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PROJECT COMPLETION REPORT, BUILDING 4A COMPLEX

01/15/97

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DOE-FEMP EPAS
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REPORT

Department of Energy
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JAN 15 1997

DOE-0427-97

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

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

Dear Mr. Saric and Mr. Schneider:

PROJECT COMPLETION REPORT, BUILDING 4A COMPLEX

This Project Completion (PC) Report is being submitted to demonstrate compliance with the Operable Unit 3 (OU3) - Building 4A Complex Implementation Plan for the Above-Grade Decontamination and Dismantlement (D&D) Project at the Fernald Environmental Management Project (FEMP). The work was conducted in accordance with the Building 4A Complex Implementation Plan.

This PC Report fulfills the reporting requirements outlined in Section 4.6.5 of the OU3 RD/RA Work Plan for Interim Remedial Action and covers the time period from December 1994 through September 1996. Work practice improvements to the D&D procedures are documented in this report as specified in the Building 4A Complex Implementation Plan. Please note that the final Remedial Action Report, as described in the draft OU3 Integrated RD/RA Work Plan currently under review by you, will address final disposition of the Building 4A Complex materials.

If you or any of your staff have any questions, please contact John Trygier at (513) 648-3154.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Trygier

Enclosure: As stated

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

FINAL REPORT

BUILDING 4A COMPLEX PROJECT COMPLETION REPORT

January 1997

U.S. DEPARTMENT OF ENERGY

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ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material
AMS	Air Monitoring Station (site boundary)
BATF	Bureau of Alcohol, Tobacco and Firearms
Ci/ml	Curie per milliliter
D&D	decontamination and decontruction
DCG	Derived Concentration Guides
DCN(s)	Design Change Notice
dpm	disintegrations per minute
DOE	Department of Energy
FEMP	Fernald Environmental Monitoring Project
HEPA	high efficiency particulate air
NTS	Nevada Test Site
Ohio EPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU3	Operable Unit 3
pCi/m^3	picoCuries per cubic meter
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SWMB(s)	small white metal box
U.S.EPA	United States Environmental Protection Agency
WAC	Waste Acceptance Criteria

1.0 INTRODUCTION

The purpose of this Project Completion (PC) Report is to closeout the above-grade decontamination and dismantlement (D&D) of Building 4A Complex in accordance with the Building 4A Implementation Plan. This activity was completed in accordance with the Operable Unit 3 (OU3) - Building 4A Implementation Plan for Above-Grade D&D Project at the Fernald Environmental Management Project (FEMP). The Building 4A Complex consists solely of Building 4A. The D&D activities began in December 1994 and continued through September 1996. The Implementation Plan activities were completed on schedule September 26, 1996. This PC Report explains the work practice changes and improvements to the Implementation Plan with an explanation as to why these changes were necessary. Subsequent to the approval of the Building 4A Implementation Plan, several key events occurred which required changes to the materials management strategy contained in the Implementation Plan. The Records of Decision (ROD) for Operable Units 2 and 5 were approved which included the construction and operation of an on-site disposal facility (OSDF) for disposition of remediation materials from the Fernald Environmental Management Project (FEMP) that meet defined waste acceptance criteria (WAC).

Additionally, the OU3 Remedial Investigation/Feasibility Study (RI/FS) and Proposed Plan were issued which provided a new material classification system and also identified on-site disposal of material meeting the WAC as the preferred alternative. The OU3 Record of Decision for Final Remedial Action finalized this decision for on-site disposal. Further, Removal Action 17 Work Plan, Revision 3 and its addendum, Improved Storage of Soil and Debris was issued to amend the material management concepts so as to be consistent with the response actions. The Interim Debris Management Plan contained in the Removal Action 17 Work Plan, Revision 3 and addendum, allows for open, bulk storage of certain categories of material and bases the storage of all material categories on their potential disposition. The U.S. Environmental Protection Agency (U.S. EPA) and the Ohio Environmental Protection Agency (Ohio EPA) concurred with open storage of Building 4A metals (Categories A, B, and D). The materials management strategy stated in the Building 4A complex Implementation Plan was revised to reflect the Removal Action 17 Work Plan, Revision 3 and addendum. The final OU3 Remedial Action Report will summarize the final disposition of the materials from this project.

1.1 Complex Description

Building 4A was located south of 2nd Street, between B and C Streets near the central portion of the former production area. Building 4A was a rectangular structure measuring 146 feet (ft.) by 194 ft. and 92 ft. high. It was constructed of structural steel enclosed by transite siding and roofing panels, and was constructed on a concrete foundation.

The processes and operations within Building 4A converted uranium trioxide (UO_3, orange oxide) to uranium tetrafluoride (UF_4, green salt) using a multi-step hydrofluorination process. The specific processes that were conducted in Building 4A are described in Section 3.0 of the Building 4A Implementation Plan. At- and below-grade remediation was not included in the scope of this project.

1.2 Project Chronology Summary

Table 1 identifies the significant work activities start and completion dates. Section 2.2 discusses the six remedial tasks in greater detail.

TABLE 1 - Activity Sequence

Activity	Start Date	Completion Date
FEMP Safe Shut Down Field Activities	02 MAY 94	24 MAR 96
D&D Contract Award		01 DEC 94
Subcontractor Field Activities	08 DEC 94	24 SEP 96
Mobilize Building	13 MAR 95	25 MAY 95
Remove Demolition/ Debris	09 MAY 95	04 JAN 96
Asbestos Abatement	17 MAY 95	26 JUN 95
Remove Equipment (smaller)	13 JUN 95	26 FEB 96
Remove Interior Transite	21 AUG 95	14 MAR 96
Building Clearing/Clearance Testing	12 FEB 96	11 JUN 96
Remove Roof Transite	13 JUN 96	13 AUG 96
Remove Exterior Wall Transite	17 JUN 96	15 AUG 96
Pre-demolition Activities (seal pad, cutting, shearing)	17 JUN 96	14 AUG 96
Implode Building 4A		24 AUG 96
Steel Shearing Operations	26 AUG 96	21 SEP 96
Demobilization	19 AUG 96	26 SEP 96
Construction Inspection		30 SEP 96

2.0 REMEDIATION APPROACH

The performance specifications referenced in this report were provided to the U.S. EPA and the Ohio EPA in the Operable Unit 3 (OU3) Remedial Design/Remedial Action (RD/RA) Work Plan for Interim Remedial Action (DOE 1995). Attachment A provides a concise listing of the work practices changes to the Performance Specifications, which are called Design Change Notices (DCNs) to the Building 4A Complex Implementation Plan, and the basis for the twelve changes. In Attachment A the DCN is listed next to the Performance Specification that it affected and is followed by a listing of the Performance Specification wording changes with a Basis of Change for the Performance Specification provided.

2.1 FEMP Preparatory Activities

The Building 4A Complex Implementation Plan identified six remedial tasks to be performed prior to and during the Implementation Plan field activities. Three of the remedial tasks were completed prior to the start of the Implementation Plan field activities and are described below. The remaining three remedial tasks are described in Section 2.3.

2.1.1 Preparatory Action : Inventory Removal (Task I)

In accordance with Removal Action No. 9 - Removal of Waste Inventories, existing waste/product inventories were removed from Building 4A by FEMP waste management personnel, and transported to the interim storage facilities.

2.1.2 Preparatory Action: Safe Shutdown (Task II)

In accordance with Removal Action No. 12 - Safe Shutdown, production residual material was removed from Building 4A by FEMP personnel using Facility Shutdown Standard Operating Procedures. Residual material was collected, containerized, and transported to the interim storage facility. Final disposition of the material will be included in the Removal Action No. 12 Final Closure Report. Table 2 states that the removed residual material is awaiting shipment to NTS for disposal.

2.1.3 Hazardous Waste Management Units (Task III)

The Building 4A Implementation Plan identified two inactive Hazardous Waste Management Units (HWMUs) located in the Building 4A Complex. Both HWMUs were closed under the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, independent of the Building 4A D&D Project. Acceptance of closure certification was received from Ohio EPA for HWMU No. 6, Drummed HF Residue Storage Inside Building 4A, on April 13, 1995. Acceptance of closure certification from Ohio EPA for HWMU No. 7, Drummed HF Storage Area Northwest of Building 4, was received on July 2, 1996.

2.2 Preliminary Remediation Activities

The FEMP established the areas (break room, clean room, and shower facilities) prescribed in the Mobilization Performance Specification 01515. The subcontractor prepared work plans on material handling, containerization, access/egress, construction boundaries zones as required in the Mobilization Performance Specification. These subcontractor work plans were reviewed and accepted by the FEMP. The subcontractor provided their own equipment, materials, and support trailers. The equipment was inspected by FEMP Construction Management and surveyed by FEMP radiological control technicians before being brought on-site. Job site posting of permits and health and safety plans was conducted as specified in the Mobilization Performance Specification. The subcontractor provided plans that described how adjacent facilities would be protected during D&D and how fugitive emissions would be controlled, Performance Specification 03315. The storm water protection and erosion control plans work practices were enhanced by retaining selected concrete piers until below-grade excavation is conducted.

2.3 Remediation Activities

2.3.1 Asbestos Removal (Task IV)

Asbestos removal was conducted in accordance with Performance Specification 01516 and Removal Action 26 - Asbestos Abatement.

2.3.2 Surface Decontamination (Task V)

The Building 4A structure was cleaned prior to removal of the exterior transite. Loose contamination was removed from the structural steel surfaces prior to exposing those surfaces to the environment. The cleaning process included high efficiency particulate air (HEPA) vacuuming and high pressure water washing. Fixatives/encapsulants were applied to the interior of the exterior transite and structure surfaces whenever criteria for removable contaminants could not readily be met by cleaning alone. All surface cleaning and fixative/encapsulant usage was performed in accordance with Performance Specification 01517.

To protect the environment from removable contamination being released from Building 4A, the initial submittal of Section 01517 contained job-specific performance criteria for opening of the Building 4A to the environment. The procedure was changed without changing the substance of Performance Specification 01517 which is to be protective of human health and the environment. The work practice change was two-fold:

a. The first work practice change was "to remove equipment, material or debris from a local containment or enclosure, or to containerize, surfaces shall be free of visible process material as determined by a FERMCO representative. The definition of visible process material is: visible process residues (green salt, yellow cake, etc.) on the interior or exterior surfaces of materials that is obvious to the eye and that if rubbed, would be easily removed. Stains, rust corrosion, and flaking do NOT qualify as visible process material. If an item fails visual inspection after (at least) one washing attempt (where applicable), the equipment/material/debris shall be encapsulated, sealed, wrapped, and placed outside the building for placement on pallets located at the container queuing area. The subcontractor shall supply and secure a cover (tarp, etc.) over the equipment/material placed on the pallet. All equipment, material, and debris are still considered to be radiologically contaminated." This work practice change reduced worker exposure and the requirement to wrap, unwrap and survey, and rewrap obviously contaminated equipment, material and debris prior to containerizing these items.

b. The second work practice change provided that, "... all non-porous surfaces (such as structural steel or steel decking) within the structure shall be below 10,000 [disintegrations per 100 square centimeters] dpm/100 cm^2 for total (sum of alpha and beta-gamma) removable radiological contamination and all above-grade porous surfaces (such as concrete decking and wood) shall be below 1,000 dpm/100 cm^2 beta-gamma removable and 5,000 dpm/100 cm^2 beta-gamma fixed radiological contamination." This change to surveying/scanning equipment and materials prior to removing it from containment, reduced worker radiological exposure. The above radiological criteria and levels were achieved during the Building 4A D&D.

2.3.3 Above-Grade Dismantlement (Task VI)

Bulk removal operations, interior and exterior equipment removal, interior panel removal, exterior transite removal, and structural steel removal and their related support activities (lifting and rigging; ventilation; and, containment) were conducted in accordance with Performance Specifications 03315, 05126, 07415, 14955, 15065 and 15066. Cutting operations were performed by the remediation subcontractor within the project boundaries.

The Concrete Removal Performance Specification 03315 was modified. Inside the footprint of Building 4A, the at-grade equipment, columns and miscellaneous foundation piers and curbs were sealed and remain intact until the below-grade removal occurs. This is to enhance storm water run-off control.

2.4 Structural Steel Demolition

The Building 4A structural steel and miscellaneous steel included the following: mezzanines, elevator shafts crane rails, floor plate/decking, stairs, handrails, doors, and outside pipe racks. The demolition procedure consisted of four main steps, in accordance with Performance Specification 05126:

1. Preliminary: The columns for the placement of the shape charges. The lead-based paint was mechanically removed prior to cutting and the paint chips were collected and managed in accordance with Performance Specification 01120.
2. Final Preparation: Approximately 330 nonelectrical detonators of various delays were used. The ground structural column bases were laterally displaced using gelatin dynamite after the columns were severed by the cutting shape charge.
3. Implosion: Prior to the implosion, the structural steel was wet down to reduce airborne emissions. Access to the area was limited and barricades were erected to keep personnel at a safe distance in accordance with the FEMP detonation plan.
4. Shearing: Prior to shearing the steel, the area was inspected for undenoted shape charges. Undetonated charges were retreived and properly dispositioned in accordance with internal safe work practices and the Bureau of Alcohol, Tobacco, and Firearms (BATF) guidance. Using a grapple, the sheared steel was stacked on the Building 4 Pad. The maximum height of the stack is ten feet. Water mist was used during shearing operations to mutigate fugitive dust.

3.0 MATERIAL HANDLING, STAGING AND INTERIM STORAGE

Chagnes in the material categories were made to reflect the improved material category system initiated after the Building 4A Complex Implementation Plan was written. The improved material categories define, with greater accuracy, the composition of the Building 4A material streams, provide more accurate material vilumes and improved material tracking. Additionally, because the new categories provide a better description of the Building 4A material streams, more accurate disposition decisions can be achieved (i.e., off-site shhipment or within the WAC for disposition in the OSDF). Table 2 provides a "crosswalk" from the IROD material categories used in the Building 4A Implementation Plan to the categories proposed in the November 1996 Draft Integrated RD/RA Work Plan.

3.1 Materials Management

This section describes the handling and storage of primary materials (e.g., dismantlement debris and other bulk waste materials) and secondary materials (e.g., vacuumed dust, filters, wash waters).

3.1.1 Primary Materials Management

Building 4A D&D material was segregated according to the material segregation and containerization criteria in Performance Specification 01120. There were three significant work practice changes that impacted the material handling. These changes are described below.

3.1.1.A The 48 furnances, surroounded with refractory brick, and the two fluid beds located in Plant 4A were declared inaccessable metal, Category H4. However, it was discovered that the insulation was composed of asbestos which had contaminated the refractory brick, mineral wool and steel casing with friable asbestos. The original plan for disposition was to place each furnace, intact, into a top loading container for shipment and disposal at the NTS. Due to the condition of the asbestos contaminated refractory brick and the unavailability of NTS for disposal (at the time, NTS did not accept friable ACM) and after an evaluation of health, safety, and industrial hygiene concerns, it was determined that the furnaces would be disassembled into four basic components. The asbestos containing refractory brick and the asbestos contaminated mineral wool would be abated and placed into small white metal boxes (SWMB). These boxes would be considered Category K (friable ACM). The furnace tubes were considered to be Category H1 (process related materials) since they were similar to process piping, both in physical characteristics and potential for containing process material. The remaining metal furnace shrouds were wiped clean to remove any asbestos fibers, visually inspected for process material, then were recategorized as Category H 2(restricted use metal). With the adoption of the RI/FS material categories, the asbestos SWMBs are RI/FS material Category H (friable asbestos), the furnaces tubes were repackaged and shipped

to NTS asRI/FS material Category C (process related metal), and the furnace shrouds are being bulk stored for future disposal into the OSDF as RI/FS material Category B (inaccessible metal). Disposition of the material in the OSDF would reduce transportation risks and is consistent with the OU3 ROD for Final Remedial Action. These asbestos containing materials were placed into small white metal boxes (SWMB). Final disposal will be resolved in the near future and will be reported to U.S. EPA and Ohio EPA (Attachment A, DCN #12).

3.1.1.B A second work practice was changed to follow the RI/FS material criteria, which allowed adoption of visual standards for the removal of equipment and debris from Building 4A. Radiological surveys of total fixed and removable radiological contamination were not necessary to determine the disposition of the material. Changing to the visual decontamination standard reduced worker exposure and the time needed to conduct radiological surveys. Ohio EPA reviewed the visual inspection technique in the field, on January 31, 1996, and found it to be acceptable (Attachment A, DCN #4).

3.1.1.C A third material handling work practice change involved the enriched (.95% and < 2%) uranium-contaminated process equipment and debris that was located in Building 4A. After the equipment and debris were grossly decontaminated using hand tools and vacuuming with HEPA units, an attempt was made to decontaminate this equipment using high pressure water. This process was expected to allow the equipment to be recategorized from RI/FS material Category C to RI/FS material Category B and placed in the OSDF. The high pressure wash was evaluated and determined to not be a viable alternative because the visible process residue could not be sufficiently removed. The water generated from the decontamination effort was collected, evaluated and combined with the other project decontamination water and processed through the FEMP waste water treatment system. The enriched equipment was containerized and prepared for shipment to NTS as RI/FS material Category C (Attachment A, DCN #6).

3.1.2 Secondary Materials Management

The metal construction debris (conduit, pipe, process and nonprocess equipment) was rinsed using a high pressure, low volume water wash as described in the Implementation Plan. As water from the decontamination wash process was generated, the effluent was collected into four 6,500 gallon collection tanks pending sampling and analysis for Building 4A contaminants of concern. After review of the analytical data, the effluent was then transferred to the FEMP waste water treatment system. Quality Assurance/Quality Control samples were collected in accordance with applicable project Data Quality Objectives. Sampling was performed to characterize and properly disposition the wash water generated from the project The sampling was performed in accordance with the project specific sampling plan, which

was developed based on the OU3 Interim Remedial Action Sampling and Analysis Plan (SAP) contained in Volume 2 of the OU3 RD/RA Work Plan for Interim Remedial Action. In addition, drums of process residue sump sludge were generated during the general release cleaning of Building 4A.

3.2 Material Handling, Staging, Interim Storage and Disposition

Except as noted in Table 2, the current plan for the material generated from the Building 4A D&D is for disposal in the OSDF. The inventory removed from Building 4A (1,393 drums) was transported to on-site storage locations. The following table provides a summary of the categories and volume (in cubic feet) of material generated during the Building 4A D&D project. This material is being managed in accordance with the strategy outlined in the OU3 Record of Decision for Final Remedial Action and the Removal Action 17, Work Plan, Revision 3 and addendums.

TABLE 2 - Material Generation Summary and RI/FS Material Category Crosswalk

IROD Material Category	OU3 RI/FS Material Category	Material Description	Weight (pounds)	Volume (ft^3) actual bulk	Container type or bulk storage and Location
I	A	Accessible Metal	2,994,420	97,590	Bulked stored on Building 4A Pad
H2, H4	B	Inaccessible Metal	910,730	44,550	Roll-off Boxes 80 north gravel pad
H1, H3, H4	C	Process Related Metal	705,110	38,800	Sea/Land Containers Shipped to NTS
H	D	Painted Light-gauge Metals	10,870	4,050	Roll-off Boxes Plant 7 area
G	D	Painted Light-gauge Metals (lead)	3,301	106	55-gallon Drums and 2 SWMB - Bld.79
F	E	Concrete	35,960	569	Roll-off Boxes - Plant 4 pad and SWMBs - Plant 1 pad
K	F	Acid Brick	0	0	----------
D	G	Nonfriable Asbestos	not weighed	5,593	Wrapped Transite Panels - Plant 4 pad
K	H	Friable Asbestos	606,312	33,875	End loading Sea/Lands and SWMBs Plant 1 pad

IROD Material Category	OU3 RI/FS Material Category	Material Description	Weight (pounds)	Volume (ft^3) actual bulk	Container type or bulk storage and Location
B, C	I	Miscellaneous	334,720	21,060	Roll-off Boxes 10A pad/Plant 7 area
E	J	Product, Residues, and Special Materials	53 - 55 gallon drums	392	55-gallon Drums Awaiting Shipment to NTS - Bld.79E
E, B	J	Product, Residues, and Special Materials (Aerosol cans)C	8 - 55 gallon drums	60	55-gallon Drums -the aerosol cans are expected to be handled as nonregulated material TS-4
		Total		246,645	
O		Wash Water			approx. 42,000 gallons

3.3 Environmental Monitoring

During the Interim Remedial Action, project-specific air monitoring was conducted to assess the projec impact on air quality, project personnel, FEMP workers and the environment. Under the requirements o the Building 4A Implementation Plan eight continuous air monitors were to be used for the project, t supplement the sitewide air monitoring network. The number of monitors was later reduced to seven base on additional analysis, practical considerations, historical data and process knowledge. The reduction i monitors was submitted to James Saric, U.S. EPA, and Tom Schneider, Ohio EPA, in a letter from Jac Craig, DOE, dated August 7, 1995 (DOE-1245-95). Concurrence with this change was received fro James Saric to Jack Craig in a letter dated September 14, 1995.

The project-specific air monitoring locations are numbered P4-1 to P4-7 (Figure 1). In Table 3 the Buildin 4A Complex environmental air monitoring data, in picoCuries per cubic meter (pCi/m^3) of total uranium from March 31, 1995 through October 25, 1996, is summarized in Table 3:

TABLE 3 - Summary of Project Air Monitoring Data

AMS Location	Minimum pCi/m^3	Average pCi/m^3	Maximum pCi/m^3
P4-1	1.60 E-04	2.02 E-03	1.51 E-02
P4-2	2.09 E-04	4.74 E-03	8.29 E-02
P4-3	4.84 E-04	2.49 E-03	1.94 E-02
P4-4	4.42 E-04	4.82 E-03	4.04 E-02
P4-5	6.70 E-04	1.49 E-02	1.51 E-01
P4-6	2.32 E-04	3.22 E-03	3.29 E-02
P4-7	8.48 E-05	4.02 E-03	3.08 E-02

The airborne radiological activity, from August 9 to August 23, 1996, D&D work activities included precutting structural beams with acetylene torches in preparation for the implosion. This work increased airborne radiological activity detected by the Building 4A project-specific air samplers.

Additionally, during the sampling periodic August 21 to August 27, 1996, following the Building 4A implosion (August 24, 1996), five of the nine site boundary air monitoring stations (AMS) indicated year-to-date maximum values. At AMS-1B the highest maximum value was 0.0013 pCi/m^3. However, this maximum value recorded is well below the FEMP administrative (internal) action level of 0.1 pCi/m^3. The Department of Energy (DOE) Order 5400.5 limit at the boundary fence line, for all pathways, is 100 milliRem/year. Chapter III of this Order, Derived Concentration Guides (DCG) for Air and Water, identifies the U-Natural inhalation DCG as 1×10^{-13} Curie per milliliter (Ci/ml), which equates to 0.1 pCi/m^3 per year.

Plant 4 Air Monitor Locations

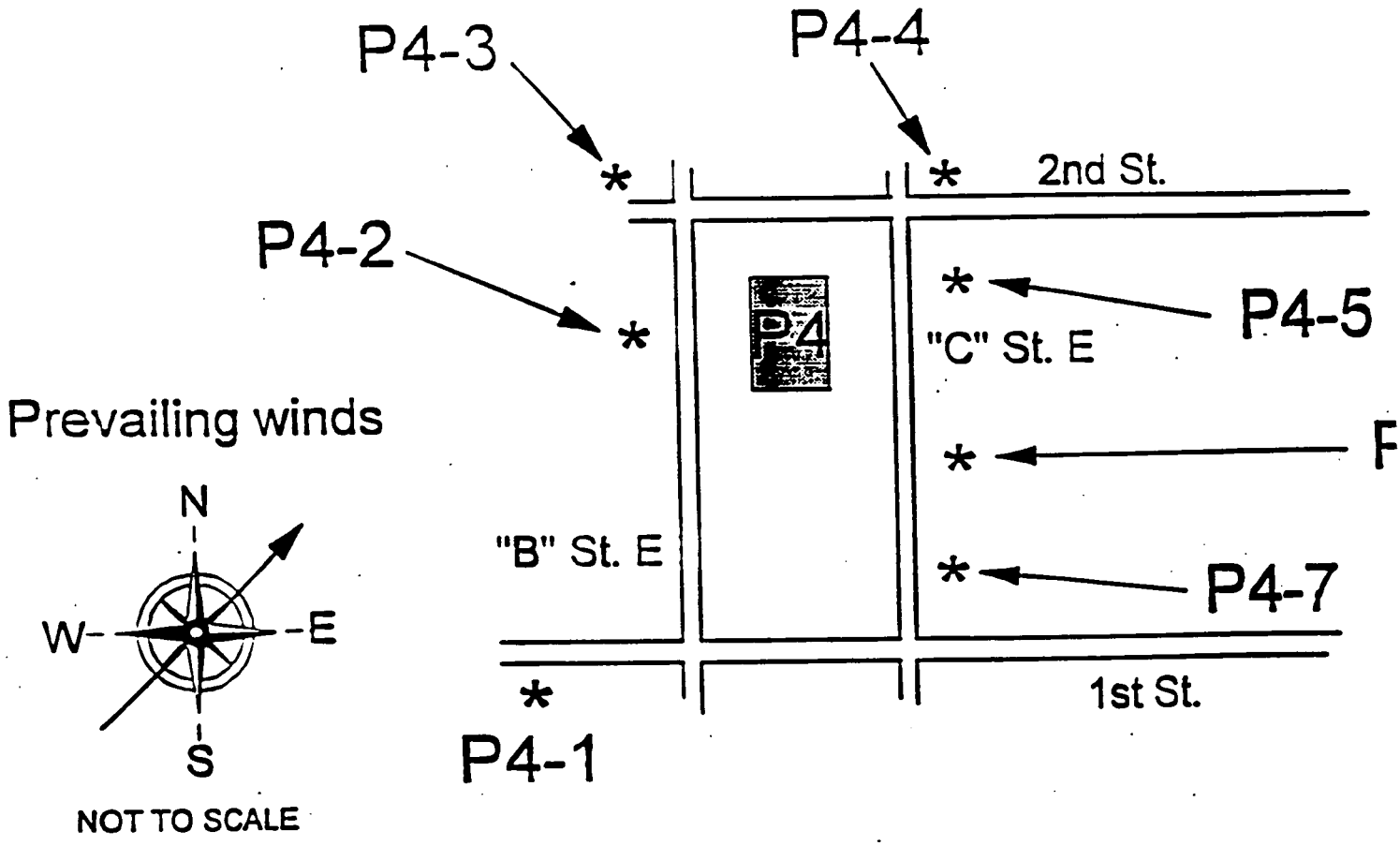

FIGURE 1 - Building 4A Complex Project-Specific Air Monitoring System Locations

4.0 LESSONS LEARNED

During the Building 4 D&D project twelve DCNs were prepared to document the enhanced work practices. Below are significant Work Practices Improvements/Lessons Learned that were identified:

1. During the removal of roof transite on Building 4A, a residue material was encountered between layers of roofing material that exhibited radioactivity. This material was not anticipated and required a quick turnaround lab analyses to determine the nature of the material. Work was halted. The analysis indicated that the residues were uranium fluorides. The material was collected in 55-gallon drums, handled and stored safety and in a manner protective of the environment. Workers on future D&D activities will be cautioned to assume that all hidden surfaces might contain contamination and should be surveyed in advance to assist in job planning.

2. Following implosion, shearing operations and the general vehicle activity in the work zone resulted in higher job perimeter radiological monitor readings during the project (Plant 7 D&D exhibited a similar pattern). Sufficient use of dust control (water mist) mitigated the ambient levels of contaminants to acceptable levels.

3. One significant safety accident on the Building 4A roof reinforced the value of the present lanyard/safety harness system mandated for use on the job. One worker fell through the roof to the inside of Building 4A, and due to the design of the system and harness safety equipment, he was unharmed.

4. The Building 4A Implementation Plan activities were conducted in accordance with the Sitewide CERCLA Quality Assurance Project Plan and site procedures which assisted in the prompt sampling and analysis in dealing with the roof residue.

5.0 SUMMARY

This Remedial Action Report for Building 4A Complex documents that the above-grade portions of Building 4A were decontaminated and dismantled in accordance with the OU3 - Building 4A Implementation Plan for the Above-Grade Decontamination and Dismantlement Project at the Fernald Environmental Management Project. The Lessons Learned are in accordance with the revised strategies presented in the OU3 RI/FS and Removal Action 17 Work Plan, Revision 3 and its addendum. This PC Report was prepared in the format described in the OU3 RD/RA Work Plan for Interim Remedial Action.

The Remedial Tasks identified in the Implementation Plan 1) Inventory Removal, 2) Safe Shutdown, 3) Hazardous Material Treatment Units, 4) Asbestos Removal, 5) Surface Decontamination, and 6) Above-Grade Dismantlement; were successfully completed in a safe and environmentally sound manner, on schedule. Work practice modifications to the Implementation Plan are also noted. The material handling procedures, material volumes and storage locations are also provided. The Project-Specific Air Monitoring significant data were provided and discussed. The Lessons Learned Section identifies specific actions to improve future Implementation Plan field activities.

ATTACHMENT A

This Attachment provides a listing of the Building 4A Complex Design Change Notices (DCNs). This Attachment provides a concise listing of changes to the decontamination and dismantlement (D&D) strategy and the reasons for the changes. The DCN is listed next to the Performance Specification that it affected, followed by a listing of the Specification section word changes and the Basis for Change. It should be noted that the changes were made to the Building 4 D&D Performance Specifications, dated July 1994.

Design Change Notice #	Specification Changed	Change Description	Basis for Change
1 Rev.0	01517, Part 1.8	In addition to identified pieces of equipment [a list of equipment is attached to the DCN], any piece of other equipment or debris that does not meet the clean criteria stated in Specification 01517, Article 1.8 after 2 attempts with high pressure wash, will also be placed into a large white metal box or top loading ISO container inside of Plant 4 by the subcontractor.	**Waste Management** Limits the number of times the Subcontractor attempts decontamination on a piece of equipment. This then limits the amount of water contaminated from the cleaning of enriched ($\geq$ .95%) residue. This also serves as a personnel safe guard to limit accumulating quantities of enriched sediments in anyone container.
	01120, Appendix A	**Table of Material, Segregation and Containerization Criteria** change in preferred containers.	Loading the equipment in Building 4A reduced the number of times the equipment was handled and ensured that the equipment was not exposed to wind or rain in the environment.
2 Rev. 0	Fire & Radiation Riser Diagram	Relocate pole 18 feet west and 47 feet south of existing coordinates per drawing 93X-5900-E-00653.	**Ease of Installation** Relocate the electrical pole to a more suitable installation location. The original location was on a 10 inch concrete slab. The new location was on gravel.
3 Rev. 0	Fire & Radiation Riser Diagram	Install a 45', class 2, utility pole at coordinates, measurements to be field verified. To permit installation of aerial cable to building 71. Approximate span of aerial cable is 150' per drawing 93X-5900-E-00653..	Corrects drawing for DCN 2, Rev. 0.
4 Rev. 0	15066, 3.1.A	Insert sentence: Subcontractor shall seal openings of Category H-2 items after verification inspection by a FERMCO representative prior to movement from the immediate removal area. If a Category H-2 item fails inspection, that item shall be deemed a Category H-1 item and dispositioned appropriately.	**Clarifies Waste Handling Criteria** Serves as guidance for segregating specific waste streams from the dismantlement of Building 4A, for the purposes of meeting interim storage requirements and preparing materials for potential on-property and off-property disposal. Total and removable contamination levels are not necessary for disposition decisions.

Design Change Notice #	Specification Changed	Change Description	Basis for Change
4 Rev. 0 (continued)	15065, 3.1.A.1.c 15065, 3.1.A.2.c 15065, 3.1.A.3.c	Insert sentence at end of each section: Subcontractor shall seal openings of Category H items after verification inspection by a FERMCO representative and after cleaning.	**Clarifies Waste Handling Criteria** Determining total and removable contamination levels are not necessary for disposition decisions. Therefore visual inspections were used in lieu of radiological instrument surveys. Serves as guidance for segregating specific waste streams from the dismantlement of Building 4A, for the purposes of meeting interim storage requirements and preparing materials for potential on-property and off-property disposal.
	01120, 3.2.B	Waste materials to be containerized into waste containers and sealed within a local containment area or building enclosure will require decontamination per Section 01517 of this specification package.	
	01517, 1.8.A	Delete and replace with: "For the purpose of removal from local containment or enclosure, or containerizing into roll-off boxes, surfaces shall be free of visible process material as determined by a FERMCO representative." Definition of visible process material is: Visible process residues (green salt, yellow cake, etc.) On the interior or exterior surfaces of materials that is obvious to the eye and that if rubbed would be easily removed. Stains, rust, corrosion, and flaking do NOT qualify as visible process material. The material is still considered to be radiologically contaminated.	
	01517, Appendix A	Delete	
5 Rev.0	01120, 3.1.D.3	Delete	**Realigns Subcontractor and FDF Responsibilities** Container preparation of large metal boxes is the responsibility of FDF personnel. This change removes the Subcontractor requirements on container preparation and provides a method to return filled containers.
	01120, 3.1.D.4	Delete	
	01120, 3.1.D.5	Insert at end of sentence: "with clamping devices, pins or other FERMCO approved method."	

Design Change Notice #	Specification Changed	Change Description	Basis for Change
6 Rev.0	01517, 2.1.B.2 01517, 2.1.B.3	Add this phrase to the beginning of the first sentence: "For the washing of all equipment/material suspected or containing less than or equal to 1% (≤1%) enrichment,"... the subcontractor shall supply .... Add "For the washing of equipment/material suspected or containing greater than 1% (>1%) but less than or equal to 1.25% (≤1.25%) enrichment, in accordance with the list attached to DCN 1618-001, the subcontractor shall supply effluent storage tanks and secondary containment with a minimum liquid effluent storage capacity to allow 15 calender days storage with out impacting the subcontractor operations. NO one individual effluent storage tank shall have a capacity greater than 175 gallons and must be placed a minimum of 2 feet apart. FERMCO will perform effluent sampling. After approval from FERMCO CCM, the subcontractor shall transport the liquid effluent to Plant 8 sump and pump the liquid effluent into the Plant 8 sump. The subcontractor shall store sludge, resulting from washing, in 55 gallon drums (supplied by FERMCO) at a maximum of 1300 pounds of Uranium. The filled drums will be stored at a minimum of 2 feet apart in a designated area approved by FERMCO. Filled drums will be sampled by FERMCO (for concentration and enrichment). After approval from the FERMCO CCM, the subcontractor shall transport the drums to the queuing area.	**Waste Minimization** The potential to decontaminate enriched (≥ .95%) equipment and debris was identified during the Building 4A dismantlement. The decontamination could permit management of this equipment and debris in the on-site disposal facility (OSDF) instead of shipping the equipment and debris to Nevada Testing Site. The balance of the DCN deals with the management of the decontamination water generated.

Design Change Notice #	Specification Changed	Change Description	Basis for Change
6 Rev.0 (continued)	01517, 2.1.B.4	Add "For the washing of equipment/material suspected or containing greater than 1.25%(>1.125%) and less or equal to 2% (≤2%) enrichment, in accordance with the list attached to DCN 1618-001, the subcontractor shall supply effluent storage tanks and secondary containment with a minimum liquid effluent storage capacity to allow 15 calender days storage without impacting the subcontractor operations. NO one individual effluent storage tank shall have a capacity greater than 30 gallons and must be placed a minimum of 2 feet apart. FERMCO will perform effluent sampling. After approval from FERMCO CCM, the subcontractor shall store sludge, resulting from washing, in 55 gallon drums (supplied by FERMCO) at a maximum of 252 pounds of Uranium. The filled drums will be stored at a minimum of 2 feet apart in a designated storage area approved by FERMCO. Filled drums will be sampled by FERMCO (for concentration and enrichment). After approval from the FERMCO CCM, the subcontractor shall transport the drums to the queuing area.	**Waste Minimization** The potential to decontaminate enriched (≥ .95%) equipment and debris was identified during the Building 4A dismantlement. The decontamination could permit management of this equipment and debris in the on-site disposal facility (OSDF) instead of shipping the equipment and debris to Nevada Testing Site. The balance of the DCN deals with the management of the decontamination water generated.
	01517, 3.2.F	Insert at the end of the sentence: "as long as it does not exceed the capacity (gallons) for effluent storage or sludge mass (pounds) restrictions described in Section 01517 2.1.B.2, 2.1.B.3, and 2.1.B.4."	
	01517, 3.2.G	Replace the second sentence of this subpart to read, "Sludge and effluent shall be containerized according to the requirements contained in section 01517 2.1.B.2, 2.1.B.3, and 2.1.B.4."	

Design Change Notice #	Specification Changed	Change Description	Basis for Change
7 Rev.0	15066, 3.1.A	Replace with "Ductwork and piping shall be removed, cut and segregated per the requirements of section 01120 of this specification. After verification inspection (i.e., inspection for visible contamination) by a FERMCO representative, the Subcontractor shall seal openings of ductwork and piping prior to movement from the immediate removal area to prevent spillage of any residual liquids or contamination. Sealing is not a requirement for electrical conduit. These items and other demolition debris will be handled in accordance with Specification section 01517, 1.8.A.1."	**Streamline Work Practices** Radiological surveying/scanning is not required for piping and ductwork. The piping ends are sealed to prevent spills.
	10565, 3.1.A.1.c 10565, 3.1.A.2.c 10565, 3.1.A.3.c	Insert sentence at end of each section: "Subcontractor shall seal openings after cleaning and after verification inspection by a FERMCO representative."	Reiterates radiological requirements for asbestos containing containers being released from the Building 4A confinement.
	01120, 3.2.B	Add "Waste materials to be containerized into waste containers and sealed within a local containment area or building enclosure will require decontamination per Section 01517 of this specification package."	

Design Change Notice #	Specification Changed	Change Description	Basis for Change
7 Rev.0 (continued)	01517, 1.8.A	Delete and replace with: "**1.8.A.1** To remove equipment, material or debris from a local containment or enclosure, or to containerize, surfaces shall be free of visible process material as determined by a FERMCO representative. The definition of visible process material is: visible process residues (green salt, yellow cake, etc.) On the interior or exterior surfaces of materials that is obvious to the eye and that if rubbed, would be easily removed. Stains, rust corrosion, and flaking do NOT qualify as visible process material. If an item fails visual inspection after (at least) one washing attempt (where applicable), the equipment/material/debris shall be encapsulated, sealed, wrapped, and placed outside the building for placement on pallets located at the container queuing area. The subcontractor shall supply and secure a cover (tarp, etc.) Over the equipment/material placed on the pallet. All equipment, material, and debris are still considered to be radiologically contaminated. **1.8.A.2** Prior to removing the exterior siding of a structure or prior to demolishing a structure where the exterior siding is not removed, all non-porous surfaces (structural steel, steel decking) within the structure shall be below 10,000 dpm/100 cm^2 for total (sum of alpha and beta/gamma) removable radiological contamination and below 5,000 dpm/100cm^2 beta-gamma removable radiological contamination; and all above-grade porous surfaces (such as concrete decking and wood) shall be below 1,000 dpm/100 cm^2 beta-gamma removable and 5,000 dpm/100 cm^2 beta-gamma fixed radiological contamination."	**Streamline Work Practices** Prior to removing the exterior siding radiological surveying is required. The FDF requirement for surveying/scanning equipment and materials prior to exiting the containment of the building was modified since the requirement was not more protective of the environment and decreased worker radiological exposure.

Design Change Notice #	Specification Changed	Change Description	Basis for Change
7 Rev.0 (continued)	01517, 3.2.A	Delete and replace with "**3.2.A.1** The Subcontractor shall remove contamination on equipment, materials, or debris in accordance with Specification 01517 1.8.A.1 **3.2.A.2** The Subcontractor shall remove or remove and fix contamination on all the surfaces within the structure until the detected radiological levels are below the criteria as stated in Specification 01517, 1.8.A.2 prior to removing the exterior siding from a structure and prior to demolishing a structure where the siding is not removed."	**Streamline Work Practices** This change carries forward the requirement that the radiological standards are complied with prior to exposing the structural steel to the environment.
	01517, 3.3.A	Delete and replace with "After removing or removing and fixing contamination, the Subcontractor shall notify the FERMCO Construction Manager to arrange for a re-survey of the facility structure to ensure that surface contamination is below the criteria stated in Specification section 01517, 1.8.A.2."	
	01517, Appendix A	Delete	
8 Rev. 0	05125, 3.3.C.2	Revise to read "Welded connections on structural steel rigging frame utilized for critical lifts, as identified specification section 14955, shall be 100% radiograph tested."	**Streamline Work Practices** Load critical welds were 100% radiograph tested. However, 100% radiograph testing for non-critical welds it is not required.
9 Rev. 0	03315, 1.1.A.4	Revise to state: "Foundations, piers, and selected curbs projecting above grade."	**Erosion Control** Some concrete curbs could remain in place (especially curbs) to provide control of run-on/ run-off waters of material stored on the Building 4A pad.
	03315, 3.2.H.1	Add "See Part 6 of the Invitation for Bid for instructions on building."	

Design Change Notice #	Specification Changed	Change Description	Basis for Change
10 Rev. 0	03315, 3.2.H.1	Revise to state: "Inside the footprint of building 4A, above-grade concrete piers, building curbs, walls, and miscellaneous equipment foundations are to be sealed and may remain intact until structural dismantlement. After structural dismantlement, the concrete is to be separated from the structural steel and the concrete is to be placed in a roll-off box and transferred to the Plant 1 Pad."	**Erosion Control** Inside the footprint of Building 4A, concrete piers, building curbs, walls, and miscellaneous equipment foundations are considered part of the slab and will be removed when the slab is removed. Outside the foot print of Building 4A, above-grade concrete piers, building curbs, walls, and miscellaneous equipment foundations are to be removed flush with the existing grade.
	03315, 3.2.H.2	Revise to state: "Inside the footprint of Building 4A, at-grade equipment, column, and miscellaneous foundation piers and walls, and curbs will be sealed and may remain intact until the slab is remediated by the soil excavation project."	
	03315, 3.2.H.3	Added to state: "Outside the footprint of Plant 4, equipment, column, and other miscellaneous foundation piers and walls are to be removed flush with existing grade."	
11 Rev.0	03315, 1.5.A.3.E 05126, 1.5.A.3.E	Revise to state: "Proof of a State Blasters License, a Federal ATF Permit, a Curriculum Vitae, and a copy of liability insurance that covers the work."	**Blaster Certification** The demolition contractor met the following criteria to procure a license in Hamilton country : submit proof of a license in another state, a Federal ATF Permit, a Curriculum Vitae showing trade experience for the individual performing the work, and a copy of a general liability insurance certificate covering the work..

Design Change Notice #	Specification Changed	Change Description	Basis for Change
12 Rev. 0	01120, Appendix A	Revise table to show: 1) Refractory Brick is to be placed in small white metal boxes. 2) Asbestos Block (refractory-friable ACM) will be placed into small white metal boxes. 3) Mineral wool is considered to be friable ACM and will go into a small white metal box. 4) Furnace shroud should replace furnaces w/o refractory under Type H and be placed into a roll-off box. 5) Furnace tubes should be listed as a separate item under Type H and be placed into a roll-box.	**Clarify Waste Handling Criteria** The waste handling criteria described in Specification 01120 needed to be coordinated with the waste handling criteria listed in the Building 4A Furnace Disassembly plan.