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**Department of Energy**

**Ohio Field Office**
**Fernald Closure Project**
**175 Tri-County Parkway**
**Springdale, Ohio 45246**
**(513) 648-3155**

MAR 1 1 2005

Mr. James A. Saric, Remedial Project Manager
U.S. Environmental Protection Agency
Region V-SRF-5J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

DOE-0185-05

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 E. 5th St.
Dayton, OH 45402-2911

Dear Mr. Saric and Mr. Schneider:

**AMENDMENT AND RESPONSE TO COMMENTS FOR THE OU4 COMPLEX SILOS 1&2 IMPLEMENTATION PLAN FOR ABOVE-GRADE DECONTAMINATION AND DISMANTLEMENT AND AMENDMENT TO OPERABLE UNIT 3 INTEGRATED REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN REGULATORY MILESTONES**

References:
1) Letter, T. A. Schneider to W. J. Taylor, "Re: Operable Unit 3 Operable Unit 4 (OU4) Complex Silos 1&2 Implementation Plan for Above-Grade Decontamination and Dismantlement, dated February 8, 2005

2) Letter, J. A. Saric to J. W. Reising, "Re: OU 4 Complex Implementation Plan, dated February 2, 2005

In response to Reference Letter 1 and according to discussions between the U.S. Department of Energy and regulatory agencies during the weekly conference call on February 22, 2005, an amendment has been prepared to provide additional details relating to the Decontamination and Dismantlement (D&D) activities for Components 34A (Silo 2) and 34B (Silo 1) along with the Silos 1&2 and AWR Bridges. The intent of this amendment is to detail Components 34A, 34B and the bridges demolition work scope such that regulatory agency concerns are addressed and dismantlement activities specific to these components may begin.

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Additionally, the remainder of the Silos 1&2 Complex components identified in the OU4 Silos 1&2 D&D Implementation Plan will be re-examined and a revision will be made to update the implementation plan based upon actual facility operation. The milestone date for submittal of the Revision 1 Silos 1&2 D&D Implementation Plan is September 30, 2005. This milestone date has been added to Table 6-1 and Figure 6-1 of the OU3 Integrated Remedial Design/Remedial Action Work Plan as Page Change Notice 9 (PCN9). Our intent will be to submit the Revision 1 Silos 1&2 D&D Implementation Plan 30 days after startup of Silos 1&2 operations, which should occur before the September 30, 2005 milestone date. Please remove the existing RD/RA Work Plan pages affected by PCN9 and replace them with the enclosure.

In response to Reference Letter 2, this letter also transmits the response to comments along with the OU4 Complex Silos 1&2 Implementation Plan for Above-Grade D&D Page Change Notice 1 (PCN1). Please note Figure 1-1 has been corrected to include all Silo 1&2 Components and is enclosed with PCN1. Please remove the existing OU4 Complex Silos 1&2 Implementation Plan for Above-Grade D&D pages affected by PCN1 and replace them with the enclosure.

If you have any questions or need further information, please contact Johnny Reising at (513) 648-3139 or Ed Skintik at (513) 246-1369.

Sincerely,

William J. Taylor
Director

Enclosure: As Stated

cc:
w/enclosure

J. Reising, OH/FCP
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G. Jablonowski, USEPA-V, SR-6J
T. Schneider, OEPA-Dayton (three copies of enclosure)
F. Bell, ATSDR
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M. Shupe, HIS Geo Trans
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J. Fry, Fluor Fernald, Inc./MS64
F. Johnston, Fluor Fernald, Inc./MS52-5
C. Murphy, Fluor Fernald, Inc./MS77
Pat O'Neill, Fluor Fernald, Inc./MS52-1
D. Powell, Fluor Fernald, Inc./MS64
D. Sizemore, Fluor Fernald, Inc./MS02
ECDC Fluor Fernald, Inc./MS52-7
Silos Project Number 40430.1.2 Fluor Fernald, Inc./MS20
Administrative Record Fluor Fernald, Inc./MS78

# AMENDMENT #1 - OPERABLE UNIT 4 (OU4) COMPLEX SILOS 1&2 IMPLEMENTATION PLAN FOR ABOVE GRADE DECONTAMINATION AND DISMANTLEMENT ADDITIONAL DETAIL FOR COMPONENTS 34A, 34B AND G-008 (SILOS 1&2 AND AWR BRIDGES) DECONTAMINATION AND DISMANTLEMENT ACTIVITIES

**MARCH 2005**

## 1.0 Project Statement

This amendment to the Operable Unit 4 (OU4) Complex Silos 1&2 Implementation Plan provides additional Decontamination and Dismantlement (D&D) activities detail for Components 34A (Silo2), 34B (Silo1) and G-008 (Silos 1&2 and AWR Bridges) that are located at the U.S. Department of Energy (DOE) Fernald Closure Project (FCP) in Fernald, Ohio.

## 2.0 Silos 1&2 Additional D&D Activities Detail

Phase 1 D&D Activities

Prior to D&D, isolation verifications will be completed for the following equipment:

- The abandoned Radon Control System hoses and electrical conduits located on the earthen berm.
- The high-pressure water to duct spool pieces (3) between Silo 1 and the Silo 1 Bridge.
- The Silo 1 slurry and sluice piping and the RCS ducting.

Once the respective isolation verifications are complete, the Fluor Fernald Self-Perform Group will perform the following D&D activities:

- Remove, size-reduce and containerize the Radon Control System hoses and electrical conduits located on the earthen berm.
- Size-reduce and containerize the Radon Control System hose support steel located on the east side of Silo 2 earthen berm.
- Remove, size-reduce and containerize the "T" posts and woven wire fencing on and around the earthen berm.
- Remove, size-reduce and containerize other miscellaneous equipment as required to support excavation of the earthen berm.
- Remove duct spool pieces (3) between Silo 1 and the Silo 1 bridge, cover resulting module and silo openings with ¾" plywood and "C" clamps.
- Cut visual inspection access for WAO (Waste Acceptance Operations) in isolated Silo 1 slurry and sluice piping and RCS ducting as directed by WAO.
- Transport the resulting debris to the On-Site Disposal Facility (OSDF) for placement.

Berm Removal

Prior to Phase 2, 3 & 4 D&D activities, the earthen berm will be excavated and removed by the Fluor Fernald Self-Perform Group per Silos Design Change Notice #40710-DCN-724. During the earthen berm excavation, the Silos Project will conduct core sampling of the Silos 1&2 concrete wall, remove the Decant Sump stand pipe and pump out the sump contents.

Phase 2 D&D Activities

Upon completion of the earthen berm removal, the Fluor Fernald Self-Perform Group will perform the following D&D activities:

- Rig and torch-cut the Silo 1 east and west stair tower sheet piling at grade.
- Size reduce and containerize the sheet piling.
- Transport the resulting debris to the OSDF for placement.
- Establish Silo 1 dust suppression, air monitoring and radiological/construction boundaries.
- Demolish the Silo 1 concrete walls and dome utilizing a track hoe with concrete processor attachment.
- Transport the Silo 1 sized concrete wall and dome debris to Soil Pile 7 (SP-7).
- Cover the remaining grout and at-grade slab with soil. Note: The Silo 1 grout and at-grade slab will remain in place until excavation of all waste pit material is complete and until sufficient gondola cars with lids are available for sized concrete debris shipment.
- Remove the Silo 1 grout, weir boxes and soil cover.
- Transport the Silo 1 grout, weir boxes and soil cover to SP-7, blend with soil and load into rail cars.
- Demolish Silo 1 at grade slab, transport the Silo 1 at-grade slab sized debris to SP-7, blend with soil and load into rail cars.

Phase 3 D&D Activities

Upon completion of Phase 2 D&D and the Silo 2 waste retrieval activities, final cleanout of the Decant Sump and all Silo 1&2 safe shutdown activities by the Silos Project, the Fluor Fernald Self-Perform Group will perform the following D&D activities:

- Remove, inspect, wash (if necessary) and containerize the Decant Sump discharge line attached to Silo 1 bridge steel.
- Remove all piping, conduit and structural steel from the Silo 1 east stair tower north to the common Silo 1&2 bridge support tower.
- Demolish the Silo 1 Bridge by pulling the bridge south.
- Shear and load-out all bridge steel and equipment, segregate plate steel requiring torch cutting to an adjacent location and torch-cut/load-out.

- Rig and cut the common east to west bridge steel and piping between the common Silo 1&2 bridge support tower east to the location of system air gaps.
- Transport the resulting debris to the OSDF for placement.

Phase 4 D&D Activities

Upon completion of the Silo 2 weir box removal and grouting, the Fluor Fernald Self-Perform Group will perform the following D&D activities:

- Remove the duct spool pieces (3) between Silo 2 and the Silo 2 bridge, cover resulting module and silo openings using ¾" plywood and "C" clamps.
- Cut visual inspection access for WAO in the isolated Silo 2 slurry and sluice piping and RCS ducting as directed by WAO.
- Rig and torch-cut the Silo 2 east and west stair tower sheet piling at grade.
- Size-reduce and containerize the sheet piling.
- Transport the resulting debris to the OSDF for placement.
- Establish Silo 2 dust suppression, air monitoring and radiological/construction boundaries.
- Demolish the Silo 2 concrete walls and dome utilizing a track hoe with concrete processor attachment.
- Transport the Silo 2 sized concrete wall and dome debris to Soil Pile 7 (SP-7).
- Cover the remaining grout and at-grade slab with soil. Note: The Silo 2 grout and at-grade slab will remain in place until excavation of all waste pit material is complete and until sufficient gondola cars with lids are available for sized concrete debris shipment.
- Remove the Silo 2 grout, weir boxes and soil cover.
- Transport the Silo 2 grout, weir boxes and soil cover to SP-7, blend with soil and load into rail cars.
- Demolish Silo 2 at grade slab, transport the Silo 2 at-grade slab sized debris to SP-7, blend with soil and load into rail cars.
- Remove all the piping, conduit and structural steel from the Silo 2 east stair tower south up to and including the common Silo 1&2 bridge support tower.
- Demolish the Silo 2 Bridge by pulling the bridge south.
- Shear and load-out all the bridge steel and equipment, segregate plate steel requiring torch cutting to an adjacent location and torch-cut/load-out.
- As necessary, excavate to expose the Decant Sump structure.
- Demolish the Decant Sump structure, load-out debris to SP-7 and blend with soil.
- The K-65 Trench pipe (remaining Component 22E) and any piping beneath the silo slabs will be removed, size-reduced, visually inspected by WAO and dispositioned per WAO direction.

## 3.0 Debris Handling

The D&D project will employ methods of dust suppression that will maximize atomization of the water while minimizing the amount of water generated. A surfactant may be utilized during dust suppression to help maximize efficiency of the dust suppression. Upon completion of silo concrete demolition, a surface encapsulant will be applied to the sized concrete debris pile.

Component 34A and 34B sized concrete debris generated during the D&D Phases 2 & 4, will be wetted down and loaded into articulating dump trucks. The articulating dump trucks will be located on the roadway just to the west of Component 34A and 34B. Tarps will be placed over each truckload to further minimize dust. The debris will be transported north for temporary staging at SP-7. From SP-7, the sized concrete debris will be wetted down and loaded into covered gondola cars. The waste packaging activity will involve placing a soil layer in the base of each gondola car, followed by placement of silos concrete debris and covered with the final soil layer. There will be a concrete/debris to soil mixture not to exceed 16% for each gondola car. This will ensure the 5,000 pCi/g Envirocare requirement is met. Once the packaging activity is complete, the gondola cars will be shipped to Envirocare for disposition.

## 4.0 Air Sampling/Modeling

Silos Radiological Engineering will develop, modify and implement an air sampling plan that addresses isotopes of concern, sampling methods, placement and analysis for the protection of personnel working in or adjacent to the described activities. Also, this document will provide detail with respect to source terms, area and personnel monitoring, engineering/administrative controls and response to abnormal/unexpected air sampling results.

An analysis of the residual source term for Silo 1 has been completed and documented as the technical basis for the Project Specific Air Sampling Plan. At this time, Fernald Closure document SD-2095, Rev. 1, Silo 1 Residual Source Term and Radon Production Rate Determinations, dated 2/10/05, (Attachment A) has been issued.

An analysis of the residual source term for Silo 2 will be completed and documented as the technical basis for the Project Specific Air Sampling Plan, prior to initiation of the activities described in this plan.

These analysis will serve as a synopsis of the evaluations and derivation methods used to establish the potential source terms and dispersible quantities contained within the concrete structures and the potential local and fence line concentrations of both particulate radionuclides, radon gas and associated progeny.

Attachment A

| SUPPORTING DOCUMENT | DOCUMENT NO: SD- 2095 | Effective Date: 02/10/05 |
|---|---|---|
| FERNALD CLOSURE PROJECT<br>ESH&Q<br>SAFETY AND HEALTH<br>Silos Radiological Control | Position Paper: SILO 1 RESIDUAL SOURCE TERM AND RADON PRODUCTION RATE DETERMINATIONS | |
| | ☐ POSITION PAPER ■ TECHNICAL BASIS | |
| | AUTHOR: Jim Barber / Stan Waligora | Revision No: 1 |
| | Approval: *ON FILE* Date 2/9/05<br>Jim Barber, CHP, Silos Radiological Engineering and Control | |

**Concurrence Signature:**

*ON FILE* **Date:** 2/9/05

**Stanley J. Waligora Jr., CHP**

Supersedes - None

## SUMMARY LOG

| Revision Number | Effective Date | Description of Revision | Pages effected |
|---|---|---|---|
| 0 | 01/26/05 | Initial issuance | All |
| 1 | 02/10/2005 | Revised to include updated information and new analysis. | All |

## TABLE OF CONTENTS

## 1.0 PURPOSE

This analysis was performed to address three radiological questions that must be answered as Silo 1 moves to the final stage of remediation. The questions relate to the residual radionuclide inventory and/or the consequent Rn-222 production rate and their effect on environmental safety, worker health and safety, and Silo 1 downgrading.

## 2.0 SCOPE

This analysis applies only to Silo 1. A revision to this document will be performed to include data analysis when Silo 2 has reached a similar conditional circumstance.

## 3.0 BACKGROUND

In 1952, Silos 1 and 2 were constructed at the Fernald, Ohio, site and used for storage of approximately 10,000 tons of radium-bearing residues, referred to as K-65 residues. These residues remained within the silos for over 50 years. In CY2004, Fluor Fernald began Silos Waste Retrieval System (SWRS) operations, transferring residues to the newly-constructed Transfer Tank Area (TTA). These activities were conducted under the Accelerated Waste Retrieval (AWR) Project.

In December, 2004, Silo 1 retrieval operations had reached a point where the residues were considered effectively removed. It was time to move into the final remediation phase, demolition and disposal of the Silo 1 structure and residual debris. It is expected that Silo 2 will reach the same state in the first quarter of CY 2005.

## 4.0 PATH FORWARD CONSIDERATIONS

The final phases of remediation will consist, in part, of isolating Silo 1 from the Radon Control System (RCS) and opening it to the environment. In order to move forward on this path, there are three considerations requiring evaluation and/or resolution. Each consideration has its own unique criteria and/or concern, but all are dependent on the residual radionuclide inventory existing in Silo 1.

**Consideration 1:**
The Rn-222 production rate must not result in a fence-line concentration greater than .5 pCi/l (Rn-222) above background annual average.

**Consideration 2:**
The Rn-222 production rate will not result in unnecessary occupational radiation dose.

**Consideration 3:**
The residual radionuclide inventory is low enough for downgrading from an HC-3 Nuclear Facility to a less-than-nuclear facility.

## 5.0 METHOD OF ANALYSIS

There are multiple approaches/methods available for interpreting radiological conditions in order to address the three considerations specified above. Silos Radiological Engineering has selected one analytical approach based on available empirical data. The approach and the results are presented in this document.

Silo 1 (like Silo 2) has a Continuous Radon Monitor (CRM) installed in the upper headspace (dome) region. This instrument has been used throughout the waste removal process to monitor and track headspace Rn-222 (gas) concentrations, providing continuous data in pCi/L. Silos Radiological Engineering also has other non-fixed location (portable) CRM units of the same type used for area evaluations.

On Jan. 15, 2005, Operations began an internal rinse-down of the Silo 1 interior with recycled sluice water to remove as much sludge or residual material as possible. On Jan. 16, a final rinse with 16,000 gallons of fresh water was performed.

During these rinses, the internal radon concentrations rose to approximately 180,000 pCi/L. This was an expected condition resulting from radon being released from the sluice water into the void space of the silo. The RCS was operational during this period and subsequently drove the concentrations down to approximately 3,400 pCi/L at 1400 hrs the following day (Jan. 17). At that time, RCS Operations secured airflow through the silo.

Radiological Engineering then began a Rn-222 in-growth analysis using two CRM monitors. From 1500 Jan. 17th through 1600 hrs Jan. 19th, void space radon concentrations were tracked with measurements from the upper-region CRM. As an equilibrium state was expected to be reached sometime on Jan. 20th, the second CRM unit was deployed at 1600 hrs Jan. 19th with the sample hose approximately 8 feet above the floor. This was done to gather a second reference point sample location to verify that concentrations in the upper region did not differ significantly from the lower region.

At approximately 1200 hrs Jan. 20th, radon concentration measurements from both CRMs indicated a state of equilibrium had been reached at approximately 35,000 pCi/L, with an insignificant variance between the two readings. (see the attached data graph)

Making use of these equilibrium concentrations, and given that the Silo 1 void space is 4.77 E+06 L, total radon activity values and a production rate were calculated using the following equations.

Void Space Total Activity = (C ) (V)
Void Total Activity = (35,000 pCi/L)(4.77 E+06 L) = .167 Ci
**Total activity assuming a 10% release to air = 1.67 Ci Rn-222**

Production rate = (Void Space Total Act.) ($\lambda$)
**Production rate = (.167 E+12 pCi) (1.26E-04 / min) = 2.10 E+07 pCi/min**

The RCS was turned on and the radon concentrations decreased and stabilized on January 25 – 26, 2005. It was decided that another calculation of the emission rate would be made based on the stabilized radon-222 concentration with the ventilation rate on January 26, 2005. The average radon-222 concentration during that day was 9312 pCi/L and the RCS was ventilating 250 CFM from Silo 1.

$E = CV(Q/V + (\lambda)$

E = emission rate (pCi/min)
C = radon-222 concentration (pCi/L)
V = Silo 1 Volume (Liters)
Q = ventilation flow rate (L/Min)
$\lambda$ = radon-222 decay constant (1.259E-04 /min)

E = (9312 pCi/L) (4.77E+06 L) ((7.08E+03 L/min/4.77E+06 L) + (1.259E-04))
**E = 7.15 E+07 pCi/min**

The equilibrium radon-222 concentration without ventilation would be:

7.15E+07 pCi/min/ (1.259E-04/min x 4.77E+06 L) = *1.19E+05 pCi/L*

The total radon-222 activity would be:

1.19E+05 pCi/L x 4.77E+06 L = 0.568 Ci

Assuming an emanating fraction range of from 0.1 – 0.25, the radium-226 inventory is estimated to be in the range of 2.26 to 5.68 Ci.

On January 27, 2005, the interior surfaces of Silo 1 were grouted and the radon-222 emission rate and concentration decreased. The average radon concentration For January 28 – 31 was 2978 pCi/L. During that time, the ventilation flow from Silo 1 averaged an approximate 300 CFM.

E = (2978 pCi/L) (4.77E+06 L) ((8.50E+03 L/min/4.77E+06 L) + (1.259E-04))
**E = 2.72 E+07 pCi/min**

## 6.0 APPLICATION OF ANALYSIS RESULTS

The derived values for Rn-222 production rates and total activity can now be applied to the three identified considerations.

**Consideration 1:**
The Rn-222 production rate will not result in a fence-line concentration greater than .5 pCi/l (Rn-222) above background annual average.

Silos document 40710-CA-0029, *Radon-222 Area Source Release Considerations for a Silo Containing Only Residual Waste (Heel) Upon Termination of the Retrieval Process* [Ref. i] reverse-calculates a source term surface release rate of 22.3 Ci/year (Rn-222). Thus, 4.24 E+07 pCi/min. is needed to realize a .5 pCi/L fence-line annual average above background.

The derived post grout radon release rate for Silo 1 is 64% of the annual production rate that CAP 88 modeling indicates is needed to reach the fence line threshold of .5 pCi/L above background on an annual average.

**Consideration 2:**
The Rn-222 production rate will not result in unnecessary occupational radiation dose.

Local concentration air modeling was performed with BEE-line ISCST3 "BEEST" Version 8.60 software, utilizing 1.88 E+07 pCi/min as the release rate. Two models were run using 1991 meteorological data for release heights of 10 meters and 40 meters to simulate the initial condition of the silo dome being exposed (40 meters) and a subsequent lower release point as the silo itself is brought down, sized and packaged for disposition (10 meters).

Modeling results indicate the highest expected 1 hour Rn-222 concentration to be on the order of 2.38 pCi/L. Assuming a post grout release rate of 2.72 E+07 pCi/min and a daughter equilibrium concentration of 40% to 100%, this equates to a Derived Air Concentration (DAC) equivalent of 4.6% to 11.5%.

Based on the results of this analysis, Silos Radiological Control will establish a radiological boundary around Silos 1 & 2 once the RCS is removed from service, and demolition of the silos begins. Personnel performing work within that area will be required to wear respiratory protection and additional anti-contamination clothing as specified on the applicable Radiological Work Permit. These boundaries will be monitored, as will the outlying areas to ensure daily concentrations do not exceed those requiring additional monitoring and/or personnel protection.

Copies of the modeling reports, with input parameters and output results are attached to this document.

**Consideration 3:**
Is the residual radionuclide inventory sufficiently low to facilitate downgrading from an HC-3 Nuclear Facility to a less-than-nuclear facility.

DOE-STD-1027 [Ref. ii] establishes the guidance for hazard categorization of nuclear facilities, with Threshold Quantities (TQs) for radionuclides. The TQs for Hazard Category 3 Nuclear Facilities for the Silo 1 radionuclides are listed in Column 4 of the following table.

Applying the derived total Rn-222 activity of **2.26 – 5.68 Ci**, assuming Ra-226 at equilibrium, and utilizing the established 95% Upper Confidence Level ratios [Ref. iii] for Silo 1, the current radionuclide inventories are determined and compared to the TQs in **TABLE 1**.

**TABLE 1: COMPARISON OF SILO 1 RADIONUCLIDE INVENTORIES TO HC-3 TQs**

| Nuclide | Ratio to Ra-226 | Derived Value (Ci) using .1 to .25 | DOE-STD-1027 HC-3 TQs (Curies) | Results of Comparison to HC-3 TQs |
|---|---|---|---|---|
| **Ac-227** | **.016** | **.036 - .091** | **0.042** | **> HC-3 Threshold** |
| Pa-231 | .000 | 0 | 0.2 | < HC-3 Threshold |
| **Pb-210** | **.423** | **.956 – 2.40** | **0.36** | **> HC-3 Threshold** |
| **Po-210** | **.589** | **1.33 – 3.36** | **1.9** | **> HC-3 Threshold** |
| Ra-226 | 1 | 2.26 – 5.68 | 12 | < HC-3 Threshold |
| Th-228 | .005 | .011 - .028 | 1.0 | < HC-3 Threshold |
| **Th-230** | **.144** | **.325 - .818** | **0.62** | **> HC-3 Threshold** |
| Th-232 | .002 | .005 - .011 | 0.1 | < HC-3 Threshold |
| U-234 | .002 | .005 - .011 | 4.2 | < HC-3 Threshold |
| U-235 | .000 | 0 | 4.2 | < HC-3 Threshold |
| U-238 | .001 | .002 - .006 | 4.2 | < HC-3 Threshold |
| Rn-222 | 1 | 2.26 – 5.68 | 10 | < HC-3 Threshold |

Four isotopes, (Ac-227, Pb-210, Po-210 and Th-230) exceed the TQ for an HC-3 nuclear facility. The guidance in DOE-STD-1027-92 allows for modification of TQs if credible release fractions can be shown to be significantly different from the default values based on physical and chemical forms of the material and dispersive energy sources. Such a modification was documented and approved by DOE for the Silos 1 & 2 Remediation N-HASP [Ref. iv].

In DOE–STD-1027, the default airborne release fraction for solid materials is based on dry powders. Since the hazardous material analyzed in the N-HASP was actually slurry, the TQ was adjusted upward by a factor of 25 to account for the less-dispersible properties of the slurry as compared to dry powder. The residual waste in Silo 1 will be encased in grout in preparation for D&D activities. This solid form clearly allows for an adjusted TQ value for the isotopes of concern, which exceed the TQ.

## 7.0 RECOMMENDATIONS

Based on this analysis, Silos Radiological Engineering recommends that the Silos Project initiate processes to obtain DOE approval for the downgrade of Silo 1 from an HC-3 facility to a less-than-nuclear facility.

## 8.0 REFERENCES

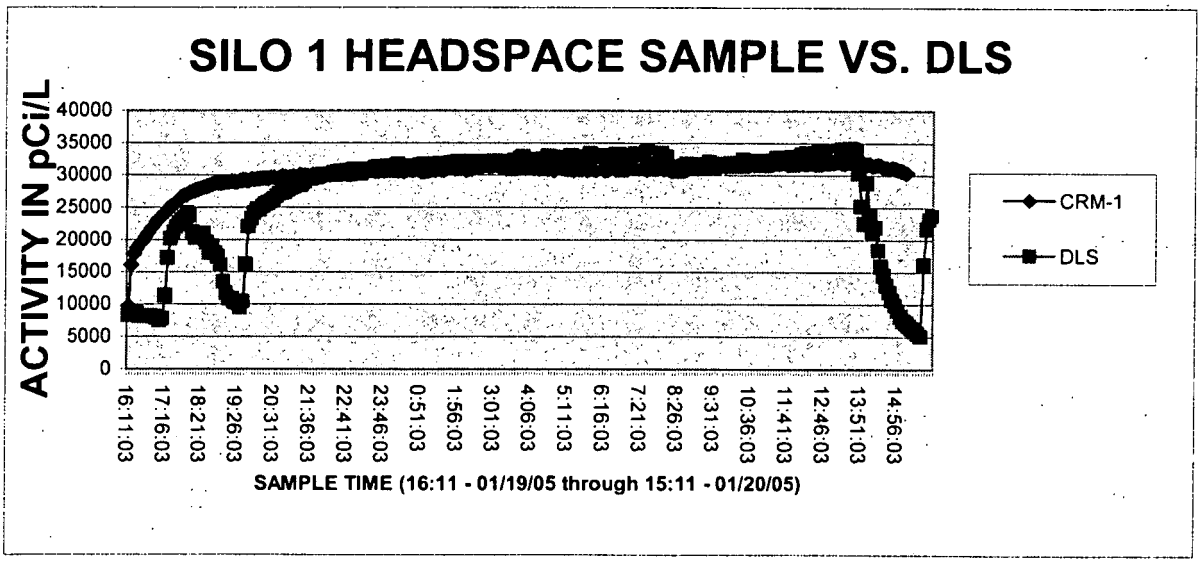
i. 40710-CA-0029, *Radon-222 Area Source Release Considerations for a Silo Containing Only Residual Waste (Heel) Upon Termination of the Retrieval Process*

ii. DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, U.S. Department of Energy; September, 1997

iii. *Remedial Investigation Report for Operable Unit 4*, Final, Volumes 1 through 3, Fernald Environmental Management Project; November, 1993

iv. 40710-PL-0015, *Silos 1 & 2 Remediation Nuclear Health and Safety Plan*, Fluor Fernald; 11-03-04

**GRAPH 1: COMPARISON OF THE UPPER AND LOWER CRM READINGS FROM 01/19-20/05**



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# OPERABLE UNIT 4 (OU4) COMPLEX SILOS 1&2 IMPLEMENTATION PLAN FOR ABOVE-GRADE DECONTAMINATION AND DISMANTLEMENT FERNALD CLOSURE PROJECT RESOLUTION TO USEPA COMMENTS

1) Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2 Pg #: 6 Line #: Not applicable (NA)
Original Specific Comment #: 1
Comment: The text states that, if practical, the K-65 Trench steel piping system will be cleaned to meet OSDF placement criteria. The text should be revised to include an appropriate reference or discussion relating to what method(s) will be used to accomplish this task.

Response: The last sentence of the first full paragraph on Page 6 has been changed to read "If practical, the K-65 Trench steel piping system will be cleaned using high pressure washwater within containment to meet OSDF placement criteria."

2) Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.3.2 Pg #: 8 Line #: NA
Original Specific Comment #: 2
Comment: The text states that up to 1,000,000 gallons of decontamination washwaters may be generated during D&D of Silos 1&2. The text should be revised to include an appropriate reference or discussion relating to how the washwater will be stored prior to pre-treatment and discharge to the Advanced Wastewater Treatment System.

Response: The 1,000,000 gallons of decontamination washwaters was a conservative projection for Silos 1&2, their associated structures and the Fluor Fernald construction equipment. Because of the effective material removal from the silos' interior surfaces, we expect to generate very little water during demolition of the actual Silo 1&2 concrete structures and their pipe bridges.

The following has been added as Paragraph 3 to Section 2.3.2: "The method of pre-treat for the Silo 1&2 concrete structures will be determined as a result of the concrete core sampling. Decontamination water used on the Silo 1&2 structures and their pipe bridges will be collected in onsite storage tanks with secondary containment and sampled prior to discharge to the AWWT. Bridge piping will be moved to a location where a containment can be established and decontamination performed using a high-pressure washer. After a reasonable effort is made, if the piping is unable to meet WAO inspection criteria, it will be placed in railcars for shipment to Envirocare. Decontamination activities and washwater generated during D&D of the remaining Silo 1&2 associated structures will be handled in a fashion similar to the actual Silo 1&2 concrete structures."

Additionally the 2nd sentence of the 2nd paragraph in Section 2.3.2 has been changed to read: "This wastewater may have to be pre-treated prior to discharge to the AWWT." The 3rd sentence of the 2nd paragraph in Section 2.3.2 has been deleted.

3) Commenting Organization: U.S. EPA Commenter: Saric
Section #: Appendix A Pg #: 1 Line #: NA Code:
Original Specific Comment #: 3
Comment: The text states that the silos material constituents may be sampled for heavy metals based on information gathered during silo operations. This information should have already been gathered and should be included in this report. Consequently, a determination regarding heavy metals sampling should have already been made.

Response: The text in Appendix A has been changed to read: " Prior to the demolition activity, core samples will be taken from the Silo 1&2 concrete structures and analyzed for heavy metals."

# OPERABLE UNIT FOUR COMPLEX SILOS 1&2 IMPLEMENTATION PLAN

## DOCUMENT NUMBER 40900-PL-0002 (REV. 0) PCN1

## PAGE CHANGES

INCLUDES:

COVER PAGE/RECORD OF REVISION

PAGE 3/4

PAGE 5/6

PAGE 7/8

PAGE 9/10

APPENDIX A PAGE 1/2

5907

# OPERABLE UNIT 3

## OPERABLE UNIT 4 (OU4) COMPLEX SILOS 1&2 IMPLEMENTATION PLAN FOR ABOVE-GRADE DECONTAMINATION AND DISMANTLEMENT


**FEBRUARY 2005**

**FERNALD CLOSURE PROJECT**
**FERNALD, OHIO**

**U. S. DEPARTMENT OF ENERGY**
**FERNALD AREA OFFICE**

**FINAL**

**DOCUMENT CONTROL NO. 40900-PL-0002 (REV. 0) PCN1**

## RECORD OF ISSUE/REVISION

| DATE | REVISION NO. | DESCRIPTION AND AUTHORITY |
|---|---|---|
| 12/15/04 | Rev. 0 | Issued Final Implementation Plan |
| 2/28/05 | Rev. 0, PCN1 | Page 4 - Revised Figure 1-1 to include Components 94T and 94Y.<br><br>Section 2.2, Paragraph 2 – The last sentence has been changed to read: "If practical, the K-65 Trench steel piping system will be cleaned using high pressure washwater within containment to meet OSDF placement criteria."<br><br>The following text has been added as Paragraph 3 to Section 2.3.2: "The method of pre-treat for Silo 1&2 concrete structures will be determined as a result of the concrete core sampling. Decontamination water used on the Silo 1&2 structures and their pipe bridges will be collected in onsite storage tanks with secondary containment and sampled prior to discharge to the AWWT. Bridge piping will be moved to a location where a containment can be established and decontamination performed using a high-pressure washer. After a reasonable effort is made, if the piping is unable to meet WAO inspection criteria, it will be placed in railcars for shipment to Envirocare. Decontamination activities and washwater generated during D&D of the remaining Silo 1&2 associated structures will be handled in a fashion similar to the actual Silo 1&2 concrete structures."<br><br>The 2nd sentence of the 2nd paragraph in Section 2.3.2 has been changed to read: "This wastewater may have to be pre-treated prior to discharge to the AWWT." The 3rd sentence of the 2nd paragraph in Section 2.3.2 has been deleted.<br><br>In Appendix A, under "Characterization Screening", the 3rd paragraph has been changed to read: "Prior to the demolition activity, core samples will be taken from the Silo 1&2 concrete structures and analyzed for heavy metals." |

Appendix D provides copies of available drawings and sketches that show floor plans and elevations of buildings/components. Appendix E contains selected photographs of notable features of Silos 1&2 and the associated structures.

## 1.4 Location of Silos 1&2

The Silos 1&2 project area is located at the U.S. Department of Energy (DOE) Fernald Closure Project (FCP) in Fernald, Ohio. Project components include the structures located north of Silo Road and south of the Biodenitrification Surge Lagoon within the southwestern-most block of the former Production Area. The Silos 1&2 project area is illustrated in Figure 1-1.

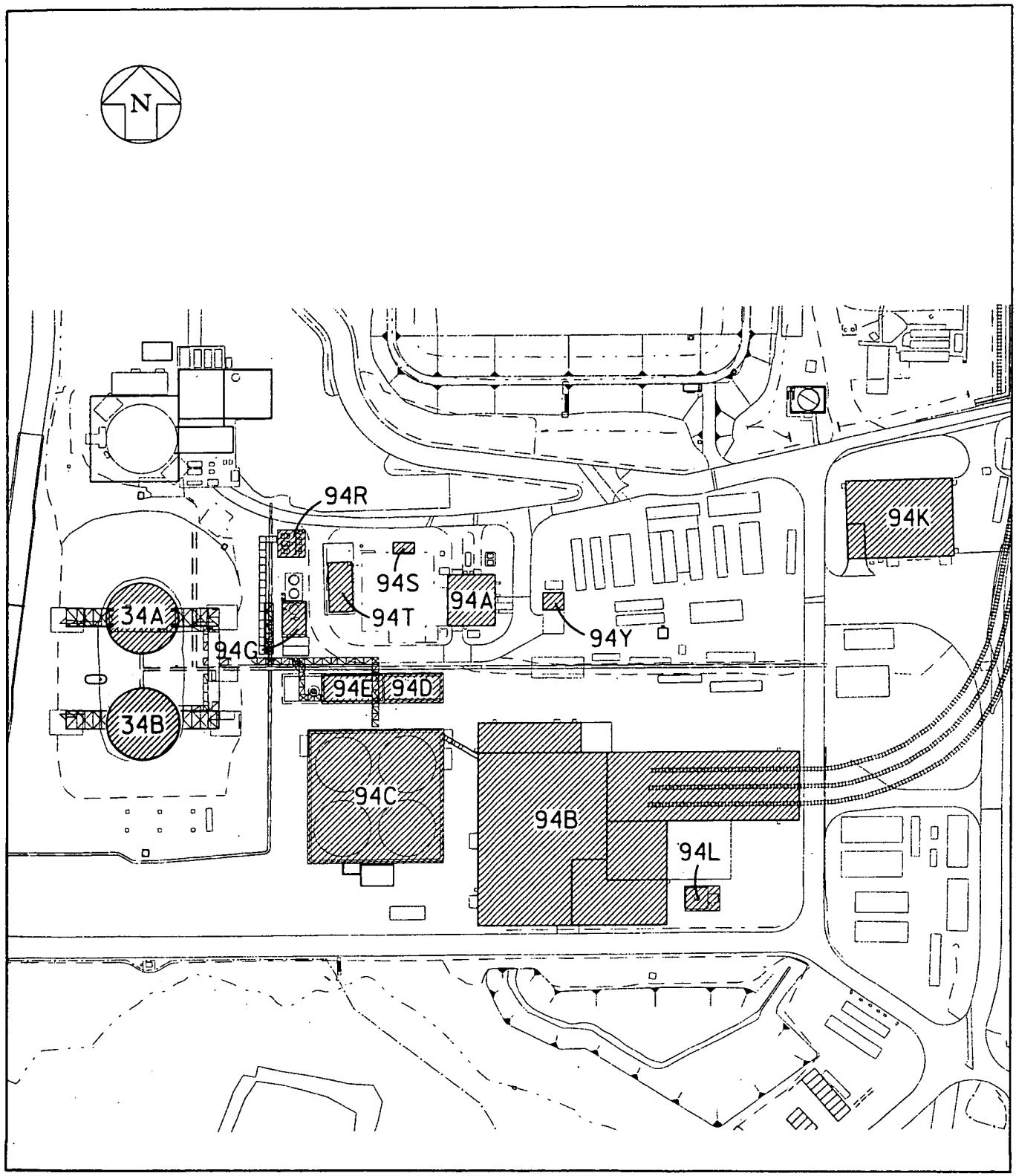


**FIGURE 1-1 Silos 1&2 and Associated Structures PCN1**

## 2.0 GENERAL PROJECT REMEDIATION APPROACH

The overall approach to the above-grade D&D of Silos 1&2 and associated structures is based on the project-specific applications of the programmatic elements and tasks that were described in Section 3 of the OU3 Integrated RD/RA Work Plan. Section 2 of the implementation plan summarizes the project-specific applications of those elements.

### 2.1 Sequencing of Remediation

The remediation sequence for components in the OU4 Complex Silos 1&2 D&D project covers the period of: 1) premobilization, which includes the preparation, review and approval of the Fluor Fernald self-perform work control documents, health and safety documents, etc; 2) mobilization, which includes establishing project support facilities and controls; 3) actual D&D field activities for each building/component; and 4) demobilization, which includes securing the area and decontaminating/removing Fluor Fernald self-perform equipment. The actual sequence of building/component D&D will be determined by the Fluor Fernald self-perform project schedule which includes the operational sequence for shut-down of facilities. It is anticipated that the sequence for dismantlement may be the following:

1. Component 34B – K-65 Storage Tank (Silo 1)
2. Component G-008 – Silo 1 Bridge
3. Component 34A – K-65 Storage Tank (Silo 2)
4. Component G-008 - Silo 2 Bridge
5. Component F34-4 – Decant Sump Tank
6. Component 22E – K-65 Trench
7. Building 94T – Silos Test Stand
8. Building 94S – Silos Small Lab Building
9. Building 94R – Silos 1&2 High Pressure Pump/Breathing Air Utility Building
10. Component G-008 – AWR Bridges
11. Building 94C – Silos 1&2 Transfer Tank Area
12. Building 94A – Silos Operations/Maintenance Building
13. Building 94Y – Silos Maintenance Building
14. Building 94G – Silos 1&2 Electrical Building
15. Building 94D – Silos 1&2 Carbon Bed Facility
16. Building 94E – Silos 1&2 Radon Control System (RCS)
17. Building 94J – AWR Continuous Emissions Monitoring (CEM) Building
18. Building 94L – Silos 1&2 Continuous Emissions Monitoring (CEM) Building
19. Building 94B – Silos 1&2 Remediation Facility
20. Building 94K – Silos 1&2 North Warehouse

### 2.2 Characterization of Silos 1&2 and Associated Structures

Aside from Silos 1&2, the K-65 trench and Decant Sump Tank, the buildings are new structures. Building 94 (VITPP) was briefly operated to demonstrate the ability to make gems from surrogate material and shutdown after the melter failed resulting in RCRA contaminated systems and components. This plant was modified in 1998 to remove RCRA contaminated

plant components and to decommission the facility. In 2001, partial demolition of the facility was completed removing additional structures, systems and components. At this time, the facility was renovated for its existing use as the Silos Operations and Maintenance facility.

Based on knowledge from previous remediation activities associated with Component 22E (K-65 Trench) in the Silos 1&2 area, elevated concentrations of Technetium-99 may exist in the remaining trench. If Technetium-99 is found to exist, the remaining K-65 Trench gravel backfill will be removed and disposed offsite. If practical, the K-65 Trench steel piping system will be cleaned using high pressure washwater within containment to meet OSDF placement criteria. **PCN1**

Just prior to D&D, Silos 1&2 and associated structures will be surveyed so that debris disposition can be established based on the survey results. Upon availability, the radiological characterization information for Silos 1&2 and associated structures will be issued with a submittal letter to the regulatory agencies.

D&D debris that has come in direct contact with the Silos 1&2 material will be evaluated for disposition in accordance with the criteria outlined in Section 3.3.1 of the OU3 Integrated RD/RA Work Plan.

D&D debris that has not come in direct contact with Silos 1&2 material (ex: structural steel, non-process pipe & equipment and structural concrete) will be evaluated for disposition in accordance with the criteria outlined in Section 3.3.1 of the OU3 Integrated RD/RA Work Plan. It is anticipated that this material will be released for off-site disposal. Changing radiological conditions could alter the waste disposition of this D&D debris.

The most significant radiological concerns are the health and safety of the workers during dismantlement of Silos 1&2 (Component 34A & 34B). Standard technology will be used to prevent or minimize generation of airborne contamination. Component 34A and 34B are known to have residual Radium-226 contamination. This condition requires thorough surface cleaning to remove any loose contamination and the use of additional high efficiency particulate air (HEPA) filtration ventilation devices and vacuums, which amounts to approximately two times the typical number of HEPA air filtration devices and approximately one and one-half time the typical number of HEPA vacuums.

Specific uses of the radiological survey data to be obtained prior to the D&D activities will support the following efforts:

- Developing the safety assessment documentation to support the proposed activities.
- Enhancing the project-specific health and safety requirements and determining potential concerns for worker protection based on the suggested D&D techniques.
- Documenting expected contamination levels for self-performing the work.
- Determining personnel monitoring requirements.

- Identifying specific systems or equipment that will require radiological engineered controls prior to dismantlement.
- Air modeling for and assessment of potential radiological air emissions.
- Identifying potential gross radiological contamination that will need to be removed/fixed prior to exposing affected material surfaces to the environment.

Due to support facility construction in recent years, it is anticipated that there will be no friable asbestos containing materials (ACM) present in the OU4 Complex Silos 1&2 D&D Project. Silos 1&2 and associated structures will be evaluated by a State of Ohio-Certified Asbestos Hazard Evaluation Specialist for asbestos containing materials (ACM) prior to demolition activities. Results of the evaluation will be used to determine asbestos abatement requirements for the Silos 1&2 D&D activity. The results of this evaluation will be forthcoming and therefore are not available to be presented in this implementation plan. If required, sampling criteria for asbestos abatement activities will be established just prior to the OU4 Silos 1&2 D&D Project activities.

## 2.3 Materials Management

Project-specific material management strategies for the OU4 Complex Silos 1&2 D&D project are based on the overall material management strategies that were presented in Section 3.3 of the OU3 Integrated RD/RA Work Plan and the project-specific requirements presented in Specification Section 01120. Management of primary and secondary waste materials estimated to be generated during the OU4 Complex Silos 1&2 D&D project is discussed in this section.

Waste minimization will be accomplished, in part, by ensuring that equipment and material are unpacked prior to entering the FCP controlled area whenever possible. This administrative control will limit the amount of trash that could become contaminated and limit quantities of any hazardous material brought into the project area.

### 2.3.1 Primary Materials Management

Primary materials refer to the debris that will be generated by the dismantlement of the components and structures associated with Silos 1&2. During the remedial design, a Project Waste Identification and Disposition form (PWID — see Section 3.3.1 of the OU3 Integrated RD/RA Work Plan for description) was developed which identifies all debris to be generated along with quantities, characterization, container requirements, and disposition location. In support of the PWID, each waste stream has been characterized and documented in a Material Evaluation Form (MEF) or an OSDF profile. In order to provide the sizing, segregation, and containerization requirements outlined in the OU3 Integrated RD/RA Work Plan, a Material Segregation and Containerization Criteria form (MSCC — see Section 3.3.1 and Appendix A of the work plan for description and example, respectively) was developed.

Pursuant to DOE's commitment to evaluating potential opportunities for recycle/reuse, as described in Section 3.3.6.1 of the OU3 Integrated RD/RA Work Plan, an evaluation of material

disposition alternatives for accessible metals was performed and a summary of the results is presented in Appendix B.

Specification Section 01120 identifies debris/waste-handling requirements. Debris handling requirements are defined by the following classifications: 1) non-process debris; 2) process debris and 3) suspect process debris. Details regarding the handling of each of these types of debris are described in Article 3.2 of Specification Section 01120. All debris is required to be sized, segregated, and containerized in accordance with MSCC. To ensure debris that is destined for disposal in the OSDF meets the OSDF waste acceptance criteria (WAC), the MSCC identifies specific materials from the project that are known to either meet or not meet the OSDF WAC. When debris is generated, a representative from the Waste Acceptance Organization will be present to ensure that debris is segregated according to the proper categories identified on the MSCC.

### 2.3.2 Secondary Waste Management

Management of secondary wastes includes handling, sampling, storage and disposition of secondary waste materials generated during remediation. Secondary waste includes vacuumed particulate, filters, personal protective equipment (PPE), spent consumables and washwaters.

Depending on the DOE-approved methods for equipment/systems dismantlement, it is possible that up to 1,000,000 gallons of decontamination washwaters may be generated during the D&D of Silos 1&2 and associated structures and the Fluor Fernald self-perform equipment. This wastewater may have to be pre-treated prior to discharge to the AWWT. Wastewater handling includes sampling and analysis of water and sludges for constituents of concern (see Section 2.4 for wastewater monitoring), discharge of approved effluent into the FCP wastewater treatment system (Advanced Wastewater Treatment Facility) and sludge removal. The need for washwater sampling is determined by the Wastewater Treatment System (WWTS) Manager if significant levels of constituents of concern are present, based on an assessment of relevant OU3 Remedial Investigation and Feasibility Study (RI/FS) (DOE 1993a) analytical data and process history. Section 2.4 further discusses wastewater monitoring strategies. The ultimate disposition of wastewater into the WWTS is managed in accordance with existing site procedure EP-005 "Controlling Aqueous Wastewater Discharges into Wastewater Treatment Systems". **PCN1**

The method of pre-treat for the Silo 1 & 2 concrete structures will be determined as a result of the concrete core sampling. Decontamination water used on the Silo 1&2 structures and their pipe bridges will be collected in onsite storage tanks with secondary containment and sampled prior to discharge to the AWWT. Bridge piping will be moved to a location where a containment can be established and decontamination performed using a high pressure washer. After a reasonable effort is made, if the piping is unable to meet WAO inspection criteria, it will be placed in railcars for shipment to Envirocare. Decontamination activities and washwater generated during D&D of the remaining Silo 1 & 2 associated structures will be handled in a fashion similar to the actual Silo 1 & 2 concrete structures." **PCN1**

### 2.3.3 Estimates of Material Volumes

Materials to be generated during this project have been categorized using the same classification system that was developed for and described in the OU3 RI/FS and OU3 Integrated RD/RA Work Plan, and are estimated in Tables 2-1, 2-2, and 2-3.

### 2.3.4 Material Handling, Storage, Treatment, and Disposition

Materials generated from the D&D of Silos 1&2 and associated structures will be reduced in size, segregated, and containerized in accordance with the requirements identified in the MSCC form. Quantities and disposition of specific material categories were documented in the PWID form for internal use. Tables 2-1, 2-2, and 2-3 summarize the MSCC and PWID by identifying quantities, containerization, staging/interim storage, and disposal requirements for each category of material. Debris size requirements are described in Sections 3.3.2.1 and 3.3.6.2 of the OU3 Integrated RD/RA Work Plan.

Concrete debris generated from D&D of the actual Silos 1&2 structures (Components 34A & 34B) will be managed separately from all other OU4 Complex Silos 1&2 debris. Concrete from Components 34A & 34B will be dispositioned to an offsite facility such as Envirocare.

Other than Components 34A & 34B, concrete debris generated from D&D of the OU4 Complex Silos 1&2 will be dispositioned in the OSDF or appropriate offsite disposal facility. Concrete and all other debris not exhibiting volumetric contamination will be subjected to evaluation for free release to an approved sanitary landfill in accordance with the criteria defined in DOE Order 5400.5 "Radiation Protection of the Public and the Environment" (DOE 1993b). The debris commingling information contained in the following paragraph does not pertain to Components 34A & 34B concrete debris.

As stated in Section 3.3.2.2 of the OU3 Integrated RD/RA Work Plan, materials will be identified according to the OU3 debris categories identified in the MSCC. The MSCC for Silos 1&2 and associated structures allows for commingling of OU3 debris categories A, B, D and incidental E into the same Roll-Off Boxes (ROBs) since each of these material types conform to OSDF Impacted Material Category 2. The majority of Debris Category E (concrete), however, will be placed in separate ROBs. Commingling of OU3 debris categories A, B, D and incidental E is being done to conform to the OSDF impacted material categories in order to facilitate placement. By allowing the commingling of these types of debris into the same ROB, there will be more efficient use of a limited number of available ROBs at the FCP. Materials will be containerized inside the project boundaries adjacent to structures being dismantled. It is currently planned that filled containers will be covered/sealed, screened for exterior radiological contamination, inspected, tagged, and transported directly to the OSDF Transfer Area. Should any materials be encountered that do not meet the OSDF waste acceptance criteria (e.g., materials with "visible process residues" as defined in Specification Section 01120; they will be segregated from OSDF-bound materials. This debris that exceeds the OSDF Waste Acceptance Criteria will be evaluated for the appropriate offsite disposal destination.

## TABLE 2-1 Silos 1&2 and Associated Structures Bulked Material Volume Estimates ($yd^3$)

| Component Number | OU3 Debris Categories | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|
| | Cat. A | Cat. B | Cat. C | Cat. D | Cat. E | Cat. F/G/H | Cat. I | Cat. J | |
| 34A | 0 | 10 | N/A | 0 | 450 | N/A | 0 | 0 | 460 |
| 34B | 0 | 10 | N/A | 0 | 450 | N/A | 0 | 0 | 460 |
| 94A | 94 | 189 | N/A | 94 | 958 | N/A | 60 | 3 | 1398 |
| 94B | 283 | 566 | N/A | 283 | 1866 | N/A | 120 | 6 | 3124 |
| 94C | 277 | 554 | N/A | 277 | 3324 | N/A | 150 | 12 | 4594 |
| 94D | 36 | 72 | N/A | 36 | 206 | N/A | 30 | 3 | 383 |
| 94E | 70 | 141 | N/A | 70 | 213 | N/A | 30 | 3 | 527 |
| 94G | 68 | 136 | N/A | 68 | 27 | N/A | 30 | 3 | 332 |
| 94J | 0 | 41 | N/A | 0 | 0 | N/A | 4 | 0 | 45 |
| 94K | 0 | 100 | N/A | 20 | 279 | N/A | 30 | 1 | 430 |
| 94L | 0 | 20 | N/A | 5 | 0 | N/A | 2 | 1 | 28 |
| 94R | 8 | 17 | N/A | 8 | 120 | N/A | 2 | 1 | 156 |
| 94S | 0 | 30 | N/A | 30 | 0 | N/A | 0 | 0 | 60 |
| 94T | 120 | 90 | N/A | 90 | 0 | N/A | 0 | 0 | 300 |
| 94Y | 0 | 30 | N/A | 30 | 0 | N/A | 0 | 0 | 60 |
| G-008 | 2250 | 2250 | N/A | 0 | 0 | N/A | 0 | 0 | 4500 |
| 22E | 0 | 20 | N/A | 0 | 0 | N/A | 0 | 0 | 20 |
| F34-4 | 0 | 10 | N/A | 0 | 0 | N/A | 0 | 0 | 10 |
| Complex Total | 3206 | 4286 | N/A | 1011 | 7893 | N/A | 458 | 33 | 16,887 |
| Container/ Quantity | ROB or Truck 107 | ROB or Truck 143 | N/A | ROB or Truck 34 | ROB or Truck 388 | N/A | ROB or Truck 16 | WMB or DM 1 | |
| Interim Storage | OSDF Transfer | OSDF Transfer | N/A | OSDF Transfer | OSDF Transfer | N/A | OSDF Transfer | OSDF Transfer | |
| Disposition | OSDF or Sanitary Landfill | OSDF or Sanitary Landfill | N/A | OSDF or Sanitary Landfill | OSDF or Sanitary Landfill | N/A | OSDF or Sanitary Landfill | OFFSITE | |

General Notes:

OU3 Debris Categories: Cat. A – Accessible Metals; Cat. B – Inaccessible Metals; Cat. C – Process-Related Metals; Cat. D – Painted Light Gauge Metals; Cat. E – Concrete; Cat. F – Brick; Cat. G – Non-Regulated ACM; Cat. H – Regulated ACM; Cat. I – Miscellaneous Materials; Cat J – Special Handling.

**ROB:** Roll-Off Box holds 30 cubic yards (810 cubic feet) and/or 16.95 tons of material; **ISO:** End-Loading Container/Sea Land boxes, holds up to 36 cubic yards (971 cubic feet) and/or 42,000 lbs. of material. **WMB:** White Metal Box holds 80 cubic feet with a weight restriction of 8000 pounds. **DM:** 55-Gallon Drum

OSDF Transfer: On-site Disposal Facility Transfer area. Refers to direct disposal in the OSDF; however, the ability to deliver debris directly to the OSDF Transfer Area is dependent on whether the OSDF is accepting debris and/or availability of containers (ROBs) for transport. If necessary, Category A, B, D, and E debris may be temporarily stockpiled on the Pilot Plant Pad at project completion.

## TABLE 2-2 Silos 1&2 and Associated Structures Unbulked Material Volume Estimates ($yd^3$)

| Component Number | OU3 Debris Categories | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|
| | Cat. A | Cat. B | Cat. C | Cat. D | Cat. E | Cat F, G & H | Cat. I | Cat. J | |
| 34A | 0 | 3 | N/A | 0 | 225 | N/A | 0 | 0 | 228 |
| 34B | 0 | 3 | N/A | 0 | 225 | N/A | 0 | 0 | 228 |
| 94A | 31 | 63 | N/A | 31 | 479 | N/A | 30 | 3 | 637 |
| 94B | 94 | 188 | N/A | 94 | 933 | N/A | 60 | 6 | 1375 |
| 94C | 92 | 184 | N/A | 92 | 1662 | N/A | 75 | 12 | 2117 |
| 94D | 12 | 24 | N/A | 12 | 103 | N/A | 15 | 3 | 169 |
| 94E | 23 | 47 | N/A | 23 | 106 | N/A | 15 | 3 | 217 |
| 94G | 23 | 45 | N/A | 22 | 13 | N/A | 15 | 3 | 121 |
| 94J | 0 | 13 | N/A | 0 | 0 | N/A | 2 | 0 | 15 |
| 94K | 0 | 33 | N/A | 6 | 138 | N/A | 15 | 1 | 193 |
| 94L | 0 | 6 | N/A | 2 | 0 | N/A | 1 | 1 | 10 |
| 94R | 3 | 5 | N/A | 3 | 40 | N/A | 1 | 1 | 53 |
| 94S | 0 | 10 | N/A | 10 | 0 | N/A | 0 | 0 | 20 |
| 94T | 40 | 30 | N/A | 30 | 0 | N/A | 0 | 0 | 100 |
| 94Y | 0 | 10 | N/A | 10 | 0 | N/A | 0 | 0 | 20 |
| G-008 | 750 | 750 | N/A | 0 | 0 | zN/A | 0 | 0 | 1500 |
| 22E | 0 | 6 | N/A | 0 | 0 | N/A | 0 | 0 | 6 |
| F34-4 | 0 | 3 | N/A | 0 | 0 | N/A | 0 | 0 | 3 |
| Complex Total | 1063 | 1423 | N/A | 335 | 3924 | N/A | 229 | 33 | 7012 |

General Note
Refer to Table 2-1 for OU3 Debris Category descriptions.

# APPENDIX A

## PROPOSED SAMPLING

Several types of sampling were identified early in the design process to support both the design itself and to support logistical planning for field remediation. The scope and requirements for potential D&D sampling were outlined in the Sampling and Analysis Plan, included as Appendix D to the OU3 Integrated RD/RA Work Plan. A project-specific summary of the sampling types are included below.

**Characterization Screening**

Due to recent construction, there is a remote possibility of lead base paint on painted steel. Lead screening may be performed to verify lead is not present in the painted steel.

During silos demolition, the concrete from the actual silo structures may be sampled for silica.

Prior to the demolition activity, core samples will be taken from the Silo 1 & 2 concrete structures and analyzed for heavy metals. **PCN1**

Just prior to D&D activities, radiological surveying will be conducted for fixed and removable radioactive contamination using both Geiger-Mueller radiological contamination meters and scintillation counters (to monitor alpha) as well as low background counting systems. Radiological surveying will continue to be used throughout D&D activities to verify that radiological facility release criteria (i.e., release from containment) are met on equipment and materials being removed from the project containment.

**Asbestos**

Due to support facility construction in recent years, it is anticipated that there will be no friable asbestos containing materials (ACM) present in the OU4 Complex Silos 1&2 D&D Project. Prior to demolition activities, the OU4 Silos 1&2 D&D Project will be evaluated for asbestos containing materials (ACM) by a State of Ohio-Certified Asbestos Hazard Evaluation Specialist. Results of the evaluation will be used to determine asbestos abatement requirements for the OU4 Complex Silos 1&2 D&D Project activity. The results of this evaluation will be forthcoming and therefore are not available to be presented in this implementation plan. If required, sampling criteria for asbestos abatement activities will be established prior to the OU4 Complex Silos 1&2 D&D Project asbestos activities.

Upon evaluation of the OU4 Complex Silos 1&2 project for the presence of ACM, if the evaluation reveals that ACM is present, this plan will be revised to discuss the location and volume of ACM that will require abatement and the associated impact, if any, on the decontamination and dismantlement schedule.

**Secondary Waste (Decontamination Water)**

Based on worst-case wash-down calculations, up to 1,000,000 gallons of decontamination washwater could be generated during equipment cleaning. Samples will be used to determine pre-treatment requirements prior to discharge into the AWWT. Based on this worst-case washwater volume estimate, fifty samples would be needed to characterize washwater for isotopic radionuclides & heavy metals, up to forty-five samples would be needed to evaluate enrichment (i.e., levels of uranium, Thorium-230 and Radium-226).

A project-specific sampling plan for the decontamination washwater will be developed after decontamination washwater is generated but prior to actual sampling. An example of a typical wastewater sampling plan is attached to Appendix D of the OU3 Integrated RD/RA Work Plan.

**Nevada Test Site (NTS) Confirmatory**

At this time, it is anticipated that NTS will not be a disposal facility for any OU4 Silos 1&2 debris. No sampling of any material/waste stream will be performed.

**Permitted Off-site Commercial Disposal Facility**

Sampling is anticipated from potential mixed waste sludge that will be collected from the settling of decontamination washwater and associated filtercake. Sampling and analysis required for shipment certification will be as specified by the permitted facility's WAC. Section 3.2.3 of the SAP contained in Appendix D of the OU3 Integrated RD/RA Work Plan addresses analytical requirements for off-site disposal.

**Asbestos Air Monitoring**

If friable and non-friable ACM is discovered, asbestos air sampling will be necessary for ACM removal prior to dismantlement under controlled abatement methods per Specification Section 01516 and 07415. If required, occupational air sampling for asbestos will be performed as required by OSHA standards.

**Radiological Air Monitoring**

Data from the IEMP site-wide routine environmental air monitoring program will be used to complement the occupational air monitoring program. Per the Fluor Fernald Radiological Control Requirements Manual, occupational air (i.e., breathing zone) samplers will be worn as necessary by workers to evaluate the potential for intake when performing airborne radioactivity generating activities in a contamination area, high contamination area or an airborne radioactivity area. Per the Fluor Fernald Radiological Control Requirements Manual, occupational air (i.e., breathing zone) samplers will be worn by one hundred percent (100%) of the workers in each work group/crew when performing thorium or radium airborne generating activities in a contamination area, high contamination area, or an airborne radioactivity area, unless otherwise specified on the appropriate Radiological Work Permit.