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Department of Energy

Ohio Field Office
Fernald Environmental Management Project
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

AUG 2 5 2003

Mr. Gene Jablonowski, Remedial Project Manager
United States Environmental Protection Agency
Region V, SR-6J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

DOE-0490-03

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Jablonowski and Mr. Schneider:

RESPONSES TO COMMENTS AND REVISED SILOS 1 AND 2 DOME PENETRATION AND RISER INSTALLATION PLAN

References:
1. Letter from G. Jablonowski to G. Griffiths, "Silos Dome Penetration and Riser Installation Plan," dated August 6, 2003
2. Letter from T. Schneider to J. Reising, "Comments – Silos Dome Penetration and Riser Installation Plan and Video Demonstration," dated July 23, 2003

Enclosed for your review and approval is Responses to Comments and the Revised Dome Penetration and Riser Installation Plan, Rev. 2, dated August 21, 2003.

The document was revised to incorporate the comment responses you provided in above referenced letters. In addition, a series of testing of the Radon Control System (RCS) was conducted during August 20 and August 21, 2003 to address the potential RCS responses to cutting of the dome and riser installation. The testing was completed on August 21, 2003 under the Operations Work Instruction (OWI) 22-03, which was provided to you for information. As indicated in the Teleconference briefing of the testing to you on August 20, 2003, the RCS responded as expected within the normal operating parameters during the test.

Recycled and Recyclable

The contractors for the dome penetration and riser installation construction activities will be mobilized during the week of September2, 2003 to begin preparing for the activity, pending your final approval of the revised plan.

If you have any questions on this matter, please contact Nina Akgündüz at 513) 648-3110.

Sincerely,

Glenn Griffiths

FCP:Akgündüz

Glenn Griffiths
Acting Director

Enclosure: As Stated

cc w/enclosure:
N. Akgündüz, OH/FCP
G. Brown, OH/FCP
J. Saric, USEPA-V, SR-6J
T. Schneider, OEPA-Dayton (three copies of enclosure)
M. Cullerton, Tetra Tech
M. Shupe, HSI GeoTrans
R. Vandegrift, ODH
AR Coordinator, Fluor Fernald, Inc./MS78

cc w/o enclosure:
R. Greenberg, EM-31/CLOV
S. Robison, EM-31/CLOV
K. Johnson, OH/FCP
S. Beckman, Fluor Fernald, Inc./MS52-4
D. Carr, Fluor Fernald, Inc./MS1
R. Corradi, Fluor Fernald, Inc./MS52-4
T. Hagen, Fluor Fernald, Inc./MS1
M. Jewett, Fluor Fernald, Inc./MS52-5
D. Nixon, Fluor Fernald, Inc./MS65-2
D. Thiel, Fluor Fernald, Inc./MS52-2
T. Walsh, Fluor Fernald, Inc./MS52-3
ECDC, Fluor Fernald, Inc./MS52-7

Silos 1 and 2 Dome Penetration and Riser Installation Plan and Video Demonstration

Responses to Ohio EPA and U.S. EPA Comments

OEPA Comments (7/23/03)

General Comment

1. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: na Pg #: na Line #: na Code: C

Original Comment #: 1
Comment: An evaluation should be performed as to the likelihood of the RCS "tripping" during silo penetration. The sudden change in pressure and air flow when the cut-out is removed may cause an upset condition for the RCS.
Response: Comment acknowledged.
Action: The approach to pressure and air flow through the silos has changed to better control these parameters. Section 3.1 of the plan has been rewritten with this alternate approach as follows:

'The Radon Control System (RCS) will be used to control airflow through the silos and contain the radon within the silos during cutting, cutout removal and riser installation activities. Prior to starting dome penetration activities radon levels in the silos will be low enough to provide a safe work environment for the workers.

Prior to initiation of cutting, cutout removal, and riser installation, operations will slowly open the unused 12 inch nozzle on the silo dome being worked on. This will allow the pressure in the affected silo to rise to a very slightly negative point inside the silo. This will automatically close the silo air inlet louver slowly and place the RCS and the silo in a stable condition that will not be affected by the penetration and installation activities. In this condition, there is no positive pressure inlet to the silo and it is extremely unlikely that the RCS will shutdown based on silo pressure (positive or negative).

RCS operations personnel will monitor the status of the 12 inch nozzle throughout the penetration and riser installation activities and will close the valve if necessary. The 12 inch nozzle will be closed upon completion of penetration and installation activities, at the end of each day, and in the event of an upset condition. As the 12 inch nozzle is closed, the silo air inlet louver will open, thus ensuring that the silo pressure does not fall to an undesirable negative condition. The silo Pressure Control Valves (PCVs) will also ensure the pressure does not fall below –3.0 inches W.G.

During the cutting, cutout removal, and riser installation activities, the RCS will be operated normally, maintaining air influx into the silo through both the opened 12 inch nozzle and the dome cut(s). To increase air influx, operations can increase the flow rate of the air exiting the silo being penetrated up to a maximum of 1000 CFM.

During concrete cutout removal and riser installation, flow may be discontinued through the silo not being worked, to ensure interlocks associated with that silo (e.g. high pressure) do not cause a shutdown of the RCS fan.

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Riser installation will occur immediately after the concrete cutout is removed. If any problems should arise, a cover will be placed over the opening (as described in section 4.2.3) and the RCS will maintain operations.

All concrete cutout removal and riser installations will be complete on one silo before work commences on the second silo. Normal RCS operations will resume after all risers have been installed in the silo(s). The order in which the silos are worked does not have an impact on RCS operations. Initiating penetration of the second silo may not begin until radon levels in the silo are low enough to provide a safe work environment for the workers.

If there is an extensive downtime between activities on the silos, openings in the silo will be temporarily covered and/or sealed, as directed by Radiological Safety personnel, to reduce the potential for releasing radon. Temporary covers are described in Section 4.2.3. Additionally, if during this activity an RCS shutdown occurs, activities on the silo dome will be discontinued until the system can be returned to operation. Communication will be maintained between the RCS Control Room and the construction crew using radios and area cameras.

In order to obtain operating experience for running the RCS before the actual work evolution proceeds, the use of the 12" nozzle will be tested under a series of controlled RCS operating conditions. The test, the evaluation of the results, and their incorporation into the specific RCS operating plans will be done prior to the commencement of the penetration and riser installation activities. During the test, the initial flow rates and pressures will be varied to optimize the RCS settings so that during the actual performance of the work the likelihood of the RCS "tripping" can minimized.'

Specific Comments

2. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.2.2 Pg #: 2 of 12 Line #: na Code: C
Original Comment #: 2
Comment: What other recommendations were proposed by Mr. Hanskat that may not have been implemented?

Response: Mr. Hanskat made recommendations in five areas:

1) **Design of the concrete strengthening members around the proposed wall opening in Silo 3.**

In this case, which concerned the integrity of the Silo 3 structure, Mr. Hanskat offered recommendations concerning the need for and and necessary design of concrete members to strengthen the wall of Silo 3 in the area of the proposed wall opening. These recommendations were considered in designing the concrete reinforcement subsequently installed on Silo 3. Since AWR is concerned only with Silos 1and 2, however, implementing this recommendation was not considered relevant for discussion within the draft penetration plan.

2) **Suitability of Silo 1 and 2 dome penetration and riser installation (Including demonstration on Silo 4).**

In this case, Mr. Hanskat provided:

a) "It may be beneficial to take a partial depth core sample of the Silo 1 & 2 domes

(sic) concrete. These cores can be visually inspected for evidence of internal fractures resulting from freeze-thaw or ASR and if warranted submitted for a petrographic analysis to give a better fell for the concrete quality of the dome sections. Compressive strength tests of these core samples dimensions would not produce accurate results."

b) "..... "I recommend designing the sections to be lifted out by a mechanism that grips on the underside of the dome (such as a toggle bolt anchor), ..."

Recommendation 2 – b was implemented as represented in the draft plan.

Recommendation 2 – a was not implemented. The coverage of the Silo 1 &2 dome by the cap and the insulating foam reduced the potential for delamination from freeze/thaw exposure. It was the judgment of project that little would be gained from a qualitative assessment of partial depth coring. For one, it would need to be taken at more than one location per silo to be representative, and two, it would neither represent the full depth of the silo concrete nor allow for a quantitative assessment of compressive strength. The assumption and use of a 3,000 psi compressive strength for the domes' concrete was considered sufficiently conservative for the analysis of the domes' strength.

3) **Increase of the Silo dome live load limits.**

Mr. Hanskat recommended that the live load of the Silo 1&2 domes could be increased to 2000 lbs, and that a point load of grater than 2000 lbs over a one square meter area should be avoided.

The project has pursued this recommendation within the procedural context of a change to the "Technical Safety Requirements Document for Operable Unit 4" (TSR). This requested change requires approval from DOE and is under current consideration.

The implementation of the "Silos Dome Penetration and Riser Installation Plan" does not assume that the requested change to the TSR will be needed to proceed with work.

4) **Maintaining soil berms around Silos 1&2 during silo material retrieval.**

"I recommend digging a couple of test pits down the tank wall to approximately one-half the wall height and then taking cores at the bottom of the bottom of the test pit (tank mid-height), mid-height (tank three quarter height) and just below the dome band. These cores can be visually inspected for evidence of internal fractures and if warranted submitted for petrographic analysis to give a better feel for the concrete quality of the wall sections. If concrete analysis shows 3,500 psi is not justified, the analysis of the berm loads should be redone using an appropriate strength."

This recommendation does not relate to the Silos Dome Penetration and Riser Installation Plan.

5) **Effect of internal pressure integrity of Silos 1 & 2**

Recommendation #5 is not a recommendation but rather a reconfirmation that previous calculations demonstrating that the internal pressure is not a problem remain fully applicable.

Action: N/A

3. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: 7 Line #: na Code: C
Original Comment #: 3
Comment: Page 7 of 12 (apparently containing Section 4.1) was missing from all copies of the submittal. Please provide.

Response: Upon receipt of comments, the referenced page was provided to Ohio EPA and USEPA by DOE-FCP.
Action: The referenced page is included in the enclosed revised plan.

4. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.2.3 Pg #: 9 of 12 Line #: na Code: C
Original Comment #: 4
Comment: The third paragraph in this section states that 'remaining openings will be sealed....after all the risers on each dome have been installed'. Please explain why it is acceptable to leave the openings unsealed on each riser for what could be an undetermined amount of time, versus sealing all openings after each riser is in place.

Response: The clamping plates are flat while the dome surface is curved, thus the plate, which is essentially tangent to the dome surface rises slightly above the surface of the dome as one moves further away from the center line of the opening. As each clamping plate is installed, the silo penetration in question will be sealed from the environment. There will, however still be an opening between the clamping plate and the dome surface that needs to be sealed to provide stability for the risers. The "sealing of openings" referenced in OEPA's comment refers to grouting of the space between the clamping plate and the dome surface for riser stability, and is not required to prevent release of radon.

Action: N/A

Ohio EPA Comments on Silos Dome Penetration Demonstration Video

Video Comments

5. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: na Code: C
Original Comment #: 5
Comment: During the Silo 4 hole cutting video, Ohio EPA observed shims placed in the Silo hole as it was being cut. It is our understanding that these shims are necessary to prevent the plug from settling further into the silo as the hole is cut. However, as the plug was lifted by a crane, most of the shims can be seen falling into the silo. Had this been Silo 1 or 2, DOE would have had to contend with removing this solid debris with the silo contents. DOE needs to formulate a plan to keep the shims and other debris from falling into the silo during plug removal.

Response: The shims have been redesigned and are now affixed to a safety tether line attached to the lifting jig. The shims will be disposed of along with the concrete cutout and lifting jig. No other loose debris is anticipated to be in the area of the penetrations.

Action: The shims have been redesigned as stated above.

6. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: na Code: C
Original Comment #: 6
Comment: Ohio EPA noticed that there was some difficulty aligning the cover plate to the bolts in the silo. While attempting to install the cover plate, the silo hole was totally opened to the atmosphere. It is unsure if the problem is with the accuracy in which the bolts were installed into the silo or properly aligning the plate hole to its specific corresponding bolt but DOE should formulate a method to hasten the installation of the cover plant over the opened hole of the silo.

Response: Comment acknowledged. During the demonstration, the camera penetration bolt pattern on the dome surface was incorrectly laid out.
Action: A template has been fabricated to ensure the proper bolt patterns are established prior to installation of anchors for all penetrations on the Silo 1 and 2 domes. A verification step has been added to the work plan to ensure riser cover plate matches the bolt pattern prior to initiating concrete cutting.

7. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: na Code: C
Original Comment #: 7
Comment: Page 10 of the Silo Penetration and Riser Installation Plan states that the Silo 4 demonstration was to have personal in the same level of PPE as would be when working on Silos 1 & 2. When observing the video, it was noted that the worker around the cutting tool on the first opening was in a much higher level of PPE, including a respirator, then workers on the second opening. Please explain.

Response: The intent of having workers in full PPE during the demonstration was to determine the impact of PPE on their ability to perform the work activities as designed. When it was clearly demonstrated that the PPE had no impact on the ability to perform work during the first cutting evolution, the decision was made to allow workers to perform the second cut without donning PPE.
Action: N/A

8. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Pg #: Line #: na Code: C
Original Comment #: 8
Comment: One part of the plan which appears to need more practice from the video is the wrapping of the cutout for storage until disposal. The plastic used to wrap the cutouts in the video demonstration was not opened before placing it underneath the cutout, causing the bottom of the cutout (which could contain silo material) to brush across what, when unfolded, became the outside of the wrapper for the cutout. Unless the cutouts were wrapped again off camera, this is not acceptable. Please correct.

Response: Comment acknowledged.

Action: This process has been revised to stipulate the plastic must be open before it is moved under the concrete cutout. The concrete will also be raised to a slightly higher elevation, allowing workers to manipulate the plastic without brushing the underside of the concrete. A heavy gage clear plastic will be used in order to allow for a visual inspection of the cutout after removal from the dome.

U.S. EPA Comments – 8/8/03

General Comment

1. Commenting Organization: U.S. EPA Commentor: Jablonowski
Section #: Not Applicable (NA) Pg #: NA Line #: NA
Original General Comment #: 1

Comment: A number of Contingencies have been addressed in the plan. However, it is not clear what will be done if a section of a silo dome collapses during cutting operations or during installation of the riser. The plan should be revised to address this possibility.

Response: Response to a partial or complete failure of one of the Silo domes is governed by Site Procedure EM-0030, "Silos Area Emergency Procedure," and by Silos Project procedure 11-E-005, "Silos Project Emergency Events Response." Actions implemented under these procecures include the following:

- Identification and verification, though visual &/or camera inspection, monitoring data, etc., of a potential or actual failure of a silo dome.
- Notifications
- Mobilization of response personnel
- Maintenance of RCS operations, and cessation of other operations in the Silos area
- Notification and protection of personnel in potentially impacted areas
- Evaluation of reasponse actions, such as covering of the impacted area of the dome.

Action: The following text has been added to Section 2.2, Contingencies:

"In the event of a partial or complete silo structural failure, the Silos Emergency Procedure EM-0030 and the Silos Project Emergency Events Plan 11-E-005 will be implemented."

Specific Comments

2. Commenting Organization: U.S. EPA Commentor: Jablonowski
Section #: 3.1 Pg #: 5 0f 12 Line #: NA
Original Specific Comment #: 1
Comment: The text states that the return air flow to the silo being worked on will be discontinued in order to reduce the possibility of positive pressure in the silo. It is not clear how this will be accomplished without causing the system to shut down as a result of high negative pressure (vacuum) inside the silo. When cutting operations start, air will be drawn into the silo through a cut gap that will be about 3/16 inch wide. However, the cutting speed will be only 2 to 2 inches per minute. Not much air will be drawn through the cut gap to make up the deficit created b shutting down the return air flow to the silo. However, the air flowing through this gap will be moving at a rather high velocity caused by the differential in pressure. Once the opening is fully cut and the cut-out section is lifted, conditions inside the silo will change rapidly. The negative pressure will drop as the plug is being lifted, which may cause nuisance tripping, alarms, and unnecessary shutdowns. It would be advisable to operate the Radon Control System (RCS) in manual mode during cutting operations. The return air should also be operated in manual mode to limit the velocity of air entering the silo through the cut gap unit the time plug is ready to be lifted out, at which point the return air can be shut down. The plan should be revised accordingly.
Response: Comment acknowledged.
Action: Section 3.1 has been rewritten with an alternate approach to provide better control of airflow and silo pressure during dome penetration and riser installation activities. The specific text is provided in the response to OEPA comment 1.

3. Commenting Organization: U.S. EPA Commentor: Jablonowski
Section #: 3.1 Pg #: 5 of 12 Line #:NA
Original Specific Comment #: 2
Comment: The text states that "to maximize the velocity of air entering the active penetration and significantly minimize the chance for radon release during this activity, flow from the silo may be increased to as high as 1,000 cfm to maximize inflow through the penetration, depending on the size of the penetration." Because there will be no return air entering the silo, all the make-up air will be drawn into the silo through the gap created by the cutting operation, which will be about 3/16 inch wide. Initially, 500 cubic feet per minute (cfm) of air will be drawn into the silo through this cut gap, which will enlarge at a rate of 2 to 3 inches per minute. Increasing the air flow out of the silo to 1,000 cfm would create very high air velocity at the cut gap and might shut down the RCS as a result of the negative pressure created inside the silo. The procedures discussed in the text should be reviewed and revised as necessary to address this issue.

Response: Comment acknowledged.

Action: Section 3.1 has been rewritten with an alternate approach to provide better control of airflow and silo pressure during dome penetration and riser installation activities. The specific text is provided in the response to OEPA comment 1.