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OPERABLE UNIT 4 SILO 2 CAMERA INSTALLATION/BENTONITE INSPECTION WORK PLAN

10/05/93

DOE-0021-94
DOE-FN/EPA
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WORK PLAN

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Department of Energy
Fernald Environmental Management Project
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OCT 0 5 1993

DOE-0021-94

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

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

Dear Mr. Saric and Mr. Mitchell:

OPERABLE UNIT 4 SILO 2 CAMERA INSTALLATION/BENTONITE INSPECTION WORK PLAN

As we discussed on Thursday, September 30, 1993, the United States Department of Energy and the Fernald Environmental Restoration Management Corporation are preparing to install two cameras in Silo 2 to view the bentonite cap in an effort to explain a recent upward trend in headspace radon concentrations in that silo. In spite of the recent concentrations in Silo 2, it is important to note that the original performance goal of the K-65 Removal Action of a radon concentration of 0.015 pci/l, above background, at the nearest resident has not been exceeded.

Enclosed for your information is a brief Work Plan which discusses the camera installation. Basically, the procedures and equipment used will be identical to those of the surface mapping project and bentonite installation in 1991.

Pending the reallocation of necessary funds to support the project, camera installation will be initiated on November 16, 1993. Therefore, if you have any questions or concerns, please call Randi Allen at 513-648-3102 prior to this date.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Allen

Enclosure: As Stated

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WORK PLAN

K-65 SILO 2 CLOSED CIRCUIT CAMERA INSTALLATION AND BENTONITE INSPECTION

FEMP

OCTOBER, 1993

REVISION 1

Prepared by:

FERMCO

For:

The United States Department of Energy

Approved by: 10/4/93
For: W. S. Pickles - CRU4 Director

Concurred by: 10-4-93
R. B. Allen - Branch Chief - DOE-FN

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I. INTRODUCTION

The Remedial Investigation/Feasibility Study (RI/FS) identifies Operable Unit 4 at the Fernald Environmental Management Project (FEMP) as the two K-65 silos (1 and 2), the metal oxide silo (3), empty silo (4), the potentially contaminated soils surrounding the waste storage silos, any perched water encountered during remediation, and other associated facilities. In April, 1990, a Removal Site Evaluation (RSE) was generated by the Department of Energy (DOE) consistent with 40 CFR 300.410 and it was determined by the DOE, as the lead agency at the FEMP, that a non-time critical removal action was necessary. The scope of this removal action was broadly defined as the reduction of chronic radon emissions and the control of potential releases of residues from Silos 1 and 2 in event of a dome collapse, whether spontaneous or induced.

In 1991 a layer of bentonite was placed on top of the K-65 residues in Silos 1 and 2 to retard the emanation of radon gas into the space between the residues and silo domes. The layer also protects the residue in the event of dome failure. Bentonite was chosen due to its ease of application and ability to seal cracks and discontinuities in the waste surface. In addition, the bentonite maintains moisture that retards radon flow into the headspace.

Radon concentrations have remained relatively steady in both silos thru April 1993. Average head space concentration at that time were 500,000 pCi/L for Silo 1 and 2,000,000 pCi/L for Silo 2. Since that time Silo 1 readings have remained relatively steady while Silo 2 is showing an upward trend to levels approaching 4,000,000 pCi/L.

This work plan is being prepared to cover the installation of remote controlled television cameras in Silo 2 to view the interior of the silo. The bentonite layer in particular will be evaluated in an effort to determine the cause for the recent upward trend in radon concentration.

DOE Orders require that a work plan be submitted to DOE-FN for review and comment prior to implementation. This work plan satisfies that commitment. All activities performed under this maintenance action will be in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and consistent with the OSWER Directive 9360.0-03B, Superfund Removal Procedures, Rev. 3. U.S. EPA and Ohio EPA will be notified of this maintenance action prior to initiation of field activities.

II. BACKGROUND

1.0 Summary of the Potential Threat

During the early 1950's, pitchblende (high grade uranium/radium ore) from the Belgian Congo, was processed to remove uranium by the Mallinckrodt Chemical Works at St. Louis, Lake Ontario Ordinance Works and later at the FEMP site. The residue from this processing contained significant amounts of radium, which, at that time, had significant economic value. This residue was considered valuable and as part of the purchase agreement, ownership of the residue was retained by the mining company, African Metals. Ownership was subsequently transferred to the DOE from African Metals in the early 1980's.

Silos 1 and 2 were constructed in 1951 and 1952 for the purpose of storing this residue, which was called K-65 material. These silos received residues during the years between 1952 and 1958. The silos contain approximately 9600 tons of residue. The radioactive constituents of concern are uranium-238 and 234, radium-226 and thorium-230. The radium bearing residues emit radiation in the form of alpha, beta, and gamma rays, as well as emitting radon gas.

Most of the radon that is generated by the K-65 residues is contained within the silos. Radon in the head space will build up until an equilibrium concentration is reached. Radioactive decay of the radon (half-life is 3.84 days) and the head space ventilation rate (due to diffusion through intact concrete and leakage through cracks) affect this equilibrium.

Independent studies by Camargo (1986) and Bechtel (1990) have been conducted on the structural integrity of the silos. The studies concluded that the silos have lost over half of their design strength and that no life expectancy could be predicted for the silo domes.

The result of a silo dome failure would be an immediate release of radon gas from the head space of the silos to the environment. There is also the potential for the K-65 residues to become airborne under tornado loading conditions.

The layer of bentonite placed on top of the K-65 residues in 1991 retards emanation of radon gas into the space between the residues and silo domes. However, due to the continuing upward trend of headspace radon concentration in Silo 2, the integrity of the bentonite cap is in question. The bentonite cap is an effective method for

attenuating radon emissions from the K-65 material as evidenced by the Silo 1 performance. Speculation is that the bentonite cap in Silo 2 has dried, cracked, or sloughed from the mounds. However, this cannot be determined or confirmed until the cap can be viewed.

2.0 Related Action

There are various ongoing activities and projects being conducted in the K-65 Silos area. These include periodic pumping of the K-65 Decant Sump, nondestructive concrete testing of all four silos, and a radon adsorption test.

3.0 Roles of the Participants

The DOE, as the lead agency for this maintenance action will coordinate and execute this action. The United States Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency (Ohio EPA) roles have been one of providing guidance and participation in the preparation of the CERCLA 120 Consent Agreement and technical information exchanges.

Fernald Environmental Restoration Management Corporation (FERMCO), as the FEMP contractor, is responsible for implementing this maintenance action in a manner consistent with applicable DOE orders and regulatory guidance.

4.0 Maintenance Action

This maintenance action is to investigate the cause of the recent upward trend in Silo 2 headspace radon concentration. The preferred method is to install two closed circuit television (CCTV) cameras in the 20 inch manways to inspect the condition of the bentonite cover. These will be the same cameras that were used to monitor the bentonite installation in 1991. Videotapes during and after bentonite installation are available and a comparison to the current condition will be made. Cracks, gaps or shifting of the bentonite along with its overall condition may explain the increase in concentration levels.

5.0 Integration with the Remedial Action

This maintenance action will not affect remedial actions.

III. SUPPORT ACTIVITIES

1.0 Planning Activities

Activities to be undertaken prior to the actual site work are planning, training, and preparing the detailed operating procedures and Health & Safety Plan. An Operational Readiness Review (ORR) or Readiness Assessment will be conducted prior to field activities.

2.0 Specific Design Activities

The CCTV will be installed in opposing manways (180°) to better facilitate investigation of the bentonite surface. Remote viewing of the entire Silo 2 surface will be possible. Glovebags will be utilized at manways during installation and operation of the CCTV. An operations trailer at the base of the Silos will be utilized for viewing and operation of the cameras. The equipment and system was successfully demonstrated during the 1991 removal action. No new design is required.

3.0 Training Requirements

All personnel involved with field activities will be trained in accordance with the Occupational Safety and Health Administration (OSHA) standards found in 29 CFR 1910.120. In addition to this training, all personnel involved will be trained on:
1) how to handle emergency situations in the K-65 Silos area according to the FEMP K-65 Silo Numbers 1 and 2 Area Emergency Standard Operating Procedure (SOP) 65-C-201 dated March 1, 1990, and 2) applicable procedures relevant to the activities to be performed.

IV. FIELD ACTIONS

Coordination of this maintenance action along with supplying equipment, maintenance, installation, operation, dismantling and removal of the equipment/system will be performed by FERMCO personnel. Commercially available equipment and/or systems will be utilized to the extent practical.

Installation/Operation of the CCTV

Operation of the CCTV system within the silo will proceed after testing/startup proves that the system operates satisfactorily.

Installation in Silo 2 will include:

a. Installing a glovebag over the southeast or northwest manway.
b. Removing the manway cover.
c. Installing the CCTV in the manway.
d. Repeat steps a thru c for the manway 180° from first camera location.
e. Install a glovebag over one of the two remaining perimeter manways.
f. Remove the manway cover.
g. Install the light system in the manway.
h. Repeat steps e thru g for the remaining perimeter manway.
i. Inspect the condition of the bentonite cover utilizing the two remote controlled CCTV's.
j. After completion of video monitoring, remove the CCTV's and lights, reinstall the manway cover on the silo, and remove the glovebag.
k. Review videotapes to qualitatively evaluate current condition of the bentonite surface.

V. ENVIRONMENTAL MONITORING PLAN

The K-65 residues generate radon on a constant basis. The resulting radon concentration has been monitored as a part of the FEMP Environmental Monitoring Program in support of this maintenance action and the remedial action for Operable Unit 4. Also, in support of this maintenance action, additional radon monitoring may be undertaken.

1. The atmosphere within Silo 2 will continue to be measured for pressure and temperature and then compared to the pressure and temperature of the surrounding ambient air.

2. Additional radon concentration monitoring at Silo 2 may be initiated as necessary by the Radiation Work Permit (RWP).

The above mentioned radon concentration monitors, temperature sensors and pressure sensors in Items 1 and 2 have the capability to monitor on a one hour time increment. This hourly data will be collected from the chart recorders on each of the instruments. FEMP personnel will be responsible for collecting the data associated with the above items, in addition to the data currently collected as a part of the FEMP Environmental Monitoring Program.

VI. HEALTH AND SAFETY PLAN

The work will be performed consistent with the Health and Safety Plan prepared for this maintenance action. The plan

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identifies, evaluates, and addresses all safety and health hazards. In addition, it provides for emergency response for hazardous operations. The plan is consistent with 29 CFR 1910.120 and the FEMP Health Plan ESH-1-1000. The plan will be released prior to initiation of any work activity.

VII. QUALITY ASSURANCE

The silo monitoring action will be conducted in accordance with the requirements of FERMCO's Quality Assurance Program Description, RM-0012 and the SCQ, as applicable. Program elements applicable for this Project Specific Plan include the SCQ requirements for developing this Project Specific Plan, deviation reporting, document and record management and corrective action using site procedures. This plan requires no environmental sampling and analysis to be performed. The objective will be to provide a viewing of the interior of Silo 2 to examine the bentonite for potential cracking or openings, which may be the cause for the upward treand of radon concentration.

VIII. SCHEDULE

ACTIVITY	DATE SCHEDULED
Transmit Work Plan to DOE-FN	September 24, 1993
Transmit Work Plan, Rev. 1, to DOE-FN	October 4, 1993
DOE Approval of the Work Plan	October 6, 1993
Notification of the Regulatory Agency	October 18 1993
Install Cameras - Inspect Bentonite	November 16, 1993
Report and Recommendation	December 7, 1993
DOE Concurrence with Recommendation	December 14, 1993

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