



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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FERNALD
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Mr. Johnny W. Reising
United States Department of Energy
Fernald Area Office
P.O. Box 398705
Cincinnati, Ohio 45239-8705

SRE-5J
REPLY TO THE ATTENTION OF

2855

Subject: Disapproval of "Remedial Design Work Plan for the Silos 1 and 2 Accelerated Waste Retrieval (AWR) Project"

Dear Mr. Reising:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the above-referenced document as part of its oversight activities for Operable Unit 4 at the Fernald Environmental Management Project (FEMP). The document, which is dated January 2000, was prepared by Foster Wheeler Environmental Corporation, a subcontractor to Flour Daniel Fernald, for the U.S. Department of Energy (U.S. DOE). The document provides remedial design documentation for retrieval of K-65 material from Silos 1 and 2 and transfer of the material to temporary transfer tanks. U.S. EPA previously submitted technical review comments on the site preparation portion of the December 1999 version of the remedial design work plan to U.S. DOE.

U.S. EPA's review of the above-referenced document focused on assessing the its technical adequacy. U.S. EPA found that the document is incomplete and that several issues require clarification.

The AWR project is critical for ensuring the eventual success of K-65 material treatment. Considering the importance of the AWR project and the severe consequences in the event of failure, it is recommended that the AWR design undergo independent review, and possible pre-review by those who would comprise the Operational Readiness Review team. Independent review should help ensure that the AWR and TTA facilities are designed and operated in conformance with applicable DOE orders and directives, ensure protection of the public health and safety, especially worker safety, and that TTA can support the eventual K-65 material treatment.

Therefore, U.S. EPA disapproves the document. U.S. EPA's general and specific comments are enclosed. Please contact me at (312) 886-4591 if you have any questions.

Sincerely,

Gene Jablonowski
Remedial Project Manager
Federal Facilities Section
SFD Remedial Response Branch #2

Enclosure

cc: Tom Schneider, OEPA-SWDO

2855

Bill Murphie, U.S. DOE-HDQ
John Bradburne, Fluor Fernald
Terry Hagen, Fluor Fernald
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ENCLOSURE

TECHNICAL REVIEW COMMENTS ON
"REMEDIAL DESIGN WORK PLAN FOR THE SILOS 1 AND 2
ACCELERATED WASTE RETRIEVAL (AWR) PROJECT"

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

(Seven Pages)

TECHNICAL REVIEW COMMENTS ON
"REMEDIAL DESIGN WORK PLAN FOR THE SILOS 1 AND 2
ACCELERATED WASTE RETRIEVAL (AWR) PROJECT"

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

GENERAL COMMENTS

SYSTEM DESIGN DESCRIPTION

Commenting Organization: U.S. EPA

Section #: Not applicable (NA)

Page #: NA

Line #: NA

Original General Comment #: 1

Comment: The AWR project involves the retrieval and storage of K-65 materials from Silos 1 and 2 and the potential for elevated radiation doses to workers. It has been previously mentioned that the estimated contact exposure rate on the side of a tank transfer area (TTA) tank is 600-mR/hour. If this is correct, then an individual standing at the center of the 4 TTA tanks could experience an exposure rate in excess of 2,000-mR/hour. Such exposure rates are of concern when considering U.S. DOE's administrative dose limit of 500-mrem/year for workers.

The AWR project is critical for ensuring the eventual success of K-65 material treatment. The design and operation of AWR and the TTA should ensure quick recovery from unanticipated downtimes or events, and avoid situations where project recovery is hampered due to worker health and safety issues and poor facility configuration and design. U.S. DOE should ensure that the AWR and tank transfer area (TTA) design and facility configuration minimizes the potential for worker exposure during operations, maintenance, and accident scenarios to the extent possible.

Considering the importance of the AWR project and the severe consequences in the event of failure, it is recommended that the AWR design undergo independent review, and possible pre-review by those who would comprise the Operational Readiness Review team. Independent review should help ensure that the AWR and TTA facilities are designed and operated in conformance with applicable DOE orders and directives, ensure protection of the public health and safety, especially worker safety, and ensure that TTA can support the eventual K-65 material treatment.

Commenting Organization: U.S. EPA

Section #: Not applicable (NA)

Page #: NA

Line #: NA

Original General Comment #: 1

Comment: The text states that the entire system for the AWR project will be automated; however, no loop diagrams or process and instrumentation drawings for the system are included in the work plan. The text refers to motorized valves, motorized dampers, and other controls; however, no drawings are included to show how the system will work or what is being controlled manually, automatically, or by other means. The work plan should be revised

to include appropriate diagrams and drawings as well as a full description of system operations.

Commenting Organization: U.S. EPA
 Section #: NA Page #: NA Line #: NA
 Original General Comment #: 2
 Comment: The text states that closed-circuit television (CCTV) will be used to inspect various activities inside the silos and tanks. It is not clear if the proposed system will work, because activities in these enclosed environments might be obscured by water, mist, and vapor. Additionally, the camera lenses would need to be cleaned periodically in order to remove condensation and dirt. The work plan should be revised to discuss these potential problems and to include a contingency plan for resolving them should they occur. According to the process flow drawings, no CCTV cameras are to be located in the secondary enclosures.

Commenting Organization: U.S. EPA
 Section #: NA Page #: NA Line #: NA
 Original General Comment #: 3
 Comment: The text does not address grounding requirements or lightning protection for the AWR project system. These elements should be included in the system design.

Commenting Organization: U.S. EPA
 Section #: NA Page #: NA Line #: NA
 Original General Comment #: 4
 Comment: The text contains numerous typographical errors. Also, the text is inconsistent in discussing voltage ratings for various electrical components such as 115 volts (V) versus 110V, 480V versus 460V, and so on. The text should be revised to eliminate these errors and inconsistencies.

SPECIFIC COMMENTS

SYSTEM DESIGN DESCRIPTION

Commenting Organization: U.S. EPA
 Section #: 2.2.3.1 Page #: 5 Line #: NA
 Original Specific Comment #: 1
 Comment: The text states that three manways in each silo will be modified for deployment of the silo waste retrieval system (SWRS); however, no details on how these manways will be modified are provided. Foster Wheeler Environmental Corporation indicated at a meeting held on February 8, 2000, that the manways will be enlarged. Therefore, the text should be revised to discuss how the manways would be enlarged for deployment of the SWRS.

Commenting Organization: U.S. EPA
 Section #: 2.2.8 Page #: 7 Line #: NA
 Original Specific Comment #: 2
 Comment: The text states that "the sluicing jet, from time to time, will impinge upon and impact the retrieval pump, that is able to

withstand the jet during operation." If the sluicing jet can impinge upon the retrieval pump, it is also possible that the jet can impinge upon the wall of the silo. The text should be revised to discuss this possibility and to evaluate whether there will be any negative effect if the silo wall is impinged upon by the sluicing jet.

Commenting Organization: U.S. EPA
 Section #: 4.1.2.3 Page #: 17 Line #: NA
 Original Specific Comment #: 3

Comment: The text states that a progressive cavity pump will be used for removal of slurried materials. It is not clear why this type of pump was selected. The slurry could contain gravel and other debris small enough to pass through a strainer basket with half-inch openings, and such debris could damage the Buna-n stator. For slurry pumping, a recessed-impeller, vortex pump is typically used. Submersible pumps of this type are available from a number of manufacturers. The text should be revised to either justify the selection of the progressive cavity pump or propose use of a vortex or equivalent type of pump instead.

Commenting Organization: U.S. EPA
 Sections #: 4.2 and 4.2.1 Pages #: 21 and 25 Line #: NA
 Original Specific Comment #: 4

Comment: The text discusses the radon control system and refers to redundant recirculation fans FAN-20-001A and FAN-20-001B as well as a number of dampers, filters, desiccant drying systems, and carbon beds. However, Diagrams No. 10FMD002 and 10FMD003 are not consistent with the text. The dampers shown on these diagrams are not labeled, and recirculation fan FAN-10-001 shown in the diagram is not mentioned in the text. Also, it is not clear how a damper installed on the exhaust duct for the silo will help maintain negative pressure inside the silo. Normally, a damper is used on an inlet to restrict flow of air into a contained area. The text and diagrams should be revised to address these issues.

Additionally, it is not clear how a negative pressure of -0.1 inch of water will be maintained inside the silo given the constantly changing volume of materials in the silo. No provision is made to compensate for fluctuating volumes of liquids and solids in the silo. Typically, during sluicing operations, a volume of water is introduced into a silo displacing an equivalent volume of gas. Later the slurry is pumped out of the silo, reducing the volume of liquids and solids and increasing the volume of gas. Finally, the water added during sluicing and slurring operations contribute to the vapor content of the gas in the silo, increasing the pressure inside the silo. Temperature fluctuations may also affect maintenance of a negative pressure of -0.1 inch of water inside the silo. The text and the diagrams should be revised to clarify how a negative pressure will be maintained in the silos.

Commenting Organization: U.S. EPA
 Section #: 4.4.9 Page #: 35 Line #: NA
 Original Specific Comment #: 5

Comment: The text states that sampling of waste residue will be conducted by continuously collecting a sample at a rate of 1 gallon for every 1,000 gallons transferred. However, the text further states that at a maximum flow rate (transfer rate) of 350 gallons per minute, the sampler will take a 200-cubic-centimeter sample about every 9 seconds. This statement implies that the sampling will not be continuous but will involve collecting composite samples composited from a number of grab samples. The text should be revised to clarify the type of sampling that will be conducted.

Commenting Organization: U.S. EPA
 Section #: 5.1.4.4 Page #: 55 Line #: NA
 Original Specific Comment #: 6

Comment: The text states that the motor starter will be used to provide "for normal shutdown or soft stop shutdown." It is not clear how a motor starter can provide a soft-stop shutdown. The text should be revised to clarify this matter.

Commenting Organization: U.S. EPA
 Section #: 5.1.5.1 Page #: 56 Line #: NA
 Original Specific Comment #: 7

Comment: The text states that the slurry pump speed will be controlled by an operator in the control trailer. The text further states that the "ultrasonic level sensor is mounted above the slurry pump intake to determine the level of slurry present at the pump intake. If the slurry amount or level is low, the sensor will detect the low-level and turn the slurry pump off." The text should be revised to clarify the fact that an ultrasonic level sensor can detect only the level of slurry, not the amount of slurry. Additionally, the ultrasonic level sensor can be used to control the slurry pump's speed by maintaining the slurry at a preset level above the minimum or at a "pump stop" level. Because the operator will not be able to see inside the tank and because CCTV cameras may become obscured, an automatic level control system should be used to avoid unnecessary pump shutdowns and provide for uninterrupted pumping of slurry. The text should be revised accordingly.

Commenting Organization: U.S. EPA
 Section #: 5.1.5.3 Page #: 56 Line #: NA
 Original Specific Comment #: 8

Comment: The text states that "the motor starter provides a method to remove power from the motors for normal shutdown or soft stop shutdown." Soft-stop shutdown is typically provided by a variable-speed drive (a variable-frequency drive), not a motor starter. A motor starter can only connect the motor to or disconnect the motor from a power supply. The text should be revised to reflect this fact. In addition, it is not clear exactly where the lockable disconnect switch will be located. The text or drawings should be revised to specify the location of the lockable disconnect switch.

Commenting Organization: U.S. EPA
 Section #: 5.1.6.4 Page #: 58 Line #: NA

Original Specific Comment #: 9

Comment: The text states that "the soft stop cable is intended to rapidly stop motor-driven equipment." Typically, an emergency stop is a safety feature that disconnects the power to a motor; it therefore cannot provide a soft stop. The text should be revised to reflect this fact.

Commenting Organization: U.S. EPA

Section #: 5.1.6.5 Page #: 58

Line #: NA

Original Specific Comment #: 10

Comment: The text states that "the enclosure is equipped with a sun shield to reduce the sun heat load during the summer conditions." The sun shield could be eliminated if the enclosure were to be mounted on the north facing wall. This adjustment to the design should be considered. Furthermore, heaters are used inside electrical cabinets is to prevent condensation, not to maintain a "warm internal cabinet temperature in cold weather conditions" as the text states. The text should be revised to reflect this fact.

Commenting Organization: U.S. EPA

Section #: 5.1.6.11 Page #: 59

Line #: NA

Original Specific Comment #: 11

Comment: The second sentence of Paragraph 2 starts with the phrase "the equipment includes..." but does not list any equipment. The text should be revised to identify what equipment is included.

Commenting Organization: U.S. EPA

Section #: 5.1.7.2 Page #: 60

Line #: NA

Original Specific Comment #: 12

Comment: The text states that "the power supply provides power to a limited amount of sensors and actuators" and that "sensor and actuator requirements may demand additional power supplies." It is not clear where these additional power supplies will be located or who will be providing them. The text should be revised to clarify this matter. Also, if the power requirements of the selected equipment are not known at this time, the design for the control logic and for equipment control cannot be complete. The text should be revised to explain how this deficiency will be addressed.

Commenting Organization: U.S. EPA

Section #: 5.1.8.2 Page #: 61

Line #: NA

Original Specific Comment #: 13

Comment: The text states that a motor starter will be used to "remove power from the motors for normal shutdown or soft stop shutdown." Typically, motor starters are used to start and stop pump motors; however, they cannot provide a soft stop. A soft stop can be provided by a variable-frequency controller; however, the proposed decant pumps, are single-speed pumps and therefore a soft stop cannot be provided. The text should be revised to reflect these facts.

Commenting Organization: U.S. EPA

Section #: 5.1.8.3 Page #: 61

Line #: NA

Original Specific Comment #: 14

Comment: The text states that the enclosure for the decant pump controls will not require heat or air conditioning. Air conditioning will not be required; however, a strip heater should be installed in each control panel located outdoors to prevent condensation inside the control panel. The text should be revised accordingly.

BERM EXCAVATION PLAN

Commenting Organization: U.S. EPA
 Section #: 1.4 Page #: 2 Line #: NA
 Original Specific Comment #: 15
 Comment: The text states that soil will be continuously surveyed for the presence of contamination during excavation. Separate documents should be submitted to detail how this survey can be performed, with adequate sensitivity and accuracy in the presence of the gamma interference (commonly called radioactive "shine") from the K-65 material in the silos.

SAMPLING PLAN

Commenting Organization: U.S. EPA
 Section #: 2.3 Page #: 6 Line #: NA
 Original Specific Comment #: 16
 Comment: The text states that method blanks will be used to monitor for the presence of interfering substances. A blank sample prepared using a new batch of reagent should be analyzed before that batch is accepted for use on actual samples. In addition, each new lot of spiking solution for laboratory control samples (discussed in Section 2.2.1) and for matrix spikes (discussed in Section 2.2.5) should be analyzed before the lot is accepted. Section 2.3 should be revised to incorporate these practices.

Commenting Organization: U.S. EPA
 Appendixes #: C and E Page #: NA Line #: NA
 Original Specific Comment #: 17
 Comment: Appendixes C and E present procedures for collecting water and air samples, respectively. The certified-for- construction drawings, which are not yet available, should incorporate the necessary taps, sample ports, and working space for the sampling activities discussed in these appendixes.

Commenting Organization: U.S. EPA
 Appendix #: E Section #: VI.A.7 Page #: A-10 Line #: NA
 Original Specific Comment #: 18
 Comment: The text states that samplers should "take intermediate readings of flow rates" and other relevant parameters. The text should specify the frequency for intermediate readings, such as once every minute, hour, or day.