Tests, Chemical Testing Procedures, Technology Screening, and Field Activities (EPA/625/6-89/02). In Section 4, Physical Tests to Characterize Waste Before and After Stabilization/ Solidification, recommends to use of five physical tests: index property, density, permeability, strength, and durability tests. Durability tests are the following:

1. Freezing and Thawing Test of Solid Waste (ASTM D4842)

2. Wetting and Drying Tests of Solid Wastes (ASTM) D4843)

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Response: DOE agrees that durability testing would yield useful additional information for the detailed design developed during the Remedial Design Phase. If stabilization is selected, it is recommended that these tests be performed during Remedial Design Testing.

The comment concerns durability. The emphasis of the comment appears to address specific physical effects related to durability. Saturation, erosion and subsequent possible contamination of the surrounding area are referenced. The effects of weathering such as freezing and thawing and wetting and drying are listed as potential causes of future contamination. The scenario proffered in the comment represents a physical deterioration of the stabilized waste and subsequent release of the constituents of concern.

In the Advanced Testing Stages of the treatability study, TCLP testing is conducted utilizing the sample specimen (mold) used previously for Preliminary Stage I or II testing. The TCLP sample preparation protocol appears to accurately simulate the physical deterioration and potential release of contaminants as presented in the comment. The analysis of the TCLP extract can be employed as an indicator of the success of the fixation process after both physical and chemical (acid) deterioration.

In the Advanced Testing Stage, the cylindrical mold that had previously been subjected to Unconfined Compressive Strength testing is crushed in a press to facilitate particle size reduction so that the material is capable of passing through a 9.5 mm standard sieve. Through this process much finer sized particles are also generated. The crushed material that is subsequently subjected to acid digestion ranges in size from "dust" up to 9.5 mm. Particle size reduction enhances acid digestion through increased surface area and represents a worst case scenario of deterioration. DOE believes this mechanical particle size reduction simulates the physical effects of freezing and thawing and wetting and drying referenced in the comment.

The material that has undergone particle size reduction is subsequently subjected to 18 hours of rotary agitation in an acidic extraction fluid and then filtered to obtain the TCLP extract for analysis. The combination of the physical and chemical breakdown of the mold to generate the TCLP extract for analysis may represent a worse case scenario in simulating the effects of weathering.

In the Advanced Testing Stage, the TCLP extract is analyzed as a final evaluation as to the success of the treatment. The intent of these treatment mixtures is to chemically fix the contaminants in an altered waste matrix and thereby reduce their leachability. If the formulation passes the TCLP testing, one could assume that the durability of the mixture was adequate.

The treatability study as presently designed will provide critical performance data needed to evaluate the applicable treatment alternatives and select an alternative for remedial action based on the nine RI/FS evaluation criteria.

Action: None required.

3. Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 17

Comment: The work plan does not include any discussion on how fly ash would be addressed in the advanced phase-optional if the reagent mixtures using fly ash prove to be ineffective. A general description of activities that might be performed in the advance phase optional should be included in the work plan. All tests to be performed during an optional phase should be submitted to the EPAs for review and approval.

Response: If the fly ash proves to be ineffective for use in treating the OU2 wastes, the fly ash will then be used in treating the wastes from OU1 and OU4. The fly ash will be stabilized in the event that reagent mixtures using fly ash prove to be ineffective for OU1 and OU4.

Action: None required.