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21 JAN 2004

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

DOE-0104-04

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

Dear Mr. Jablonowski and Mr. Schneider:

REVISED HEEL AND DECANT SUMP TANK SLUDGE REMOVAL PLAN FOR THE ACCELERATED WASTE RETRIEVAL PROJECT

References:
1. DOE letter, DOE-0006-4, G. Griffiths to G. Jablonowski and T. Schneider, "Heel and Decant Sump Tank Sludge Removal Plan for the Accelerated Waste Retrieval Project," dated October 7, 2003
2. Letter, G. Jablonowski to G. Griffiths, "Draft Heel and Decant Sump Tank Sludge removal Plan for the Accelerated Waste Retrieval Project," dated November 6, 2003
3. Letter, T. Schneider to G. Griffiths, "Re: Comments – Heel and Decant Sump Tank Sludge removal Plan for the Accelerated Waste Retrieval Project," dated November 16, 2003

Enclosed you will find the following documents that have been prepared in response to the comments from the United States Environmental Protection Agency (USEPA) and the Ohio Environmental Protection Agency (OEPA) on the Heel and Decant Sump Tank Sludge Removal Plan for the Accelerated Waste Retrieval Project (see References 2 and 3):

1. Response to Comments document addressing comments from the USEPA and OEPA on the draft Heel and Decant Sump Tank Sludge Removal Plan.

2. Revised Heel and Decant Sump Tank Sludge Removal Plan, which incorporates the revisions noted in the Response to Comments.

If you have any questions or comments regarding the enclosed documents, please contact John Sattler at (513) 648-3145.

Sincerely,

WJ Taylor

FCP:Sattler

William J. Taylor
Director

Enclosures: As Stated

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

cc w/o enclosures:
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

RESPONSES TO COMMENTS ON: REMEDIAL DESIGN FOR SILOS 1 AND 2 HEEL REMOVAL AND DECANT SUMP TANK SLUDGE REMOVAL

Ohio EPA Comments

General Comments:

1. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: na Pg #: na Line #: na Code: C
Original Comment #:
Comment: The criteria for determining when enough heel has been removed is vague. What radon concentrations are necessary to turn off the RCS?

Response: The primary criterion for completion of heel removal is the ability to meet the prerequisites for initiation of decontamination and demolition (D&D) of the Silo 1 and 2 structures. One of the prerequisites to initiating D&D is the ability to isolate the silo structures from the RCS without causing environmental (fenceline) or onsite (workplace) radon levels to be exceeded. The RCS could be turned off (from treating silos radon) when the measured rate of radon emanation is less than a predetermined threshold value. The threshold rate is the rate such that were the emanation to enter the environment uncontrolled, the concentration of airborne radon at selected receptor points, and the estimated exposures calculated therefrom, would be within acceptable limits. It is at that point that the RCS could be shut off from controlling radon within the silos.

The actual rate of radon emissions from the heel will depend upon the concentration of K-65 material remaining in the heel, and on the emanation characteristics associated with the residual. Modeling has been performed of radon emission from 8 inches of heel, assuming a 15% K-65 solids concentration in the residual. Based on those results, the impact to the FCP fenceline would result in an extremely low incremental radon concentration increase. This additional projected increase in radon concentration would be so low as to have minimal impact on the 0.5 pCi/l annual average proposed fenceline 10CFR834 limit. This modeling is continuing to be reviewed and refined.

Even if the amount of residual reaches the level consistent with initiating D&D, further removal activities could be undertaken. The extent of these actions will depend upon:

a) The ability of the heel material, after blending with inert materials (or grouting) and packaging, to meet LSA-1 requirements for shipment
b) The amount of blended or grouted waste that would be produced and require offsite disposal,
c) The operating status of treatment capability within the Silos 1&2 Treatment facility, and,
d) The schedule for subsequent phases of the AWR Project i.e. Silos 1 and 2 D&D.

Action: The above text has been added to the Executive Summary section of the Plan.

2. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: na Pg #: na Line #: na Code: C
Original Comment #:
Comment: The issues regarding heel removal are not clearly identified. The design should include clear goals, and, then how design accomplishes these goals.

Response: The primary objective for the heel removal process is to clean the silos to acceptable levels for decontamination and decommissioning operations. The goal of each of the potential steps of heel removal is to transfer as much of the residual Silos 1 and 2 material to the TTA as is practical without proceeding beyond a point where, as pointed out in Ohio EPA's next comment, "large amounts of excess water is being generated with very small amounts of waste loading." As each of the six potential heel removal steps reaches this point of diminishing return, an evaluation will be conducted to determine if deployment of the next heel removal step is necessary. Our overall approach is presented in the decision tree presented in the Plan (Figure 1, page 3-2).

First, it should be recognized that the existence of a heel cannot be proven or inferred definitively from the existing data. It is postulated that there may be a different kind of material encountered as the process of bulk slurry removal proceeds with depth into the silos. Compaction over time may have produced a material that is somewhat more refractory to removal than the bulk waste overlying it. It is also possible, however, that the heel may not even exist as a material whose mobilization characteristics are differentiable from the bulk slurry itself, therefore presenting a removal challenge no different from that of the bulk material. Therefore, rather than a closed, specific design, the project is proposing a flexible, observationally-based approach for the removal of the heel.

The project has developed an operational definition of the "Heel": When the Hazelton pump with the large (approximately 10" immersion) screen is no longer effective in removing slurry the "Heel" has been reached. To get to the heel, we intend to operate the Hazelton pump that is currently part of the bulk slurry removal process until, observationally, it is judged to be no longer effective in waste removal. This means: Conducting limited sampling over time of the slurry exiting the Slurry Module to determine the % solids of the exiting, pumped slurry; ascertaining the distance from the bottom of the Hazelton Pump intake screen to the floor of the silo; visually confirming that the Hazelton pump has not dug itself into a cone of depression.

The sluicing units (there are two to each silo) can be used to blast out any mounded materials and thus control any cone into which the Hazelton pump may dig itself. We are able to monitor the length of the hose immersion into the silo, thus knowledge of the hose extension and the relative datum of the silo floor relative to the bridge will provide knowledge of the height of the pump screen above the floor of the silo.

When we see that the solids levels in the exiting slurry are consistently low (nominally less than 15%), that the distance to the floor of the silo is approaching 12" and that the Hazelton pump has not dug itself into a cone of depression, the heel has been reached. Via the three cameras

installed in the silo, we shall have visual access to the silo. Thus, we will be able to see the extent of removal.

At this point we will determine the rate of radon emission. If the rate is acceptable (See response to OEPA's General Comment #1) we will proceed to determine compliance of the material as an LSA-1 waste. A decision would be made here as to whether there is a need to proceed any further with heel removal.

Assuming that further removal is either required or desired, the large screen would be removed from the Hazelton pump and replaced with an essentially flat screen. This action will force the Hazelton pump to remove waste down to a level of about 1-2". Again, the determination of the effectiveness of the removal of waste would proceed much the same as above: Limited sampling, visual observation. The radon emission rate and the compliance of a blended or grouted waste with LSA-1 limits are again determined. When, observationally, the altered Hazelton pump is no longer effective in removing waste, we will evaluate the need to proceed to the next contingency.

If judged necessary, we will proceed to the use of a jet pump. The Hazelton pump within the Slurry Pumping module will be removed and replaced with a jet pump. The intake of the jet pump will be placed at the bottom of the sump located on the silo floor where the conical grading converges near the floor's center. By sluicing toward the sump we expect to be able to make further removal progress. As for the previous contingencies, we need to determine the effectiveness of the jet pumping operation. Limited sampling and visual observation will be employed to determine when the pump is no longer effectively removing silo material.

When the jet pump is no longer effective in waste transfer its operation will be discontinued. Depending on the amount, if any, and characteristics (radionuclide concentration and dose, radon emanations) of any residual heel remaining in the silo, additional actions may be implemented prior to initiation of D&D. These final actions may include blending the residual with inert material, grouting or fixing it in place, or manual removal.

At the end of this phase and depending upon the status of the berm removal, the decant ports will be removed. Sluice water will be directed to remove accumulated waste from the displaced weir boxes and the exposed ports they formerly covered. Continued sluicing of the floor of the silo and use of the jet pump in the sump will be employed to remove the waste liberated from the decant weirs and ports.

Finally at whatever point the removal of heel is completed, we will wash down the Silos interiors with the sluicers, and make preparations to initiate D&D.

Action: Text has been added to the Executive Summary and Section 3.2 to clarify the goals and criteria for the heel removal process.

3. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: na Pg #: na Line #: na Code: C
Original Comment #:
Comment: The six-step approach outlined in this RD appears to generate large amounts of excess sluice water with very small amounts of waste loading. How will the excess water be handled?

Response: As stated in Section 1.0, it is not expected that all of the steps will be necessary in order to remove sufficient heel material. Minimizing the generation of sluice water with very small waste loading is a primary objective of the six-step approach.

As stated in Section 1.0, all of the six steps are not expected to be necessary in order to remove sufficient heel material. Minimizing the generation of excess water per unit volume of heel material removed is a primary objective of the six-step approach. The project is, however, currently evaluating options for the management of water expected to be generated and utilized during AWR operations (including heel removal), the Silo 1&2 treatment processes, and the D&D actions that will follow. This investigation will include an estimation of water quantities, evaluation of interim storage options as/if necessary, and ultimate treatment and disposal options. The investigation is expected to be completed during the first quarter of CY 2004.

Action: The findings of this evaluation will be presented to OEPA and U.S. EPA for information.

4. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: na Pg #: na Line #: na Code: C
Original Comment #:
Comment: Several times throughout the document, DOE refers to using the ROV to remove heel material from the silos. Ohio EPA would like to have more information regarding this piece of equipment. Has the equipment been procured? What are its dimensions? Will the equipment be able to fit through the access points at the top of the silos or will a larger access point need to be established? Information regarding this piece of equipment is very vague.

Response: The Remotely Operated Vehicle (ROV) is no longer included in the heel removal design concept. As described in the response to Ohio EPA Comment #2 above, the action(s), if any, required to be taken after the third contingency of the heel removal process (jet pump) is completed, prior to initiating D&D, will be determined based upon the amount, and characteristics of any residual heel remaining in the silo and may include blending the residual with inert material, grouting or fixing it in place, and/or manual removal..

Action: The discussion of the ROV has been deleted from the plan; text has been added to the Executive Summary and Section 3.2 to clarify the goals and criteria for the heel removal process.

Specific Comments:

5. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: 1-1 Line #: na Code: C
Original Comment #:
Comment: In the last paragraph, the document states that heel removal operations could potentially be stopped when the amount of K-65 material is low enough that the RCS is not needed to control radon emissions. Later in the paragraph, it is stated the project will not stop heel removal simply because operation of the RCS is no longer required. These two statements seem to contradict each other. Please clarify.

Response: The goal of each step of the proposed heel removal approach is to remove as much heel material as possible before the technique being utilized becomes ineffective. As illustrated by the logic diagram in Figure 1, the decision to either consider heel removal complete, or to proceed to the next step in the removal process will be based upon determination of whether or not the removal of additional heel material is required to meet technical criteria for initiation of D&D of the Silo structures. These technical criteria include the ability to isolate the Silos from the RCS.

As pointed out in our response to Ohio EPA's General Comment #1, even if the amount of residual reaches a level that meets the criteria for initiation of D&D, further heel removal activities could be undertaken. The extent of these actions will depend upon:

a) The amount of packaged waste that would be produced and require offsite disposal,
b) The operating status of treatment capability within the Silos 1&2 Treatment Facility, and
c) The schedule for subsequent phases of the AWR Project, i.e. Silos 1 and 2 D&D.

If, for example, the Silos 1 & 2 treatment process were still in operation when the threshold was reached, there could be an advantage to conducting further removal to lower the amount of blended or grouted waste that would be produced and ultimately handled by the D&D actions including offsite disposal. In this case, and notwithstanding the complications that may be associated with additional wastewater generation, further removal activities would proceed.

Action: Text has been added to the Executive Summary and Section 3.2 to clarify the goals and criteria of the heel removal process.

6. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: 1-2 Line #: na Code: C
Original Comment #:
Comment: Para 4. If the heel material is set up to the point that the heel will not sluice, the material may break off in "chunks". How will the jet pump be able to pump "chunks" of material.

Response: Depending on the size of chunks, the jet pump will not be able to handle such material. Of course, we would make attempts to use the sluicing systems to break down the size, but this method also may not be successful. Ultimately there may be a situation that arises wherein the only option available to the project is to blend or grout the remaining heel along with the anticipated debris including the decant ports which will have been knocked into the Silo. (See response to General Comment: Ohio EPA #2).

Action: No change required.

7. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Executive Summary Pg #: 1-2 Line #: na Code: C
Original Comment #:
Comment: Para. 5. It is unclear how the decant ports can be flushed effectively if one side of the port is blocked by the silo berm. If the ports are flushed from the inside out, how will the water be contained?
Response: There are two alternatives for cleaning out the Decant Ports: 1) If the berm has been removed, then the decant ports will be flushed out from the outside of the silo, and the collected water will be pumped to the TTA; or 2) if the berm remains in place, a mechanical device (being developed by MSE, Inc.) will be used to physically remove the decant ports (weir and baffle assemblies) from the inside, allowing the sluicer spray to wash down the ports from the inside. The wash water in this case will also be pumped to the TTA.

Action: No change required.

8. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.2 Pg #: 3-2 Line #: na Code: C
Original Comment #:
Comment: What radon emissions are necessary to discontinue RCS operation and end heel removal? What if these emissions are never met?

Response: The primary criterion for completion of heel removal is the removal of sufficient heel material to allow the initiation of D&D of the Silo 1 and 2 structures. One of the prerequisites to initiating D&D is the ability to isolate the silo structures from the RCS without causing environmental (fenceline) or workplace (onsite) radon levels to be exceeded. Modeling has been performed of radon emission from 8 inches of heel, assuming a 15% K-65 solids concentration in the residual. Based on those results, the impact to the FCP fenceline would result in an extremely low incremental radon concentration increase. This additional projected increase in

radon concentration would be so low as to have minimal impact on the 0.5 pCi/l annual average proposed fenceline 10CFR834 limit. This modeling is continuing to be reviewed and refined. Based upon the evaluations supporting this heel removal design, a situation where an acceptable emission rate cannot be met is considered to be very improbable.

Action: No changes required.

9. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 4.0 Pg #: 4-1 Line #: na Code: C
Original Comment #:
Comment: The text describes modification of the Hazleton pump for heel removal and the risk of damage to the pump. Will there be a standby pump on hand in case of damage or failure of the pump during heel removal?

Response: The modification to the Hazelton pump will be made when it is judged that the Hazelton pump configured for bulk slurry removal has completed its mission, namely, the removal of the bulk slurry from one of the silos. When the modification to the pump is made, (removal of the screen as described in Section 4.1.1) the project is essentially sacrificing the Hazelton pump to heel removal. There is no standby Hazelton pump nor need there be one.

The next contingency that the project would then implement (if required) is the deployment of the jet pump. The Hazelton pump will be removed and the jet pump will be deployed in the existing Bulk Slurry Pumping Module modified to accept the jet pump.

Action: No change required.

10. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5.1 Pg #: 5-1 Line #: na Code: C
Original Comment #:
Comment: The use of the slurry jet pump appears to be designed to remove an additional 3/4" to 1-1/4 " of material. Is this step necessary?

Response: As stated in Section 1.0, it is not expected that all of the steps will be necessary in order to remove sufficient heel material. Although the necessary systems for implementation of each of the potential steps are being designed and put in place to ensure timely completion of heel removal, only those steps required to meet the criteria for initiation of Silo 1 and 2 D&D will be implemented.

Action: No changes required

11. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.0 Pg #: General Line #: na Code: C
Original Comment #:
Comment: The design insufficiently describes the ROV and its specifications.

Response: The Remotely Operated Vehicle (ROV) is no longer included in the heel removal design concept. See the response to Ohio EPA Comment 4.

Action: The discussion of the ROV has been deleted from the plan; text has been added to the Executive Summary and Section 3.2 to clarify the goals and criteria for the heel removal process.

12. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 10.1 Pg #: 10-1 Line #: na Code: C
Original Comment #:
Comment: Define the amount of sludge that is acceptable for tank removal during D & D operations.

Response: There is currently no specified amount of sludge that must be removed from the decant sump tank prior to removal of the tank; the goal is to remove all visible sludge from the tank prior to its disposal. A performance specification is being prepared for use to procure the services of a subcontractor whose objective will be to remove the sludge to this level. Even if the subcontractor is successful in removing all visible sludge, there will be a residual remaining that is expected to present a radiological hazard to D&D workers thus necessitating implementation of a plan for the minimization of worker exposures and releases of radon to the working environment.

Action: The above text has been added to Section 10.1 of the Plan.

13. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 10.1 Pg #: 10-1 Line #: na Code: C
Original Comment #:
Comment: The description for decant sump tank sludge removal is vague. No equipment is specified.
Response: A performance specification for removal of the sludge in the Decant Sump Tank is currently in draft. This specification lists the operation and technical performance requirements for the equipment to be used for the removal of the sludge. The specification will be used to procure the service of a tank-cleaning subcontractor.

Action: The performance specification will be provided for U.S. EPA and OEPA information to provide additional details of Decant Sump Tank sludge removal.

14. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 10.1 Pg #: 10-1 Line #: na Code: C
Original Comment #:
Comment: What are some of the options for alternate treatment mentioned in this section?
Response: If it is not practical to transfer the sludge to the Silos 1 and 2 Remediation Facility, then an alternate means will be used to meet requirements specified by disposal facility Waste Acceptance Criteria (WAC) and applicable transportation regulations. Potential methods include mixing the sludge with grout, or blending it with soil, flyash, or other inert materials as required to attain criteria such as moisture content and radionuclide activity or dose rate.

Action: No change required.

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U.S. EPA COMMENTS

Specific Comments

1. Commenting Organization: U.S. EPA Commentor: Jablonowski
Section #: 3.3.4 Pg #: 3-4 Line #: Not Applicable (NA)
Original Specific Comment #: 1
Comment: The text states that "during decant tank cleaning operations, ventilation can also be provided by the Radon Control System (RCS) as needed." It is not clear whether any other types of ventilation systems are available for the decant tank in the event that the RCS cannot be used. The text should be revised to clarify this issue.

Response: Removal of the sludge from the Decant Sludge Tank will be accomplished by a procured subcontractor. The present project schedule allows for the RCS to be in operation during the cleanout of the Decant Sump Tank. At present, no other systems for ventilation of the Decant Sump tank have been planned or identified as necessary. If, when we procure this subcontractor there appears to be a need for additional ventilation capability, a requirement to provide a portable system (e.g. a package carbon adsorption air unit) could be incorporated into the specification.

Action: The referenced text has been clarified.

2. Commenting Organization: U.S. EPA Commentor: Jablonowski
Section #: 6.0 Pg #: 6-1 Line #: NA
Original Specific Comment #: 2
Comment: The text discusses use of a remotely operated Vehicle (ROV) for heel removal. It is not clear how large this ROV is or how it will be deployed in a silo. The silo openings are rather small to accommodate the ROV and all the attachments listed, as well as ensuring proper placement and orientation. In addition, the text states that the ROV will be equipped with a water sluicer nozzle and other attachments. The text does not specify what the sluicer nozzle discharge pressure will be or whether the ROV will have adequate mass to resist the force of the sluicer nozzle. The text should be revised to discuss these issues.

Response: The Remotely Operated Vehicle (ROV) is no longer included in the heel removal design concept. As described in the response to Ohio EPA Comment #2 above, the action(s), if any, required to be taken after the third contingency of the heel removal process (jet pump) is completed, prior to initiating D&D, will be determined based upon the amount, and characteristics of any residual heel remaining in the silo and may include blending the residual with inert material, grouting or fixing it in place, and/or manual removal..

Action: The discussion of the ROV has been deleted from the plan; text has been added to the Executive Summary and Section 3.2 to clarify the goals and criteria for the heel removal process.

3. Commenting Organization: U.S. EPA Commentor: Jablonowski
Section #: 6.1.2 Pg #: 6-2 Line #: NA
Original Specific Comment #: 3
Comment: The text discusses cable management and the use of an umbilical for the ROV. It is not clear how cable management will be performed to prevent interference with the sluicer nozzles. It is also not clear how the ROV would be retrieved in the event of equipment failure, or if the umbilical can be used to remove the ROV. The text should be revised to discuss these issues.

Response: The Remotely Operated Vehicle (ROV) is no longer included in the heel removal design concept. As described in the response to Ohio EPA Comment #2 above, the action(s), if any, required to be taken after the third contingency of the heel removal process (jet pump) is completed, prior to initiating D&D, will be determined based upon the amount, and characteristics of any residual heel remaining in the silo and may include blending the residual with inert material, grouting or fixing it in place, and/or manual removal..

Action: The discussion of the ROV has been deleted from the plan; text has been added to the Executive Summary and Section 3.2 to clarify the goals and criteria for the heel removal process.