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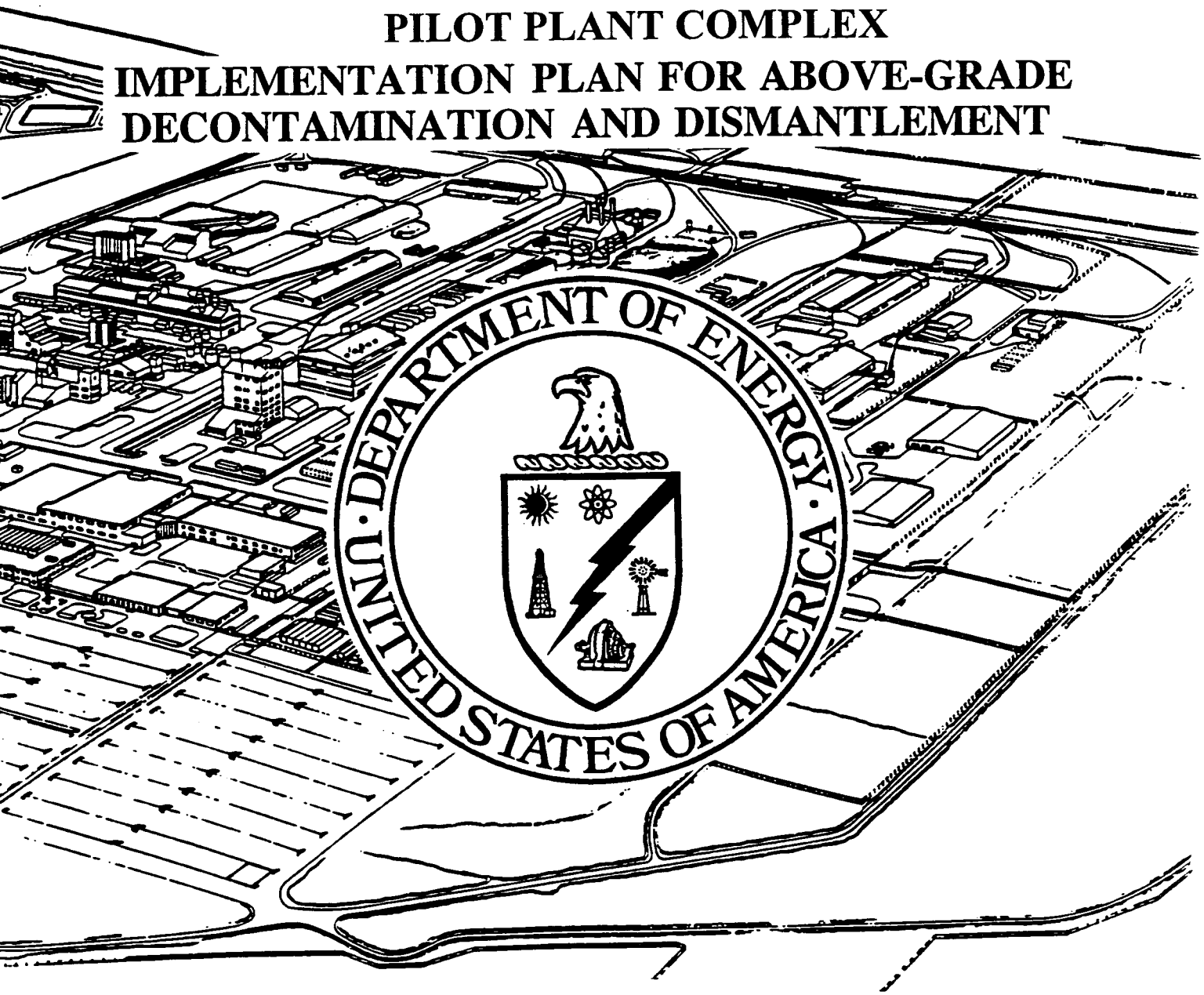
PILOT PLANT COMPLEX IMPLEMENTATION PLAN FOR ABOVE-GRADE DECONTAMINATION AND DISMANTLEMENT



FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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3701

OPERABLE UNIT 3

PILOT PLANT COMPLEX IMPLEMENTATION PLAN FOR ABOVE-GRADE DECONTAMINATION AND DISMANTLEMENT

MAY 2001

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FERNALD, OHIO

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IMPLEMENTATION PLAN FOR ABOVE-GRADE DECONTAMINATION AND DISMANTLEMENT

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NOTATION

Abbreviations, Acronyms, and Initials

ACM	Asbestos-Containing Material(s)
ALARA	As Low As Reasonably Achievable
AMS	Air Monitoring Station
ARP	Aquifer Restoration Project
AWWT	Advanced Waste Water Treatment System
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, as amended
CMU	Concrete Masonry Unit
DOE	United States Department of Energy
D&D	Decontamination and Dismantlement
FEMP	Fernald Environmental Management Project
HEPA	high-efficiency particulate air [filter]
HVAC	heating, ventilation and air conditioning
IEMP	Integrated Environmental Monitoring Plan
IIMS	Integrated Information Management System
MEF	Material Evaluation Form
MSCC	Material Segregation and Containerization Criteria
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NTP	Notice to Proceed
NTS	Nevada Test Site
Ohio EPA	Ohio Environmental Protection Agency
OU3	Operable Unit 3
PCB(s)	polychlorinated biphenyl(s)
PCDF	permitted commercial disposal facility
PPE	personal protective equipment
PWID	Project Waste Identification and Disposition [form]
RCRA	Resource Conservation and Recovery Act, as amended
RD/RA	remedial design/remedial action
RI/FS	remedial investigation/feasibility study
ROB	roll-off box
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SWIFTS	Site-Wide Waste Information, Forecasting and Tracking System

Abbreviations, Acronyms, and Initials (Cont'd.)

U.S. EPA	United States Environmental Protection Agency
WAC	Waste Acceptance Criteria
WWTS	waste water treatment system

Units of Measure

cm.	centimeter(s)
cm^2	square centimeter(s)
dpm	disintegration(s) per minute
ft.	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)

Chemical Symbols

U	uranium
U-235	uranium-235
Th	thorium
Th-230	thorium-230
Th-232	thorium-232

1.0 INTRODUCTION

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1.1 Project Statement

This implementation plan represents the sole remedial design deliverable developed for the Pilot Plant Complex (PPC) decontamination and dismantlement (D&D) project, which has been prepared for regulatory agency approval pursuant to the Operable Unit 3 (OU3) Integrated Remedial Design/Remedial Action (RD/RA) Work Plan (DOE 1997a). This document presents a summary of the remedial design documentation developed between September and November 1999 for the Pilot Plant Complex. This D&D project is being implemented pursuant to the authority stipulated in the OU3 Record of Decision for Final Remedial Action (OU3 Final ROD) (DOE 1996), which covers D&D, waste treatment, and disposition.

The purpose of this document is to summarize the Pilot Plant Complex D&D design in the format and content stipulated by the OU3 Integrated RD/RA Work Plan and established by previously approved D&D implementation plans. This document elaborates, as applicable, on programmatic strategies developed for the Contractor's scope of work, and project specifications (contained in Appendix C of this document).

1.2 Scope of Work

The Pilot Plant Complex D&D project includes the following major activities:

- hazardous waste management unit closures;
- asbestos abatement/removal;
- surface decontamination;
- above-grade component dismantlement;
- environmental monitoring; and
- material management.

Preparatory action: Inventory Removal and Facility/Safe Shutdown are not in the scope of this D&D project; however, these activities have previously been performed and pertinent information has been summarized in Sections 2 and 3. The following components are included in the Pilot Plant Complex:

- Building 13A - Pilot Plant Wet Side;
- Building 13B - Pilot Plant Maintenance Building;
- Building 13C - Sump Pump House;
- Component 13D - Pilot Plant Thorium Tank Farm;
- Building 37 - Pilot Plant Annex;

- Building 54A - Six to Four Reduction Facility #1;
- Building 54B - Pilot Plant Warehouse;
- Building 54C - Pilot Plant Dissociator Shelter and
- Component 74U – Pilot Plant Pad (Existing Overhead Bridge Crane Structure)

Building 68, Pilot Plant Warehouse and G-008, Pipe Bridges will be moved to the Laboratory Complex D&D project due to ongoing use for the Sample Disposition Project being performed by the Waste Treatment and Storage group. Project completion is scheduled for the end of FY04.

Requirements for above-grade D&D of the Pilot Plant Complex were developed using the performance specifications that were originally included in Appendix B of the OU3 Integrated RD/RA Work Plan. Appendix C of this Implementation Plan contains project-specific applications of these performance specifications that incorporate process improvements and lessons-learned from previous D&D projects at the Fernald Environmental Management Project (FEMP).

Department of Energy (DOE) will provide notification to the regulatory agencies of any significant changes to the design prior to implementation. Should the regulatory agencies have any concerns regarding any significant design change, DOE will properly address those concerns as soon as practicable and, if necessary, perform one or more of the following: amend the implementation plan, amend the OU3 Integrated RD/RA Work Plan, present an explanation of significant difference to the OU3 ROD, and/or amend the RODs. Significant changes to the design are those that require formal design modification that would impact the implementation strategies presented in this document. If necessary, affected activities may be suspended until the revision has been completed and approved. This course of action adheres to the commitments made in Section 4.2.2 of the OU3 Integrated RD/RA Work Plan for design changes.

1.3 Plan Organization

This implementation plan is comprised of five sections and five appendices. Section 1 contains the remedial action project statement, scope of work, an overview of this implementation plan, and a brief description of the Pilot Plant Complex. Section 2 describes the overall approach to implementing this above-grade D&D project, as applied from the OU3

Integrated RD/RA Work Plan. That approach includes the projected sequence for remediation of components, a plan for materials management, environmental monitoring activities, and the project-specific applications of implementation strategies for above-grade remediation. Section 3 presents pertinent component history and applicable component-specific details of the applicable remedial tasks. Section 4 presents the schedule for remediation and project reporting. Section 5 describes the subcontract strategy and FEMP project management approach.

Appendix A contains a discussion of potential environmental and occupational sampling for this project, based on the assumptions in the Sampling and Analysis Plan (SAP) contained in Appendix D of the OU3 Integrated RD/RA Work Plan, and on the remediation requirements presented in this plan. Appendix B provides a summary of the evaluation of material disposition alternatives for accessible metals and a tabulation of the cost comparison between the disposition alternatives. Appendix C provides the project performance specifications. Appendix D provides copies of available drawings and sketches that show floor plans and elevations of components. Appendix E contains selected photographs of notable features of the Pilot Plant Complex.

1.4 Location of the Pilot Plant Complex

The PPC project site is located at the U.S. Department of Energy (DOE) Fernald Environmental Management Project (FEMP) in Fernald, Ohio. Project components include most of the structures located within the southeastern-most block of the former Production Area, which is situated south of 1st Street and west of the Analytical Laboratory Building (Building 15A). The PPC is illustrated in Figure 1-1.

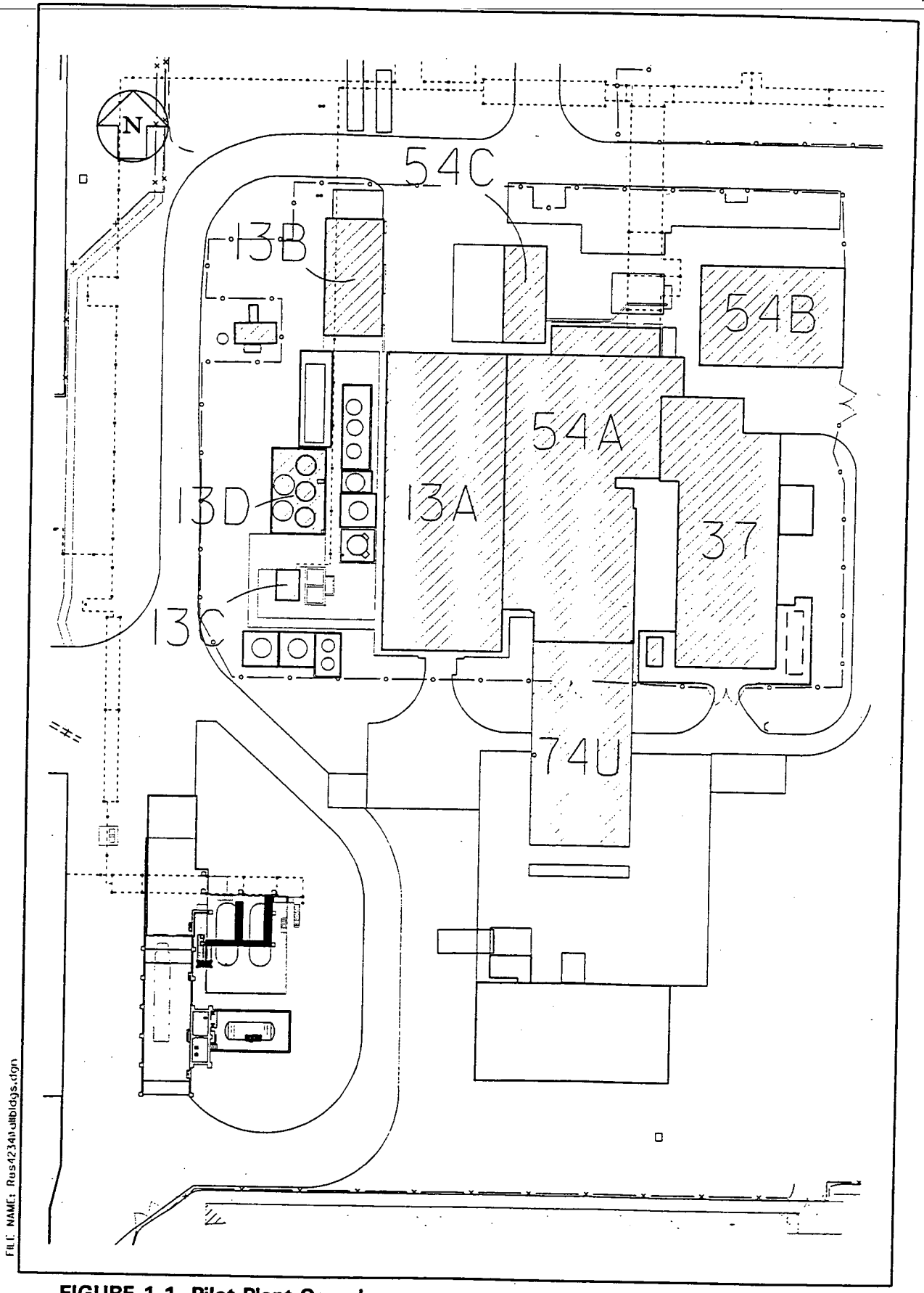


FIGURE 1-1 Pilot Plant Complex

2.0 GENERAL PROJECT REMEDIATION APPROACH

The overall approach to the above-grade D&D of the Pilot Plant Complex 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 Pilot Plant Complex D&D project includes a period of: 1) Notice to Proceed (NTP); 2) premobilization, when Contractor Safe Work Plans, health and safety documents, etc., are prepared, submitted and approved; 3) mobilization, which includes establishing project support facilities and controls; 4) D&D field activities for each component and 5) demobilization, securing the area and decontaminating/removing Contractor equipment. The actual sequence of component D&D will be determined by the Contractor's project schedule, subject to FEMP Project Management approval. Based on a constructability review of the project, it is anticipated that the sequence for dismantlement may be the following:

1. Component 74U;
2. Building 54B;
3. Building 54C;
4. Building 13B;
5. Building 54A (southern portion);
6. Building 37;
7. Building 13C;
8. Building 13D;
9. Building 13A; and
10. Building 54A (northern section).

In order to meet the project schedule shown in Section 4, it is expected that multiple work crews will be used in each of the PPC buildings to concurrently remove/fix contamination, perform asbestos abatement, and dismantle interior equipment/systems.

2.2 Characterization of the Pilot Plant Complex

Historical and recent radiological surveys were compiled during the design to substantiate this information and are summarized in Table 2-1.

TABLE 2-1 Radiological Contamination Survey Summary

Component #	Alpha Removable (dpm/100 cm²)			Beta-Gamma Removable (dpm/100 cm²)			Beta-Gamma Total (dpm/100 cm²)		
	Avg Value	Max Value	Sample Points	Avg Value	Max Value	Sample Size	Avg Value	Max Value	Sample Size
13A	674	3,817	34	1,006	5,022	34	197,034	1,350,000	118
13B	44	44	6	39	39	6	11,143	40,000	28
13C	766	2,960	9	708	2,107	9	416,667	2,900,000	25
13D	49	74	3	165	416	3	58,000	200,000	21
37	326	7,460	50	1,134	23,473	80	13,379	9,000,000	367
54A	160	2,122	97	573	15,546	97	77,384	1,000,000	207
54B	N/A	N/A	N/A	N/A	N/A	N/A	1,000	1,000	12
54C	102	317	8	48	59	8	1,250	3,000	18
74U	52	52	7	47	47	7	1,500	2,000	8

General Notes:

(1) The values provided are typical ranges of contamination levels in each facility and are representative of the general floor areas, walls, structural components and exterior surfaces of equipment. Higher contamination levels should be expected within process equipment internals, sumps and facility overheads.
(2) Higher levels of contamination should be expected as inaccessible areas are exposed during dismantlement.
(3) All values are in units of dpm/100cm².
(4) **The isotope of concern for 13A, 13C & 13D is: surface contamination Th-230 and airborne radioactivity Th-232. The isotope of concern for all other Pilot Plant buildings and components is U-238.**
(5) <MDCR indicates activity is below the minimum detectable count rate of the counting instrument.
(6) Average values are calculated using only those data points where contamination levels were detected in excess of the minimum detectable count rate.

Relevant analytical evaluation data generated from the OU3 Remedial Investigation/Feasibility Study (RI/FS) and summarized in Section 3.3.1 of the OU3 Integrated RD/RA Work Plan reveals that the top half-inch of concrete in the Southern Extraction Area of Building 13A contains elevated concentrations of technetium-99 that must be removed and disposed offsite. The Work Plan also identifies that lead flashing in Buildings 13A and 54A, totaling approximately 0.8 tons, is considered potentially mixed wastes (reference: Table 3-6 of the OU3 Integrated RD/RA Work Plan). Additionally, the OU3 RI/FS identified that process piping and equipment exists in several of the components associated with processes in the Pilot Plant Complex and acid brick exists in some Building 13A floor areas. The top half-inch of concrete from the Southern Extraction Area, lead flashing, process-related metals, and acid brick are prohibited from disposal in the On-Site Disposal Facility (OSDF) per the OU3 Final Action ROD and therefore these materials will be segregated and containerized for off-site disposal. Other materials to be generated from components in the Pilot Plant Complex are considered low-level radiological waste, which may be disposed in the OSDF provided that other physical OSDF Waste Acceptance Criteria (WAC) is met.

The most significant concerns arising from the review of component characterization data are the health and safety of the workers during dismantlement of equipment/systems and other miscellaneous materials in Buildings 13A and 13D. The presence of radiological contamination justifies at least best available technology to prevent or minimize generation of airborne dusts. Buildings 13A and 13D are known to have residual thorium-230 and thorium-

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 summarized in Table 2-1 during the remedial design include support for the following design efforts:

- develop the safety assessment documentation to support the proposed activities;
- enhance the project-specific health and safety requirements and determine potential concerns for worker protection based on the suggested D&D techniques;
- document expected contamination levels for the Contractor;
- determine personnel monitoring requirements;
- identify specific systems or equipment which will require radiologically engineered controls prior to dismantlement;
- air modeling and assessment of potential radiological air emissions; and,
- identifying potential gross radiological contamination that will need to be removed/fixed prior to exposing affected material surfaces to the environment.

The Pilot Plant Complex was evaluated by a State of Ohio-Certified Asbestos Hazard Evaluation Specialist for asbestos containing materials (ACM). The results of this evaluation are summarized in the following paragraphs.

Materials discovered to contain asbestos fibers in percentages of greater than one percent fall into the following categories:

<u>Friable Asbestos Materials</u>:

- pipe run insulation
- pipe fitting insulation
- storage tank insulation
- woven gasketry
- gasketry (rope)
- cloth gasketry
- duct insulation
- furnace refractory insulation

<u>Non-friable Asbestos Materials</u>:

- resilient floor tile (9"x9")
- gasket
- transite sheet
- electric wire insulation

The asbestos evaluation also concluded the following:

- Fire-rated/insulated door cores are assumed to contain asbestos;
- Pipe or tank insulation covered with an embossed metal jacket can be considered non-asbestos. Any remaining pipe or tank insulation should be presumed to be ACM unless labeled as "Asbestos Free";
- Exterior gutter debris/residual material contains detectable amounts (>1%) of friable asbestos fibers and should be considered friable ACM;
- Any gasket material installed throughout the buildings is considered ACM.
- Built-up roofing of building 13B contains ACM, all remaining built-up roofing has been found to be non-ACM.

2.3 Materials Management

Project-specific material management strategies for the Pilot Plant Complex 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 Pilot Plant Complex 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 FEMP 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 in the Pilot Plant Complex. 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, 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. To supply the Contractor with 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 for the Contractor. 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 are required to be sized, segregated, and containerized in accordance with MSCC. To ensure that debris which 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 are generated, a representative from the OSDF Waste Acceptance Organization will be present to ensure that debris is segregated according to the proper debris categories identified on the MSCC, with specific oversight on the debris being containerized for the OSDF.

One of the most important decisions that will be made regarding debris disposition is whether or not certain debris contains *visible process residues*. The definition of visible process residues (green salt, yellow cake, black oxide, etc.) is hold-up/materials on the interior or exterior surfaces of debris that is obvious and that if rubbed, would be easily removed. Dirt, oil, grease, stains, rust, corrosion, and flaking do NOT qualify as visible process residues; however, dirt, oil, grease, stains, rust, corrosion, and flaking require decontamination (i.e., surface cleaning) for radiological control purposes prior to removing the debris from the enclosure or prior to opening a building to the environment per Specification Section 01517. The evaluation to determine whether or not something is "process debris" will occur both before and during debris generation. Some process piping is not amenable to decontamination to remove such residues and therefore is pre-determined to be "process debris". Other process-related piping and equipment will be evaluated during dismantlement as to whether removal of visible process residues is practical. Regardless of whether or not visible process residues are present, all debris are still considered to be radiologically contaminated unless otherwise specifically identified. Final visual inspection will take place following dismantlement, sizing, and sealing of openings per Specification Section 15065,

decontamination per Article 3.1 of Specification Section 01517, and relocation to an approved inspection staging area.

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 dust, filters, filter cake, personal protective equipment (PPE), spent consumables, and washwaters.

Depending on the DOE-approved methods for equipment/systems dismantlement, it is possible that up to 50,000 gallons of decontamination washwaters may be generated during the D&D of Pilot Plant components and Contractor equipment. Since decontamination methods include non-water wash techniques (e.g., encapsulation), the projected volume of washwater is only a liberal estimate based on previous OU3 D&D projects that used high pressure, low volume water spray. Wastewater will be managed in accordance with the strategies laid out in the OU3 Integrated RD/RA Work Plan. The wastewater collection system will include polyethylene-lined containment structure(s) over which equipment is washed, and filters (20 micron prefilter and 5 micron filter) to remove entrained particulate during transfer into a holding tank. 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 FEMP wastewater treatment system (Advanced Wastewater Treatment Facility), and sludge removal and containerization in 55-gallon drums. 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 RI/FS 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".

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 Report (1996a), and OU3 Integrated RD/RA Work Plan, and are estimated in Tables 2-2, 2-3, and 2-4.

2.3.4 Material Handling, Storage, Treatment, and Disposition

Materials generated from the D&D of the Pilot Plant Complex will be reduced in size, segregated, and containerized in accordance with the requirements identified in the MSCC form supplied to the Contractor. Quantities and disposition of specific material categories were documented in the PWID form for internal use. Tables 2-2, 2-3, and 2-4 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.

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 the Pilot Plant Complex 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 FEMP. 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" such as yellow cake, black oxide, green salt, etc.) 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 2-2 Pilot Plant Complex Bulked Material Volume Estimates (yd^3)

Component Number	OU3 Debris Categories										
	Cat. A	Cat. B	Cat. C	Cat. D	Cat. E	Cat. F	Cat. G	Cat. H	Cat. I	Cat. J	T
13A	192	519	5.2	0	612 (1)	1500	76	0	70	10	2
13B	15	309	3.3	48	176	0	0	2	19.2	0	5
13C	3	33	.6	9	17	0	1.4	0	.4	0	
13D	0	153	1.5	0	66	140	0	10.5	.4	0	3
37	112	180	.3	0	320	0	2.8	26	51.6	0	6
54A	420	1080	15	963.9	400	0	26	5	44.6	0	2
54B	27.9	45	1.5	0	0	0	0	0	0	0	
54C	27.9	105	1.5	0	0	0	0	0	36	0	1
74U	113	0	0	0	0	0	0	0	0	0	1
Complex Total	911	2424	28.9	1020.9	1591	1640	106.2	43.5	222.2	10	7
Container/ Quantity	ROB 31	ROB 81	WMB 10	ROB 35	ROB 106 WMB 2	WMB 554	Pallets 53	ISO 2	ROB 8	WMB 4 DM 15	
Interim Storage	OSDF Transfer	OSDF Transfer	TL/Plt. 1 Pad	OSDF Transfer	OSDF Transfer	WMB Plt. 1Pad	OSDF Transfer	ISO Plt. 1 Pad	OSDF Transfer	OSDF Transfer	
Disposition	OSDF	OSDF	OFFSITE	OSDF	OSDF	OFFSITE	OSDF	OSDF	OSDF	OSDF	

Footnote:

(1) Tc-99 contaminated concrete from the top 0.5 inches of floor in Bldg 13A Pilot Plant Wet Side will be dispositioned 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 2-3 Pilot Plant Complex Unbulked Material Volume Estimates (yd^3)

Component Number	OU3 Debris Categories										
	Cat. A	Cat. B	Cat. C	Cat. D	Cat. E	Cat. F	Cat. G	Cat. H	Cat. I	Cat. J	To
13A	64	171	1.7	0	306	238.3	38	0	35	10	8
13B	5	103	1.1	16	88	0	0	1	9.6	0	2
13C	1.5	11	.2	3	8.5	0	.7	0	.2	0	2
13D	0	51	.5	0	33	23	0	3.5	.2	0	1
37	56	60	.1	0	155	0	1.4	13	25.8	0	3
54A	140	360	5	321.9	200	0	13	2.5	22.3	0	10
54B	9.3	15	.3	0	0	0	0	0	0	0	2
54C	9.3	35.2	.5	0	0	0	0	0	18	0	6
74U	37.6	0	0	0	0	0	0	0	0	0	3
Complex	322.7	806	9.4	341.2	791	261	53	20	111.6	10	28

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

TABLE 2-4 Pilot Plant Complex Material Weight Estimates (Tons)

Component Number	OU3 Debris Categories										
	Cat. A	Cat. B	Cat. C	Cat. D	Cat. E	Cat. F	Cat. G	Cat. H	Cat. I	Cat. J	Totals
13A	51.2	22.7	.4	7.8	288	156	19	0	13	5	563
13B	4	22.7	.1	3	74	0	0	.3	6.6	.2	111
13C	1.2	2.4	0	.1	7	0	.4	0	.2	.2	12
13D	0	11.2	.1	0	29	18	0	1.1	0	.2	60
37	44.8	13.2	.3	0	144	0	.7	4.5	7	.2	215
54A	112	79.2	1	45.3	189	0	6.8	.9	2	.2	436
54B	7.5	3.3	.1	0	0	0	0	0	0	.2	11
54C	7.4	7.7	.1	0	0	0	0	0	18	1	34
74U	13	0	0	0	0	0	0	0	0	0	13
Complex	241	162	2.1	56.2	731.5	174	27	7	46.6	7.2	1455

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

The current project strategy for managing debris is to deliver containerized debris directly to the OSDF Transfer Area; however, stockpiling of Category A, B, D and E debris for interim storage is a possibility due to the limited number of ROBs at the FEMP. Stockpiling of debris, if utilized, will follow the strategies provided under Section 3.3.2.3 of the OU3 Integrated RD/RA Work Plan, which requires best available storage configuration for OU3 Debris Categories A, B, D, and E. The strategy for stockpiling also requires removing or encapsulation of contaminants. Specification Section 01517 debris release criteria requires that gross contamination be removed or encapsulated on debris surfaces prior to their removal from a building enclosure or local containment. To the maximum extent practicable, debris will be containerized following sizing when sufficient containers are available. Should the best available storage configuration (i.e., containers with lids or tarps) be temporarily unavailable, stockpiling of debris that meet the release criteria on pads with run-off controls would be performed. Based on current estimates for OSDF debris transfers and the schedules for completion of Pilot Plant Complex D&D and start of Area 4B soil excavation, debris stockpiles may remain on the pads of the Pilot Plant Complex for up to six months.

Material tracking is performed using the Site-Wide Waste Information, Forecasting and Tracking System/Integrated Information Management System (SWIFTS/IIMS) through the FEMP waste management organization. Project-specific reporting on material disposition will be provided by a SWIFTS/IIMS summary in the Project Completion Report. Section 3.3.2.2 (Segregation, Containerization, Tracking) of the OU3 Integrated RD/RA Work Plan describes material tracking and reporting using SWIFTS. OU3 Debris Categories A, B, D, and E debris are classified as OSDF Category 2 material. Therefore, commingled Debris Categories A, B,

D, and E quantities will be tracked in SWIFTS/IIMS under a discreet Material Evaluation Form that corresponds to Impacted OSDF Category 2 debris in interim storage. OU3 Debris Category I (Miscellaneous Materials) is also OSDF Category 2 but will not be commingled and therefore actual volumes will be easily obtained. Debris Category G (Transite) and Debris Category H (Regulated ACM) are regarded as OSDF Categories 3 and 5, respectively, and will also be handled separately. Since the volume of commingled debris will represent a combination of waste streams, proportions of OU3 debris categories within that total volume will be derived based on original estimates to identify and track waste volumes by OU3 debris category. These derived quantities will be documented in the Project Completion Report for the Pilot Plant Complex. Other than tracking debris specifically for the purpose of OSDF placement, project-specific material tracking and reporting strategies for the Pilot Plant Complex project do not differ from the strategies laid out in the OU3 Integrated RD/RA Work Plan and therefore no additional details were developed during the remedial design process.

The disposition strategy for Pilot Plant Complex materials is consistent with the requirements stated in the OU3 Final Action ROD (1996b) and strategies presented in the OU3 Integrated RD/RA Work Plan. Table 2-2 identifies that debris generated from this project will be placed in the OSDF. No treatment will be necessary for those materials destined for on-site disposal since all chemical-based waste acceptance criteria are met based on OU3 RI/FS data.

2.3.5 Material Recycling/Reuse

Accessible metals (Category A) from the Pilot Plant Complex have been evaluated for potential recycling options and a detailed summary of that evaluation is available in Appendix B. Using the Decision Methodology for Fernald Material Disposition Alternatives (the "Decision Methodology"), 241 tons of potentially recyclable accessible metals (OU3 Debris Category A) from all Pilot Plant Complex components were evaluated by comparing the four leading alternatives to on-site disposal. Of the three phases of the Decision Methodology (Threshold Phase, Life Cycle Analysis Phase, and Decision Phase), only the first phase was applied since the comparative evaluation of project costs for each alternative showed that the total costs for each of the recycling options greatly exceed the 25 percent total cost criteria compared to OSDF.

2.4 Environmental Monitoring

Environmental monitoring for the Pilot Plant Complex D&D project will include supplemental radiological environmental air monitoring and wastewater monitoring. Groundwater monitoring is not needed to support this project but would be employed if necessary, as described in Section 3.6.2.3 of the OU3 Integrated RD/RA Work Plan.

Project-specific stormwater management is governed by the FEMP Stormwater Pollution Prevention Plan (DOE 1996c) and any monitoring associated with that program is managed by OU5/Aquifer Restoration Project. Project-specific stormwater management includes the diversion of stormwater to appropriate site collection drains surrounding the project.

<u>Surface Water (Wastewater) Monitoring</u>

Section 2.3.2 of this Implementation Plan describes the wastewater management strategies that have been developed for the D&D of the Pilot Plant Complex. The OU3 Integrated RD/RA Work Plan describes the overall strategies to be implemented for project monitoring of wastewater. Listed below are the specific references in the Work Plan:

- Section 3.2.5, Surface Decontamination: Wastewater collection and management strategies.
- Section 3.3.3, Management of Secondary Waste: The overall strategy for managing wastewater, as one of the primary aspects of secondary waste, through the site wastewater treatment system.
- Section 3.5.2, Management of Contaminated Water: References site procedure to be used for the evaluation and management of contaminated wastewater.
- Sampling and Analysis Plan (SAP)/Section 2, General Sampling and Data Collection Approach: Focuses on wastewater sampling, among other aspects of sampling.
- SAP/Section 3, Specific Sampling Programs: Sampling for disposition of wastes, including wastewater. Determination of hazardous, radiological, and other waste characteristics.

The WWTS manager has been provided with a spreadsheet containing OU3 R/FS analytical data from intrusive sampling of the Pilot Plant Complex components to determine whether potential elevated levels of contaminants of concern may be present. Based on an estimated 50,000 gallons of potential washwater, it is anticipated that up to seventeen samples will be taken to determine isotopic radiological and heavy metals concentrations prior to discharge into the Advanced Wastewater Treatment Facility. Of those seventeen samples, one will be a

duplicate for quality assurance/quality control purposes. The purpose of the sampling is to ensure the adequacy of treatment capacity so that National Pollutant Discharge Elimination System (NPDES) permit requirements are met.

Project-specific reporting for wastewater will be provided in the project completion report. The report will include a summary of the data generated during the project. The report will include a summary of the results from sampling and analysis prior to its discharge into the WWTS.

Radiological Air Monitoring

Occupational monitoring will be performed using personal and workplace air samplers in the work areas to ensure worker protection and will also serve as an indication of the effectiveness of engineering controls. Since the Pilot Plant will be enclosed (sealed) during D&D, any potential emissions that could affect the outside environment would be detected first by occupational monitoring. Section 8.1 of the OU3 RD/RA Health and Safety Plan (Appendix E of the OU3 Integrated RD/RA Work Plan) describes the occupational air monitoring program.

Environmental radiological air monitoring during the D&D of the Pilot Plant Complex project will consist of the Fernald Site Environmental Monitoring Program described in the site-wide IEMP, and discussed in Sections 3.5.1 and 3.6.2.1 of the OU3 Integrated RD/RA Work Plan. FEMP boundary monitors are shown in Figure 2-1.

The need for a supplemental environmental radiological air monitoring program for this D&D project was evaluated by modeling the potential release of radiological (uranium) contaminants from the components during D&D. The result of that modeling effort reveals that uranium emissions would be negligible and therefore, supplemental radiological monitoring is not warranted.

Radiological survey data summarized in Table 2-1 were used for the air emissions modeling input. Computer modeling of potential uranium emissions from the Pilot Plant Complex was performed using the CAP88PC method to measure potential dose impacts from the project. CAP88PC is the personal computer version of the U.S. EPA model CAP88 that is the approved method for predicting dose impacts to off-site personnel from emissions of

radionuclides under the National Emissions Standards for Hazardous Air Pollutants (NESHAPs) regulations. It is emphasized that the CAP88PC model is being used as a tool to assess potential dose to off-site personnel from radionuclide emissions from a project in order to identify potential mitigative controls and supplemental monitoring measures; it is not being used as a means to demonstrate compliance with NESHAPs Subpart H. The method to be used for demonstrating NESHAPs Subpart H compliance is presented in the IEMP as a collective sitewide strategy.

The CAP88PC modeling methodology is prescribed by the U.S. EPA reference manual: U.S. EPA User's Guide for CAP88, Version 1.0, 402-B-92-001. Computer modeling of potential radiological emissions from the Pilot Plant Complex used radiological smear data to provide a more realistic measure of removable alpha, beta, and gamma contamination rather than fixed contamination (identified through intrusive sampling results from the OU3 RI/FS database and direct surface contamination surveys) for estimating contaminant release. The removable contamination data obtained through smear sampling represents a model input that depicts worst case emissions since it represents removable contamination present prior to the decontamination activities.

The modeling methodology assumed no controls on emissions release, such as HEPA filters on containment ventilation systems and a percentage (of removable contamination) that would become airborne during D&D activities. Potential emissions sources were treated as being in readily dispersible forms. The results of the computer modeling indicated that the maximally exposed individual would theoretically be located approximately 751 meters east-southeast of the project area and would potentially receive a maximum Total Effective Dose Equivalent of 2.27×10^{-4} mrem/year from the D&D activities. Based on a review of the results of the computer modeling, no supplemental environmental air monitoring will be required for the Pilot Plant Complex D&D activities.

Further justification for not providing project specific air monitors comes from analysis of data from the Plant 7 Dismantling - Removal Action No. 19 Final Report (DOE 1995), the Project Completion Report for Building 4A (DOE 1997c), the Plant 1 Complex - Phase I Project Completion Report (DOE 1997d), and the Thorium/Plant 9 Complex Project Completion Report (in draft), which have shown that dismantlement activities resulted in negligible airborne

radiological contaminant emissions. Results for airborne uranium contamination during those projects have been approximately 5 percent of the DOE maximum off-site guidelines of 0.1 pCi/m^3. The relationship between pCi/m^3 and mrem/year may be understood by the conversion factor used to equate the two terms at the FEMP: if inhaled continuously (24 hours/day), 0.1 pCi/m^3 of uranium in air will result in a dose of 100 mrem/year. It should be noted that various assumptions have been incorporated into this conversion factor. Mitigative measures that might be employed in the event of exceedence of the set criterion would include an increase in engineering and administrative controls during a particular task that has been identified as the cause or possible cause of the elevated radiological levels. Such controls could include negative pressure within an enclosed work area using additional HEPA filtration units or additional surface cleaning (wash) steps before removing material from the containment area.

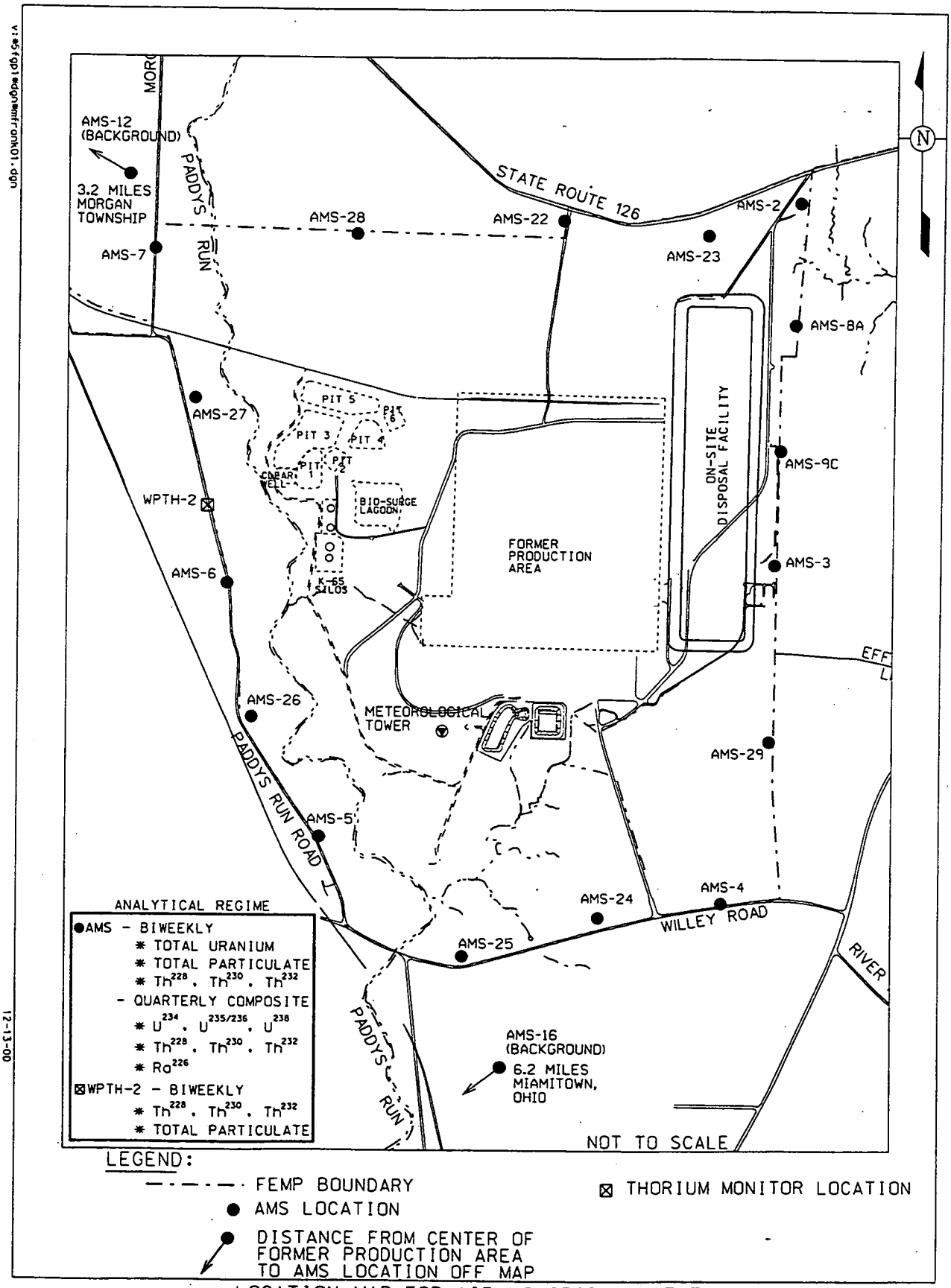


FIGURE 2-1 Pilot Plant Complex Air Monitoring Stations

2.5 Remediation Activities

A general approach to the D&D of the Pilot Plant Complex is described in the following subsections. Section 3 elaborates on this discussion by identifying component-specific interests concerning the remedial tasks listed below, as applicable. The remedial tasks that apply to the Pilot Plant Complex include the following:

- Preparatory Action: Inventory Removal;
- Preparatory Action: Facility/Safe Shutdown;
- Hazardous Waste Management Unit Closure Tasks;
- Asbestos Removal;
- Surface Decontamination; and
- Above-Grade Dismantlement.

As required by Specification 01515 (Mobilization), the remediation contractor will mobilize in preparation for the D&D activities by establishing the construction zone boundary and material handling and containerization area(s), providing portable support facilities as needed, extending water and electrical utilities from designated tie-ins, and establishing stormwater controls. Site preparation by the FEMP workforce will complete the relocation of radiological control point/break trailers to the designated area prior to contractor mobilization. The contractor will supply an asbestos hygiene trailer/facility.

The proposed construction zone boundary is delineated in the Civil Demolition Plan drawing, a copy of which is included in Appendix D. Equipment that are potentially contaminated due to a history of use at another radiological facility will be inspected by FEMP Project Management and surveyed by radiological control technicians to ensure that no contamination or items prohibited by the FEMP are brought on-site. A sign-in station will be established at the entrance to the job site for posting of permits and health and safety plans. Additional radiological control boundaries will be established in various areas as necessary prior to starting remediation activities in those areas. These boundaries will be established prior to starting in order to locate contaminated material staging areas as well as access and egress points to and from contaminated areas.

As required in the performance specifications, the remediation contractor will develop and submit for FEMP Project Management approval safe work plans detailing work activities. Examples of such plans include details relative to where the remediation contractor will erect barriers and fences for radiological control (Specification Section 01515), controlling fugitive

emissions (Specification Section 15067), stormwater run-off protection (Specification 01515), and controlling erosion (Specification Section 01515). Throughout the remediation activities, the remediation contractor will be responsible for notifying FEMP Project Management of conditions in the field (e.g., chemical spills, leaking containers) that require environmental response. All conditions that necessitate a response will be dealt with immediately.

2.5.1 Preparatory Action: Inventory Removal

Waste/product inventories have been removed from Pilot Plant Complex components and were transported to interim storage facilities or off-site disposal facilities under the decisions and procedures adopted from Removal Action No. 9, Removal of Waste Inventories. For those components that had inventory removed, a summary of inventory types and quantities has been provided in the respective Section 3 component-specific remediation details.

2.5.2 Preparatory Action: Facility/Safe Shutdown

Facility/Safe Shutdown activities were performed by FEMP personnel between October 1995 and May 1996 under Removal Action No. 12 procedures. The Facility/Safe Shutdown scope consisted of the following activities:

- removal of all salvageable equipment;
- removal of loose, gross contamination;
- removal of hold-up material;
- general clean-up; and
- disconnection of all utilities.

All steam, potable water, electrical power, fire protection alarms and systems, compressed air, and communication systems have been disconnected at the equipment or at the building exterior to establish the known condition of each energy source within the remediation area. Section 3.2.2 of the OU3 Integrated RD/RA Work Plan further discusses the scope of this preparatory action and Section 3 of this implementation plan details component-specific details regarding hold-up material types and quantities removed.

2.5.3 Hazardous Waste Management Unit Closure Tasks

Six HWMUs, associated with the Pilot Plant Complex, and their current status are identified in Table 2-5. Of these six HWMUs, completion of closure has been certified for four units. The

two remaining HWMUs, Abandoned Sump West of the Pilot Plant (HWMU No. 22) and Tank T-2 (HWMU No. 54), are being remediated in accordance with the integrated RCRA/CERCLA process described in Section 3.6 of the OU3 Integrated RD/RA Work Plan..

TABLE 2-5 Pilot Plant Complex HWMU Closure Status

HWMU No.	HWMU Identification	Component No.	Closure Documentation Submittal
INACTIVE UNITS CLEAN CLOSED UNDER RCRA			
30	Barium Chloride Salt Treatment Facility	13A	19-Apr-90
31/32	Bulk Storage Tanks T5 & T6	13D	18-Nov-93
52	North & South Solvent Tanks (Pilot Plant)	13D	30-Dec-93
INACTIVE UNITS TO BE CLOSED UNDER RCRA/CERCLA INTEGRATED PROCESS			
54	Thorium Nitrate Tank (T-2)	13D	23-Nov-98 (DOE-0188-99) documented completion of closure activities. PPC Project Completion Report to document debris disposal.
22	Abandoned Sump West of Pilot Plant	13A	RvA 24 Close-Out Report (1993) documented decontamination and disposal of debris; Area 4B Soil Excavation Project Completion Report to document soil element.

HWMU No. 54:

Tank T-2 was classified as a HWMU (HWMU No. 54) based on storing waste thorium nitrate (characterized as D002 - corrosive, D006 - cadmium, and D007 - chromium) for greater than 90 days. As part of the Thorium Nitrate Stabilization Project (TNSP) conducted under Removal Action 9, the waste was removed from the tank and treated to meet LDR treatment standards. Decontamination was achieved by flushing the tank system with water. Samples of the decontamination rinseate were analyzed and met Ohio EPA closure guidance limits for pH, cadmium and lead. A sample of the storm water which had collected in the secondary containment area also met Ohio EPA closure guidance limits for these constituents. In November 1998, these results were transmitted to Ohio EPA and concurrence was obtained from the Agency for the completion of remedial activities for this unit. Final certification of closure will be achieved in accordance with the Integrated RCRA/CERCLA DF&O following completion of the relevant CERCLA documentation for this unit.

HWMU No. 22:

There are no above-grade components associated with the Abandoned Sump West of the Pilot Plant (HWMU No. 22). The sump and its contents were removed in 1993 as part of

Removal Action No. 24. Since this implementation plan only addresses above-grade remedial activities for the Pilot Plant Complex, no further action is required in this plan to address the remediation of HWMU No. 22. Final remediation of this unit (i.e., remediation of contaminated media) will be addressed by SCEP in the appropriate implementation plan for at- and below-grade remediation and the appropriate closure documentation will be provided within the project completion report for the Area 4A soil excavation project.

2.5.4 Asbestos Removal

The removal of ACM from components will be conducted by a remediation contractor qualified to conduct asbestos abatement operations. This activity will involve removing all friable types of asbestos, typically consisting of thermal system insulation (TSI) on pipes and equipment and non-friable ACM such as floor tile, mastic, gaskets, etc. Component-specific details of asbestos removal, including estimated quantities, are provided in Section 3, as applicable. ACM removal strategies that will be applied to this project were discussed in depth in Section 3.2.4 of the OU3 Integrated RD/RA Work Plan while overall project specific requirements for the D&D Contractor are detailed in Specification Section 01516.

2.5.5 Surface Decontamination

Surface decontamination refers to the removal of loose surface contamination and/or potentially the encapsulation of remaining contaminants in order to minimize the potential for release of contaminants during handling and disposal. Specification Section 01517 addresses the removal and/or fixing of radiological contamination and generally covers the following activities:

- cleaning low-level uranium contaminated materials and/or building surfaces by contaminant removal or encapsulation to meet debris and/or structure release criteria;
- cleaning process equipment and materials to remove visible process residues, if practicable; and
- controlling and moving effluent produced during the removal and/or encapsulation of contamination.

To identify materials/surfaces that may require surface cleaning, existing radiological surveys were reviewed. These surveys provide Radiological Engineers with an indication of the extent of alpha removable, and beta-gamma removable, and total beta-gamma radiological contamination.

Prior to removing debris from a building enclosure or local containment, all external surfaces will be cleaned per Specification Sections 01517 and 01120. Specification Section 01517 identifies the requirements for removing/fixing of contamination, including DOE-approved methods, while Specification Section 01120 identifies the level of decontamination needed to meet material handling criteria. Among other requirements, these specifications require removal of gross removable surface contamination and sealing of all openings of equipment and debris that are potentially contaminated internally with removable contamination. For large items such as ductwork, the Contractor may encapsulate all internal surfaces in lieu of sealing. Acceptable methods for removing surface contamination include, but are not limited to: low volume hydro-blasting with a minimum of 1,000 psi, steam-cleaning, sponge blasting, CO_2 blasting, etc. FEMP Project Management will be notified prior to encapsulation of debris to allow for inspection for visible process residues. Acceptable methods for encapsulating contamination, which is not readily removed by the above-identified methods include, but are not limited to, encapsulating coatings, non-strippable coatings as referenced in Article 2.2 of Specification Section 01517, and reinforced polyethylene sheeting which is sealed prior to movement to prevent migration of potential contaminants.

Internal surfaces of process pipe will not be decontaminated per Specification Section 01120; however, external cleaning is required per Specification Section 01517. Internal surfaces of process piping are assumed to exceed both the removable and total contamination limits for uncontained demolition and are not amenable to decontamination.

Prior to opening the structures that require decontamination to the environment, either by removal of exterior siding or by dismantlement, the Contractor is required to remove and/or fix radiological contamination on all surfaces in the facility until the detected radioactivity levels are below the facility release criteria identified in Part 8.C. of the contract (Radiological Requirements Plan). FEMP Project Management will perform a radiological release survey to ensure the radioactivity criteria are met.

2.5.6 Above-Grade Dismantlement

All above-grade dismantlement activities to be performed during the Pilot Plant Complex project are described in Section 3.2.6 of the OU3 Integrated RD/RA Work Plan. The

specification sections listed below describe various project applications of structural building/component dismantlement:

- Bulk Removal: includes removal of electrical components, piping, construction debris, and heating, ventilation and air conditioning (HVAC) systems: (Specification Section 15065);
- Equipment/System Dismantlement: Specification Section 15065;
- Transite Removal: Specification Section 07415;
- Structural Steel Dismantlement: Specification Section 05126; and
- Concrete/Masonry Removal: Specification Section 03315.

The remediation contractor is required by each of the above-referenced specifications to submit a Safe Work Plan for approval by FEMP Project Management. Content, such as methods, and submittal requirements for Safe Work Plans are described in each of the performance specification sections. Based on these and other supporting specifications, a general description of above-grade dismantlement tasks is described below, while building-specific above-grade dismantlement tasks are discussed in Section 3.

Bulk Removal

Prior to breaching any system, the remediation contractor and FEMP Project Management will verify that all the systems are de-energized.

All piping, valves, electrical components, conduit, wire, cable trays, construction debris, and HVAC systems will be removed and reduced in size. During removal of HVAC ductwork, internal surfaces will be visually inspected to ensure the absence of free liquids or solid materials. If free liquids or solid materials are found, an evaluation will be initiated by the FEMP Project Manager to determine the requirements for material handling and removal. The evaluation will identify the contents and requirements for containerization, storage, and disposal. If the item fails visual inspection, it will be labeled as "process debris" (designated by red paint) unless the item is decontaminated free of such residues and thereby rendering it as "non-process" debris. Specification Section 01120 (Part III) describes the decision process used to evaluate whether debris is to be labelled as "non-process", "process", or "suspect process" and the action to be taken for each.

Methods such as reciprocating saws, portable band saws, and shears are the preferred methods for bulk removal. Surface wiping or HEPA filtered vacuuming may be required for

contaminated surfaces where cuts are planned in order to minimize transferrable contamination. Methods that minimize volatilization and release of paint constituents and other contamination are preferred; however, alternative methods may be proposed provided that HEPA-filtered local ventilation and adequate respiratory protection are used. Continuous workplace air monitoring for radioactivity will be performed to ensure that engineering controls employed by the Contractor are adequate.

Equipment/System Dismantlement

As equipment/systems are removed, the previously inaccessible surfaces will be visually inspected to ensure the absence of free liquids or debris. If these materials are found, an evaluation will be initiated by FEMP Project Management to determine the appropriate removal and handling requirements for the material (Specification Section 15065).

The Contractor will detail in its Safe Work Plan for equipment removal the sequence, methods of removal and dismantlement, equipment required, catalog cut sheets, drawings and methods and materials to control generation of airborne contaminants from cutting operations, etc. Staging of removed equipment and size reduction will be proposed by the Contractor and approved by FEMP Project Management.

Transite Removal

Specification Section 07415 addresses the requirements for removal of interior and exterior transite panels. Prior to removing any transite panels, a coating of amended water or encapsulant will be applied to lock down any loose fibers. A screw gun or bolt cutter is the preferred method for removing the panel fasteners. If the fasteners are not removed with a screw gun, then the area around the fastener will be sprayed with a fixative allowing the fastener to be cut or pried out. Prior to locking down contamination, Specification Section 07415 requires the remediation contractor to demonstrate the proposed method to be utilized. After the screw is cut or pried out, the fixative will be reapplied. If a broken panel is encountered, then the area around the break will be sprayed with amended water or encapsulated with the fixative. HEPA vacuums will be available to collect any loose material.

Mineral wool batt insulation will be removed and containerized during interior transite removal. As batt insulation is removed, a visual inspection and a radiological survey will be performed

on the newly exposed surfaces. Indications of friable asbestos will require removal of loose material and locking the remaining fibers in place. If radiological survey results indicate the need to perform decontamination or lock down of the areas to levels consistent with surrounding building surfaces, then these activities will be performed. Fasteners and molding that hold the panels and insulation in place will also be removed as part of this operation. In some instances, the interior transite roof panels may be removed after the exterior transite panels have been removed.

Prior to exterior transite panel removal, Specification Section 07415 specifies that the remediation contractor shall remove and or fix radiological contamination on all structural surfaces within the facility until the detected radioactivity levels are below the criteria defined in Part 8 of the IFB/RFP.

Structural Steel Dismantlement

Specification Section 05126 addresses structural steel dismantlement requirements. Exterior metal panels will be left in place on the structural steel members. All remaining items, such as non-load bearing steel members, windows and frames, doors, gutters and down spouts, will be removed using mechanical means. As these items are removed, the exposed component surfaces have the potential of holding debris and contamination. These areas will be visually inspected to determine if these surfaces meet the decontamination requirements of Specification Section 01517.

For all of the components in the Pilot Plant Complex, hydraulic shears or oxy-acetylene torches are expected to be used to dismantle and size reduce the structural steel frame. Prior to and during structural dismantlement, the area surrounding the structure will be sprayed with water as necessary to reduce fugitive dust emissions.

The D&D Contractor will be required, pursuant to Specification Section 05126, to specify in a Safe Work Plan for structural steel removal the following methods:

- Detailed sequence of dismantlement and method of cutting, including equipment to be used;
- Methods for contaminant control, including fugitive emissions during cutting;

- Detailed plan for protecting lay down and cutting areas from contamination by lead paint chips and for controlling airborne radiological emissions;
- Methods and materials used for cutting lead-painted steel;
- If structural steel is removed in sections, verify the structural adequacy of the remaining structure. Calculations and drawings to verify the structural integrity of the partially dismantled structure must bear the stamp of a Registered Professional Engineer; and
- Plans for personnel tie offs, use of pick boards and walking on or near roof purlins/girders.

Furthermore, Specification Section requires that the remediation contractor apply mechanical means of cutting to remove the structural steel to the largest extent possible while also avoiding damage to adjacent structures, components, equipment, and utilities.

Concrete Masonry Unit (CMU) Removal

Specification Section 03315 requires the remediation contractor to develop a Safe Work Plan for concrete/masonry removal that contains the following information:

- Detailed method and sequence of dismantlement, including equipment to be used;
- Methods for control of contaminants, including control of fugitive emissions;
- Materials, such as non-woven geotextile fabrics and surfactants, to be used;
- Methods of cutting, including equipment to be used;
- Calculations to verify structural adequacy of partially dismantled structure, as applicable; and
- If dismantlement method requires personnel on the roof, the Contractor shall provide calculations verifying the structural adequacy of the roof to support personnel and equipment. These calculations shall be stamped by a Registered Professional Engineer.

The CMU walls will be radiologically surveyed prior to removal to determine the need for engineering controls, such as an enclosure with ventilation or water sprays to minimize fugitive dust, during removal operations. When controls are necessary, best available control technologies will be applied to CMU removal operations.

Specification Section 01515 addresses requirements relative to the preparation of the base slab during demobilization. Specifically, openings in the slab will be filled with granular material or soils and grout to provide a flat uniform surface to minimize the chance for water accumulation and migration, and to mitigate potential safety hazards. Wire and cable will be

cut away to grade from the conduit embedded in the concrete. Conduit and other slab obstructions will be cut away to grade, plugged, and covered with grout to grade level for positive drainage.

2.6 Use of New Technologies

The FEMP Technology Programs department will provide information to prospective bidders of the D&D contract regarding the availability of new and innovative technologies that are available and approved for D&D work. While the performance specifications provide an avenue for the contractors to propose new and innovative technologies, FEMP Project Management can only encourage use of particular technologies by apprising them of approved technologies at the pre-bid meeting or in performance specifications. FEMP Technology Programs department will present to prospective bidders information supporting use of the latest innovative technologies that have been shown through site technology demonstrations to provide safer, quicker, and/or less expensive remediation.

3.0 COMPONENT-SPECIFIC REMEDIATION

This section presents component-specific remediation tasks identified for the Pilot Plant Complex D&D project. Background information provided in this section was obtained primarily from the OU3 RI/FS Work Plan Addendum (DOE 1993), records from Removal Actions 9 and 12, and the remediation contract Statement of Work (SOW). Structural (plan and section view) drawings have been compiled for each of the Pilot Plant Complex components and are shown in Appendix D (see Appendix D list of drawings for component identification). Photographs illustrating various features throughout the Complex are provided in Appendix E (see listing of photograph numbers and accompanying drawing in Appendix E for photograph identification). Information regarding the remediation approach was obtained from the remediation contract SOW, performance specifications, and the OU3 Integrated RD/RA Work Plan.

3.1 Building 13A – Pilot Plant Wet Side

<u>Background</u>

Building 13A is a multi-level processing facility located south of 1st Street near the southeastern corner of the former Production Area (refer to Figure 1-1). Building 13A measures 63 feet (ft.) x 155 ft. x 35 ft. for approximately 80 percent of the structure. The structural height is 53 ft. for the remaining 20 percent.

<u>Process Area Description</u>

Numerous processing functions were developed in Building 13A during operation of the Pilot Plant. These processes included size reduction, dissolution, precipitation, filtration, solvent extraction, and drying of several uranium, thorium, and zinc compounds. The testing nature of the Pilot Plant, the duration of the operations, and the rapid turnover of test projects contributed to the incomplete documentation of all processes that occurred in Building 13A. Building 13A currently houses process tanks, columns, filters, ovens, and size reduction equipment that have undergone hold-up removal under Safe Shutdown. This equipment was used to complete solvent extraction-purification of thorium- and uranium- bearing solutions; process liquids from the building's floor drains; digest thorium and uranium; produced thorium oxalate, thorium hydroxide gel, thorium tetrafluoride, and zinc fluoride intermediate products;

size-reduce calcium fluoride for use as pot liner material; dissolve metals; oxidize uranium compounds; and treat barium chloride solutions. Ancillary equipment, consisting of former process storage tanks within a concrete secondary containment system and dust collectors, are located immediately outside of Building 13A, to the west.

The Pilot Plant sump processing system, located in Building 13A, collected wash water, rainwater, spills, and sludges from the Pilot Plant. Wastewater from the sump system and from the F-102 tank were transferred to one of two holding tanks, depending on whether the primary contaminant in the wastewater was uranium or thorium. Building 13A contains three process areas, as discussed below. The southern third of Building 13A housed the solvent extraction operations. A concrete block partition wall separates the southern third of the extraction area (the "high bay" area) from the northern two-third, which is contiguous with the Central and Northern Process Areas.

Process Area 1 — Southern Solvent Extraction Area.
The Southern Solvent Extraction Area was used to extract uranyl nitrate and thorium nitrate. Uranyl or thorium nitrate solutions containing undesirable contaminants were introduced into the top of the pulsed extraction column. The solvent — either tributyl phosphate (TBP) in kerosene for uranyl solutions, or diamyl-amyl phosphonate or di-sec-butyl phenyl phosphonate in kerosene for thorium — was introduced at the bottom of the column. Uranium or thorium was transferred from the aqueous phase to the organic phase as the solutions passed through the column.

The depleted aqueous stream, called raffinate, that flowed out of the bottom of the column, was washed with kerosene in a single mixer-settler stage to remove entrained TBP. The raffinate, containing most of the unwanted chemical impurities from the original nitrate feed, was then sent to a storage tank before being filtered.

Processing of uranyl nitrate that contained uranium with less than 1 percent enrichment was carried out primarily in 6-inch columns; uranyl nitrate having greater than 1 percent enrichment was performed in 2-inch columns. Thorium processing was carried out in both 6-inch and 9-inch columns.

As noted in Section 2.2, the Southern Solvent Extraction Area has been identified in the OU3 Final ROD as having surface concrete containing an elevated concentration of technetium-99. Pursuant to the decision in the OU3 Final ROD, the top 0.5 inches of concrete will be removed from this process area and disposed offsite.

Process Area 2 — Central Solvent Extraction Area.

The Central Solvent Process Area was used to produce thorium oxalate and thorium hydroxide gel, and to convert barium chloride, as discussed in the following subsections.

Thorium Oxalate - Thorium nitrate solution was mixed with an excess of oxalic acid solution. This process produced a slurry of thorium oxalate particles in nitric acid, which was pumped to a plate-and-frame filter press located on the mezzanine, where a thorium oxalate cake was produced.

Thoria Gel and Ammonium Diuranate - The process for producing thorium hydroxide gel involved the chemical denitration of thorium nitrate by precipitating it from solution with ammonium hydroxide and carbon dioxide.

The system produced approximately one ton thorium/day and consisted of polyvinyl chloride-lined piping, 1,000 gal. rubber-lined tanks, and 900-gallon rubber-lined vacuum tanks. Other equipment used included a precipitation tank, two filter presses in the mezzanine area, and six tray driers.

Barium Chloride Conversion - Barium chloride salts were converted to barium sulfate in a batch process that used equipment located in the northern and central areas of Building 13A.

Process Area 3 — Northern Solvent Extraction Area.

The Northern Solvent Extraction Area was used for thorium digestion. Additional processes in this area were thorium tetrafluoride (ThF_4) and zinc fluoride preparation, as well as other secondary processes.

Thorium Digestion - Thorium digestion was carried out in an agitated tank, located in the northern third of Building 13A. The product of the digestion, a thorium nitrate solution, was

sent to the solvent extraction process for removal of impurities. Most of the solid material fed to the digester was thorium nitrate crystals. Thorium oxides and residues were also dissolved here in nitric acid and hydrofluoric acid (HF).

Enriched Oxidation Furnace - A small, single-hearth gas-fired furnace installed along the east wall in the northern area of Building 13A, was used to oxidize uranium scrap materials with enrichment that was too high to be processed in the Plant 8 furnaces. Materials were loaded into the furnace in trays. After oxidation of the materials, the trays were moved into an exit vestibule and lifted to an air cooling chamber. Black oxide resulting from the process was subsequently dumped into a drum or can for transfer to a digestion system, either in Building 13A or the Ore Refinery Plant.

Removed Processes

Some of the unit processes formerly operated in Building 13A have been removed. The names of these processes and brief descriptions are as follows:

- Crushing and Milling/Pot Liner Preparation - Jaw crushers and a ball mill were located along the north wall of Building 13A. These units were utilized to size-reduce slag received from the uranium and thorium production.
- Metal Dissolver/Decladding - The metal dissolver/pickling and decladding equipment was located in the Northern Process Area. The equipment involved with these processes included a trough tank and associated equipment.
- Thorium Tetrafluoride and Zinc Fluoride Precipitation - A pilot facility for the precipitation of thorium tetrafluoride from thorium nitrate was located in the northern portion of Building 13A. This facility was also used for the precipitation of zinc fluoride from zinc oxide. The main equipment items were a precipitation tank, a hold tank, a thorium nitrate head tank, an HF head tank, three box filters, and a vacuum tank.

Remedial Tasks

Five remedial tasks apply to Building 13A and are described below.

Preparatory Action: Inventory Removal

Table 3-1 identifies the quantity of containerized material that was removed from Building 13A as part of inventory removal activity.

TABLE 3-1 Building 13A Inventory Removal

Material Description	Lot mark Code	No. of Drums
Zirnlo Ends	076	80

Preparatory Action: Facility/Safe Shutdown

Safe shutdown activities included the removal of all hold-up material within the equipment, piping and ductwork systems. Safe shutdown records indicate that 8,800 pounds of "Miscellaneous Material" (i.e., contaminated water and oil) were removed from Building 13A.

Safe Shutdown also removed potential biological hazards that result from pigeon carcasses and pigeon excrement. The health and safety concern over histoplasmosis, which is caused by this specific biological hazard, was a significant concern in Building 13A.

Asbestos Removal

The ACM in Building 13A is in a deteriorated condition, causing the building to be designated as an airborne asbestos area. A polyethylene enclosure will be erected in the building areas where substantial amounts of piping insulation are located, as well as around areas that contain damaged or deteriorated ACM, prior to ACM removal.

Deteriorated ACM piping insulation that has fallen to the floor in the Southern Solvent Extraction process area will be removed first. The ACM and deteriorated ACM from the equipment, the interior walls, and from areas that have the potential to be disturbed during bulk removal and equipment removal operations will also be removed. An aggressive air sampling test will be performed to determine the absence of asbestos fibers. If the asbestos fiber count is elevated the surfaces will be locked down and the test performed again.

A final asbestos removal effort will take place after the completion of the bulk removal and equipment removal operations. The removal of the equipment will allow for unobstructed movement around the building, simplifying removal of the remaining asbestos. Approximately 3,623 lineal ft. of pipe and pipe insulation will be removed as part of the asbestos removal activity.

Surface Decontamination

The Contractor will construct a vestibule in Building 13A for container receiving and removal to ensure containment of airborne contamination. Prior to removing debris from Building 13A, all external surfaces will be cleaned to remove gross removable surface contamination and all openings of equipment and debris that potentially contain internal contamination will be sealed or encapsulated. All residual dust, particles, debris, and rubble left over from the removal of equipment/systems and dismantlement of other internal structures will be collected and containerized. HEPA vacuuming, hydo-blasting with a minimum of 1,000 psi, and surface wipe-downs are likely methods for removing/fixing contamination.

Above-Grade Dismantlement

Building 13A is constructed of pre-cast concrete columns and beams, CMU non-supporting walls, a poured reinforced concrete floor with some areas lined with acid brick (non-RCRA), and a pre-cast concrete roof deck. The structural frame is constructed of reinforced concrete. The building also contains CMU secondary containments and piers. The CMU wall on the west side of Building 13A is a common wall with Building 54A. This wall will be removed as part of Building 13A exterior building dismantlement. Building 13A and 54A north (the area north of the autoclaves) are structurally interconnected; therefore, structural dismantlement would occur simultaneously for both structures. Tripping the building by using a track-hoe mounted shear is considered a potential option for structural dismantlement.

Of the material take-off estimates that were performed on Building 13A, the following types of materials were found to make up the majority of non-structural materials to be removed (volume/weights are cumulatively summarized in Tables 2-2, 2-3, and 2-4):

- piping and conduit/wire;
- equipment, including pumps, computer equipment, motors, tanks, compressors, blowers, dust collectors, scrubbers, refrigeration units.

Dismantlement of Building 13A will follow the general strategies laid out in Section 2.5.5. It is anticipated that the Contractor will propose to use the methods previously discussed in Section 2.5.5 (e.g., power saws, hydraulic shears, oxy-gas torch). Following surface decontamination, the goal of dismantlement will be to remove all potentially process-related metals first to remove any visible process-residues. Once the process-related metals are

removed from the structure, the dismantlement of remaining non-process equipment/systems and structure can be performed more efficiently and safely.

3.2 Building 13B – Pilot Plant Maintenance Building

Background

Building 13B is a single-level structure measuring 30 ft. X 60 ft. X 11 ft. in height. It is located northwest of the Pilot Plant Wet Side (Building 13A) (Refer to Figure 1-1). Building 13B consists of CMU walls supported by a reinforced, poured concrete floor and built-up roof. The building has two roll-up doors on the east side that face an asphalt apron area which is adjacent to the north side of building 13A. The interior of Building 13B consists of two tile-floored offices and a concrete floor storage area.

Process Area Description

Equipment maintenance activities were performed in Building 13B during the Pilot Plant operation period. The building was later converted for use as a base of operation for radiological technicians involved in renovation, removal actions, and remediation studies at the FEMP.

Remedial Tasks

Four remedial tasks apply to the D&D of Building 13B.

Preparatory Action: Facility/Safe Shutdown

Only utility disconnection work was applicable to Building 13B during the safe shutdown of the Pilot Plant Complex. However, Building 13B is now the rigging loft and its electrical service has been restored. Utility disconnection work will be performed by Facilities Shutdown prior to D&D activities.

Asbestos Removal

Individual asbestos abatement work areas will likely be established in Building 13B along with some glovebag removals. Most of the ACM is in good condition; no building areas have been designated as asbestos areas. Approximately 275 lineal ft. of pipe and pipe insulation will be removed as part of the asbestos removal activity.

Surface Decontamination

Based on the most recent use of Building 13B as a fixed contamination work area, it is anticipated that release cleaning will involve only minimal surface cleaning. HEPA vacuuming and wiping of surfaces are the likely methods to be used.

Above-Grade Dismantlement

The structural make-up of Building 13B lends itself to structural dismantlement by the track-hoe mounted shear. The built-up ACM-containing ballasted roof will remain intact and will not be allowed to impact the ground in a manner that allows generation of airborne fibers. CMU walls will also be wetted during dismantlement to control potential dust generation. Material take-off estimates identify the following types of materials that will be removed (Tables 2-2, 2-3, and 2-4 summarize material quantities):

- piping and conduit/wire;
- roofing material;
- doors and windows;
- structural and miscellaneous steel; and
- CMU walls.

3.3 Building 13C – Sump Pump House

Background

Building 13C (Sump Pump House and Sump Tanks) is located to the southwest of the Pilot Plant Wet Side (Building 13A) and immediately south of the Pilot Plant Thorium Tank Farm (Component 13D) (Refer to Figure 1-1). The Sump Pump House is a single-level CMU structure having dimensions of 12 ft. x 16 ft. x 8 ft. high. Building 13C houses three pumps on concrete pedestals and associated equipment that extracted liquids from adjacent underground concrete sump tanks located adjacent to Building 13C on the east side. These underground tanks have since been abandoned and filled with concrete. The four above-grade storage tanks (TS-1, TS-2, TS-100, TS-101) are surrounded by a concrete dike secondary containment structure.

Process Area Description

The function of Building 13C was to pump filtered sump system flows from treatment facilities inside the Pilot Plant Wet Side to the General Sump (Building 18B) for final treatment and discharge.

Remedial Tasks

Four remedial tasks apply to Building 13C.

Preparatory Action: Facility/Safe Shutdown

Only utility disconnection work was applicable to Building 13C during the safe shutdown of the Pilot Plant Complex.

Asbestos Removal

Asbestos abatement will be necessary on approximately 330 lineal ft. of pipe insulation. The ACM remains in good condition and therefore the work area does not have to be classified as an asbestos area. Area containment and glovebag work are likely methods for abatement.

Surface Decontamination

Surface decontamination of Building 13C does not include any particular strategies beyond those already presented in Section 2.5.5.

Above-Grade Dismantlement

Building 13C is constructed of CMU support walls, on a poured reinforced concrete floor and has a shingled roof. The building also contains CMU secondary containment. Material take-off estimates identify the following types of materials that will be removed (Tables 2-2, 2-3, and 2-4 summarize material quantities):

- piping and conduit/wire;
- various equipment;
- roofing material, doors and windows;
- structural and miscellaneous steel; and
- CMU walls and secondary containment.

Structural dismantlement of Building 13C and debris sizing will likely be performed using a track-hoe mounted shear.

3.4 Component 13D – Pilot Plant Thorium Tank Farm

Background

Component 13D (Pilot Plant Thorium Tank Farm) is an above-ground storage tank area located west of the Pilot Plant Wet Side (Building 13A) (Refer to Figure 1-1). The tank farm consists of five vertical, cylindrical, steel tanks situated within a 28 ft. x 45 ft. x 18-in high concrete secondary containment structure. Component 13D contains tank T-2, which was identified as HWMU No. 54.

Process Area Description

Component 13D stored thorium nitrate tetrahydrate liquid, bulk process chemicals, and spent solvents from Building 13A processes. A sump is located in the southeastern corner of the containment area. Overhead piping was used to transfer the liquids between the tanks and Building 13A.

Remedial Tasks

Four remedial tasks apply to Building 13D.

Preparatory Action: Facility/Safe Shutdown

Safe shutdown of Building 13 involved only utility disconnections. No hold-up material was found in piping associated with this component.

Hazardous Waste Management Unit Closure Tasks

Requisite closure support activities for HWMU No. 54 (Tank T-2) were performed in 1995 under the Thorium Nitrate Stabilization Project (TNSP) and were reported in the TNSP Final Report (DOE 1996d). The project involved the removal and treatment of waste in Tank T-2 and decontamination of the tank and secondary containment area. Documentation was submitted with a DOE letter dated November 23, 1998 (Letter No. DOE-0188-99) regarding completion of closure activities for Tank T-2 to satisfy the administrative requirements for closure.

Asbestos Removal

Most of the ACM is in good condition in the tank farm area and no areas have been designated as being asbestos-contaminated or prone to imminent asbestos release. Individual work areas and glovebag removals will likely be used to minimize the amount of area that will have to be released from asbestos concerns. Approximately 415 lineal ft. of pipe insulation will be removed as part of the asbestos removal activity.

Surface Decontamination

Surface decontamination of Building 13D does not include any particular strategies beyond those already presented in Section 2.5.5; however, each tank will be regarded as a separate structure for release cleaning purposes.

Above-Grade Dismantlement

The five storage tanks will likely be dismantled by mechanical shearing and use of oxy-gas torches. The concrete secondary containment system will be removed following tank dismantlement. Material take-off estimates identify the following types of materials that will be removed (Tables 2-2, 2-3, and 2-4 summarize material quantities):

- piping and conduit/wire;
- equipment; and
- CMU secondary containment.

3.5 Building 37 – Pilot Plant Annex

Background

Building 37 (Pilot Plant Annex) is a rectangular, single-story building measuring, approximately 52 ft. x 122 ft. x 25 ft. high (Refer to Figure 1-1). The function of Building 37 was to test new processes for uranium and thorium production and recovery.

Process Area Description

The Pilot Plant Annex contained six process areas plus additional processes that have been removed. Associated equipment and tankage remain outside the building. Building 37 frequently changed configuration to meet its mission of testing processes for potential improvement of operations at other plants of the FEMP. These process areas and the major equipment used in them are described below.

Process Area 1 - Grit and Dust Collector; Briquetting Unit; and Roto [shot]-Blaster

Grit Blaster and Dust Collector - The grit blaster was designed to remove slag from thorium and uranium derbies and crucibles produced in Plant 5, using an abrasive mixture. The grit blaster equipment consisted of a ventilated glove-box-type booth in which the blasting was performed, a motor and drive that supplied the compressed air and coal slag grit used in the cleaning operation, and a holding tank for the grit. The Wheelabrator dust collector serviced the grit blasting unit, as well as the heat-treat furnace, briquetting press, shot blaster, charging station, and jolter. The latter two units have been removed.

Briquetting Unit - The briquetting unit consists of a rotary briquetting press, a drumming station, and roller conveyors. The process involved blending and crushing UF_4 and magnesium into briquettes to make a high-density reduction charge. The press compressed the uranium/magnesium blend into pillow-shaped briquettes. After the material was formed into briquettes, a vibrating-type conveyor with a stainless pan transferred the briquetted material to a drumming station. A dust enclosure was vented to the Wheelabrator east dust collector described for the grit blaster in Process Area 1.

Roto [shot]-Blaster - The unit process consisted of a Pangborn Rotoblast used to remove magnesium fluoride slag and magnesium plate from derbies on an enclosed work table. The spent uranium was transported to a pneumatic separator, where dust and fines were removed by air current and the remaining shot was separated by size. Usable shot was returned to the storage bin, and the fine material was drawn away by the east Wheelabrator dust collector described for the grit blaster in Process Area 1. The Roto-clone dust collector, located just north of the east Wheelabrator may also have serviced the rotoblaster.

Process Area 2 - Plasma Furnace and Dust Collector

This process involved the application of protective coatings of molten ceramic particles to pour plugs and the interior of clean crucibles from the grit blasting unit. The environmental chamber, which has been removed, was used for a short time to spray on experimental uranium oxide coatings under high-temperature melting conditions.

Process Area 3 - P-2 Furnace

The P-2 furnace removed excess hydrogen gas from 2-inch and 4-inch thick flat castings of uranium metal. A small amount of water from a concrete ram pit under this furnace was removed with a portable sump pump and transferred to the Pilot Plant sump system for treatment. Two Hoffman dust collectors, located in the alley between Buildings 37 and 54A, near the northwestern corner of the Pilot Plant Annex, were used to collect dust from the P-2 furnace.

Process Area 4 - NuSal Heat-Treat Furnace and Quench Tank

The heat-treating unit consists of an immersion electrode salt furnace, an oil quench tank, two wash water tanks and a heat exchanger. A 50/50 blend of molten sodium chloride and potassium chloride salts were used as a medium for heat-treating uranium core blanks on a pilot scale. The pieces to be heat-treated were loaded into fixtures, and the fixtures were totally immersed into the salt bath. After a specified heating time, the fixtures and pieces were transferred from the salt bath to an oil or water quench tank.

Process Area 5 - West Wall Processes

The central area along the west inside wall of Building 37 is used for drum storage.

Process Area 6 - Southeast Corner Processes

A charging station and a jolter are the only remaining portions of the pilot-scale uranium reduction process.

Removed Processes

Some of the unit processes formerly operated in the Pilot Plant Annex have been removed. The names of these processes and brief descriptions are as follows:

- Oil Reclaimer - Hilco oil reclaimer for vacuum pump oil was used in the P-2 furnace;
- Thorium Tetrafluoride Mill - Dehydrated thorium tetrafluoride was milled and packaged for reduction in a mill that has been removed;
- Calcium Metal Storage - Drums of fine calcium metal were stored and weighed for the reduction process;
- Box Furnace - The box furnace was an electrically heated multipurpose furnace used for enriched uranium turnings and sawdust oxidation;

- Enriched Derby Furnace - The enriched derby furnace was a small-scale reduction furnace, which used to perform test runs for production of 5-inch diameter enriched uranium derbies up to 5 percent Uranium-235;
- Centrifugal Casting Furnace - No information is available for this unit, nor for a nearby tank shown on earlier drawings of the area, where out-of-spec plutonium materials drums are currently stored.

Remedial Tasks

Five remedial tasks apply to Building 37, each of which are described below.

Preparatory Action: Inventory Removal

Table 3-2 identifies the quantity of containerized material that will be removed as part of inventory removal activity.

Preparatory Action: Facility/Safe Shutdown

Facility/safe shutdown for Building 37 included the disconnection of utilities.

TABLE 3-2 Building 37 Inventory Removal

Material Description	Enrichment Code	Lot mark Code	No. of Drums
Scrap salts, low fluoride & floor sweepings	H[1]	066	26
Wet Sump or Filter Cake	H[1]	068	94
Spencer Portable Vacuum	A[2]	917	2

Footnotes:
1) H – Enriched
2) A - Normal

Asbestos Removal

Since asbestos remains in good condition in Building 37, individual asbestos abatement areas will likely be established rather than enclosing the entire building. Approximately 713 lineal feet of pipe and pipe insulation will be removed as part of the asbestos removal activity.

Surface Decontamination

Typical surface decontamination/release cleaning methods, as described in Section 2.5.5, are anticipated for Building 37.

Above-Grade Dismantlement

Building 37 is constructed of CMU non-support walls, on a poured reinforced concrete floor and has a built-up ballasted roof. The building frame consists of structural steel. The building also contains CMU piers. It is expected that the method of structural dismantlement will be through the shearing of structural members by a track-hoe mounted shear; however, since the western wall of Building 37 is shared with Building 54A, the Contractor will have to ensure that the western wall remains intact until Building 54A is ready for dismantlement.

Building 37 consists of an estimated 12,000 ft^3 of equipment, including a grit blaster, roto (shot) blaster and dust collector, vacuum system, drum compactor, briquetting unit, plasma furnace and dust collector, P-2 furnace, and heat-treat furnace and tank. One specific condition for equipment dismantlement is that the hydraulic lift, which was used for moving the P-2 furnace, shall be removed in total, including underground appurtenances and the resulting hole filled.

Material take-off estimates identify the following types of materials that will be removed (Tables 2-2, 2-3, and 2-4 summarize material quantities):

- roofing material, doors and windows;
- piping and conduit/wire;
- structural and miscellaneous steel; and
- CMU (walls, columns, secondary containment, piers).

3.6 Building 54A – Six to Four Reduction Facility

<u>Background</u>

Building 54A (Six to Four Reduction Facility #1) is an irregularly shaped structure, located at the south end of 1st Street (Refer to Figure 1-2). The maximum dimensions of Building 54A are 165 ft. x 123 ft. x 44 ft. Building 13A (Pilot Plant Wet Side) adjoins Building 54A to the immediate west, while Building 37 (Pilot Plant Annex) adjoins to the east.

<u>Process Area Description</u>

The main processing area contains three three-level steel structures that house the hydrogen fluoride recovery system, the uranium hexafluoride (UF_6) to uranium tetrafluoride (UF_4) reactors, and the acid vapor scrubber equipment.

The primary process in Building 54A was the chemical reduction of UF_6 to UF_4. Process equipment in Building 54A included a jolter; blender; Rockwell furnaces where pots were lined, loaded with reactants, and used to produce zinc-thorium metal derbies; a power hacksaw to cut samples from the derbies; and an experimental furnace where a continuous process to make uranium metal was tested.

Building 54A contains eight process areas: the reduction reactors, AHF recovery system, HF scrubbers, thorium derby production area, derby saw/sampling area, and furnace rooms, and the autoclave area.

Process Area 1 - Autoclave Area

UF_6 cylinders, 10- and 14-ton capacities, were delivered to the concrete Pilot Plant Pad (Component 74U) south of the autoclave section. The cylinders were placed in one of three low-pressure, steam-heated autoclave units located in the autoclave section of Building 54A. The autoclaves heated the UF_6 to vaporization. The vaporized UF_6 was piped into a heated surge tank, and from the tank to the reactors in the main process area.

Process Area 2 - Reduction Reactors

The reduction reaction was carried out in the two reactor vessels. UF_6 feed gas was mixed with hydrogen, obtained from dissociated ammonia, and fed through a mixing head at the top of one of two vertical tube reaction vessels. Heat was applied to the external surfaces of the reaction vessels to induce the reduction reaction. Pneumatic vibrators and heating/cooling cycles were used to dislodge UF_4 slag that accumulated on the walls of the reaction vessels.

UF_4 powder fell through the reaction vessel into a water-cooled, jacketed-screw conveyor and then passed through a sealed hopper, rotary valve, and pulverizer. The screw conveyor transported the UF_4 to one of the two packaging stations. The UF_4 was then packaged into 10-gallon cans, weighed, and subsequently used in the Metals Production Plant (Building 5A). The packaging station was ventilated with the exhaust going to two bag-type dust collectors located northeast of the packing station, above the plant floor.

Process Area 3 - AHF Recovery.

Gases exiting the reduction reactors passed through two cyclone separators, two sintered metal filters, and an activated carbon tube-type filter for removal of UF_4 dust and unreacted UF_6. The reaction gases were then cooled to condense out hydrogen fluoride as anhydrous (AHF). The AHF refrigeration systems are located along the north and west walls, also within a steel structure. A horizontal, cylindrical steel tank located outside the east wall near the northeastern corner of the Pilot Plant Annex provided intermediate storage for the AHF, which was then pumped to the Old/Main Tank Farm for long-term storage.

Process Area 4 - HF Scrubbers

The remaining reduction reaction off-gas passed through a series of three aqueous scrubbers to remove residual hydrofluoric acid (HF). Scrubber effluent, dilute hydrofluoric acid (DHF), was collected in polyethylene tanks at the bases of the scrubbers.

Process Area 5 - Thorium Derby Production

This area contained equipment used to: line furnace pots with calcium fluoride; blend thorium tetrafluoride with calcium and zinc fluoride; load furnace pots; produce thorium metal derbies; and sample thorium metal derbies was contained in this process area. Jolters, located in the northeastern corner of the building, were used to line furnace pots with calcium fluoride (CaF_2) or magnesium fluoride.

Thorium tetrafluoride was blended with calcium and zinc fluoride in an enclosed blender located near the jolters. The blended material was charged into the CaF_2-lined pots, capped with CaF_2, and enclosed with a lid. The loaded pots were then heated in one of two Rockwell resistance-type furnaces to produce a thorium zinc metal derby and CaF_2 slag.

Process Area 6 - Derby Saw/Sampling

A power hacksaw was used to saw a thin slice from each thorium zinc derby for chemical analysis. Thorium/zinc dust from the sampling was drummed and sent to the Recovery Plant (Building 8A). It is believed that, before the UF_6 to UF_4 process upgrade, a scale located near the power hacksaw was removed and that the remaining recession in the floor was filled with concrete.

Process Area 7 - P1 Furnace Room

Zinc-Thorium derbies from the Rockwell furnaces were placed in the P-1 vacuum furnace located in the furnace room, to be heated to a sufficient temperature to vaporize away the zinc.

Process Area 8 - PLT Furnace

The pressurized low-temperature (PLT) furnace was used to test a continuous process to produce uranium metal.

Removed Processes

Equipment from several operations in the main processing area of Building 54A have been removed. Process equipment no longer in place includes the following:

- Thorium Derby Production - All the equipment used in Process Area 5 has been removed.
- Derby Saw/Sampling - The derby saw and sampling equipment located east of the P1 furnace room have all been removed.
- PLT Furnace - The experimental furnace and associated equipment have all been removed.

Remedial Tasks

Five remedial tasks are applicable to Building 54A.

Preparatory Action: Inventory Removal

Table 3-3 below lists materials that were removed under removal action.

TABLE 3-3 Building 54A Inventory Removal

Material Description	Enrichment Code	Lot Mark Code	No. of Drums
Wet Sump or Filter Cake	H[1]	068	82

Footnotes:
1) H – Enriched

Preparatory Action: Facility/Safe Shutdown

In addition to the standard utility disconnections, safe shutdown of Building 54A included the removal of considerable amounts of hold-up material. Table 3-4 lists hold-up material types and quantities.

TABLE 3-4 Building 54A Hold-up Material

Hold-up Material Description	Weight (lbs.)
Thorium Oxide (ThO_2)	1,500
Dust collector Bags & Residue	8,000
Nitrates	3,500
U_3O_8	4,200
UF_4	2,000

Asbestos Removal

Since asbestos remains intact in the building, it is expected that the Contractor will establish individual asbestos abatement areas and/or use glove-bag techniques rather than enclose the whole facility for abatement. Approximately 1,951 lineal feet of pipe and pipe insulation will be removed as part of asbestos removal activities.

Surface Decontamination

Standard methods for removal/fixing of surface contamination are anticipated for Building 54A.

Above-Grade Dismantlement

Building 54A is constructed of a structural steel frame with transite walls, on a poured reinforced concrete floor and has pre-cast concrete roof panels. The building also contains CMU secondary containments and piers. The interior building walls are transite with batt insulation between the inner and outer walls.

The Autoclave section is constructed of metal walls, on a poured reinforced concrete floor and has a built-up ballasted roof. The structural frame is constructed of structural steel. Material take-off estimates identify the following types of materials that will be removed (Tables 2-2, 2-3, and 2-4 summarize material quantities):

- piping, conduit/wire;
- various equipment;
- interior transite and batt insulation;
- exterior wall panels, roofing material, doors and windows;
- structural and miscellaneous steel; and
- CMU columns, secondary containment, and piers.

3.7 Building 54B – Pilot Plant Shelter

Background

Building 54B (Pilot Plant Shelter) is a single-level building south of 1st Street in the northeastern corner of the Pilot Plant Complex (Refer to Figure 1-1). The shelter is a steel framed structure that is rectangular in shape with dimensions of 50 ft. x 74 ft. x 10 ft. in height Building 54B stored Pilot Plant materials and processed hydrocarbon materials containing green salt (UF_4).

Process Area Description

Building 54B originally provided temporary storage of UF_4, which was produced by the reduction process housed in the Six to Four Reduction Facility (Building 54A) and stored other Pilot Plant materials. The shelter also previously housed a heating and centrifuging process designed to remove UF_4 from paraffin. All the paraffin processing equipment has been removed. Building 54B was most recently used for storage of inventory materials until their removal under a preparatory action.

Remedial Tasks

Four remedial tasks apply to Building 54B.

Preparatory Action: Inventory Removal

Table 3-5 identifies the quantity of containerized material that will be removed from Building 54B as part of inventory removal activity.

TABLE 3-5 Building 54B Inventory Removal

Material Description	Enrichment Code	Lot Mark Code	No. of Drums
Chemical Reject Primary Ingots	H[1]	120	2,802
Contaminated Copper (For Discard)	S[2]	016	865
Off-Spec. UF[4] or THF[4]	H[1]	082	540
Contaminated Graphite – Crushed	S[2]	024	395
Glass or Sample Bottles	S[2]	014	252
Contaminated Metallic Filter Elements	S[2]	025	77

Footnotes:
1) H – Enriched
2) S – Off-Spec. U-235

Preparatory Action: Facility/Safe Shutdown

Facility/safe shutdown consisted primarily of utility disconnections.

Surface Decontamination

Standard methods for removal/fixing of surface contamination are anticipated for Building 54B.

Above-Grade Dismantlement

Building 54B is constructed of metal walls, on a poured reinforced concrete floor and has a metal roof. The structural frame is constructed of structural steel. The structural make-up and dimensions of Building 54B makes it a likely candidate for in situ dismantlement by the track-hoe shear. Material take-off estimates identify that the majority of debris from structural dismantlement will consist of the following materials:

- piping and conduit/wire;
- Exterior wall panels, doors and windows; and
- structural and miscellaneous steel.

3.8 Building 54C – Pilot Plant Dissociator Shelter

Background

Building 54C (Pilot Plant Dissociator Shelter) is a single-story structure, measuring 20 ft. x 48 ft. x 19 ft. It is located on 1st Street at the northwest corner of the Six to Four Reduction Facility (Building 54A) (Refer to Figure 1-1).

Process Area Description

Building 54C contains three ammonia dissociators that were used to catalytically dissociate, or "crack", anhydrous ammonia to hydrogen and nitrogen for use in the Pilot Plant Six to Four Reduction Facility. Liquid anhydrous ammonia was first heated to vaporization. The vaporized ammonia was passed over an electrically heated nickel catalyst bed at a controlled temperature, where it was "cracked" to hydrogen and nitrogen. The hot dissociated ammonia (e.g., hydrogen and nitrogen gas) was then passed through a heat exchanger to heat incoming liquid ammonia entering the ammonia dissociators. The dissociated ammonia was passed through a water-cooled heat exchanger, where residual ammonia and moisture were absorbed onto one of the two molecular sieves and then fed to one of two reaction vessels located in the UF_6 to UF_4 reduction process area.

Remedial Tasks

Three remedial tasks apply to Building 54C.

Preparatory Action: Facility/Safe Shutdown

Facility/safe shutdown for Building 54C involved only utility disconnections.

Surface Decontamination

Standard methods for removal/fixing of surface contamination are anticipated for Building 54C.

Above-Grade Dismantlement

Building 54C is constructed of metal walls, on a poured reinforced concrete floor and has a metal roof. The structural frame is constructed of structural steel. Based on material take-off estimates, the following items will constitute the majority of the waste stream:

- piping, conduit/wire;
- various equipment;
- exterior wall panels; and
- structural and miscellaneous steel.

3.9 Component 74U – Pilot Plant Pad

Background

Component 74U (Pilot Plant Pad) is a reinforced concrete pad, located immediately south of the Pilot Plant Six to Four Reduction Facility #1 (Building 54A) (Refer to Figure 1-1). It is rectangular and is comprised of approximately 5,000 ft.^{2} of storage space. 74U is accessed by concrete driveways from the east and west. A hoist system moved equipment and containers (e.g., cylinders of UF_6) between the autoclave room of Building 54A and 74U. The concrete apron of the Pilot Plant Warehouse (Building 68) borders 74U on the south. Only the above-grade portion of this component, the overhead crane, will be decontaminated and dismantled under the Pilot Plant Complex D&D project.

Process Area Description

During production years, Component 74U provided temporary storage of drummed uranium and thorium compounds, equipment, and operating supplies. Materials destined for use in the Six to Four Reduction Facility were unloaded with the exterior bridge crane and fork lifts.

Remedial Tasks

Three remedial tasks are applicable to Component 74U.

Preparatory Action: Facility/Safe Shutdown

Isolation of utilities to the exterior bridge crane hoist was the only shutdown activity performed to Component 74U.

Surface Decontamination

Standard methods for removal/fixing of surface contamination are anticipated for Building 74U; however, minimal loose contamination is expected due to the continuous exposure of the exterior bridge crane to the environment.

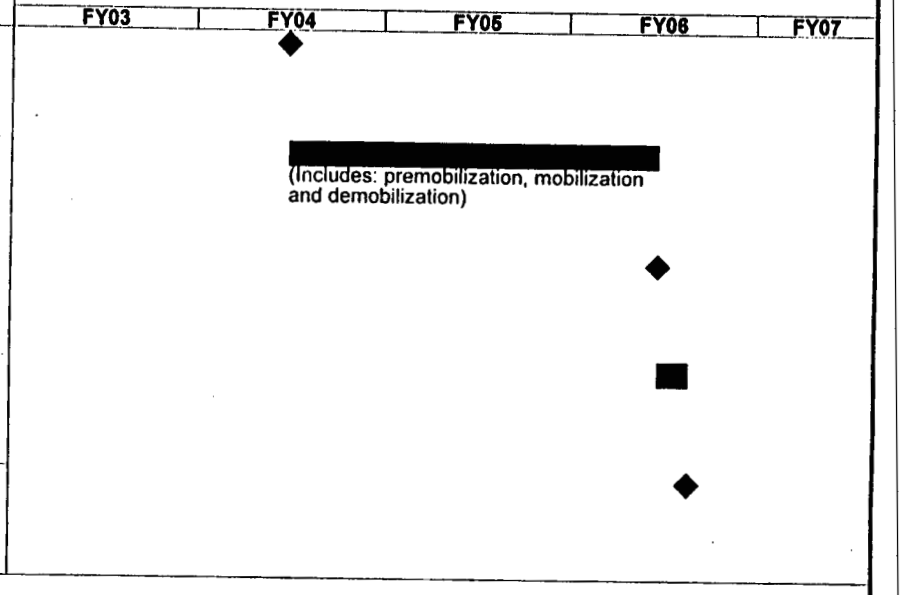
Above-Grade Dismantlement

Material take-off estimates identify that structural steel will constitute the majority of the waste stream from the remaining exterior bridge crane structure. Use of hydraulic shears or oxy-acetylene torch are the preferred methods for structural dismantlement.

4.0 SCHEDULE

This section presents the planning and implementation schedules for the Pilot Plant Complex D&D project. Figure 4-1 presents the schedule for implementation of field activities beginning with the Contractor's Notice To Proceed (NTP) and ending with the submittal of the Project Completion Report. The primary milestones of the project include the following: 1) NTP; 2) Completion of Field Activities, and the submittal of the Project Completion Report to U.S. EPA and Ohio EPA. The content for the Project Completion Report is outlined in Section 4.5 of the OU3 Integrated RD/RA Work Plan.

Activity Description	Early Start	Early Finish	Orig Dur
NOTICE TO PROCEED	29MAR04*		0
FIELD REMEDIATION OF PILOT PLANT	29MAR04	26MAR06	728
COMPLETION OF FIELD ACTIVITIES		26MAR06	0
PREPARE PROJECT COMPLETION REPORT	27MAR06	25MAY06	60
SUBMIT PROJECT COMPLETION REPORT TO US/OEPA		25MAY06	0



Start Date	01OCT97
Finish Date	25MAY06
Data Date	31DEC97
Run Date	23MAY01 10:52

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OPERABLE UNIT 3 D&D SCHEDULE

PILOT PLANT COMPLEX D&D

FLUOR FERNALD

FIGURE 4-1 Pilot Plant Complex Remediation Schedule

5.0 MANAGEMENT

The implementation of the Pilot Plant Complex D&D project will be performed through a coordinated effort by the D&D Contractor, Fluor Fernald Project Management and support organizations, and DOE Project Management. Section 7 of the OU3 Integrated RD/RA Work Plan provides the overall management structure applied to this remediation project. A description of project-specific management responsibilities has been highlighted for the Pilot Plant Complex in this section.

DOE will provide direct project oversight in two ways, both of which become a concerted effort to ensure that remedial activities are performed according to project specifications and requirements. The DOE Office of Operations Assurance has assigned a Facility Representative from the Fernald Field Office whose responsibilities will be to perform independent field oversight of all remedial activities performed under this project. This individual will be responsible for weekly coverage of all field activities and necessary reporting to the DOE – FEMP Site Manager. The Facilities Representative will have the authority to stop work if conditions warrant such action. DOE- FEMP will also conduct field oversight in the areas of construction, engineering, quality assurance, and health and safety. The DOE Facilities Representative and others will immediately notify the DOE Project Manager of any issues or problems that arise in an effort to seek prompt resolution.

The DOE Project Manager and the environmental management contractor, Fluor Fernald, will oversee the remedial action through its project team review and approval process and by performing the following functions:

- ensuring that the Contractor is provided with the proper direction and support necessary to meet the remedial action objectives for this project;
- detailing all work conditions and scope requirements;
- conducting an alignment meeting where all project personnel will be instructed on the Safe Work Plans, pre-construction meetings, daily pre-work scope and safety briefings, and weekly coordination meetings with the Contractor to address all concerns, schedule status, planning, progress, and deviations;
- performing quality assurance and quality audits of all remediation tasks to determine adherence to project specifications;
- verifying work is performed in compliance with approved health and safety plans; and
- performing pre-final and final inspections.

- performing pre-final and final inspections.

The Contractor will perform D&D of the components, material sizing, segregation, and loading into containers and/or stockpiling. FEMP Waste Generator Services personnel will perform transport of containers to and from the project area.

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REFERENCES

U.S. Department of Energy, 1993, *Operable Unit 3 Remedial Investigation and Feasibility Study Work Plan Addendum*, Final, prepared by Fernald Environmental Restoration Management Corporation, Cincinnati, Ohio.

U.S. Department of Energy, 1995, *Plant 7 Dismantling - Removal Action No. 19*, Final Report, prepared by Fluor Daniel Fernald Corporation, Cincinnati, Ohio

U.S. Department of Energy, 1996a, *Operable Unit 3 Remedial Investigation and Feasibility Study Report*, Final, prepared by Fernald Environmental Restoration Management Corporation, Cincinnati, Ohio.

U.S. Department of Energy, 1996b, *Operable Unit 3 Record of Decision of Final Remedial Action*, Final, prepared by Fluor Daniel Fernald Corporation, Cincinnati, Ohio

U.S. Department of Energy, 1996c, *FEMP Stormwater Pollution Prevention Plan*, prepared by Fluor Daniel Fernald Corporation, Cincinnati, Ohio

U.S. Department of Energy, 1996d, *Thorium Nitrate Stabilization Project Final Report*, prepared by Fluor Daniel Fernald Corporation, Cincinnati, Ohio

U.S. Department of Energy, 1997a, *Operable Unit 3 Integrated Remedial Design/Remedial Action Work Plan*, Final, prepared by Fluor Daniel Fernald Corporation, Cincinnati, Ohio

U.S. Department of Energy, 1997b, *Integrated Environmental Monitoring Plan*, Final, prepared by Fluor Daniel Fernald Corporation, Cincinnati, Ohio

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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

Lead screening was conducted during the OU3 RI/FS using X-Ray Fluorescence (XRF) screening of media for lead based paint. No additional XRF screening was required to support D&D design; however, the D&D Contractor will be required to assess surfaces of steel proposed to be cut using hot methods to address potential lead emissions. XRF screening is the preferred method for lead sampling. Radiological surveying has been conducted for fixed and removable radioactive contamination using Geiger-Mueller radiological contamination meters and 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 contamination.

Asbestos

This category represents samples that have been collected to verify whether a certain material is considered ACM and whether the ACM is regulated or non-regulated. Asbestos surveys were conducted prior to the design of this D&D project and the results were incorporated. Section 2.2 presents a summary of materials found to contain friable ACM. It is not anticipated that additional asbestos bulk samples will be needed during D&D. Asbestos air sampling will be performed during asbestos abatement.

Secondary Waste (Decontamination Water)

Based on worst-case wash-down calculations, up to 50,000 gallons of decontamination washwater could be generated during equipment cleaning. Samples will be used to

determine the need for treatment prior to discharge into the AWWT. Based on this worst-case washwater volume estimate, 17 samples would be needed to characterize washwater for isotopic radionuclides and heavy metals, up to 23 samples would be needed to evaluate enrichment (i.e., levels of U-235 to total Uranium), and two samples for Volatile Organic Aromatics for closure of HWMU No. 33.

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

To qualify debris for NTS shipment, one percent of each material/waste stream going to NTS will be sampled. For each container that makes up the one percent, three samples will be taken and analyzed in accordance with the NTS Waste Acceptance Criteria (WAC).

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. Mixed waste may result from the collection of lead-based paint in the filtrate. 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

Asbestos air sampling will be necessary since friable and non-friable ACM will be removed prior to dismantlement under controlled abatement methods per Specification Section 01516 and 07415. 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 FF Radiological Control Requirements Manual, occupational air (i.e., breathing zone) samplers will be worn by approximately twenty-five percent (25%) of the workers in each work group/crew (minimum of one worker) when performing uranium airborne generating activities in a contamination area, high contamination area, or an airborne radioactivity area. Per the FF 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 airborne generating activities in a contamination area, high contamination area, or an airborne radioactivity area.

Fluor Fernald reviews safe work plans to ensure that they include the appropriate engineering and administrative controld to mitigate the spread of radiological contaminationand limit airborne radioactivity concentrations to levels at or below those specified in the IFB/RFP. Fluor Fernald performs an occupational ALARA review or evaluation (as appropriate) for each component undergoing D&D.

Beryllium

Process knowledge indicates that limited quantities of beryllium compounds were used in several pieces of equipment located in the Pilot Plant annex (Building 37) and possibly a furnace located in the furnace room located in the Pilot Plant reactor area (Building 54). Equipment identified includes a mold coating station, a vacuum furnace and the Stokes furnace. Prior to the start of work in the Pilot Plant, Fluor Fernald will perform swipe sampling of suspect equipment in the Pilot Plant. If swipe sampling indicates levels of beryllium are present above 0.2 micrograms per 100 square centimeters, the Contractor shall decontaminate the piece of equipment so beryllium levels are below 0.2 micrograms per 100 square centimeters before the piece of equipment can be dismantled for waste packaging. Any beryllium work activities shall be performed in compliance with the Fluor Fernald Chronic Beryllium Disease Prevention Program Plan and 10 CFR Part 850.

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APPENDIX B

EVALUATION OF MATERIAL DISPOSITION ALTERNATIVES FOR THE PILOT PLANT COMPLEX

Per the OU3 Record of Decision for Final Remedial Action, the selected disposition route for the majority of OU3 radiologically contaminated material, including accessible metals, is placement in the On-Site Disposal Facility (OSDF). However, in support of DOE's commitment to evaluate recycling on a case-by-case basis during each above-grade D&D project design (per Section 3.3.6.1 of the OU3 Integrated Remedial Design/Remedial Action Work Plan under the subheading of Unrestrictive Release Recycling/Reuse), an evaluation of disposition alternatives was performed for potentially recyclable/reusable materials estimated to be generated from the Pilot Plant Complex. Using the Decision Methodology for Fernald Material Disposition Alternatives (the "Decision Methodology"), which was finalized in July 1997 following extensive stakeholder involvement and subsequent reevaluation of unit costs using 1998 recycling data from the Recycling Supplemental Environmental Project, 241 tons of potentially recyclable accessible metals (OU3 Debris Category A) from all Pilot Plant Complex components was evaluated by comparing the four leading alternatives to on-site disposal.

The Decision Methodology consists of three phases: 1) Threshold Phase; 2) Life Cycle Analysis Phase; and 3) Decision Phase. The first phase, the Threshold Phase, includes a comparative evaluation of project costs for each alternative. The cost estimates which were established under the Plant 4 Case Study (presented during July 8, 1997 public meeting; cost data dated from September 27, 1996) were utilized for the 241 tons of structural steel from the Pilot Plant Complex. Since total cost estimates for each recycling alternative are current, and other factors such as vendor and market information have not significantly changed since the Plant 4 evaluation was performed, unit rates for each of the recycling alternatives shown in the Plant 4 Case Study are considered valid for the Pilot Plant Complex alternative disposition alternative evaluation. The total cost comparison of the disposition alternatives is shown in Table B-1.

TABLE B-1 Total Cost Comparison for Disposition Alternatives

Disposition Alternative	Cost Per Pound	Total Cost	Percent Above Lowest Cost
On-Site Disposal Facility	$ 0.04	$19,280	--
Vendor Material Release Facility	$ 0.41	$197,620	1,025%
FEMP Material Release Facility	$ 0.97	$467,540	2,425%
"Recycle 2000"	$ 1.20	$612,140	3,000 %
Privatized FEMP Material Release Facility	$ 0.56	$269,920	1,400%

The comparison of total costs between disposal in the OSDF and the four recycling alternatives indicates that each of the recycling alternatives greatly exceeds the 25 percent total cost criteria established for the Threshold Phase. As a result, only the lowest cost alternative (i.e., on-site disposal) meets the minimum criterion defined for the Threshold Phase. Therefore, as identified in the Decision Methodology, no further consideration of these decision alternatives is warranted and the disposition decision the estimated, 241 tons of accessible metals is disposal in the OSDF. Should vendor or market conditions change significantly prior to OSDF disposal of the structural steel, whereby the total costs of any of the recycling alternatives approach the cost threshold for further evaluation, then an re-evaluation of the disposition alternatives would be considered.

APPENDIX C

PERFORMANCE SPECIFICATIONS

The project specification included in this appendix represent a modified version of the original set of performance specifications contained in the May 1997 final version of the OU3 Integrated RD/RA Work Plan. These project-specific specifications incorporate lessons-learned from previous D&D projects at the FEMP and identify new and innovative technologies and methods that are applicable to the Pilot Plant Complex D&D project.

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OPERABLE UNIT 3 – DEMOLITION PROJECTS

DECONTAMINATION AND DISMANTLEMENT ENGINEERING PERFORMANCE SPECIFICATIONS

ENGINEERING SPECIFICATIONS 2503-TS-0002

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

FLUOR FERNALD
P.O. BOX 538704
CINCINNATI, OH 45253-8704

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SECTION 01010

GENERAL REQUIREMENTS

PART I GENERAL

1.1 SUMMARY

A. The intent of these Specifications is to establish technical requirements necessary to support the above-grade decontamination and dismantlement (D&D) of the structures and components at the Fernald Environmental Management Project (FEMP).

B. In all cases where the terms "Vendor", "Seller", "Manufacturer", or similar terms appear in these Specifications, they shall be understood to refer to an individual or firm(s) providing materials, equipment or services, as noted, under a contract to Fluor Fernald.

C. In all cases where the term "Contractor" appears in these Specifications, it shall be understood to refer to the Contractor and their subtier contractors who are performing the D&D services at the FEMP.

D. General: The Technical Specifications are of the abbreviated, simplified, or streamlined type and include incomplete sentences. Omissions of words or phrases such as "the contractor shall," "in conformity therewith," "shall be," "as noted on the drawings," "according to the plans," "a," "the," and "all" are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the drawings.

For convenience of reference and to facilitate the letting of contracts, the Specifications may be separated into titled Divisions. The following defines the separations referred to in the Specifications:

1. Section: Separate numbered section of a Specification (e.g., Section 16020)
2. Article: Separate numbered article of a Subsection (e.g., Article 2.1)

F. Definitions: Certain terms and words as used throughout the Specifications shall be defined as follows, unless otherwise particularly specified:

1.	"Provide":	Furnish and install, complete, in place.
2.	"Indicated":	As shown on the drawings and/or specified.
3.	"Directed," "Authorized," "Permitted":	Shall be as directed, authorized, or permitted by Fluor Fernald.
4.	"Selected":	Shall be as selected by the Contractor or Fluor Fernald.
5.	"Satisfactory," "Acceptable":	Satisfactory or acceptable to Fluor Fernald.
6.	"Necessary," "Required," "Suitable":	As necessary, required, or suitable for the intended purpose as determined by Fluor Fernald.

7. "Submit": Submit to Fluor Fernald unless otherwise specified.

8. "Above-grade": Refers to first, second, third, etc., stories of a facility, and accessible materials/equipment in basements, sumps, pits, and trenches of a facility.

9. At- and Below-grade: Slab, and/or basement, foundation, loading docks, etc.

10. In all cases where the words "or equal" appear in these specifications, they shall be understood to mean "or approved as equal by Fluor Fernald."

11. Where the Sections refer to Parts 6, 7, 8 or 9, the reference will be to the IFB/RFP or the Contract, whichever is applicable.

1.2 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the code requirements listed below. References to specific codes, regulations, standards, or other criteria documents in these Sections are indicated as the latest edition of revision of each document, as of the date when these Sections were prepared. Invoking all or any part of these standards is to be accomplished in accordance with normal industry practices. Standards listed in these Sections can be used in their entirety or applicable sections depending on their application to the services being rendered by the Contractor.

A. Ohio Basic Building Code (OBBC) 1994

B. Life Safety Code 101 - 1998

C. Other applicable National Fire Protection Association (NFPA) Codes - All inclusive, including 1998 revisions

D. 10 CFR 835 – Occupational Radiation Protection

E. 10 CFR 830 – Nuclear Safety Management

F. 29 CFR 1910 - Occupational Safety and Health Standards for General Industry

G. 29 CFR 1926 - Occupational Safety and Health Standards for the Construction Industry

H. 40 CFR – Protection of Environment

I. DOE Order 440.1A - Worker Protection Management for DOE Federal and Contractor Employees

J. DOE N 441.1 - Radiological Protection for DOE Activities

K. DOE Order 5400.5 - Radiation Protection of the Public and the Environment

1.3 SUBMITTALS

A. An Installation, Operation, and Maintenance (IOM) Manual shall be prepared so as to provide optimum operation and maintenance of any equipment and systems that may be required.

B. The cover of the IOM Manual shall include the following information:

1. Project Title -_____,
2. Contractor,
3. Construction Manager - Fluor Fernald, and
4. Subtier Contractor (name, if any).

C. The IOM Manuals shall be bound into one or more volumes for ease of handling, and shall have an index. The manual shall include descriptive literature, drawings, performance curves and rating data, test reports, and spare parts lists. The maintenance section shall divide maintenance procedures into two categories, "Preventive Maintenance" and "Corrective Maintenance," and a subsection for "Safety Precaution." Preventive maintenance shall include cleaning and adjustment instructions. Corrective maintenance shall include instructions and data arranged in the normal sequence of corrective maintenance (i.e., troubleshooting, logical effect to cause), then repair and replacement of parts, then the parts list. Safety Precautions shall comprise a list of safety precautions and instructions to be followed before, during, and after making repairs, adjustments, or routine maintenance.

1.4 QUALITY REQUIREMENTS

A. The Contractor shall provide written procedures for Fluor Fernald's review and approval of all tests to be performed as identified in the drawings and specifications. These procedures shall provide the detailed step-by-step operations with sign-off columns and date columns and shall be submitted and approved prior to testing.

B. The Contractor shall not deviate from construction acceptance tests as reviewed and approved by Fluor Fernald.

C. All test instruments shall have been calibrated within 12 months prior to use on this contract or at intervals as recommended by vendor, by a calibration laboratory whose calibration equipment and instruments are fully traceable to National Institute of Standards and Technology (NIST) standards. The Contractor shall provide individual certification of calibration and NIST standards traceability for all test instruments used on this contract.

1.5 ABBREVIATIONS FOR REFERENCED STANDARDS AND SPECIFICATIONS

The following list denotes abbreviations used in the technical portions of these Sections:

Abbreviation	Authority or Title
AASHTO	American Association of State Highway Transportation Officials
AGA	American Gas Association
AGC	Associated General Contractors of America
ANSI	American National Standards Institute

Abbreviation	Authority or Title
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CFR	Code for Federal Regulations
ERDA	Energy Research and Development Administration
IFB	Invitation for Bid
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
RFP	Request for Proposal
UL	Underwriters Laboratories, Inc.

END OF SECTION

SECTION 01120

DEBRIS/WASTE HANDLING CRITERIA

PART I GENERAL

1.1 SCOPE

This Section provides the requirements for handling, containerization and stockpiling of debris/waste generated during the dismantlement of FEMP processing and support facilities. Debris/waste shall be segregated into established categories and containerized as directed in this Section. This includes, but is not limited to, the following:

A. Classification of materials by segregation category,
B. Segregation of materials,
C. Containerization/loading,
D. Movement of containers within the construction zone,
E. Tagging containers,
F. Debris stockpiling, and
G. Collection and containerization of controlled area office trash from Contractor-owned office trailers.

1.2 RELATED SECTIONS

A. Section 01515 - Mobilization, Demobilization, and General Site Requirements
B. Section 01516 - Asbestos Abatement
C. Section 01517 - Removing/Fixing Radiological Contamination
D. Section 01519 - Decontamination of Contractor Provided Tools, Equipment, and Material
E. Section 03315 - Concrete/Masonry Removal
F. Section 05126 - Structural Steel Dismantlement
G. Section 07415 - Transite Removal
H. Section 15065 - Equipment/System Dismantlement
I. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIALS

See Parts 6 and 7 for the following:

A. Index of Drawings,
B. Photographs,
C. Drawings,
D. Contractor Safe Work Plan Format Requirements, and
E. Waste Management Plan (WMP), which includes the Material Segregation and Containerization Criteria (MSCC) form. The MSCC form identifies anticipated waste streams to be generated and their respective waste categories. In addition, the MSCC identifies containers (where applicable) for the waste streams, size criteria, and special waste handling criteria. Debris is defined as dismantled piping, equipment, systems, components, asbestos-containing materials (ACM), etc. that is contained within the project boundaries.

1.4 REFERENCES, CODES AND STANDARDS

All work shall be accomplished in accordance with the following code and standards:

A. DOE Order 460.1A Packaging and Transportation Safety, and
B. 10 CFR 835 Occupational Radiation Protection.

1.5 SUBMITTALS

The Contractor shall submit the following for approval by Fluor Fernald:

A. Debris/Waste Handling Safe Work Plan

Prior to mobilization, the Contractor shall submit a detailed debris/waste handling Safe Work Plan for approval by Fluor Fernald, in accordance with the Contractor Safe Work Plan Format Requirements contained in Part 7 - ACR-002. The Safe Work Plan shall include the Contractor's:

1. Method of cutting to meet debris size requirements (if different from methods used for dismantlement),
2. Proposed equipment for loading and handling containers,
3. Method to verify that the weight capacity of each container is not exceeded,
4. Method for loading containers,
5. Method for segregating waste categories,
6. Method for moving debris in and around project area (debris flow),
7. Proposed container staging areas, as required by this Section, and
8. Material inspection area.

B. Monthly Container Report

A report shall be submitted identifying the current waste container stock listing of drums and all metal boxes delivered to and staged at the project site. This report shall be by inventory number; shall be issued on a monthly basis; and shall describe the usage and/or contents of the waste containers under control by the Contractor.

1.6 PROJECT CONDITIONS

A. Generation of additional debris/waste shall be minimized. Waste minimization shall include, but not be limited to, unpacking equipment and material prior to entering the Controlled Area. The Contractor shall not bring any hazardous material to the construction zone unless prior approval is received from Fluor Fernald. Alternatives to hazardous materials shall be used whenever possible.

B. The Contractor shall notify Fluor Fernald immediately when hazardous or mixed wastes are found or, whenever possible, before they are generated. Further management of these wastes shall be coordinated with Fluor Fernald.

C. All waste and debris designated for placement in the OSDF from thorium-contaminated areas shall be free of visible material. The Contractor shall high-pressure rinse and lock down these

items. The *exterior* surfaces of roll-off boxes used to transport these items to the OSDF shall be decontaminated as necessary and released from thorium controls prior to their pick-up for movement to the OSDF.

D. Requests for containers shall be made to Fluor Fernald in writing at least 4 calendar days in advance of need.

PART II PRODUCTS

2.1 EQUIPMENT

A. The Contractor shall supply all equipment required for:

1. Sizing debris and moving containers within the construction zones (except End Loading Container Sea Land Boxes [ISO containers]), and

2. Loading containers.

B. Fluor Fernald will move Roll-off Boxes (ROBs) and ISO containers.

2.2 MATERIALS - FURNISHED BY OWNER (FLUOR FERNALD)

A. Fluor Fernald will provide appropriate containers for debris/waste categories as identified on the MSCC* (except liquid storage tanks, as noted in Section 01517) and as otherwise specified. These containers include, but are not limited to, the following:

Container Designation	Nominal Exterior Dimensions (H x W x L)	Maximum Gross Weight (lbs)
Large metal boxes (LMB) (top load)	8' x 8' x 20'	42,000
ISO containers (top load)	8' x 8' x 20'	42,000
ISO containers (end load)	8' x 8' x 20'	42,000
Small metal boxes	Various	8,000
55-gallon drums with lid	---	882
Roll-off boxes (ROB)	6' x 8' x 22'	42,000

B. Fluor Fernald will deliver empty ("prepped", if required) containers, pallets (possibly radiologically contaminated), dunnage, and miscellaneous materials, as required, to the container staging (also referred to as "queuing") area.

* NOTE: The MSCC can be found in Part 6, Exhibit E

2.3 MATERIALS - FURNISHED BY CONTRACTOR

A. The Contractor shall supply fiber-reinforced polyethylene or polyester sheeting approved for outdoor storage: color, yellow; minimum thickness of 6-mils; ultraviolet resistant; as manufactured by Griffolyn, Herculite or equal.

B. The Contractor shall furnish 8" x 11" weatherproof removable tags.

C. The Contractor shall furnish 3.5'- 4' high woven metal fencing consisting of 14 gauge 2 inch x 4 inch galvanized welded mesh with 7 foot painted steel "T" posts embedded to a depth of 2 feet and placed at 10 foot intervals.

PART III EXECUTION

3.1 PREPARATION

A. Roll-Off Box Staging Area:

The Contractor shall establish and maintain a ROB staging area(s), as needed, which shall be proposed by the Contractor unless otherwise specified by Fluor Fernald on reference site drawings. To define and control access to this area, woven metal fencing will be erected around the perimeter of the staging area. One section of the fence will be open for access and egress. The fencing must be maintained in good condition. This area shall be used for temporary staging of empty and full ROB containers. If the staging area is a non-concrete surface, the Contractor shall be responsible for stabilizing and maintaining the areas and routes of access to accommodate container handling requirements.

B. Other Container Staging Areas:

The Contractor shall prepare other container staging areas as needed. Areas will either be used to store empty drums and metal boxes (includes ISO Containers), or will be used for full drums and metal boxes which shall be proposed by the Contractor (unless otherwise specified by Fluor Fernald on reference site drawings). Woven metal fencing will be erected around the perimeter of each staging area. One section of the fence for each area will be open for access and egress. The fencing must be maintained in good condition.

C. Material Inspection Area:

The Contractor shall establish a material inspection area for each contamination area, for access of Fluor Fernald personnel to inspect debris and/or perform radiological surveying. Each material inspection area shall be proposed by the Contractor and approved by Fluor Fernald. The inspection area shall be arranged such that routine access will be prevented by means of fencing and/or barrier tape, with appropriate posting to identify that the items contained are being held for visual inspection or radiological survey. The inspection area will be off-limits to individuals other than Fluor Fernald/Contractor waste technicians and radiological survey personnel.

3.2 APPLICATION

A. Debris handling requirements are defined by the following Fluor Fernald classifications: 1) non-process debris, and 2) process debris. All debris shall be sized, segregated rinsed with high-pressure water, and containerized in accordance with the MSCC.

1. Non-Process Debris:

Non-process debris will be exempt from the inspection requirement for *visible process residues* as described in Article 3.2.A.3 of this Section. Non-process debris would include, but are not limited to, piping for utility systems (i.e., steam, condensate, drinking water, air, and others), electrical systems (i.e., conduit, motors, electrical panels, and others), and obvious non-process items such as structural steel (Debris Category A), concrete (Debris Category E), transite (Debris Category G), and most miscellaneous materials categorized as Debris Category I.

2. Process Debris:

Process debris is defined as debris that fails the inspection for *visible process residues* per Article 3.2.A.3, and debris listed in the MSCC as Debris Category C.

3. Visible Process Residue Inspection Requirements:

The definition of *visible process residues* (green salt, yellow cake, black oxide, etc.) including films and precipitates is "hold-up/materials on the interior or exterior surfaces of debris that is obvious". Dirt, oil, grease, stains, rust, corrosion, and flaking do NOT qualify as visible process residues; however, dirt, oil, grease, stains, rust, corrosion, and flaking require decontamination for radiological control purposes prior to removing the debris from the enclosure or prior to opening a building to the environment, per Technical Specification Section 01517. Regardless of whether or not visible process residues are present, all debris are still considered to be radiologically contaminated unless otherwise specifically identified.

Fluor Fernald visual inspection will take place following dismantlement, sizing, and surface decontamination in accordance with Section 01517 Article 3.1, and relocation to the Fluor Fernald-approved Material Inspection Area referenced in Article 3.1.C of this Section.

a. Debris That Fails Inspection for Visible Process Residues:

Debris that fails the inspection criteria for visible process residues will be identified with yellow paint by Fluor Fernald, and the Contractor shall attempt to remove the visible process residues at least one time in accordance with Section 01517 prior to Fluor Fernald re-inspection. If the debris fails the second inspection for visible process residues, it shall be deemed as "Process Debris" (Debris Category C) and will be identified with red paint by Fluor Fernald.

b. Debris That Passes Inspection for Visible Process Residues:

Debris that passes the Fluor Fernald inspection for visible process residues shall be rinsed with high pressure water, and containerized or staged according to Part 6, Section 8.4, and Article 3.3 of this Section.

B. The Contractor shall be responsible for retrieving empty containers from the container staging areas (except for ISO containers), segregating debris/waste, loading, securing containers, tagging for on-site movement, and scheduling the movement of containers back to the designated container staging area. The Contractor shall use the MSCC as the basis of all containerizing activities, and shall be responsible for minimizing debris/waste generation by limiting the amount of material brought on site.

C. Equipment, material or debris requiring movement outside the enclosed building to be sized, containerized or palletized, must meet the requirements for removal/fixing of radiological contamination per Section 01517. If the removal/fixing requirements cannot be met, the material may be encapsulated or wrapped in fiber-reinforced sheeting and sealed prior to movement to prevent the migration of radioactive contamination as follows:

1. Place fiber-reinforced sheeting over pallet, position material on pallet, and wrap the sheeting over material,
2. Secure fiber-reinforced sheeting over material to prevent migration of contamination, and
3. Secure material to pallet with vinyl or metal banding material as needed.

3.3 PERFORMANCE

A. For containerization, the Contractor shall:

1. Ensure that Fluor Fernald personnel are present during the loading and securing of containers identified in the MSCC, and provide notice to Fluor Fernald within 24 hours prior to containerization.

2. Provide a debris/waste handling supervisor to supervise operations. The supervisor shall be required to complete (Fluor Fernald conducted) Nevada Test Site Waste Acceptance Criteria/Waste Certification Program Plan (NTSWAC/WCPP) training. (Note: Plans are for Fluor Fernald to develop Storage Facility WAC training, which will also be required.)

3. Segregate and containerize all debris/waste according to the categories defined in the MSCC. Should a debris/waste stream be discovered that is not on the MSCC, then work on the handling of this debris/waste shall stop, whereupon Fluor Fernald shall be contacted for further direction.

4. Commingle Debris Categories A, B, D (except for lead), and incidentally generated E in the designated container or stockpile, as directed by the MSCC. Debris Category I shall be segregated and containerized according to two subcategories: I2 - Non-compressible and/or Non-organic Misc. Debris, and I4 - Compressible and/or Organic Misc. Debris.

5. Upon receipt of containers, the Contractor shall perform a visual inspection to ensure that the containers do not contain any of the prohibited items identified in this Section, and shall complete the Project Container Arrival/Departure Inspection Checklist For Roll Off Boxes. Fluor Fernald will remove any free liquids upon removal from the work zone, as necessary.

6. Fill containers, boxes, and drums such that the interior volume is as efficiently and compactly loaded as practical up to the maximum gross weight limit of the container. Fill

void space in large piping, equipment, containers, etc., with smaller debris. Any container exceeding maximum allowable gross weight shall have contents removed, as required, to lower the weight to an acceptable range. Contents shall be prepared for containerization in order to minimize load shifting or damage to container during movement.

7. Ensure that except during loading activities, empty metal boxes and drums must remain in the established empty container staging area.

8. Ensure that the following "Prohibited Materials List" is displayed in the containerization area or on each container. Notify Fluor Fernald if any of the prohibited materials are identified for specific material handling directions.

PROHIBITED MATERIALS LIST

a. Gas cylinders that are able to be pressurized
b. Explosives
c. Materials containing free liquids. The intent of the exclusion of free liquids is to prevent contaminated liquid waste (e.g., a drum of solvent) from being directly disposed of in the On-Site Disposal Facility (OSDF). Materials that contain rainwater or that have an inherent moisture content (e.g., sludge) are not excluded.
d. Fine particulates (respirable fines)
e. Hazardous waste (Characteristic or Listed)
f. Corrosive materials
g. Etiologic agents
h. Flammable liquids or combustible solids
i. Whole or shredded scrap tires
j. Material from any off -site source, including any other DOE site
k. Product, residues, and other special materials (Category J materials)
l. Process-related metals (Category C)
m. Intact containers (i.e., containers must be empty and crushed)
n. Acid brick (Category F material)
o. Transformers, which have not either been crushed or had their void spaces filled with grout
p. HEPA filters
q. Used oils
r. Materials not accompanied by a manifest
s. Solvent saturated soils
t. Material not meeting physical WAC

9. Install weatherproof removable tags on each debris/waste container prior to loading. Tags shall identify container contents, using indelible ink, by debris/waste category specified in the MSCC and the debris/waste's building of origin. For Category J Debris, an exact description of the contents is required.

10. Containerize Thorium contaminated debris/waste separately from non-Thorium contaminated debris/waste.

B. Security and Movement of Containers:

To ensure security and movement of containers, the Contractor shall:

1. Schedule the movement of containers to the specific task location from the container staging area.

2. Ensure that the lid, doors, or tarps on debris/waste containers are secured when no containerization is in progress to prevent unauthorized containerization of materials or release of container contents. Containers must be weather protected when lid is not secured, to prevent entry of snow and rain or release of container contents.

3. Inspect all containers, double bagged materials, drums, boxes, or double wrapped components for exterior contamination and damage before removing them from the work area. Damaged containers shall be reported to Fluor Fernald. Any container damage beyond normal wear and tear that is Contractor-caused shall be the Contractor's responsibility to repair or to provide compensation for such repairs.

4. Secure full containers.

   a. End-loading ISO containers shall be secured by closing and latching doors, ensuring that all latching mechanisms are engaged.

   b. Drums shall be secured as follows:

      1. Place lid on drum, ensuring that gasket is seated to maintain a tight seal,
      2. Install bolt-type lock ring on lid and torque to 45 ± 5 foot-pounds, and
      3. Drums shall be securely strapped together on pallets, using at least one strap.

   c. Top-Loading Metal boxes (large and small) shall be secured as follows:

      1. Inspect gasket for damage and repair, if required, and
      2. Place gasket and lid on the box and secure with clamping device or pins.

   d. Roll-Off Boxes (ROBs) shall be secured as follows:

      1. Cover ROB with tarp or steel lid,
      2. Secure tarp (with straps) or steel lid (with clamping device or pins),
      3. Secure all gate chains, and
      4. Ensure that containers have not been damaged during loading.

   e. Prior to securing lid or doors on containers holding asbestos-containing materials (ACM), fold fiber-reinforced sheeting over ACM and seal with tape.

   f. Return full, secured containers to the staging area (except for ISOs, which will be removed by Fluor Fernald).

   g. Filled ROBs must remain inside the established staging area until they can be removed by Fluor Fernald.

h. Filled drums and metal boxes must remain inside the established full container staging area until they can be removed by Fluor Fernald.

i. The Contractor shall decontaminate waste containers, equipment, tools, etc., prior to exiting the construction zone or staging area as necessary in accordance with Section 01519.

C. Stockpiling of Materials:

1. The Contractor shall establish/construct and manage debris stockpile area(s) on concrete or asphalt surfaces with run-off controls (as required by Section 01515), and fencing. The Contractor shall ensure that run-off controls are constructed and used in accordance with Section 01515. Stockpiled materials shall be sized and segregated in accordance with the MSCC. A five foot buffer area shall be maintained between the footprint of the stockpile(s) and the perimeter of the pad(s) and the stockpile area fencing. The Contractor shall inspect the stockpile area(s) and report any deficiencies to Fluor Fernald. Inspections shall be documented in the Contractor's Daily Work Activities Report and shall include at least the following:

a. Daily and after storm events with heavy rains and/or strong winds to ensure that piles remain in a safe and controlled configuration,

b. Covers of catch basins to ensure that they remain unclogged and free of obstructions,

c. Diking to ensure that controls are in good condition, permitting easy flow of runoff, and

d. Perimeter fencing, gates, and other materials required for maintaining project control of the stockpile area(s).

2. Fluor Fernald will perform routine radiological contamination surveys and airborne radioactivity monitoring, as deemed to be appropriate. If deemed necessary by Fluor Fernald, the Contractor shall take measures to mitigate the spread of contamination to areas outside of the staging area and to maintain airborne radiological levels within allowable limits. These measures may include area decontamination, application of fixatives, or other measures proposed by the Contractor and accepted by Fluor Fernald.

3. Floor Load Capacity:

If the Contractor chooses to stage any debris on a floor other than a slab-on-grade, a structural engineering analysis shall be required. It shall be the Contractor's responsibility to perform the analysis to verify the loading capacity of said floor and submit the analysis to Fluor Fernald, signed and stamped by a Professional Engineer (PE) registered in the State of Ohio, to ensure that the load capacity is not exceeded.

D. Collection and Containerization of Controlled Area Office Trash from Contractor-Owned Office Trailers

Office trash from Contractor-owned office trailers shall be collected and managed in accordance with the following requirements:

1. Collect office trash from Contractor-owned office areas for participation in the controlled area office trash program.

2. Prohibited items, items that are suspected to be contaminated, or items not normally discarded into office area trash containers shall be segregated from typical office trash. Prohibited items include, but are not limited to: tools, equipment, mop heads, hose clamps, floor sweepings, aerosol cans, high density material, protective clothing (Anti-C's, gloves, booties, coveralls), yellow maslin, yellow tape/RadCon tape, yellow herculite, yellow shoe covers, radiological smears, radiological safety signs, plastic sample bottles, and instrument survey cords.

3. If any prohibited or suspect materials are found (with the exception of tools and equipment), they shall be disposed of as contaminated material in accordance with the MSCC.

4. If tools or equipment are found in office area trash containers, contact the Fluor Fernald Construction Manager for radiological evaluation and the procedure for decontamination or disposition.

5. Package office trash in green tinted translucent plastic bags provided by Fluor Fernald. These types of bags are exclusive for the Controlled Area office trash disposal program.

6. Seal each clear trash bag and green trash bag with tape (not yellow in color) and indicate the building or area where the trash was generated directly on each trash bag with a paint stick or permanent marker.

7. Place office trash in a designated area agreed upon by Fluor Fernald and the Contractor. Fluor Fernald will collect office trash daily, unless stated otherwise by the D&D Contract.

3.4 QUALITY ASSURANCE

The Contractor and Fluor Fernald shall inspect filled containers upon their return to the container staging area to verify that no damage has occurred during the filling of the container.

END OF SECTION

SECTION 01515

MOBILIZATION, DEMOBILIZATION AND GENERAL SITE REQUIREMENTS

PART I GENERAL

1.1 SCOPE

This Section consists of the work related to Contractor mobilization, demobilization, and general site requirements. The principal items included in this Section are:

A. Site access,
B. Slab Repair,
C. Construction utilities,
D. Signs and barriers,
E. Potential use of existing overhead bridge cranes,
F. Gravel pads for access and queuing areas,
G. Protecting adjacent facilities and components,
H. Stormwater control,
I. Debris chutes,
J. Remediation equipment, and
K. Ventilation and containment.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01519 - Decontamination of Contractor Provided Tools, Equipment and Materials
C. Section 03315 - Concrete/Masonry Removal
D. Section 05126 - Structural Steel Dismantlement
E. Section 07415 - Transite Removal
F. Section 15065 - Equipment/System Dismantlement
G. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIALS

Fluor Fernald will provide access to existing site drawings at the Fluor Fernald offices located at:

175 Tri-County Parkway
Cincinnati, OH 45246-3222

Drawings will be provided on an information only basis.

1.4 REFERENCES, CODES AND STANDARDS

The entire work under this Section shall be in compliance with the provisions of the following:

A. American Society of Testing and Materials (ASTM):

1. ASTM A36 — Standard Specification for Carbon Structural Steel
2. ASTM C109-93 — Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
3. ASTM C136-93 — Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates (AASHTO T27)
4. ASTM D698-91 — Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbs/ft.)
5. ASTM C1042-91 — Standard Test Method for Bond Strength of Latex Systems Used with Concrete by Slant Shear

B. National Fire Protection Association (NFPA):

1. NFPA 70 — National Electrical Code, 1996 Edition
2. NFPA 101A-98 — Code for Life from Fire in Buildings and Structures

C. American National Standards Institute (ANSI):

1. ANSI C2-93 — National Electrical Safety Code
2. ANSI C135.1-79 — Galvanized Steel Bolts and Nuts for Overhead Line Construction
3. ANSI 05.1-92 — Wood Poles Specifications and Dimensions

D. American Wood-Preservers Association (AWPA): AWPA C4-95 Poles, Pressure Treatment

E. National Electrical Manufacturers Association (NEMA):

1. NEMA LA 1-92 — Surge Arresters
2. NEMA WC 7088 — Cross-Linked-Thermosetting Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy

F. Underwriters Laboratories (UL):

1. UL 96-94 — UL Standard for Safety Lightning Protection Components
2. UL Electrical Directories, 1995 Construction Materials

G. United States Department of Agriculture, Soil Conservation Service: Water Management and Sediment Control in Urbanizing Areas.

H. Code of Federal Regulations (CFR):

1. 29 CFR 1926 — Occupational Safety and Health Administration, Dept. of Labor (as applicable)
2. 29 CFR 1910 — Occupational Safety and Health Administration, Dept. of Labor (as applicable)

I. American Water Works Association (AWWA): AWWA C506-78 C Backflow Prevention Devices-Reduced Pressure Principle and Double Check Valve Types

J. Ohio State Plumbing Code: 4104:26:105 Backflow

1.5 SUBMITTALS

The Contractor shall submit a Mobilization Safe Work Plan for approval by Fluor Fernald that shall include the following:

A. Drawings and Data:

1. Detail and layout drawings showing locations of any barriers and/or fencing the Contractor will use for construction zones, radiological control boundaries, container staging areas, debris stockpiling areas, and barriers to be used for protection of adjacent structures.

2. Detail and layout drawings showing temporary structures, access and roadways required during mobilization of major equipment components (e.g., cranes, field offices, tool and equipment storage, chutes within the stated limits of the construction zone). This shall include personnel and flow patterns into and within the construction zone.

3. Drawings showing layout, details and applicable equipment, or plans the Contractor will employ to control fugitive emissions, storm water runoff, erosion, and migration of liquids.

4. Detail and layout drawings showing lay down areas, building vestibule sizes and locations, cutting areas and, as required by Section 01120, container staging areas, material inspection area, and debris stockpiling area(s).

5. Shop drawings for all debris chutes to be used.

   a. Provide manufacturer's data or calculations to verify that the chute, its support system and the existing structure (if the debris chute is attached) can withstand all dynamic impact loads they will be subjected to during dismantlement operations.

   b. Debris chute drawings and calculations submitted must bear the stamp of a Professional Engineer registered in the State of Ohio.

B. Temporary utilities (such as water, steam, electric power) from the point source location to end use locations, as identified on the reference site drawing.

C. Portable heating systems.

D. Verification that the patching grout compressive and bond strengths are in accordance with ASTM C109 and ASTM C1042, respectively.

E. Results of the Engineering Survey per 29 CFR 1926.850 (If any building or if part of a building to be dismantled is identified in the Contractor's engineering survey as being structurally deficient, the Contractor shall include in the Safe Work Plan proposed methods to shore the structure so that safety of the workers is maintained)

F. Written statement that Contractor accepts that all electric, gas, water, steam, sewer, and/or other service lines to the structures have been disconnected and/or capped.

PART II PRODUCTS

2.1 MATERIALS

A. Patching Grout: Non-shrink type, premixed compound consisting of non-metallic aggregate; cement; water reducing and plasticizing agent; capable of developing minimum compressive strength of 5,000 psi in 28 days; capable of developing a bond strength of 1,200 psi in 28 days; conforming to ASTM C 109 and ASTM C827.

1. Acceptable products and suppliers:

   a. Masterflow 713, by Masters Builders
   b. SikaGrout 212, by Sika Corp
   c. Sealtight 588, by W. R. Meadows
   d. Approved equal

2. The "approved equal" products shall be approved by Fluor Fernald prior to use on the FEMP.

B. Construction Zone fencing shall meet the requirements for permanent fencing in Article 2.1.C. Gates shall be plastic yellow chain fixed to stanchions. Stanchions shall be located on grade.

C. Permanent Fencing: Permanent fencing shall be a distance of 10 feet outside of the areas to be protected and shall consist of 14 gauge 2"x4" galvanized welded wire mesh 48" high with 7 foot painted steel "T" posts embedded to a depth of 2 feet and placed at 10 foot intervals.

D. If filling of slab openings is required per Article 3.2.B of this Section, clean granular fill is used to fill large openings in the base slab, including pits, large sumps, etc. The Contractor will supply this material. Use of fine aggregate shall be natural river sand, bank sand or sand manufactured from stone or air-cooled blast furnace slag; washed; free of silt, clay, loam, friable or soluble materials, and organic matter; within the following limits:

Sieve Size	Percent Passing
No. 4	100
No. 50	10 - 40
No. 200	0 - 5

E. Gravel Pads for Access and Container Staging Areas

The aggregate shall be 6 - 8 inch (i.e., aggregate size) crushed limestone or gravel and compacted to form a 12 inch base.

F. Wood Utility Poles:

1. ANSI 05.1; treated southern pine poles.

2. Select poles for straightness, minimum sweeps and short crooks. Fluor Fernald shall be notified of any sweeps or crooks prior to installation for determination of acceptance.

3. Preservative: ANSI 05.1 and AWPA C4, Pentachlorophenol.

4. Apply preservative to AWPA C4 with minimum net retention of 12 lbs/ft^3 (285 kg/m^3). Obtain complete sapwood penetration.

G. Pole Hardware:

1. Miscellaneous Pole Hardware: Hot-dipped galvanized after fabrication
2. Bolts and Nuts: ANSI C135.1
3. Butt Plate: Copper
4. Guy Strand: High strength, seven strand steel cable galvanized to ASTM A475, Class A or B
5. Guy Termination: Preformed dead-end grip clamp type
6. Guy Guards: 8 foot (2 m) long plastic, colored yellow
7. Ground Wire: Soft drawn copper conductors, 6 AWG minimum size
8. Air Terminal: UL 96; 18 inch copper air terminal
9. Guy Adapter: Twin or Triple Eye

H. Line Conductors:

Secondary Conductors: Aluminum or copper, triplex (three) cable with 600 volt cross-linked polyethylene insulation for phase conductors. Use bare messenger for grounding conductor.

I. Arresters:

1. Surge Arresters: NEMA LA 1; valve type, arranged for pole mounting, and rated 3 kv.
2. Mechanical Connectors: Bronze
3. Wire: Stranded copper
4. Grounding Conductor: Size to meet NFPA 70 requirements

J. Pole Anchors: Helical screw anchor type sized for load; galvanized steel; ASTM A36/36M

K. Backflow Prevention for Temporary Water Conditions (Reduced Pressure Type):

1. The backflow preventor shall meet Ohio State Plumbing Code 4101:26:105 Backflow and the American Water Works Association (AWWA) Standard (AWWA C506-78) for Backflow Prevention Devices.

2. Acceptable products and suppliers:

   a. WATTS 909 Backflow Preventor (Fluor Fernald recommended product)
   b. Approved equal

L. Portable Heating Systems: All portable heaters shall be Underwriters Laboratories (UL) listed or American Gas Association (AGA) certified for their intended use, and are not modified for other applications.

M. Materials Supplied by Owner:

Fluor Fernald shall supply signs, barriers, fencing, and tape indicating radiological control zones for Contractor installation.

N. Materials Supplied by Contractor:

The Contractor shall supply all materials (other than those listed in M. above) required for mobilization, demobilization, and other site requirements identified herein.

2.2 EQUIPMENT

The Contractor shall supply all equipment necessary for mobilization, demobilization, and other site requirements.

2.3 UTILITIES

Fluor Fernald will provide electrical power and water according to Part 6, Section 7.

PART III EXECUTION

3.1 EXAMINATION

The Contractor shall perform an Engineering Survey in accordance with the requirements of OSHA 29 CFR 1926.850 and obtain approval from Fluor Fernald prior to mobilization.

3.2 PREPARATION

A. Site Access:

1. Vehicle, equipment and pedestrian access/egress shall be directed through the designated radiological control points.

2. Provide for emergency vehicles to enter the construction zone at all times.

B. Slab Repair:

1. Except for areas noted on the Civil Demolition Plan drawing which require permanent fencing to prevent access to particular subsurface voids (e.g., basements, pits, trenches), the Contractor shall fill large openings(e.g., pits, sumps, etc.) with granular fill material to within 2 inches of grade. Alternatively, the Contractor may propose to use engineered covers that are capable of supporting anticipated loads during D&D. Fluor Fernald shall approve alternatives.

2. Portions of the building slab, which are not identified in the Civil Demolition Plan drawing as areas to be protected with permanent fencing are potential locations for interim storage stockpiling of contaminated debris or for staging of contaminated equipment. In those areas, the slab openings (conduit, piping, drain openings, etc.) shall be filled and covered with patching grout. Additional requirements for potential stockpiling areas include the following:

a. Drain water and remove loose debris from large openings in the base slab including pits, sumps, trenches, etc., prior to filling.

b. All grease, oil, dirt and other deleterious materials shall be completely removed from slab openings and handled in accordance with Section 01120.

c. Follow the manufacturer's recommendations for the application of patching grout.

d. Fill in damaged areas of base slab and small openings including drains, chases, small sumps, etc., with a patching grout to create a surface level with surrounding slab. Maximum allowable depression not requiring repair is 1 inch in depth.

e. Concrete reinforcements, such as rebar, shall be cut flush with the slab.

C. Construction Utilities:

1. Prior to mobilization, the Contractor shall conduct a physical survey to verify that all utilities are capped and/or controlled to the Contractor's satisfaction.

2. The Contractor shall determine if the capacities that can be provided by Fluor Fernald are adequate for their needs; if not, the Contractor shall notify Fluor Fernald in writing of needs for evaluation.

3. All electrical appurtenances required for temporary power shall be in accordance with the National Electric Code.

4. Temporary heating or cooling, if needed, shall be provided by the Contractor. Ventilation for fuel-fired heaters and adequate clearance to combustible materials, surfaces, and furnishings shall be provided according to manufacturer's recommendations. Use of LPG gas-fired heaters shall be approved by Fluor Fernald. All portable continuous running of gas fired heating systems require 24 hour coverage by the Contractor.

5. The Contractor shall extend construction water from the point source location to support operations or provide portable facilities. Tie-in to water point source shall require a backflow preventor in accordance with the Ohio State Plumbing Code, as referenced in Article 1.4. Installation, maintenance, and inspection of the backflow preventor shall be by a licensed plumber and certified in the State of Ohio as a Backflow Preventor Tester. The individual who provides only the hook-up of a backflow preventor need not be a certified and licensed plumber provided that the hook-up is inspected by a certified and licensed plumber prior to system operation.

   a. The Contractor shall supply, install, and maintain all backflow prevention devices (in accordance with Article 2.1 of this Section), fittings, and valves for point source connections.

      1. The contractor shall provide Fluor Fernald with the backflow prevention device at least two weeks prior to installation for inspection.

      2. Fluor Fernald will test and approve the backflow preventor for contractor installation.

   b. Every 12 months after installation, Fluor Fernald will inspect the assemblies. The Contractor shall coordinate water hook-up with Fluor Fernald. Fluor Fernald will activate hydrants.

c. At project completion, the Contractor shall turn all backflow prevention devices, fittings, and valves over to Fluor Fernald in good working order at no additional costs.

d. Backflow devices shall have freeze protection and be accessible for inspection.

D. Signs and Barriers:

1. The Contractor shall protect manholes, catch basins, valve pits, underground utilities, post indicator valves, power poles and drains, adjacent structures, groundwater monitoring wells, existing exterior benchmarks, and survey monuments from damage. If any signage or fencing is displaced or lost, the Contractor shall reinstall at no additional cost to Fluor Fernald.

2. FDF has installed construction zone fencing outlining the construction boundaries. If modifications to the fencing are required, the Contractor shall install per 2.1.C. The Contractor shall post construction safety signs at 50 feet intervals around the defined construction area. Fencing must be supported by posts driven into the ground. The Contractor shall regularly inspect all fences and barriers for integrity in a prompt manner throughout the D&D project and repair as necessary.

3. The fencing described in 3.2.D.2 may serve as both a construction work zone boundary fence and the radiological control fence in outdoor areas. However, the Contractor shall install additional radiological control fencing as required to delineate areas discussed below. The preferred fencing is as per 2.1.C; however, yellow snow fence may be used.

   a. The yellow fencing shall be used to designate the following boundaries:

      - Contamination Area/Controlled Area;
      - High Contamination Area/Contamination Area;
      - Adjacent Contamination Areas controlled for different radionuclides; and/or
      - Any other boundaries between different levels of radiological control.

   b. Existing physical barriers, such as permanent fences or building walls, may serve as part of the radiological boundary where appropriate.

4. Fencing for short-term work, i.e., work within the project construction zone boundary, may be supported with portable stanchions placed at no more than six feet apart. Entry points shall be established such that they may be easily opened and can be held closed. These points shall be large enough to support traffic and/or movement of waste containers. For situations where personnel access is the only need, the Contractor may utilize building doors or overlapping yellow fence that can be tied back and supported by the remaining fence while open (i.e., will not lie on the ground).

5. Permanent Fencing: Upon completion of D&D activities, the Contractor shall install permanent fencing around specific areas as identified on the Civil Demolition Plan drawing. Article 2.1.C of this Section defines the material and placement specifications. An access gate, using the same fence material, shall be installed at one location along the perimeter fencing of the area to allow subsequent access by Fluor Fernald. The gate shall have a latch that can be locked.

E. Potential Use of Existing Overhead Bridge Cranes:

Use of permanent facilities shall be in accordance with the requirements specified in the provisions for Temporary Facilities and Utilities located in Part 6, Section 7. Existing Overhead Bridge Cranes or other existing hoisting devices shall not be allowed without prior approval from the Construction Manager.

F. Gravel Pads for Access and Queuing Areas:

Grading of site shall prevent ponding of water. Use a minimum slope of 1 percent. All grading will direct water toward the site's storm drainage system.

G. Stormwater Control:

Storm water control will be required for activities that could disturb soils or otherwise allow for release of contaminants from stockpiled debris. Storm drainage systems within the construction zone shall be maintained free and clear of debris and sediments by use of control devices, such as staked silt fences, and be maintained throughout the project. Hay/straw bales are not acceptable control devices.

H. Debris Chutes:

1. The Contractor shall ensure that catch platforms, chutes and other means of handling debris are properly isolated by gates or barriers designed and constructed to eliminate impact hazards and to control the flow of material to its final destination.

2. Debris chutes shall meet the requirements of 29 CFR 1926.852.

3. Debris chutes shall be fully enclosed, dust-tight and ventilated.

4. Fluor Fernald may prohibit the use of a debris chute if the radiological contamination levels could result in the uncontrolled generation of airborne radioactivity.

I. Remediation Equipment:

1. Identify any special requirements for storing material or equipment.

2. To minimize the generation of waste products by the Contractor, all equipment requiring periodic oil and filter changes shall have this maintenance performed just prior to arrival on site.

3. Additional requirements for mobilization and demobilization of remediation equipment are listed in Part 8, Section B.12.

J. Ventilation and Containment:

1. If release cleaning for structures is required, as specified in the Radiological Requirements Plan contained in Part 8, Section C 2.0, a vestibule on the entry/exit of the building access prior to the beginning of work shall be installed. The vestibule shall be constructed so as to prevent the escape of airborne contamination. Material used for the construction of vestibules shall be in compliance with Section 15067.

2. Enclose structure and ensure that all holes, gaps, openings in exterior building structure walls and roofs are sealed with duct tape, fiber-reinforced sheeting, plywood or foam material (including where doors or windows are missing) in accordance with Section 15067. Enclosed structures shall allow for emergency exits.

3.3 DEMOBILIZATION AND FINAL PROJECT SITE ACCEPTANCE

A. Demobilization includes the decontamination and removal of all contractor tools, equipment, facilities, materials, and construction zone perimeter fencing.

B. Final project site acceptance shall be conducted by Fluor Fernald, and will consist of verification of completion of all work activities relating to the work scope.

END OF SECTION

SECTION 01516

ASBESTOS ABATEMENT

PART I GENERAL

1.1 SCOPE

This Section specifies the requirements for an asbestos abatement program; methods to be used for removal, movement, and disposition of friable asbestos-containing material (ACM); and other materials contaminated with asbestos. This Section does not cover transite unless panels exhibit significantly deteriorated surfaces where surfaces become friable.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01517 - Removing/Fixing Radiological Contamination
C. Section 07415 - Transite Removal
D. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIALS

A. See Part 7 for the following:

1. Index of Drawings
2. Photographs
3. Drawings
4. Air Filter Device (AFD) Procurement Specification
5. Air Cleaning Filter Procurement Specification
6. Contractor Safe Work Plan Format Requirements
7. HEPA Vacuum Cleaner Requirement
8. HEPA Air Filtration Device Requirement

B. ACM summary information on the project is provided in Part 6, Exhibit F; however, the contractor is responsible for estimating quantities for bid/proposal and regulatory purposes.

1.4 REFERENCES, CODE AND STANDARDS

A. 29 CFR 1910 Occupational Safety and Health Administration - Dept. of Labor (as applicable)
B. 29 CFR 1926 Occupational Safety and Health Administration - Dept. of Labor (as applicable)
C. Ohio Department of Health Asbestos Hazards Abatement Rules Chapter 3701 - 34, OAC (Ohio Department of Health)
D. Ohio Environmental Protection Agency Chapter 3745-20, OAC
E. United States Environmental Protection Agency (U.S. EPA) 40 CFR 61, Subpart M, (NESHAPS)

1.5 SUBMITTALS

The Contractor shall submit to Fluor Fernald the following for approval:

A. An Asbestos Abatement Safe Work Plan, prepared by an Ohio Certified Asbestos Abatement Project Designer, in accordance with Part 7, ACR-002, Contractor Safe Work Plan Format Requirements, and Part 8, Section B.3.3 - Asbestos Abatement Safe Work Plan Requirements and Safety and Health and Training Requirements. Included are the procedures proposed for use in complying with the requirements of this Section.

B. Prior to initiation of ACM work, the Contractor shall submit the following items to Fluor Fernald:

1. Ohio Department of Health/OSHA-required documentation for Asbestos Removal Contractors:

   a. Documentation of training
   b. Medical surveillances
   c. Respirator fit-test
   d. Employee exposure assessments

2. State of Ohio certificates and licenses for the Contractor

3. State of Ohio certification for all personnel as required by law

C. Two (2) weeks or ten (10) working days (minimum) prior to submittal of notification to government agencies, the Contractor shall provide a copy of the notification to Fluor Fernald for concurrence.

D. Product Data: The Contractor shall submit manufacturer's technical information including application instructions for each material proposed for use.

1.6 PROJECT CONDITIONS

1. Transite that has deteriorated to a friable condition shall be considered friable ACM and therefore be removed in accordance with this Section.

2. ACM-containing materials such as floor tile, mastic, woven cloth-covered electric wire, and gaskets may become friable during handling; therefore, such materials shall be removed pursuant to the requirements of this Section.

PART II PRODUCTS

2.1 MATERIAL

A. Polyethylene sheeting: Fire retardant, clear, and have a minimum of 6 mils thickness as manufactured by Blueridge Films, Inc. or equal.

B. Polyethylene bags: clear and have a minimum of 6 mils thickness.
C. Outside containments: Clear, reinforced and have a minimum of 6 mils thickness as manufactured by Blueridge Films, Inc. or equal.

D. Surfactants (wetting agents), encapsulants, and lockdowns shall be mixed in a proportion specified by the manufacturer, applied according to manufacturer's specifications (including temperature), and contain a colorant to make coverage areas readily apparent. Products that have been acceptable to Fluor Fernald include those listed below. Equivalent or better products may be acceptable and shall be approved by Fluor Fernald.

1. Surfactants:

   a. CP-225 CHIL-SORB by Childers
   b. Approved equal

2. Encapsulants/Lockdowns:

   a. Control – Grayling Ind.
   b. Foster 32-60 – Foster Products Corp.
   c. Fiberset PM – Fiberlock Technologies
   d. ACC 22-P – American Coatings Corp.
   e. Serpiloc
   f. Approved equal

3. Bridging Encapsulants:

   a. Asbestos Binding Compound – Fiberlock Technologies
   b. Leadlock – Global Encasement Systems
   c. Foster 32-80, Foster Products Corp.
   d. Approved equal

E. Materials shall be in original, new, and unopened containers bearing manufacturer's name, label, and the following information:

1. Name or title of material
2. Manufacturer's stock number and date of manufacture
3. Manufacturer's name
4. Thinning instructions
5. Application instructions

2.2 EQUIPMENT

A. Negative pressure Air Filtration Device (AFD) equipped with HEPA filtration and operated in accordance with the requirements of 29 CFR 1926.1101.

B. All containments used for asbestos abatement operations shall be capable of maintaining a minimum of 0.02 inches water gauge (w.g.) of negative pressure, as recorded by manometric measurements. The ventilation system for this type of operation shall provide a minimum of four air changes per hour.

C. For mini-enclosures and glovebags, a HEPA filtered vacuum system may be substituted to

provide negative air pressure. Ensure that the HEPA filtered vacuum system meets the four air changes per hour capacity required for mini-containments.

D. HEPA filtered vacuum.

E. The Contractor shall supply a Portable Asbestos Hygiene Facility (see Figure 1). The size of this facility shall be large enough to handle the asbestos workers during peak manpower periods. The facility shall meet the requirements for a hygiene facility specified by OSHA 29 CFR 1926.1101, DOE and site radiological control requirements. It shall be constructed using fire retardant material. When exiting a radiological contaminated area, whole body monitoring is required prior to showering.

The requirements for hygiene facility compliance with radiological controls are as follows:

1. The asbestos hygiene facility shall be located adjacent to the radiological contamination area. The size of this facility is based on the number of employees that will be using the facility; this determines the number of showers required. The minimum number of showers required (based on number of workers) is located in 29 CFR 1910.141, Sanitation. It is recommended that the Contractor provide more showers than are legally required so the workers can exit the work area in a timely manner.

2. The doffing room shall be divided into two areas, the Equipment Area and the Buffer Area, and the equipment area shall be maintained under negative pressure relative to the rest of the asbestos hygiene facility.

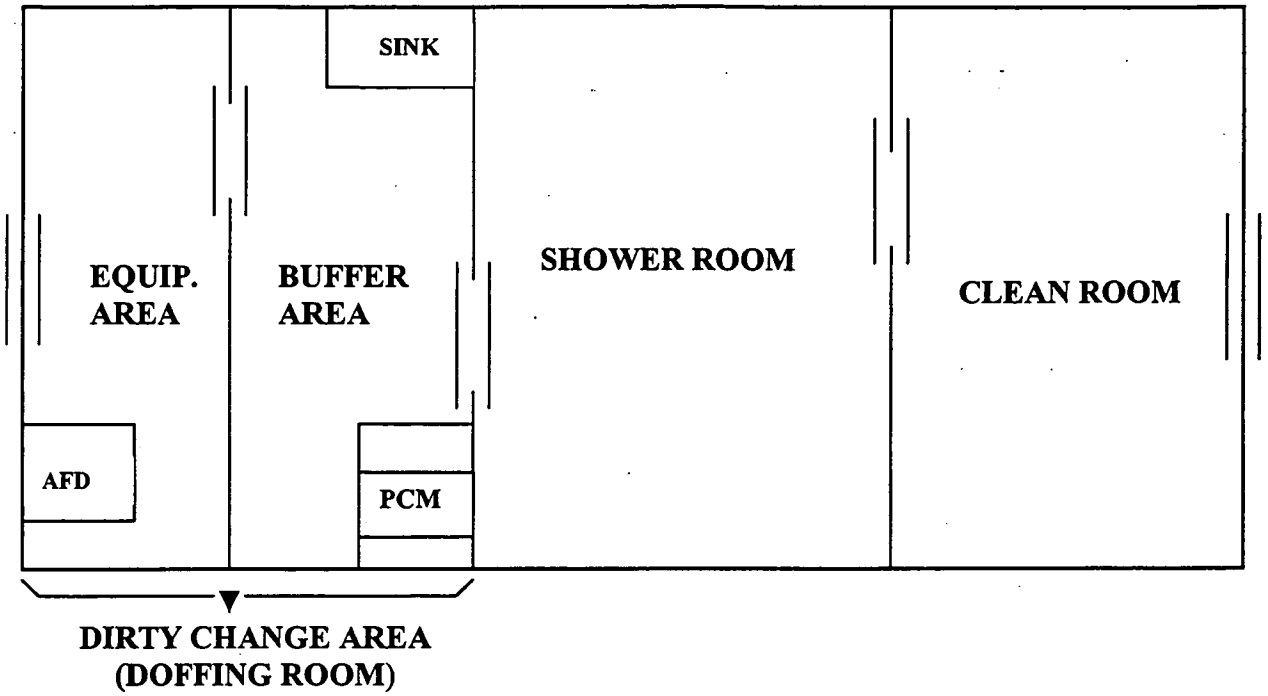
3. The Equipment Area will be considered a radiological contaminated area. The air in the dirty change area shall be exhausted through a HEPA filtered air filtration device to assist in cleaning the air in the change area. The air change requirement in the dirty change area is 4 air changes per hour at a minimum of -0.02 inches of water pressure differential, relative to outside pressure. The dirty change area shall be large enough to accommodate four containers for segregation of asbestos contaminated waste and personal protective equipment, and an Air Filtering Device. The dirty change area shall have hooks or shelves for storage of hardhats and toolbelts.

4. A step-off pad will be established in the airlock/doorway separating the radiological contaminated area from the radiological controlled area creating a boundary for control of asbestos contaminated items and radiological contamination. The second area in the doffing room (Buffer Area) will be a radiologically controlled area, which should be maintained free of any asbestos or radiological contamination. The Contractor shall ensure that an electrical outlet exists for the PCM. The minimum power requirements for the PCM are 120 volts AC and 1 amp. The PCM minimally requires an area of 5.5 feet by 4 feet by 8 feet in height. The buffer area shall also contain a sink with a spray attachment for the rinsing of respirators prior to doffing.

5. Water shall be collected from the shower room and the buffer area sink, and be filtered down to 5 microns for asbestos fibers prior to discharge to the site wastewater treatment facility.

6. The clean room shall contain benches, lockers for storage of workers' personal clothing, and shelves for storage of personal protective equipment.

FIGURE 1 ASBESTOS HYGIENE FACILITY (EXAMPLE)



PART III EXECUTION

3.1 PREPARATION

A. Regulatory:

The Contractor shall:

1. Notify the Ohio Department of Health (ODOH) ten (10) working days or two (2) weeks prior to start of ACM removal; coordinate with Fluor Fernald prior to submitting ODOH notification (Note: Fluor Fernald will be responsible for notifying the EPAs and all other applicable governmental agencies before start of work).
2. Comply with work practices and procedures set forth in all applicable Federal, State, and local codes, regulations, and standards.
3. Obtain certifications and licenses.
4. Take precautions to prevent creation of friable ACM during handling.

B. Work Area (for containment work):

1. Isolate the work area
2. Establish hygiene facility/equipment room
3. Install primary containment barriers
4. Cover the floor with two layers of 6 mil polyethylene sheeting
5. Size plastic to minimize seams
6. Cover walls and any contained work area with 6 mil polyethylene sheeting

7. Provide load out facility and emergency exits
8. Post the required asbestos hazard warning signs

C. Work Area (for glove-bag/wrap and cut removal):

1. Isolate work area
2. Establish hygiene facility/equipment room
3. Install work area barriers
4. Cover the floor with one layer of 6 mil polyethylene sheeting
5. Post the required asbestos hazard warning signs

D. Work Area (floor tile removal)

1. Isolate work area
2. Establish hygiene facility/equipment room
3. Install critical barriers
4. Post the required asbestos hazard warning signs

3.2 APPLICATION

A. Wet methods and engineering controls/containment shall be utilized throughout abatement activities to prevent employee exposure as well as the release of visible asbestos emissions to the environment.

B. Removal procedures:

1. Wet all ACM to be removed with amended water solution.

2. Saturated ACM shall be removed in manageable sections and maintained wet until placed into disposal containers or sealed in 2 layers of clear 6-mil plastic.

3. Material removed from building structures or components shall not be dropped or thrown to the floor or into disposal containers.

4. Large components removed intact may be wrapped in two layers of clear 6-mil polyethylene sheeting, secured with tape and properly labeled. All piping (less than 12 inches in diameter) insulated with ACM may be removed with ACM in place. Wrap the piping with two layers of clear 6-mil polyethylene sheeting. Remove ACM from area of cut utilizing glovebags as containment. Exposed ACM ends shall be capped and the pipe shall be wrapped in clear 6-mil polyethylene sheeting. Containerize according to the Waste Management Plan, located in Part 6, Exhibit E.

5. Asbestos-containing material with sharp-edged components (e.g., nails, screws, metal lath, tin sheeting) which will tear the polyethylene bags and sheeting shall be placed into Contractor-supplied, properly labeled containers, and subsequently bagged for disposal. These containers are required to be "see-through", so Fluor Fernald personnel can visually inspect contents. When bagging floor tile, ensure that waste bags are not overloaded such that the weight makes them difficult to handle.

6. After completion of all stripping work, surfaces from which ACM has been removed shall be wet-brushed and sponged or cleaned by some equivalent method to remove all visible ACM residue.

C. Cleanup procedures:

1. Remove and containerize all visible accumulations of ACM and asbestos-contaminated material.

2. HEPA vacuum and wet clean all surfaces in the work area.

3. For containment work, after cleaning the work area, wait at least 24 hours to allow fibers to settle, and HEPA vacuum and wet clean objects and surfaces in the work area again.

4. Inspect the work area for visible residue.

5. The work area shall be cleaned until visual inspection reveals no evidence of any ACM as determined by Fluor Fernald.

6. Apply lockdown to all surfaces in the work area.

7. For containment work, aggressive clearance testing shall be performed by Fluor Fernald and the acceptable limit shall be <0.01 f/cc by Phase Contrast Microscopy.

8. Upon successful completion of aggressive clearance testing by Fluor Fernald, the Contractor shall remove containment and dispose of it as ACM waste per Part 6, Exhibit E. If clearance sampling is unacceptable, repeat Section 3.2.C.

9. Wastewater associated with asbestos abatement shall be handled in accordance with Article 3.1.E of Section 01517.

D. Floor tile, mastic, woven cloth-covered electric wire, built-up roofing, and gaskets may become friable during removal; therefore, the Contractor shall remove such material in a manner that does not allow it to become friable while also adhering to all applicable government, state, and local asbestos abatement regulations.

E. All ACM material shall be dispositioned in accordance with the MSCC located in Part 6, Exhibit E.

3.3 QUALITY ASSURANCE

The Contractor and Fluor Fernald shall inspect removal methods and filled containers to ensure compliance with the requirements of this Section.

END OF SECTION

SECTION 01517

REMOVING/FIXING RADIOLOGICAL CONTAMINATION

PART I GENERAL

1.1 SCOPE

A. The scope of this Section is decontamination of dismantled equipment or the structure to a level that permits removal of the debris from a local containment enclosure, or permits opening the building to the environment. This Section includes, but is not limited to:

1. Decontaminating low-level uranium and thorium contaminated equipment, materials, structural members, and/or buildings,
2. Decontaminating enriched uranium contaminated equipment and materials,
3. Decontaminating RCRA contaminated equipment and materials,
4. Controlling and moving effluent produced during the removal and/or fixing of contamination, and
5. Fixing contamination.

B. Project Conditions

1. Process material (i.e., green salt, yellow cake, black oxide) in excess of films and precipitates has been removed from process equipment to the maximum extent practical by Fluor Fernald prior to D&D activities. If process material in excess of films and precipitates is found during D&D activities, Fluor Fernald shall be notified prior to disturbing the condition.

2. See Section 01120 for requirements to establish an inspection area.

3. Removing/fixing radiological contamination on multiple layers of transite roof panels is addressed in this Section; handling of transite panels is addressed in Section 07415.

4. Hazardous Waste Management Units (HWMUs) shall be decontaminated pursuant to the specific conditions included in Part 6, Section 3.4.

C. Fluor Fernald will perform all effluent sampling, analysis, and transportation.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 03315 - Concrete/Masonry Removal
C. Section 05126 - Structural Steel Dismantlement
D. Section 07415 - Transite Removal
E. Section 15065 - Equipment/System Dismantlement
F. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIALS

See Part 7 for the following:

A. Index of Drawings
B. Photographs
C. Drawings
D. Safe Work Plan Requirements

1.4 REFERENCES, CODES, AND STANDARDS

A. United States Department of Energy (DOE):

1. DOE Order 5400.5 Radiation Protection of the Public and the Environment
2. DOE/EH-0256T Radiological Control Manual, April 1994
3. DOE/EM-0142P Decommissioning Handbook, Chapter. 9, Mar. 1994

B. 10CFR835 Occupation Radiation Protection

1.5 SUBMITTALS

A. Before start of decontamination work, the Contractor shall submit for approval a Safe Work Plan in accordance with Part 7, ACR-002, Contractor Safe Work Plan Format Requirements, describing the system design for removing and/or fixing contamination. This includes the methods and equipment for: removing contamination; fixing contamination; and controlling, and filtering effluent produced during removal and/or fixing activities.

B. Product Data: The Contractor shall submit manufacturer's technical information including the material to be used, its intended use, and its application instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

The Contractor shall deliver materials in original, new and unopened containers bearing the manufacturer's name, label, and the following information:

A. Name or title of material
B. Manufacturer's stock number and date of manufacture
C. Manufacturer's Name
D. Application instructions
E. Material Safety Data Sheets

PART II PRODUCTS

2.1 CONTRACTOR'S EQUIPMENT

A. The Contractor shall supply all equipment required to remove and/or fix contamination.

B. The Contractor shall supply all equipment required to control, filter, and move effluent produced during removal and/or encapsulation of contaminants.

1. The filter system shall consist of a 20 micron pre-filter and a 5 micron filter to remove entrained particulate prior to effluent discharge to tankage.

2. The Contractor shall construct all holding tank systems and secondary containment systems as specified in Articles 3.1.D and 3.1.E.

2.2 MATERIALS

A. Encapsulating coatings: If encapsulating coatings are employed, they shall be Carboline D3358 or approved equal. Manufacturers may include, but are not limited to: Tnemec Series 6 - Tnemec-Cryl, and products by Sherwin-Williams and International Protective Coatings.

B. If non-strippable coatings are employed, they shall include Polymeric Barrier System (Bartlett), or a Fluor Fernald-approved equal.

C. Plastic sheeting: Where encapsulation by clear plastic sheet wrapping is allowed, the wrapping shall be a minimum of 6-mil reinforced fire-retardant polyethylene sheeting.

PART III EXECUTION

3.1 APPLICATION

A. Requirements for managing non-process debris and process debris are described in Section 01120, Articles 3.2.A.1 and 3.2.A.2.

B. Requirements specific to debris decontamination and their removal from a building enclosure or local containment:

1. Prior to removing debris from a building enclosure or local containment, all internal and external surfaces shall be free of gross removable surface contamination, films and precipitates. Acceptable methods for removing surface contamination, films, and precipitates include but are not limited to: hydro-blasting with a minimum of 1,000 psi, steam-cleaning, sponge blasting, CO_2 blasting, or other methods approved by Fluor Fernald.

2. Debris and equipment/systems shall be managed in accordance with Section 01120, Article 3.2.

3. Thorium-contaminated items or debris cannot be released from the building enclosure or local containment areas unless they meet thorium-specific release limits (as referenced in Part 8, Section C 2.4.3). If items do not meet release limits, then they shall be either:

- decontaminated, wrapped and brought directly to containers labeled as containing thorium-contaminated items (not for re-packaging), or
- containerized prior to removal from the enclosure as determined by Fluor Fernald.

In all cases where a thorium-contaminated area is separated from a uranium-contaminated area by a wall, the Contractor shall anticipate that the interstitial spaces in the wall will be thorium-contaminated.

4. Equipment/systems identified by Fluor Fernald as being contaminated with uranium with an enrichment over 2 percent will be removed, wrapped, and containerized by the Contractor for disposition as contaminated material without decontamination (such items shall be identified in the MSCC, Part 6, Exhibit E). These items shall not be allowed to get wet.

C. Requirements Specific to Decontamination of Structures and Outdoor Process Tanks/Pipes:

1. Structures:

Prior to opening contaminated structures to the environment (by removing the exterior siding or structural dismantlement), the Contractor shall remove and/or fix radiological contamination on all surfaces within the facility until the detected radioactivity levels are below release criteria identified in Part 8, Section C 2.4.3. Fluor Fernald will perform a radiological release survey to ensure the radioactivity criteria are met.

2. Transite Roof and Wall Panels:

Exterior panels shall be removed in a manner that minimizes the possibility of loose contamination becoming airborne (visible) when the panel is removed. A HEPA vacuum shall be used to remove any loose contamination which may be exposed when the exterior panel is removed (e.g., the under side of the outer panel and the upper surface of the lower roof panel). After the roof or wall panels have been vacuumed, all newly exposed surfaces shall be encapsulated to fix any contamination that remains. Vacuumed residues shall be handled as Debris Category J, in accordance with Part 6, Exhibit E (Debris Category J).

3. Outdoor Process Tanks and Pipe:

a. Prior to demolition of outdoor process (or suspect process) tanks, all surfaces (interior and exterior) shall be decontaminated to meet the radiological release criteria for outdoor process tanks contained in Part 7. If outdoor tanks do not meet the release criteria in Section 01519, they shall be demolished within a containment, either constructed or existing, in accordance with Section 15067 unless one of the following methods are implemented:

1. Encapsulate and mechanically cut (e.g., shear, saw, etc.):

Prior to tank demolition, the interior of the tank shall be empty and fully encapsulated. During tank demolition, the work area shall be misted with water to minimize release of airborne contamination.

2. Torch or other "hot cutting" methods:

The Contractor shall propose methods that minimize "hot cutting" (e.g., oxy/gas and oxy/acetylene torch cutting). If approved by Fluor Fernald, "hot cutting" of surfaces that exceed 25,000 dpm/100cm^2 beta-gamma total contamination or are thorium contaminated shall be performed within containment per Section 15067.

Hot cutting of tank surfaces may be considered by Fluor Fernald as a proposed method of dismantlement for tanks and pipe located outside of containment, provided that:

- HEPA filtered ventilation is maintained, and/or
- point-of-cut ventilation can be provided such that fugitive emissions are captured and project boundary airborne radioactivity levels are maintained according to limits specified in Part 8, Section C 2.4.2.

The ventilation/containment requirements of Section 15067 apply.

3. Hot cutting may be performed on contaminated surfaces less than 25,000 dpm/100cm^2 beta-gamma total contamination with local HEPA ventilation. (Note: this clause applies only to uranium-contaminated outdoor process tanks and pipe.)

b. Internal surfaces of process piping are assumed to exceed both the removable and total contamination limits for uncontained demolition. However, removal and transport to the debris decontamination area of process piping that is located outside of the building structures may be performed outside of containment if the methods of cutting inherently minimize fugitive emissions.

4. Acceptable methods for removing surface contamination on structures and outdoor tanks/pipes include, but are not limited to: hydro-blasting with a minimum of 1,000 psi, steam-cleaning, sponge blasting, CO_2 blasting, or other Fluor Fernald-approved method.

5. Encapsulation of surfaces is required if the release criteria specified in Part 8, Section C 2.4.3 have not been met and decontamination has been attempted at least once. Fluor Fernald shall be notified prior to encapsulation to allow for inspection for visible process residues. Acceptable methods for encapsulating contamination, which is not readily removed by the above-identified methods include, but are not limited to, encapsulating coatings, non-strippable coatings as referenced in Article 2.2, and wrapping in reinforced sheeting and sealed prior to movement to prevent migration of potential contaminants. The Contractor shall take precautions to prevent the breaching of encapsulating coatings applied to equipment or structure. If an encapsulating coating is breached after application, during activities leading up to but not including structural demolition, the Contractor must take action to reseal the breached areas.

6. If stabilizer or non-strippable coatings are used as fixatives, they will meet the requirements of this specification (see Article 2.2).

7. Down posting of thorium contaminated areas requires that contamination levels meet the thorium-specific release limits of Section 01519.

8. If hydro-blasting or steam cleaning is employed, the Contractor shall:

a. Seal floor cracks/seams, openings, and building cracks using sealants to protect the environment from migration of contaminants.

b. Contain effluents to the building interior/outdoor tank containment system and subsequently to collection systems.

9. The Contractor may utilize any existing building floor sumps for effluent collection, as long as system capacity for sludge and/or liquid does not exceed limitations determined from enriched levels as stated in Article 3.1.D.

10. The Contractor shall take precautions to prevent the spread of contamination from other more-contaminated areas of the facility to less contaminated areas.

11. Acceptable methods for decontamination of Hazardous Waste management Units (HWMUs) to meet RCRA/CERCLA closure Ohio Environmental Protection Agency guidance are hydro-blasting or steam cleaning with a minimum of 1,000 psi, unless otherwise stated in Part 6, Section 3.4 for that particular component.

D. Rinseate/Effluent Handling:

1. The Contractor shall collect all waste and effluent generated while removing and/or fixing contamination. Effluent and sludge shall be containerized in accordance with the requirements listed in Articles 3.1.D and 3.1.E.

2. For rinseate/effluent generated from decontamination of a structure containing uranium and/or thorium contamination, or from decontamination washwater generated from contact with outdoor pads with process tanks and pipes:

   - The Contractor shall supply all effluent collection equipment (e.g., pumps, secondary containment, tanks).

   - Effluent tanks require secondary containment with a minimum of 10 percent of the combined capacity of the effluent tanks housed and not less than the volume of one full tank, whichever is greater.

3. Enriched Equipment/Material (if listed in Part 6, Section 3.0): In addition to effluent tanks, the washing of enriched equipment/material requires the use of smaller tanks to permit safe quantities to be maintained (for nuclear criticality safety purposes). There are no mass restrictions for rinseates or sludges with a U-235 enrichment less than 1 percent.

   a. For enrichments greater than 1 percent and less than or equal to 1.25 percent, the Contractor shall supply effluent storage tanks of no greater than 175 gallon capacity, in numbers sufficient to permit 15 calendar days storage without impact to Contractor operations.

   b. For enrichments greater than 1.25 percent and less than or equal to 2 percent (no equipment/material over 2 percent enrichment is to be decontaminated, see Article 3.1.B.3), the Contractor shall supply effluent storage tanks no greater than 30 gallon capacity, in numbers sufficient to permit 15 calendar days storage without impact to Contractor operations.

   c. The Contractor shall store sludge, resulting from enriched equipment/material cleaning, in 55-gallon drums. Filled drums may be stored no closer than 2 feet apart.

   d. Should equipment be discovered with uranium enrichment greater than 1 percent then equipment/material washing operations and effluents shall be maintained separate,

based on enrichment and type, by the following: 1) uranium less than or equal to 1 percent enrichment; 2) uranium greater to 1 percent enrichment but less than or equal to 1.25 percent enrichment; 3) uranium greater than 1.25 percent enrichment but less than or equal to 2 percent enrichment; and 4) thorium. Wash systems can be maintained separate by campaign or by physically separate systems.

4. The Contractor shall devise a system that uniquely identifies each tank of generated wastewater. Prior to filling, a unique number shall be determined for the tank contents and this number shall be identified in the field, on the sampling plan, and on the wastewater discharge request.

5. Approval to commingle the effluents and sludges is required from Fluor Fernald. Approval to transfer effluents to large effluent tanks is required from Fluor Fernald.

6. The Contractor shall notify Fluor Fernald when the effluent tanks are filled. Fluor Fernald will sample, empty the tanks, and transport the effluent to the FEMP Advanced Wastewater Treatment Facility. Upon testing and approval of laboratory analysis from Fluor Fernald, Fluor Fernald shall empty the contents of the effluent storage tanks and transport the effluent to the FEMP AWWT. The Contractor shall keep additional tanks in reserve, as the tank(s) will be out of commission until the sample results are received and water is dispositioned. The Contractor shall allow six weeks for this process.

7. Effluent generated from the decontamination and/or rinsing of HWMUs shall be collected and temporarily stored separately from general, non-HWMU effluent. Fluor Fernald will notify the Contractor when commingling of HWMU and non-HWMU effluent may occur.
8. The Contractor shall supply storage tanks and secondary containment with a minimum liquid effluent storage capacity to allow 20 days storage without impacting the Contractor operations.

9. The Advanced Wastewater Treatment Facility (AWWT) of the Fernald Environmental Management Project (FEMP) is not designed to process heavy oils, greases, or other stratified organic layers. Should such contaminates exist, Fluor Fernald shall be responsible for their removal from the wastewater prior to delivery to the AWWT. The contaminants shall be containerized and delivered to Fluor Fernald personnel, who will be responsible for disposal.

E. Sludge Drumming

Sludge limits for individual drums from enriched cleaning operations are restricted to 104 grams of U-235 per 55-gallon drum. (Note: The weight is limited due to Department of Transportation and/or the maximum allowable weight of the drum.)

END OF SECTION

SECTION 01519

DECONTAMINATION OF CONTRACTOR PROVIDED TOOLS, EQUIPMENT, AND MATERIAL

PART I GENERAL

1.1 SCOPE

A. Preventative measures for and decontamination of Contractor provided tools, equipment (including vehicles), and material to a level that permits removal from an enclosure/work zone, restricted reuse, or unrestricted release. This Section includes, but is not limited to:

1. Preventative measures/waste minimization,
2. Decontamination area requirements,
3. Methods of decontamination activities,
4. Control of effluent and waste management activities, and
5. Relocation, reuse, and release activities for tools, equipment, and material.

B. Project Conditions and Requirements:

1. All facilities, unless expressly noted in Part 6 Section 3.0, shall be considered contaminated with radioactive material.

2. All items are considered potentially contaminated if they have been used or stored in Controlled Areas that could contain unconfined radioactive material.

3. The Contractor shall establish a holding/inspection area to allow Fluor Fernald to perform tool and equipment radiological surveying.

   a. The holding/inspection area shall be arranged such that routine access is prevented by means of fencing and/or barrier tape with appropriate posting to identify that the items contained are being held for survey, and such that the area is off limits to individuals other than Fluor Fernald/Contractor radiological survey personnel.

   b. Only those items which meet the requirements (as described in this Section) for leaving the work zone should enter the inspection area.

4. The Contractor should assume that extensive dismantlement and an aggressive decontamination effort will be required to achieve unrestricted release of items that have come in contact with radioactive material or were used in contamination areas. Based on past experience using the best available technologies, decontamination and survey access requirements to meet the release criteria may be difficult to achieve.

5. Hand and portable tools used in controlled areas for performance of the subcontract are to be considered expendable as specified in Part 4 - Special Terms and Conditions, DISPOSITION OF CONTRACTOR PROVIDED EQUIPMENT, TOOLS, AND MATERIALS THAT HAVE BECOME CONTAMINATED (SC-27).

1.2 RELATED SECTIONS

Work related to this Section shall also be accomplished in accordance with the following Sections:

A. Section 01120 - Debris/Waste Handling Criteria,
B. Section 01517 - Removing/Fixing Radiological Contamination, and
C. Section 15067 - Ventilation and Containment.

1.3 REFERENCE MATERIALS

A. Part 4 – "Special Terms and Conditions, DISPOSITION OF CONTAMINATED TOOLS, EQUIPMENT, AND MATERIALS" (SC-11).
B. Part 6 - Section 1.0, "Scope of Work"
C. Part 7 - ACR-002, "Safe Work Plan Requirements"

1.4 REFERENCES, CODES, AND STANDARDS

A. United States Department of Energy (DOE):

1. DOE Order 5400.5, Radiation Protection of the Public and the Environment
2. DOE/EH-0256T, Radiological Control Manual, April 1994
3. DOE/EM-0142P, Decommissioning Handbook, Chapter. 9, Mar. 1994

B. 10CFR835 - Occupation Radiation Protection

1.5 SUBMITTALS

A. The Contractor must provide Fluor Fernald with a list of all tools, vehicles, equipment and material to be brought onsite which have been used in conjunction with radioactivity in the past including such information as:

1. Previous use of the equipment,
2. Dates of use,
3. Levels of contamination, and
4. Radioisotopes involved.

This list must be submitted as soon as known in advance of bringing the item onsite. Fluor Fernald reserves the right to reject the Contractor's request to bring these items on site. Any tools or equipment contaminated with a radioactive material greater than 1 percent enriched uranium or thorium-232 will be rejected. Thorium contaminated tools and equipment may only be used in a thorium contaminated area.

B. The Contractor shall submit the manufacturer's technical information for any decontamination or contamination controlling agents for compliance review prior to use. This information shall include:

1. Material to be used,
2. Intended use,
3. Application instructions, and
4. MSDS Sheets.

C. Before start of decontamination work, the Contractor shall submit a Safe Work Plan addressing tool and equipment decontamination for compliance review in accordance with Part 7 - ACR-002 ("Contractor Safe Work Plan Format Requirements"), describing the following:

1. Preventative measures to be employed,
2. The design and construction of the decontamination area,
3. The methods to be utilized for decontamination (see Article 3.1.C of this Section),
4. The methods and equipment for controlling and handling effluent and/or secondary waste produced during decontamination activities, and
5. Plans for relocating, reusing, or releasing tools and equipment.

PART II PRODUCTS

2.1 CONTRACTOR PROVIDED TOOLS AND EQUIPMENT

A. The Contractor shall furnish all equipment, tools, and material required to perform the work described in the subcontract except where the contract explicitly states that Fluor Fernald will provide the item.

1. The Contractor shall deliver approved decontamination and contamination control materials in original, new and unopened containers bearing the manufacturer's label, and the following information:

   a. Name or title of material,
   b. Manufacturer's stock number and date of manufacture,
   c. Manufacturer's Name, and
   d. MSDS Sheets.

2. All possible shipping and packing materials will be removed upon receipt at the site prior to entering the controlled area to minimize contaminated waste generation.

B. ALARA

1. For the purposes of meeting the "As Low As Reasonably Achievable" (ALARA) goal for tools, equipment, and materials, it is expected that:

   a. All reasonable efforts are to be used to control residual contamination to the extent that there is no detectable contamination on items that were free of contamination prior to use.

   b. There is no increase in the level of contamination on items that were previously contaminated.

2. The ALARA efforts include, but are not limited to, the following:

   a. Protective measures prior to use of items,
   b. Preventative measures while items are being used, and
   c. Decontamination upon completion of work activities.

3. In support of the ALARA initiative, all Contractor furnished tools, vehicles, equipment, and material may be inspected for radioactive contamination by Fluor Fernald personnel prior to initial entry and upon removal from the radiological controlled area.

PART III EXECUTION

3.1 APPLICATION

A. Prevention of or Minimizing Contamination:

1. The Contractor shall plan and coordinate all work to minimize exposure of equipment, tools, and vehicles to potential radioactive contamination. Equipment shall be located in the area with the least potential for contamination. For example, locate equipment outside the facility with leads, hose lines, etc. wrapped and run to the interior of the facility. Typical examples of equipment where this approach should be used include air compressors, high pressure hydroblasters, welders, generators, oxy-acetylene cylinders, and battery chargers.

2. It is the Contractor's responsibility to evaluate materials, tools and equipment for ease of decontamination and disassembly that may be required for decontamination prior to use on-site. Use of unrestricted release items (i.e., those other than expendable as defined in Part 4, Special Terms And Conditions, SC-27 - "DISPOSITION OF CONTRACTOR PROVIDED EQUIPMENT, TOOLS, AND MATERIALS THAT HAVE BECOME CONTAMINATED") should incorporate appropriate precautions to prevent contamination. These precautions should be implemented prior to and during use. Precautionary measures may include the following, which are expected to be implemented as described in the Safe Work Plan:

   a. Internal combustion equipment subject to contamination should make use of pre-filters or have a separate source of outside air on the intake.

   b. High volume air handling equipment such as blowers, compressors, etc., shall have a filtered inlet to minimize the potential for internal contamination due to build up of low level radioactivity.

   c. The Contractor is prohibited from bringing electrical driven mobile equipment to the FEMP (e.g., fork-lifts) except where only electric driven equipment is available.

   d. Protective sheathing/covers, strippable coatings, or protective caps should be used to minimize the potential for contamination (e.g., coating the buckets of man lifts or other walking/standing surfaces). In addition, all openings on equipment, tools, or vehicles that may permit contamination of inaccessible or difficult to clean areas shall be covered and protected.

3. If encapsulants, sealants and/or coatings are utilized during the project, the Contractor shall be responsible for protecting their tools and equipment from over spray. In addition, the Contractor shall ensure that the encapsulant, sealant and/or coating can be readily removed during decontamination activities, if necessary.

B. Decontamination Area Requirements:

1. Tools and equipment utilized inside an enclosure/building may be decontaminated at an existing indoor debris cleaning location.

2. The following are examples of options for establishing outdoor decontamination areas:

   a. Utilize an existing concrete pad with run-on and run-off controls.

   b. Construct a temporary containment area. Containment must have a bermed perimeter to ensure run-off control. An example of acceptable containment is Herculite with sandbag underlayment perimeters on grade without penetrations. Containment used must be adequate to maintain its integrity.

C. Methods of Decontamination Activities:

1. Where decontamination is needed, the Contractor shall at a minimum use the following as applicable:

   a. Dry cleaning.

   b. Steam cleaning.

   c. High pressure, hot water hydroblasting (may be used in conjunction with abrasive techniques and approved decontamination agents) with a minimum of 1,000 psi and HEPA vacuuming.

2. When selecting a decontamination technique other than those identified in C.1 above, consideration should be given to those technologies that minimize radiological airborne emissions, secondary wastes, and tool or equipment damage.

3. As an alternative to decontamination, replacement of contaminated components shall be in accordance with the requirements of Part 4, Special Terms And Conditions, SC-27 - "DISPOSITION OF CONTRACTOR PROVIDED EQUIPMENT, TOOLS, AND MATERIAL THAT HAVE BECOME CONTAMINATED".

   a. The contaminated components are subject to the cleaning criteria stated in Article 3.2.B.

   b. The contaminated components will be managed and handled per Section 01120 and Part 6, Exhibit E subsequent to the cleaning as directed by Fluor Fernald.

D. Control of Effluent and Waste Management Activities:

1. The Contractor shall control and collect all waste and effluent generated while removing and/or fixing contamination in accordance with the requirements listed in Sections 01120 and 01517.

2. Management of wastes generated during decontamination activities shall be in accordance with Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

E. Relocation, Reuse, and Release of Tools, Equipment, and Material:

1. The Contractor shall perform all decontamination and surveying activities required to verify that the surface contamination limits identified in Table 1 of this Section are not exceeded. Fluor Fernald shall perform final verification surveying.

TABLE 1 SURFACE CONTAMINATION LIMITS[a]

NUCLIDE[f]	FIXED PLUS REMOVABLE		REMOVABLE[b],[e]
	AVERAGE[b],[c]	MAXIMUM[b],[d]	
U-nat, U-235, U-238, and associated decay products, alpha emitters.	5,000 dpm /100 cm^2	15,000 dpm /100 cm^2	1,000 dpm/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5,000 dpm /100 cm^2	15,000 dpm /100 cm^2	1,000 dpm /100 cm^2

(a) Where surface contamination by both alpha and beta-gamma emitting nuclides exists, the limits established for alpha and beta-gamma emitting nuclides should apply independently.

(b) As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

(c) Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each object.

(d) The maximum contamination level applies to an area of not more than 100 cm^2.

(e) The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

(f) The limits presented for transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, and Ac-227 may be adjusted on a case by case basis. Consult with Radiological Compliance when required to apply these limits for unrestricted release.

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2. The Contractor shall provide notice to Fluor Fernald of intent to remove tools and equipment from the contamination area, in accordance with Part 6.

3. Release of tools, equipment, and material from Contamination Areas to the Controlled Area:

   a. If removable contamination in excess of the limits of Table 1 is present on the tools, equipment or material, then:

- The items must remain in the contamination area for decontamination, or
- The item must be contained such that no contaminated surfaces of the item are accessible without disassembling the equipment or breaching the containment.

b. Examples of acceptable containment include plastic wrapping, yellow Herculite wrapping, or a sealable hard container. However, the containment used must be adequate to maintain its integrity considering the weather, conditions of storage, and the methods or conditions of transport.

c. If the removable contamination limits are met but the total (fixed plus removable) limit is exceeded, the item may be labeled or identified as radioactive material by Fluor Fernald and released to the Controlled Area.

4. Unrestricted Release Criteria:

Tools and equipment with detectable radioactivity may be released from the controlled area with the approval of a Fluor Fernald Radiological Control Technician if all of the following have been met:

a. Both removable and total surface contamination (including contamination on and under any coating) are in compliance with the levels given in Table 1 and that the item has been subjected to the ALARA process described in Article 2.1.B.

b. All areas must be readily accessible for survey for residual radioactivity including proper surface counting geometry to allow for accurate quantification. Items with inaccessible areas which are likely to be contaminated but are of such size, construction, or location as to make them inaccessible for survey shall be assumed to exceed the limits for release. The item must either be disassembled to permit an adequate survey to certify that internal contamination is at or below the limits of Table 1, or well documented process knowledge can be applied to provide confidence that contamination in inaccessible areas is not probable. In evaluating the potential for contamination in inaccessible areas, consideration will be given to where the item was used on site and preventative measures taken prior to use, such as coverings, wrappings, air intake filters, etc.

c. Upon approval from Fluor Fernald, the Contractor shall remove the tools, equipment, and/or materials off -site within eight hours.

5. Release to an Off -Site Licensed Facility:

a. If the Contractor possesses the appropriate license to receive, possess, use, and transfer the equipment, tools, material, or vehicles with radioactive contamination, Contractor may elect to remove such items from the site in lieu of decontamination. The responsibility of complying with all state, local and federal regulations during the packaging, shipping, and receipt of the equipment shall be the responsibility of the Contractor. The Contractor shall submit a copy of the license and applicable procedures to Fluor Fernald for compliance review prior to removal of the contaminated equipment. A copy of all Bills of Lading shall be submitted to Fluor Fernald prior to shipment.

b. The Contractor is to provide 24 hours notice to Fluor Fernald prior to shipping radioactive tools, equipment, and/or material.

3.2 UNSUCCESSFUL/IMPRACTICAL CONTRACTOR DECONTAMINATION

A. If Fluor Fernald determines that the Contractor has implemented the requirements of this Section and the Safe Work Plan and the Contractor's decontamination efforts are unsuccessful or decontamination is not practical (as identified below), refer to Part 4 - Special Terms And Conditions, DISPOSITION OF CONTRACTOR PROVIDED EQUIPMENT AND TOOLS THAT HAVE BECOME CONTAMINATED (SC-27) for action to be taken.

B. Decontamination may be considered impractical for non-expendable items that are integral parts of equipment and not readily replaceable such as porous materials (e.g., wood and fiberglass), wire rope, chains, brushes, items with finned surfaces, and similar items where contamination may be embedded within the material configuration matrix. These items may not be released if detectable contamination is identified on the surface.

C. All tools, material, vehicles, and equipment accepted by Fluor Fernald for disposition must have been cleaned to meet the visual inspection requirements defined in Section 01517 and handled as defined in Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

3.3 QUALITY ASSURANCE

All QA requirements required to be met by the Subcontractor are stated in Part 9.

END OF SECTION

SECTION 03315

CONCRETE/MASONRY REMOVAL

PART I GENERAL

1.1 SCOPE

Dismantling of all above-grade concrete and masonry, including:

A. Elevated floor and roof slabs,
B. Cast-in-place walls,
C. Pre-cast concrete components,
D. Foundations, piers, and selected curbs,
E. Concrete encasement (e.g., fireproofing),
F. Interior and exterior masonry,
G. Control of fugitive emissions, and
H. Windows, doors, roof louvers and lead.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01515 – Mobilization, Demobilization, and General Site Requirements
C. Section 01517 – Removing/Fixing Radiological Contamination
D. Section 05126 – Structural Steel Dismantlement
E. Section 15067 – Ventilation and Containment
F. Section 03920 – Concrete Surface Removal

1.3 REFERENCE MATERIALS

See Part 7 for the following:

A. Index of Drawings,
B. Photographs,
C. Drawings, and
D. Contractor Safe Work Plan Format Requirements.

1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. American National Standards Institute (ANSI):

1. ANSI A10.6-90 Safety Requirements for Demolition Operations
2. ANSI A10.8-88 Construction and Demolition Operations – Scaffolding – Safety Requirements

3. ANSI A10.9-83 Construction and Demolition Operations – Concrete and Masonry Work – Safety Requirements

B. National Fire Protection Association (NFPA):

1. NFPA 101A-98 Code for Safety to Life from Fire in Buildings and Structures
2. NFPA 241-93 Standard for Safeguarding Construction, Alteration, and Demolition Operations

C. DOE N441-1 Radiation Protection of the Public and the Environment

D. 10 CRF 835 Occupational Radiation Protection

E. Ohio Administrative Code (OAC): 3745-17-08 Restriction of Emission of Fugitive Dust

1.5 SUBMITTALS

The Contractor shall submit for approval a Concrete/Masonry Removal Safe Work Plan in accordance with Part 7 - ACR-002, Contractor Safe Work Plan Format Requirements, which contains the following information:

A. Detailed method and sequence of dismantlement, including equipment to be used.

B. Methods for control of contaminants, including control of fugitive emissions.

C. Materials, such as non-woven geotextile fabrics and surfactants, to be used.

D. Methods of cutting, including equipment to be used.

E. Calculations. Verification of the structural adequacy of partially dismantled structures, as applicable, shall be stamped by a Professional Engineer registered in the State of Ohio.

F. If dismantlement method requires personnel on the roof, the Contractor shall provide calculations verifying the structural adequacy of the roof to support personnel and equipment. A Professional Engineer registered in the State of Ohio shall stamp these calculations.

G. If controlled explosive methods are proposed to be used on building structures that are constructed of precast columns and roof beams, a detailed Safe Work Plan containing the following information shall be prepared:

1. Methods and materials to be used.

2. Means to protect adjacent structures, equipment, material, and underground utilities from damage, including protection from projectiles.

3. Methods and materials to control fugitive emissions.

4. Contingency plan for detonation failure.

5. Proof of permit, issued by the Bureau of Alcohol, Tobacco and Firearms, to use explosives.

6. Methods and materials to store explosives according to the requirements of 29 CRF 55 Subpart K.

7. Evidence of previous work experience using controlled explosives to take down multi-story structures near other structures within the last 5 years. Provide project locations and contacts for verification.

H. Detailed method and sequence of dismantlement of Technetium-99 contaminated concrete, including equipment to be used, method of removal, equipment/method to control, filter and store waste produced during Tech-99 Concrete removal.

PART II PRODUCTS

2.1 MATERIALS

A. Non-woven Geotextile Fabric:

1. Trevira Spunbond 1120 by Hoechst Celanese Corp.
2. Mirafi 160N by Mirafi, Inc.
3. ADS 600 by Advanced Drainage Systems, Inc.
4. Equal products manufactured by others will be acceptable. Must be approved by Fluor Fernald.

B. Encapsulants/Lockdowns:

1. Control – Grayling Ind.
2. Foster 32-60 – Foster Products Corp.
3. Fiberset PM – Fiberlock Technologies
4. ACC 22-P – American Coatings Corp.
5. Serpiloc
6. Approved equal

C. Bridging Encapsulants:

1. Asbestos Binding Compound – Fiberlock Technologies
2. Leadlock – Global Encasement Systems
3. Foster 32-80, Foster Products Corp.
4. Approved equal

PART III EXECUTIONS

3.1 PREPARATION

A. The Contractor shall ensure that adequate lay down space has been cleared and barriers have been established.

B. The Contractor shall take the following precautions to control fugitive emissions. A wet dust suppression system shall be used. This system will utilize the following:

1. Amended water (with surfactant), and
2. Finely atomized water spray.

C. Concrete and masonry shall have contamination fixed or removed prior to dismantlement and prior to removing local containment or building enclosures, in accordance with Section 01517.

3.2 APPLICATION

A. The Contractor shall prevent damage to adjacent structures, materials, and equipment including underground utilities, during dismantlement activities. Activities to fell concrete structures outside their own footprint require prior approval. Activities to fell concrete structures shall maintain the integrity of porous surfaces to the extent practical to minimize dispersal of debris. If concrete dust is generated as a result of removal operations (due to crumbling, etc.), dust suppression techniques must be employed during demolition and, if necessary, during transportation.

B. Removal of Above-Grade Concrete/Masonry:

Any above-grade concrete/masonry remaining intact following structural dismantlement shall be removed down to grade-level except for poured concrete structures that are imbedded in soil (e.g., raised slabs, curbs on slabs, foundations, concrete tank saddles), which shall remain in place.

C. Removal of At-Grade Concrete/Masonry:

1. Concrete slabs, pedestals, columns, miscellaneous foundation piers, walls, and curbs shall be sealed and may remain intact during and after structural dismantlement.

2. Cut all reinforcing (e.g., rebar) and anchors flush with base slab for areas designed on the Civil Demolition Plan for potential debris stockpiling. For all other areas, reinforcements and anchors need only be cut down to within one inch of the base slab.

D. Cutting:

1. All material shall be reduced in size as required for containerization in accordance with Section 01120 and the Waste Management Plan (WMP) located in Part 6, Exhibit E.

2. Embedded steel reinforcing is considered part of concrete. Reinforcing bar/mesh shall be cut to less than 1 ft. from concrete mass.

3. Because of contamination levels, some concrete may require local containment for cutting activities in accordance with Section 15067. Any currently known areas

requiring local containment are identified in Part 6, Section 3.0; however, new or additional areas may be identified during dismantlement activities.

E. Explosives:

1. Interior non-load bearing masonry walls shall be removed using non-explosive methods prior to opening the shell of the structure. For interior poured concrete walls, the Contractor shall have the option to leave them in place during structural dismantlement provided that facility release criteria are met prior to structural dismantlement and the method of dismantlement in the Concrete/Masonry Removal Safe Work Plan is approved by Fluor Fernald personnel.

2. Any bituminous roofs felled by explosives are to be dropped in a single unit and impact the ground in a horizontal plane.

3.3 SPECIAL INSTRUCTIONS

The following special instructions apply to concrete/masonry removal:

A. Windows and Doors

1. The Contractor shall remove all windows in one piece and place them in appropriate containers.

2. The Contractor shall remove all doors (wood and/or steel) and place them in appropriate containers.

B. Lead Materials

1. The Contractor shall segregate all lead materials (e.g., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 and the WMP located in Part 6.

2. Prior to torch cutting on a surface coated with a lead-based paint, an eight-inch strip of paint shall be removed at the area of the cut (e.g., 4 inches on each side of cut).

3. The Contractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

C. Wall and Roof Louvers

The Contractor shall remove louvers and roof vents during exterior concrete/masonry removal and place in appropriate containers.

END OF SECTION

SECTION 03920

CONCRETE SURFACE REMOVAL

PART I GENERAL

1.1 SCOPE

This Section defines the work related to the removal of a surface layer from the existing concrete pads utilizing surface removal technologies. Principals included in this Section are:

A. Removing surface layer,
B. Controlling and transporting waste produced during the removal of concrete,
C. Controlling the spread of radiological contamination in the operating area, and
D. Equipment types and usage.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01517 - Removing/Fixing Radiological Contamination
C. Section 15067 - Ventilation and Containment
D. Section 01519 - Decontamination of Contractor Provided Tools, Equipment, and Materials

1.3 REFERENCE MATERIALS

A. See Part 7 for the following:

1. Index of Drawings,
2. Photographs, and
3. Existing Drawings.

B. See Part 8 – Section C 2.0 for the Radiological Requirements.

1.4 REFERENCES, CODES, AND STANDARDS

See General Per Section 01010.

1.5 SUBMITTALS

A. Before start of concrete surface removal work, the Contractor shall submit for approval a work plan describing the system design for removing concrete. The work plan shall describe methods and equipment for removing concrete, including equipment used for controlling, filtering, and transporting waste generated during removal activities. The work plan shall also describe methods and equipment used to control the generation and spread of contamination.

B. Product Data: The Contractor shall submit manufacturer's technical information on all materials to be used, including their intended use and application instructions.

C. See Part 6, Section 11.0 for additional submittal requirements.

1.6 QUALITY ASSURANCE

Prior to commencement of work, the Contractor shall demonstrate the methods for removing concrete on a sample area of a concrete floor selected by Fluor Fernald.

1.7 PROJECT CONDITIONS

A. Radiological contamination has been detected on concrete pads, as identified in Part 6, Section 3.1.6. The Contractor is to remove surface layers of concrete in the locations and to the depth specified. This may require concrete removal adjacent to curbs and foundations.

B. See referenced drawings in Part 7, Section 4.0 for work area and local underground utilities.

PART II PRODUCTS

2.1 MANUFACTURERS/EQUIPMENT

A. The Contractor shall supply a system with all equipment required to remove concrete, including equipment to control, filter, and transport waste produced during concrete removal.

B. The concrete removal system (equipment) shall include, but not be limited to, the following features:

1. Integral vacuum system with pre- and HEPA filters.
2. Controlled, dustless process with personnel exposure below DAC limits as defined in Part 8.
3. Simultaneous collection of waste in 55-gallon drums.
4. No use of water where technetium-99 contamination is of concern.
5. Equipment shall be portable.
6. Consideration shall be used to select equipment that can be easily decontaminated for free release after use. For details on releasing tools and equipment, refer to Section 01519.
7. Equipment shall implement waste management technology that minimizes secondary waste.
8. Vacuum design shall allow operator to fill, seal, remove, and replace the waste drum under negative pressure vacuum conditions/enclosures.

C. Fluor Fernald will provide standard 55-gallon drums for collection of waste. The Contractor shall provide all replacement filters.

D. Vendor shall provide method(s) for concrete removal adjacent to areas such as curbs and around foundations.

E. Erection of any necessary local containment shall be defined by the vendor in accordance with the requirements of Section 15067.

PART III EXECUTION

3.1 APPLICATION

A. All concrete removal activities shall be performed in accordance with 10 CFR 835.

B. All work is to be performed according to Fluor Fernald's health and safety requirements. Personnel in the controlled area shall be required to wear personal protective equipment as detailed in the health and safety matrix.

C. The Contractor shall control dust and debris generated while removing concrete. Fluor Fernald shall monitor the area for airborne contamination. Contractor shall be required to make changes to operating methods and equipment if unacceptable levels of airborne contamination are found in the operating area.

D. The Contractor shall collect all waste generated while removing concrete. Waste and effluent shall be packaged in accordance with the requirements in the Waste Management Plan, located in Part 6, Exhibit E.

E. Once the concrete has been removed, the Contractor shall take precautions to prevent the further spread of radiological contamination to the area.

F. The Contractor shall not remove more than one-half (½) inch than is required.

3.2 QUALITY ASSURANCE

The Contractor and Fluor Fernald shall verify that the removal depths indicated in Part 6, Section 3.0 are met. The removal depths are the minimum requirements for concrete removal. Acceptable performance is achieved when the minimum removal has occurred over the work area specified.

END OF SECTION

SECTION 05125

NEW STRUCTURAL STEEL/METALS

PART I GENERAL

1.1 SCOPE

Design, fabrication, and installation of miscellaneous metal items for protective barriers, lifting assemblies, rigging, and temporary bracing and supports.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 05126 - Structural Steel Dismantlement

1.3 REFERENCE MATERIALS

See Part 7 for the following:

A. Index of Drawings,
B. Photographs, and
C. Drawings.

1.4 REFERENCES, CODES, AND STANDARDS

A. American Society for Testing and Materials (ASTM):

1.	ASTM A36-94	Standard Specification for Carbon Structural Steel
2.	ASTM A307-94	Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
3.	ASTM A325-94	Standard Specification for Bolts, Structural Steel, Heat Treated, 120/105 KSL Minimum Tensile Strength

B. American Welding Society (AWS):

1.	ANSI/AWS A2.4-93	Standard Symbols for Welding, Brazing, and Nondestructive Examination
2.	ANSI/AWS D1.1-96	Structural Welding Code, Steel
3.	ANSI/AWS D1.2-90	Structural Welding Code, Aluminum
4.	ANSI/AWS D1.3-89	Structural Welding Code, Sheet Steel

C. American Institute of Steel Construction (AISC):

1.	AISC	Manual of Steel Construction - Allowable Stress Design (ASD), 9th Edition

2. AISC Manual of Steel Construction - Load and Resistance Factor Design (LRFD), 2nd Edition

D. American National Standards Institute (ANSI):

ANSI A10.13-89 Construction and Demolition Operations - Steel Erection - Safety Requirements

1.5 SUBMITTALS

A. The Contractor shall submit the following for conformance review by Fluor Fernald:

1. Calculations: Indicate design method, assumptions, loads, member forces, allowable stresses, and connection designs.

2. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

3. Indicate welded connections using standard ANSI/AWS A2.4 welding symbols. Indicate net weld lengths. Submit copies of welder's certifications with shop drawings.

4. A plan for conducting and documenting field quality testing and inspection including test methods and reports required under Field Quality Assurance.

5. Provide Material Safety Data Sheets for primer and finish coatings to be applied to new structural steel, and for welding materials.

6. Contractor's AWS Welding Program for approval.

7. Mill Test Reports for structural steel

B. For additional submittal requirements see Part 6, Section 11.0.

1.6 DELIVERY, STORAGE, AND HANDLING

ASTM A325 high strength bolts shall be delivered to the site in the original labeled containers and once onsite shall not be transferred into unlabeled containers. The label information shall include the type of bolt, purchase order number, and the name of the supplier.

PART II PRODUCTS

2.1 MATERIALS

A. Steel sections and plates: ASTM A36

B. Structural Fasteners: Bolts shall be hardened and meet ASTM A325; nuts shall be heavy hex type meeting ASTM A563, Grade C; and washers shall be hardened and meet ASTM F436, Grade 1.

C. Miscellaneous Fasteners: Shall meet ASTM A307.

D. Expansion Anchors: Expansion bolts used for securing steel to concrete shall be one of the following:

1. "Parabolt" as manufactured by Molly Fastener Group of Emhard, Temple, PA 19560,
2. "Wedge Anchors" as manufactured by ITT Phillips Drill Division, Michigan City, IN 46360,
3. "Kwik Bolt" as manufactured by Hilti, Inc., Stamford, CT 06405, or
4. Fluor Fernald-approved equal.

E. Welding Materials: ANSI/AWS D1.1 - Structural Welding Code. Use E70XX electrodes.

F. Abide by requirements of Federal Fastener Act.

G. Shop Primer: Short-oil alkyd that is VOC compliant.

2.2 FABRICATION

A. For delivery to site, fit and ship assembled in largest practical sections.

B. Supply components required for connecting and anchorage of fabricated structural assemblies.

C. All welding procedures, welder's certification, and visual acceptance criteria must be in accordance with ANSI/AWS D1.1, Chapter 5.

D. Clean surfaces of rust, scale, grease, and foreign matter prior to applying shop primer. Prepare surface in accordance with paint manufacturer's instructions.

E. Shop prime with one coat of short-oil alkyd primer per manufacturer's instruction for primer (dry film) coat thickness.

F. Do not prime surfaces in direct contact with concrete or within three inches of where field welding is required.

G. All coatings shall be free of lead and chromium.

PART III EXECUTION

3.1 PREPARATION

Prior to fabrication, the Contractor shall verify field dimensions.

3.2 INSTALLATION - GENERAL

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for installation loads and provide temporary bracing to maintain true alignment until completion of installation.

C. Field weld components as indicated on the approved drawings. Field welding shall be in accordance with ANSI/AWS D1.1, Chapter 3.

D. Fasteners shall be tightened to manufacturer's specifications or applicable design requirements.

E. Field modifications to load bearing structures shall require prior approval from Fluor Fernald.

F. After installation, prime field welds and abrasions. Any steel embedded in concrete is an exception.

G. All steel shall be fabricated and installed in accordance with the AISC Manual of Steel Construction.

H. After use, all steel shall be dismantled and cut for containerization in accordance with Section 01120 and Section 05126.

3.3 QUALITY ASSURANCE

A. Calculations and shop drawings must bear the stamp of a Professional Engineer registered in the State of Ohio.

B. The Contractor shall inspect high-strength bolted connections for all shop-fabricated steel, and perform tests and prepare test reports in accordance with the AISC specifications. All test results shall be submitted to Fluor Fernald.

C. The Contractor shall conduct tests and shall state in each test report whether test specimens comply with requirements, and shall specifically state any deviations. Fluor Fernald must approve deviations in writing.

D. Shop and Field Welding

1. The Contractor shall: inspect and test, during fabrication and installation of structural steel assemblies in accordance with ANSI/AWS Structural Welding Code and as follows:

   a. Conduct inspections and tests as required. Record types and locations of all defects found in the work. Record work required and performed to correct deficiencies. All test results to be submitted to Fluor Fernald.

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b. Perform visual inspection of all welds per AWS D.1.1.

c. All welds that fail shall be repaired per approved Contractor AWS Welding Program.

d. Reworked areas shall be re-tested using the same method as used to find original indications.

2. Perform nondestructive tests of welds per AWS D.1.1. Full penetration welded connections on structural steel rigging frame utilized for critical lifts, as defined in the FEMP Hoisting and Rigging Manual, shall be 100 percent radiograph tested by an independent certified testing lab. Results shall be submitted to Fluor Fernald for approval.

a. All welds that fail testing shall be repaired per approved Contractor AWS Welding Program.

b. Reworked areas shall be re-tested using the same method as used to find original indications.

E. Correction of Substandard Work:

The Contractor shall correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements.

END OF SECTION

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SECTION 05126

STRUCTURAL STEEL DISMANTLEMENT

PART I GENERAL

1.1 SCOPE

This Section includes dismantling and containerization of:

A. Structural steel,
B. Bar joists,
C. Floor plate/decking,
D. Grating,
E. Stairs, ladders, and handrail,
F. Metal siding and roofing, including doors, louvers, and windows,
G. All other miscellaneous steel, and
H. Control of fugitive emissions.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01517 - Removing/Fixing Radiological Contamination
C. Section 03315 - Concrete/Masonry Removal
D. Section 07415 - Transite Removal

1.3 REFERENCE MATERIALS

See Part 7 for the following:

A. Index of Drawings,
B. Photographs,
C. Drawings, and
D. Contractor Safe Work Plan Format Requirements.

1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. American National Standards Institute (ANSI):

1.	ANSI A10.6-90	Safety Requirements for Demolition Operations
2.	ANSI A10.8-88	Construction and Demolition Operations - Scaffolding - Safety Requirements
3.	ANSI A10.13-89	Construction and Demolition Operations - Steel Erection

B. National Fire Protection Association (NFPA):

NFPA 241-96	Standard for Safeguarding Construction, Alteration, and Demolition Operations

C. United States Occupational Safety and Health Administration:

29 CFR 1926.858	Removal of Steel Construction

1.5 SUBMITTALS

The Contractor shall submit to Fluor Fernald for conformance review a structural steel removal Safe Work Plan in accordance with Part 7, ACR-002, Contractor Safe Work Plan Format Requirements, that contains the following information:

A. Detailed sequence of dismantlement and method of cutting, including equipment to be used.

B. Methods for contaminant control, including fugitive emissions during cutting.

C. Detailed plan for protecting lay down and cutting areas from contamination by lead paint chips and for controlling airborne radiological emissions.

D. Methods and materials used for cutting lead-painted steel.

E. If structural steel is removed in sections, verify the structural adequacy of the remaining structure. Calculations and drawings to verify the structural integrity of the partially dismantled structure must bear the stamp of a Professional Engineer registered in the State of Ohio.

F. Plans for personnel tie-offs, use of pick boards and walking on or near roof purlins/girders.

G. If controlled explosive methods are used for structural steel dismantlement, a detailed Safe Work Plan containing the following information shall be prepared:

1. Methods and materials to be used.

2. Means to protect adjacent structures, equipment, material, and underground utilities from damage, including protection from projectiles.

3. Methods and materials to control fugitive emissions.

4. Contingency plan for detonation failure and safe recovery of all undetonated charges.

5. Proof of permit, issued by the Bureau of Alcohol, Tobacco and Firearms, to use explosives.

6. Evidence of previous work experience using controlled explosives to take down multi-story structures within the last 5 years. This experience may be shown through the sub-tier contract. Provide project locations and contacts for verification.

7. If non-load bearing interior concrete/masonry walls are to be removed, refer to concrete/masonry removal specifications in Section 03315.

8. Identify locations of all cuts and charges and detonation sequence on composite drawings which will be provided by Fluor Fernald.

9. Provision of adequate protection of charges to prevent shrapnel from damaging the non-electric detonation system or persons near the exclusion boundary.

10. Predications of rubble/debris piles should be made to ensure that safe exclusion zones are established.

PART II PRODUCTS

2.1 MATERIALS

A. Non-woven Geotextile Fabric:

1. Trevira Spunbond 1120 by Hoechst Celanese Corp.
2. Mirafi 160N by Mirafi Inc.
3. ADS 600 by Advanced Drainage Systems, Inc.
4. Fluor Fernald-approved equal products

B. Surfactants:

1. CP-225 CHIL-SORB by Childers.
2. Fluor Fernald-approved equal products

PART III EXECUTION

3.1 PREPARATION

A. The Contractor shall ensure that adequate lay down space has been cleared and barriers have been established.

B. Building contents, steel, and siding shall have contamination removed or fixed prior to exposing interior surfaces including steel and siding to the environment in accordance with Section 01517.

C. If controlled explosive methods are used, the Contractor shall take precautions to control fugitive emissions by saturating the explosion footprint with water 2 to 4 hours prior to the implosion.

3.2 APPLICATION

A. All dismantlement activities shall be performed in accordance with the standards listed in Article 1.4.

B. The Contractor shall apply mechanical means of cutting and removing the structural steel to the largest extent possible while also avoiding damage to adjacent structures, components, equipment, and utilities.

C. The roof deck and roofing material, panels and concrete floor decking shall also be demolished with the structure wherever possible. Roofing material containing asbestos containing material (ACM) shall not be demolished with structural steel.

D. The Contractor shall dismantle, shear and segregate the structural steel to avoid damage to adjacent structures, component, equipment, and utilities. The Contractor shall minimize bending, twisting, and smashing of the steel during segregation and bulk storage.

E. Control of fugitive emissions shall be maintained at all times during this removal work to minimize visible dust.

F. All temporary bracing and rigging frames required shall be designed and stamped by a State of Ohio Professional Engineer, then submitted with calculations to Fluor Fernald for review and approval.

G. Cut all reinforcing (e.g., rebar) and anchors flush with base slab for areas designated on the Civil Demolition Plan for potential debris stockpiling. For all other areas, reinforcements and anchors need only be cut down to within one inch of the base slab. Fill in damaged areas of base slab with patching grout as described in Section 01515.

H. Lead-based paint chips and debris, released during structural steel dismantlement, shall be collected and managed in accordance with Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

3.3 SPECIAL INSTRUCTIONS

A. The following items are also included (where applicable) in the sequence of structural steel dismantlement:

1. Doors, Windows, and Frames:

   a. The Contractor shall remove all windows in one piece and place them in appropriate containers.

   b. The Contractor shall remove all doors (wood and/or steel) and place them in appropriate containers.

2. Lead Materials:

   a. The Contractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

   b. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut (i.e., 4 inches on each side).

   c. The Contractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

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B. All material shall be cut to meet sizing criteria and be managed in accordance with the Waste Management Plan located in Part 6, Exhibit E.

3.4 QUALITY ASSURANCE

The Contractor shall inspect debris generation, stockpiling, and containerization to ensure that all materials have been cut to meet size criteria and are being managed in accordance with the Waste Management Plan located in Part 6, Exhibit E.

END OF SECTION

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SECTION 07415

TRANSITE REMOVAL

PART I GENERAL

1.1 SCOPE

The work includes:

A. Removal of all interior and exterior transite panels.

B. Use of vacuuming, encapsulants, and/or surfactants on the transite panels to prevent airborne asbestos fibers and airborne radioactivity.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01515 - Mobilization, Demobilization, and General Site Requirements
C. Section 01516 - Asbestos Abatement
D. Section 01517 - Removing/Fixing Radiological Contamination
E. Section 15065 - Equipment/System Dismantlement
F. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIALS

See Part 7 for the following:

A. Index of Drawings,
B. Photographs,
C. Drawings,
D. Contractor Safe Work Plan Format Requirements, and
E. HEPA Vacuum Cleaner Requirements.

1.4 REFERENCES, CODES, AND STANDARDS

A.

29 CFR 1926.850	Demolition Preparatory Operations
29 CFR 1926.1101	Asbestos (Construction Industry)
29 CFR 1910.134	Use of Respirators
29 CFR 1910.1001	Asbestos (General Industry)

B. Ohio Department of Health Asbestos Hazards Abatement Rules Chapter 3701-34, OAC (Ohio Department of Health)

C. Ohio Environmental Protection Agency Chapter 3745-20, OAC

D. United States Environmental Protection Agency (U.S. EPA) 40 CFR 61 Subpart M (NESHAPS)

1.5 SUBMITTALS

A. The Contractor shall submit to Fluor Fernald a detailed Safe Work Plan (SWP) for approval in accordance with Part 7, ACR-002, "Contractor Safe Work Plan Format Requirements" and "Asbestos Abatement Safe Work Plan Requirements". The submittal shall include the procedures proposed for use in complying with the requirements of this Section. An Ohio Certified Asbestos Abatement Project Designer shall prepare and approve the SWP. The SWP shall include the following information:

1. The location and layout of storage and queuing areas.

2. The method of applying vacuuming, encapsulants, and/or surfactants.

3. The methods and sequencing of interior and exterior panel removal.

4. The interface of trades involved in the performance of work.

5. A detailed description of the methods to be employed to prohibit visible emissions in the work area.

6. A detailed description of the methods for removing transite panels from the structures and moving them to the laydown location for containerization (per the Waste Management Plan/Material Segregation and Containerization Criteria (WMP/MSCC) located in Part 6, Exhibit E. The description of methods shall include methods to be employed to ensure transite panels are removed without cutting, abrading, or breaking.

7. Description of the portable HEPA ventilation system, the containerization of removed asbestos debris, the method of treating broken and/or damaged panels, and the method of protecting adjacent structures.

8. If dismantlement method requires personnel on the roof, the plan shall include calculations verifying the structural adequacy of the roof and roof penetrations to support personnel and equipment. These calculations shall be stamped by a Professional Engineer registered in the State of Ohio, consistent with Section 01515.

9. Plans for personnel tie-off, use of pick boards and walking on or near roof purlins/girders.

B. Prior to initiation of the work, the Contractor shall submit the following OSHA-required documentation for Asbestos Removal Contractors to Fluor Fernald:

1. Documentation of training,
2. Medical surveillance,
3. Respirator fit-test, and
4. Employee exposure assessments.

C. Five (5) days prior to submittal of notification to government agencies, the Contractor shall provide a copy to Fluor Fernald for concurrence.

D. Product Data: The Contractor shall submit for approval manufacturer's technical information, including application instructions for each material proposed for use.

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1.6 HANDLING AND STORAGE

A. The Contractor shall manage transite in accordance with Section 01120 and the Waste Management Plan, located in Part 6, Exhibit E. Corrugated transite panels shall be stacked separately from flat transite panels.

B. The Contractor shall take precautions to prevent breakage of transite panels during handling.

1.7 PROJECT CONDITIONS

Multiple layers of transite roof and wall panels require specific methods for removal/fixing of radiological contamination, which is likely to exist between the layers of transite. Section 01517 contains specific instructions for removing/fixing contamination during removal of transite roof or wall panels.

Whenever transite (or transite fastener) removal is occurring on roofs, no one will be allowed within the footprint of the building until such work activities are completed.

As exterior transite panels are removed, the associated structural steel shall be considered to be contaminated with asbestos fibers, and therefore shall require encapsulation with lockdown material.

Refer to Section 01516 for information regarding the handling of deteriorated transite.

PART II PRODUCTS

2.1 MATERIALS

A. Deliver materials in original, new, and unopened containers bearing manufacturer's name, label, and the following information:

1. Name or title of material,
2. Manufacturer's stock number and date of manufacture,
3. Manufacturer's name, and
4. Thinning and application instructions.

B. Encapsulants/Lockdowns:

1. Control – Grayling Ind.
2. Foster 32-60 – Foster Products Corp.
3. Fiberset PM – Fiberlock Technologies
4. ACC 22-P – American Coatings Corp.
5. Serpiloc
6. Approved equal

Note: Encapsulants shall have a coloring agent or dye so that, when applied, there is obvious verification that a coating has been applied.

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C. Surfactants:

1. CP-225 CHIL-SORB by Childers
2. Fluor Fernald-approved equal products

D. Fiber-reinforced polyethylene or polyester sheeting approved for outdoor storage; color, yellow; minimum thickness of 6 mils; ultraviolet resistant, as manufactured by Griffolyn or Herculite.

E. Or equal, as approved by Fluor Fernald.

PART III EXECUTION

3.1 PREPARATION

A. Regulatory:

1. When applicable, the Contractor shall notify the Ohio Department of Health (ODOH) and Fluor Fernald shall notify the EPA and all other applicable governmental agencies before the start of work.

2. The Contractor shall adhere to and comply with work practices and procedures set forth in the most current and applicable Federal, State, and local codes, regulations, and standards.

3. The Contractor shall obtain certifications and licenses if transite becomes friable.

B. Consistent with Section 01517, prior to opening a building to the environment by removing the exterior siding (e.g., transite, metal siding, roof panels), the Contractor shall remove and/or fix radiological contamination on all surfaces within the facility until the detected radioactivity levels are below the criteria defined in Part 8, Section 8-C 2.4.

3.2 APPLICATION

A. The Contractor shall apply encapsulants, and/or surfactants according to the product manufacturer's specifications for application conditions (e.g., temperature).

B. Where transite panels show significant deterioration, which results in potentially friable surfaces, panels shall be removed in accordance with Section 01516.

C. Apply encapsulant and/or surfactant to areas around fasteners of transite panels before removal of fasteners.

1. Fasteners are required to be removed or cut without damaging the transite panel. A flat, sharp instrument shall be used to cut the fasteners.

2. When encapsulant and/or surfactant is applied, it shall be applied to provide visible coverage. If original application of surfactant becomes dried out before or during removal or handling, apply a second application.

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D. Prior to removal of transite panels, all surfaces of the panels shall be thoroughly encapsulated.

1. Bodily contact with the panels, as practical, shall be avoided.

2. When dust is observed between panels, collect the dust with a HEPA-filtered vacuum.

3. In the event a transite panel is broken or deteriorated, the Contractor shall apply encapsulant and/or surfactant to the edges of deteriorated areas.

4. Removed transite panels shall be encapsulated on both sides by the end of the work shift.

E. Removal of transite roof panels shall be sequenced to minimize exposed underlying surfaces.

F. Cleanup procedures:

1. Remove and containerize all visible accumulations of asbestos containing material (ACM) and asbestos-contaminated material.

2. Wet clean all surfaces in the work area.

3. Inspect the work area for visible residue.

4. The work area shall be cleaned until visual inspection reveals no evidence of any ACM as determined by Fluor Fernald.

3.3 SPECIAL INSTRUCTIONS

A. Single and Multiple Transite Layers:

Surfaces adjacent or between transite layers shall be considered radiologically contaminated.

Refer to the requirements contained in Section 01517 for removing/fixing radiological contamination on transite panels.

B. Gutters:

The Contractor shall collect all ACM from gutters using wet methods, and shall apply an encapsulant and/or surfactant to the gutters before their removal.

C. Insulation:

1. The Contractor shall remove the mineral wool insulation between the transite panels and/or other materials.

2. The Contractor shall use dust control techniques (minimum of applying amended water) to minimize airborne contaminants generated during insulation removal.

D. Windows and Doors:

1. The Contractor shall remove all windows in one piece and place them in appropriate containers.

2. The Contractor shall remove all doors (wood and/or steel) and place them in appropriate containers.

E. Lead Materials:

1. The Contractor shall segregate all lead materials (i.e., flashing, vent stacks, etc.) and place them in appropriate containers in accordance with Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

2. Prior to torch cutting on a surface coated with a lead-based paint, an eight-inch strip of paint shall be removed at the area of the cut.

3. The Contractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

F. All material shall be managed in accordance with the Waste Management Plan located in Part 6, Exhibit E.

3.4 QUALITY ASSURANCE

Mock-up: Prior to commencement of work, the Contractor shall provide for approval a Fluor Fernald-selected sample area of transite for approval, 10 feet by 10 feet in size, to demonstrate encapsulant and/or surfactant methods. The approved mock-up shall serve as a standard for the balance of the work.

END OF SECTION

SECTION 15065

EQUIPMENT/SYSTEM DISMANTLEMENT

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PART I GENERAL

1.1 SCOPE

A. This Section includes the Contractor's responsibility for removal or dismantlement of equipment and demolition debris from a facility and support systems within or outside a facility.

B. Segregation of demolition debris into various waste streams and preparation for containerizing shall be completed in accordance with the MSCC.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01515 - Mobilization, Demobilization, and General Requirements
C. Section 01516 - Asbestos Abatement
D. Section 01517 - Removing/Fixing Radiological Contamination
E. Section 15067 - Ventilation and Containment

1.3 REFERENCE MATERIAL

See Part 7 for the following:

A. Index of Drawings,
B. Photographs,
C. Drawings,
D. HEPA Vacuum Cleaner Requirements,
E. HEPA Air Filtration Device Requirements, and
F. Contractor Safe Work Plan Format Requirements.

1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. 29 CFR 1926.301 Hand Tools, and
B. 29 CFR 1926.302 Power Operated Hand Tools.

1.5 SUBMITTALS

The Contractor shall submit the following for approval:

A. Detailed removal Safe Work Plan in accordance with Part 7, ACR-002, Contractor Safe Work Plan Format Requirements for dismantlement of equipment/systems.

B. Proposed location, and method of installation of all hoisting equipment, and specialized construction equipment submitted for approval by Fluor Fernald with the Safe Work Plan.

C. Safe Work Plan specific to the dismantlement of outdoor process or suspect process tanks and pipes in accordance with Part 7, ACR-002, Subcontractor Safe Work Plan Format Requirements, including:

1. Sequence of work,
2. Methods and materials to control spills and possible generation of fugitive emissions from opening and cutting operations,
3. Method to access tanks and pipes, including health and safety issues,
4. Methods of dismantlement,
5. Method to size reduce and segregate,
6. Locations of cutting and interim storage areas,
7. Equipment required,
8. Methods to seal equipment and pipe openings for each equipment type,
9. Method to be used if piping or equipment contains nitric acid,
10. Location for interim storage,
11. Allowable floor loads,
12. Catalog cut sheets, and
13. Drawings.

1.6 PROJECT CONDITIONS

Process material (i.e., green salt, yellow cake, black oxide) has been removed from process equipment to the maximum extent practical by Fluor Fernald prior to D&D activities. If process material in excess of films and precipitates is found during D&D activities, Fluor Fernald project management shall be notified for evaluation and determination of the existing condition, prior to disturbing the process material.

PART II PRODUCTS

2.1 MATERIALS

A. The Contractor shall supply all materials required to seal equipment openings, to prevent spillage and/or migration of contaminants, per requirements of this Section.

B. Fiber-reinforced polyethylene or polyester material approved for outdoor storage: color, yellow; minimum thickness of 6 mils; ultraviolet resistant; as manufactured by Griffolyn, Herculite, or Fluor Fernald-approved equal.

PART III EXECUTION

3.1 APPLICATION

A. The Contractor shall supply all tools, materials, and equipment necessary for the performance of the work.

B. The Contractor shall use mechanical means of cutting whenever possible.

C. Prior to equipment/system dismantlement, the Contractor shall take the necessary actions to preclude spillage of residual material, if encountered. This shall include the temporary sealing of openings, pipe ends, etc.

D. Prior to cutting into tanks or piping where the potential for flammable lining exists, it shall be the Contractor's responsibility to verify that no lining exists. Should the Contractor find lined pipes or tanks, the pipes or tanks shall be cut and removed by mechanical means and shall not be torch cut.

E. In some cases, equipment may be elevated from the ground by the means of a structural platform. In these cases, the equipment should be cut away or disconnected from the platform and lowered to the ground. The dismantlement of this equipment shall be accomplished by shearing and cutting whenever possible. If this is not possible, the equipment shall be dismantled at convenient assembly joints.

F. Fluor Fernald Radiological Control shall be contacted prior to performing any torch cutting on contaminated surfaces.

G. Prior to cutting into piping or equipment known or suspected of containing nitric acid or other corrosive, toxic, flammable or combustible material, such systems shall be purged to remove any potentially explosive or otherwise potentially harmful gases.

H. Equipment that can be removed in one piece during dismantlement of the building will be identified in Part 6, Section 3.1; however, handling of such equipment must still follow all other applicable requirements in Section 01120.

I. Uncontrolled dropping of equipment and materials is not allowed.

J. Piping insulated with asbestos may be removed in its entirety per the requirements of Section 01516.

K. The Contractor shall take the necessary actions to preclude spillage of residual material, if encountered.

L. Debris segregation, sizing, and management shall be in accordance with Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

M. HEPA-filtered local ventilation shall be implemented for disassembly and sizing of process and suspect process pipe and equipment and for all burning (e.g., torch cutting) activities on contaminated surfaces.

3.2 SPECIAL INSTRUCTIONS: REMOVAL OF LEAD MATERIALS

A. The Contractor shall segregate all lead materials (e.g., flashing, vent stacks) and place them in appropriate containers in accordance with Section 01120 and the Waste Management Plan located in Part 6, Exhibit E.

B. Prior to torch cutting on a surface coated with a lead-based paint, an eight inch strip of paint shall be removed at the area of the cut.

C. The Contractor shall (whenever possible) dismantle lead flashing in a manner that will facilitate recycling. This will include minimizing inaccessible surfaces and maximizing straight lengths. This will also include avoiding the use of fixatives on the lead flashing that would require an abrasive method of removal.

3.3 INTERIM MATERIAL STORAGE

A. Where removed materials are staged or stored within the facility, they shall be stored in designated floor storage areas as described in Section 01120.

B. Damaged areas within facilities identified by the Contractor's Engineering Survey shall not be used for interim material storage.

3.4 QUALITY ASSURANCE

Calculations submitted on maximum allowable floor loading must bear the stamp of a Professional Engineer registered in the State of Ohio.

END OF SECTION

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SECTION 15067

VENTILATION AND CONTAINMENT

PART I GENERAL

1.1 SCOPE

A. This Section consists of the work related to the Contractor-supplied ventilation and local containment that is required for radiological contamination purposes. The principal items included in this Section are:

1. Local containment and vestibule design requirements,
2. Ventilation requirements,
3. Types of ventilation/local containment design,
4. Guidance on type of ventilation/local containment applicability, and
5. Exterior items; such as dust collectors.

B. Definitions:

1. Local Containment – is an enclosure that is designed to maintain 0.1 inch water gauge negative pressure, or six air changes per hour, within its structure to prevent fugitive emissions from escaping to the outside environment.

2. Vestibule – is an enclosed entrance, a passage, or space that is between the outer door and the interior of the building. The space within the vestibule does not have to be under a negative pressure.

3. Enclosure – is the exterior wall of a building forming the containment.

1.2 RELATED SECTIONS

A. Section 01120 - Debris/Waste Handling Criteria
B. Section 01515 – Mobilization, Demobilization, and General Site Requirements
C. Section 01517 – Removing/Fixing Radiological Contamination
D. Section 03315 – Concrete/Masonry Removal
E. Section 05126 – Structural Steel Dismantlement
F. Section 15065 – Equipment/System Dismantlement

1.3 REFERENCE MATERIALS

See Part 7 for the following:

A. Index of Drawings,
B. Photographs,
C. Drawings,

D. Air Filtration Device (AFD) Procurement Specification, and
E. AFD Filter Procurement Specification.

1.4 REFERENCES, CODES, AND STANDARDS

All work shall be accomplished in accordance with the following reference, code, and standard requirements:

A. United States Department of Energy (DOE):

1. DOE 5400.5 Radiation Protection of the Public and the Environment
2. DOE/EH 0256T Radiological Control Manual, April 1994

B. Energy Research and Development Administration (ERDA):

ERDA 76-21-79 Nuclear Air Cleaning Handbook

C. American Conference of Governmental Industrial Hygienists (ACGIH):

ACGIH Industrial Ventilation (latest edition)

D. American Society of Civil Engineers (ASCE):

OBBC Ohio Basic Building Code

1.5 SUBMITTALS

The Contractor shall submit a Safe Work Plan (SWP) in accordance with Part 7, ACR-002, Contractor SWP Format Requirements, with the following information to Fluor Fernald for approval:

A. Drawings and Data:

1. Indicate materials of construction, sizes, locations, entrances, and egresses that do not allow for breach of the local containment or vestibule, and all other details of local containments and vestibules to be erected.

2. Provide air flow diagrams for local containment and vestibule ventilation.

3. Submit calculations indicating that a minimum negative pressure of 0.1-inch water gauge or six air changes per hour is maintained in all local containments when the ventilation system is in operation.

4. If any part of the above affects or involves asbestos activities, the Ohio Department of Health/OSHA Asbestos Hazard Abatement Project Designer certification shall be part of the documentation submitted with the SWP.

B. Submit vendor information for performance, operation and maintenance on all accessory ventilation equipment that will be used.

C. Provide building-specific SWPs on the use of portable HEPA units including replacement of HEPA filters and prefilters.

PART II PRODUCTS

2.1 MATERIALS

A. The Contractor shall provide:

1. Air cleaning devices,
2. HEPA elements,
3. Prefilter elements, and
4. All other ventilation accessory equipment for the completion of this project in accordance with Part 6, Section 4.0.

B. Polyethylene sheeting shall be clear and have a minimum of 6 mils thickness as manufactured by Blueridge Films, Inc. or Fluor Fernald approved equal.

1. Fire retardant polyethylene shall be used.
2. All outside containments shall be constructed of reinforced polyethylene.

PART III EXECUTION

3.1 EXAMINATION

A. All vestibules, equipment, and/or structure containment material shall be fire resistant and corrosion resistant.

B. Local containment structures shall be designed to be leak-tight and capable of maintaining a negative pressure of at least 0.1 inches water gauge or six air changes per hour. Typical design for various local containments should include the following features, where applicable:

1. Windows and mountings,
2. Glove ports,
3. Ease of cleaning,
4. Interior illumination per 29CRF 1926.56,
5. Connections for services lines, conduits, instrument leads, and ductwork,
6. 6 mil polyethylene sheeting,
7. Pressure differential readouts, and
8. Attachments for interconnection of local containments.

C. Where practical, and without penetrating the local containment, all equipment components not functionally required to operate directly in the presence of radioactive materials shall be located outside the local containment.

D. The local containment or vestibule structure external to the building shall be designed to withstand the effects of normal operating conditions and the following load capacities:

1. Interior: 5 psf lateral load, and
2. Exterior: per Ohio Basic Building Code (OBBC).

3.2 PREPARATION

A. The Contractor shall enclose the structure and ensure that all building exterior holes, gaps, or openings are adequately sealed to prevent exhaust of airborne radioactive particulates.

B. The Contractor shall ensure that all ductwork used is free of dust or dirt before installing it in the ventilation system to prevent premature impingement loading of the prefilters and HEPA filters.

C. The Contractor shall ensure that all vestibules are large enough to support appropriate storage containers, material handling and dismantling equipment, and debris containerizing operations.

3.3 INSTALLATON/APPLICATION

A. The Contractor shall block, tie-down, or wheel lock all portable HEPA units.

B. The following guidelines for localized ventilation and in-place cutting control measures shall be adhered to by the Contractor:

1. The Contractor shall ensure that ventilation air is provided in the quantities required to maintain OSHA air quality limits, all Permissible Exposure Limits (PELs), and all ACGIH Threshold Limit Values (TLVs) and to maintain exposures As Low As Reasonably Achievable (ALARA).

2. For activities outside of enclosures, nuclear grade HEPA filters with a flexible ventilation duct shall be used as follows:

a. Exhaust rate of the HEPA filters with a flexible ventilation duct shall maintain sufficient airflow capture velocity to prevent entry of fumes into the room. A minimum face velocity of 150 fpm is required.

b. Each HEPA filter with a flexible ventilation duct in the cutting area should be capable of being isolated by means of control dampers to prevent backflow through a hood when it is not in service.

3701

c. The Contractor shall ensure that all local containments can maintain negative pressures. The exhaust volume rate shall be as required to attain 0.1 inch negative pressure within the containment. The exhaust air stream must be HEPA filtered. When containments are out-of-doors or border the outdoors, or are to be used for torch-cutting in the size reduction area, containments must have an airlock for the passage of equipment, personnel, and materials, so the main body of the containment is never directly open to the atmosphere. Other containments must be maintained such that there are no undesigned holes in the containment and the entrance/exit-way closes sufficiently to meet the air exchange/negative pressure requirements.

3.4 QUALITY ASSURANCE

Final acceptance of local containments, building enclosures, and vestibule structures shall be obtained from Fluor Fernald.

END OF SECTION

- 3701

APPENDIX D

DESIGN DRAWINGS

Representative architectural and D&D design drawings and sketches were copied from the extensive set compiled for the design/procurement package and are presented in this appendix. Table D-1 lists the drawings and sketches included in this appendix. Additional detail drawings may be obtained per request, if needed. Descriptions of the buildings, systems, and process areas illustrated in these drawings and sketches may be found in Section 3 of this Implementation Plan.

TABLE D-1 PILOT PLANT COMPLEX DRAWINGS

DRAWING NO.	REV.	DESCRIPTION
SKETCH 4234-1	0	PILOT PLANTCOMPLEX – BLDGS. 13A, 54A, 37
37X-5500-A-00479	3	PILOT PLANT EAST & SOUTH ELEVATIONS
54X-1910-A-00343	1	BLDG.13A ELEVATIONS & SECTION
37A-5500-A-00555	1	PILOT PLANT ANNEX EAST & WEST ELEVATIONS
37A-5500-A-00556	1	PILOT PLANT ANNEX NORTH & SOUTH ELEVATIONS
13X-5500-S-00286	1	PILOT PLANT STORAGE PAD
SKETCH 4234-2	0	PILOT PLANT MAINTENANCE BUILDING
13B-5500-A-00236	1	PILOT PALNT EXTRACTION AREA ARCHITECTURAL
SKETCH 4234-3	0	PILOT PLANT PUMP HOUSE PLAN
13C-5500-A-00253	0	MAINTENANCE SHOP & STORAGE BLDG. ELEVATIONS AND DETAILS
SKETCH 4234-4	0	PILOT PLANT THORIUM TANK FARM PLAN
SKETCH 4234-5	0	PILOT PLANT SHELTER PLAN & ELEVATION
54X-1910-A-00347	0	AMMONIA DISSOCIATOR SHED
SKETCH 4234-8	0	PILOT PLANT PAD

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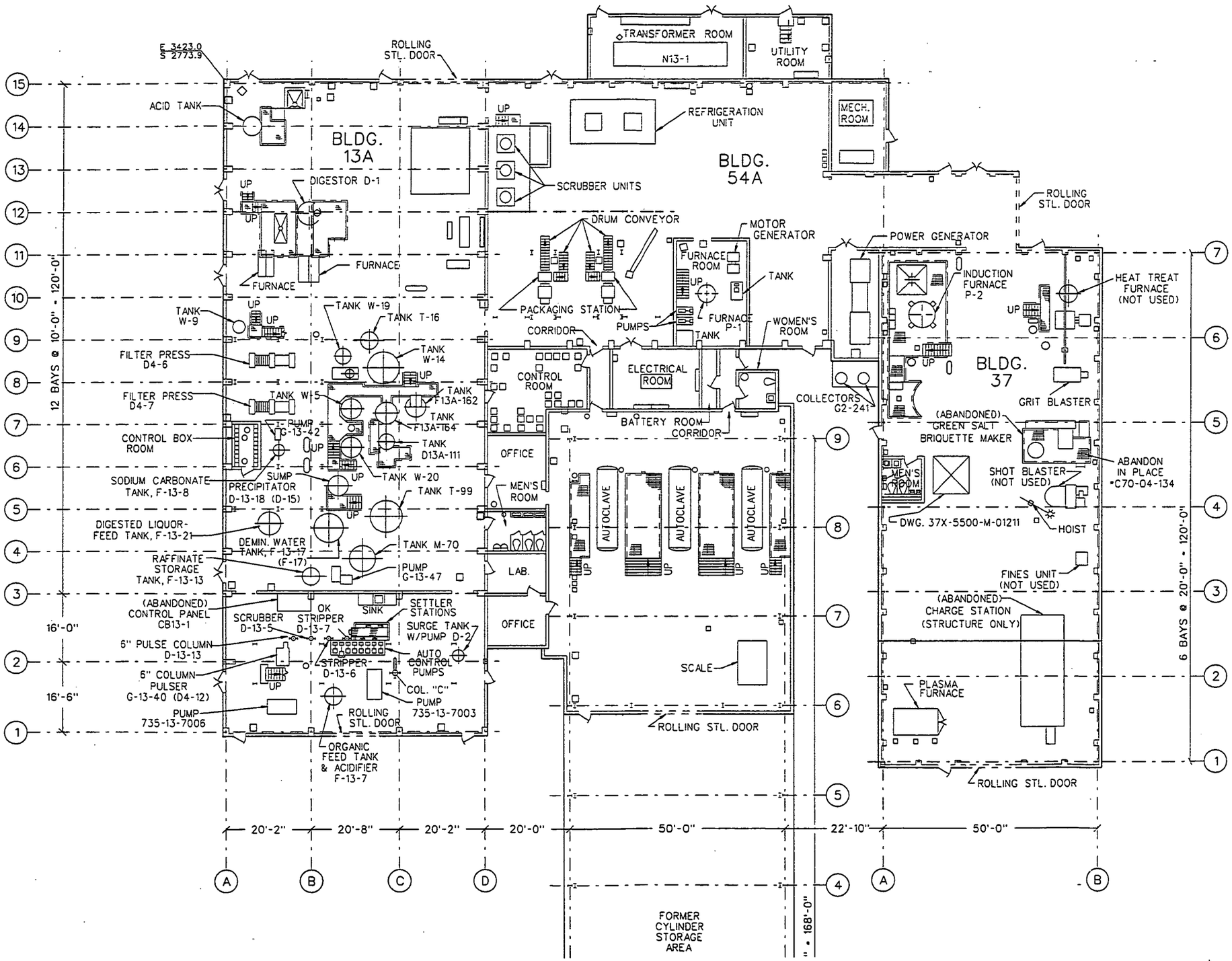
3701



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SKETCH #4234-1 PILOT PLANT COMPLEX – BLDGS. 13A, 54A, 37

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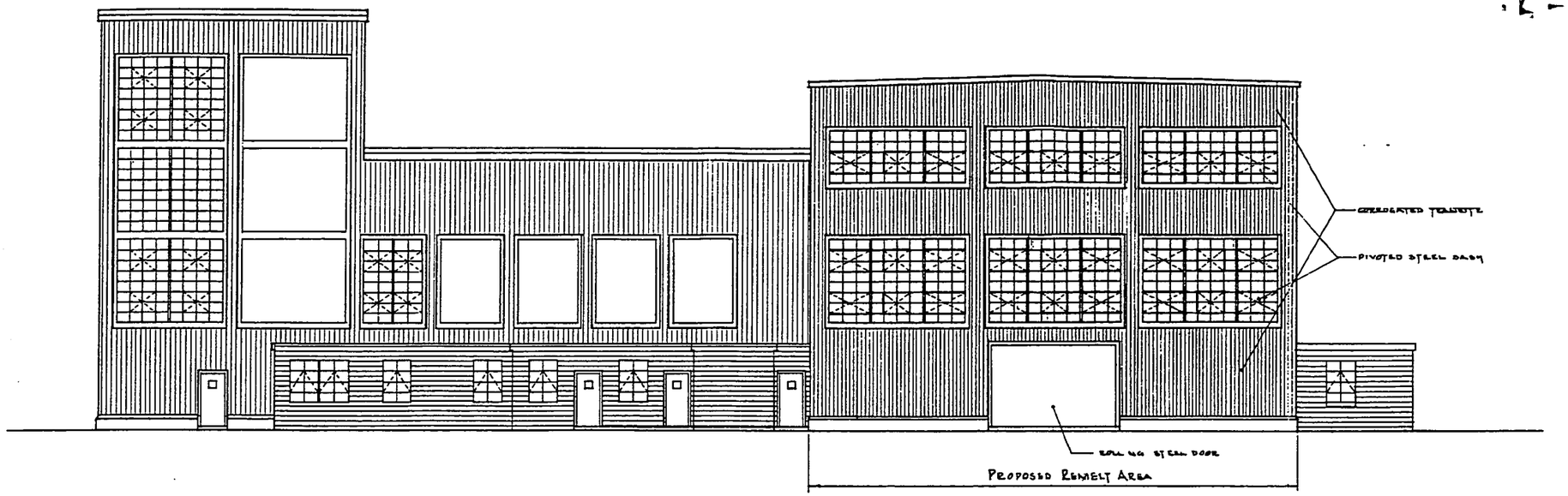
3701



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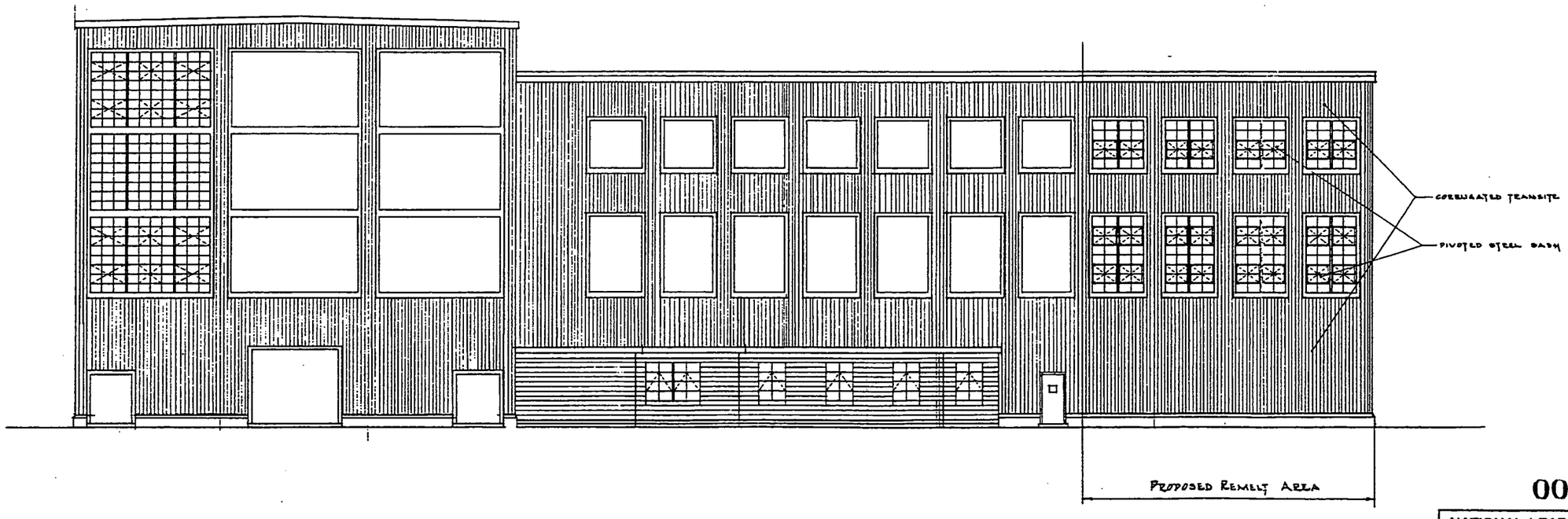


SOUTH ELEVATION

000157

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

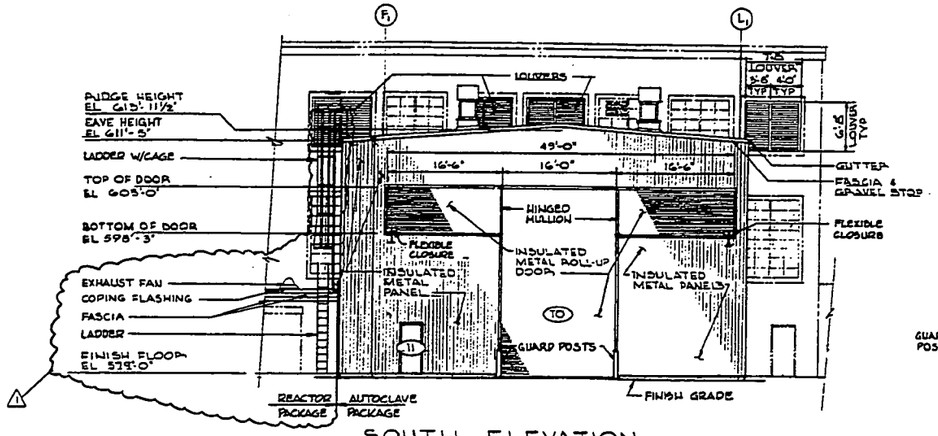
PILOT PLANT
PROPOSED ADDITION
EAST & SOUTH ELEVATIONS
ARCHITURAL LAYOUT

INDEX CODE			
FL. & AR.	ORIG.	CL.	SER. NO.
37X	5500	A	00479

REF. DWG. NO.	REF. DWG. TITLE	NO.	REVISIONS	DATE	BY
37-4050	PROPOSED ADDITION	4			
3013-E-QAP40-97	EAST & WEST ELEVATIONS	3			
3013-E-QAP40-98	NORTH & SOUTH ELEVATIONS	2			
		1			

DEPARTMENT TECH
B. M.
DRAWN DELL
TRACED
CHECKED
APPROVED
DATE 6-12-53
SCALE 1/8" = 1'-0"
DWG. NO. 37-4056
REV.

bldg13A1.m orr7026 Thursday May 10 2001 at 10:36:25 AM EDT



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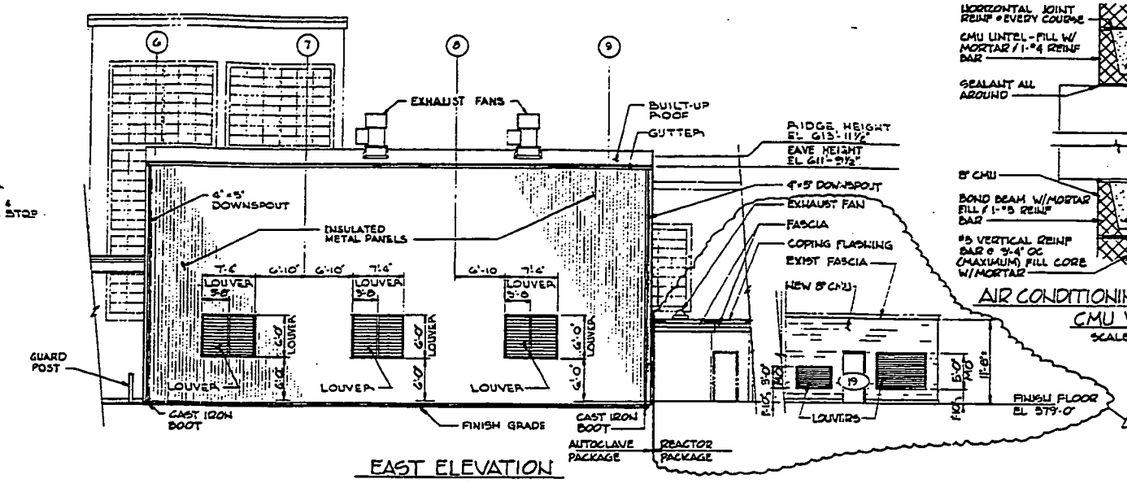

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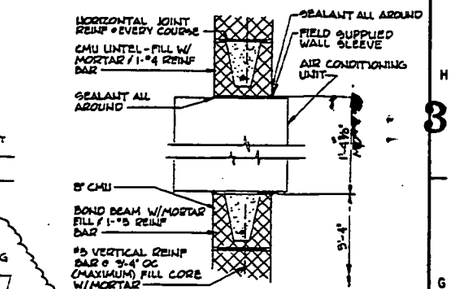

AIR CONDITIONING UNIT DETAIL @ CMU WALL
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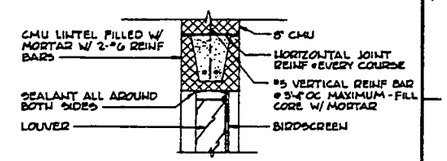

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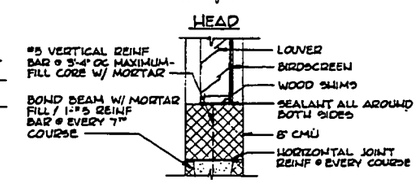

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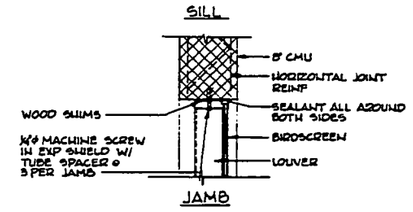

JAMB

LOUVER DETAIL @ CMU WALL
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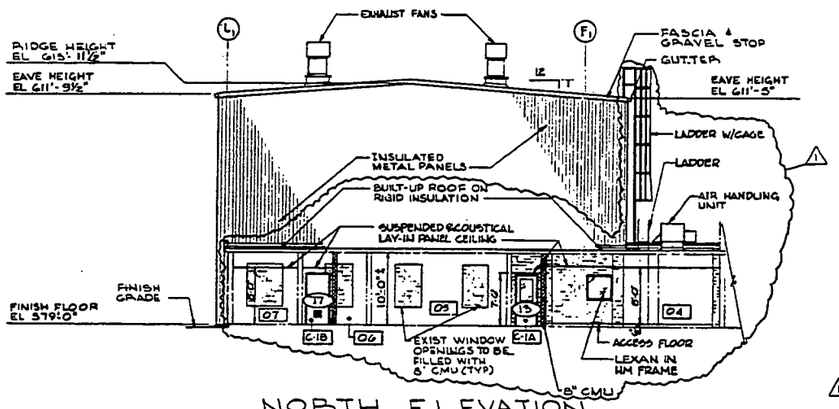

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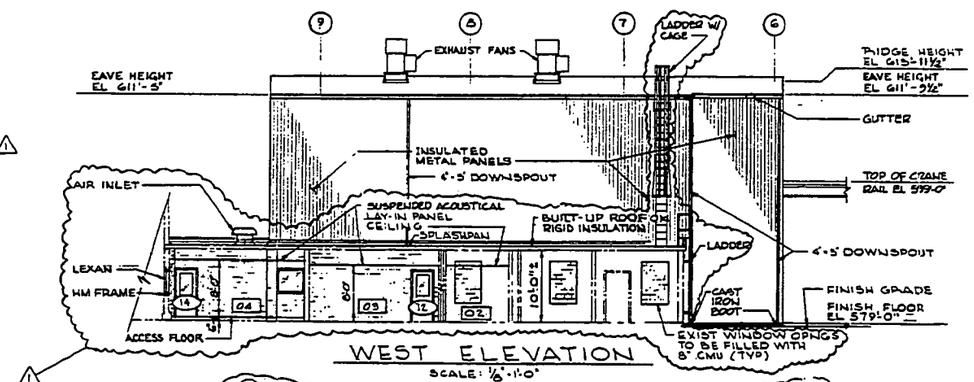

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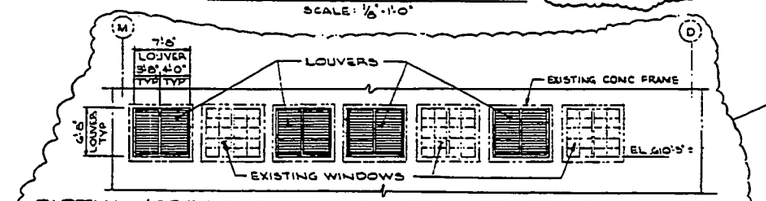

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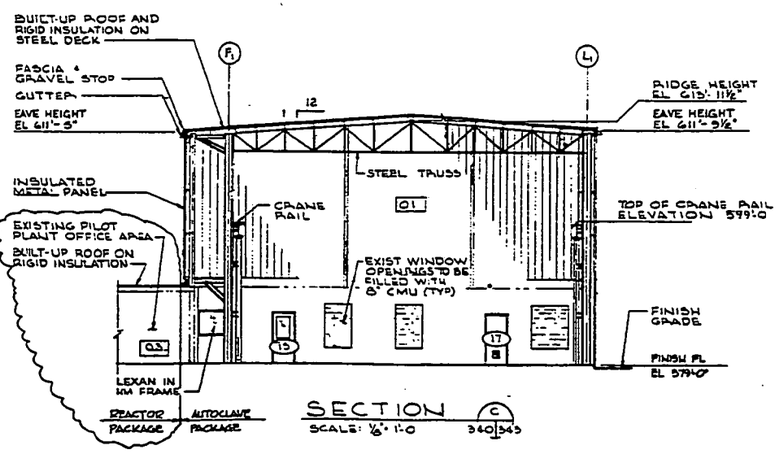

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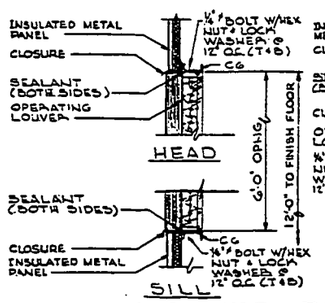

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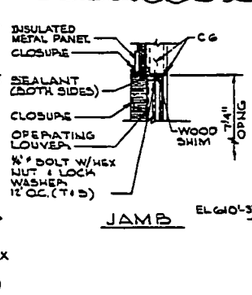

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LOUVER DETAILS
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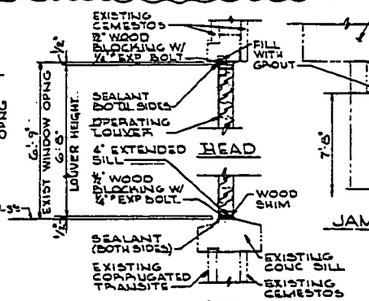

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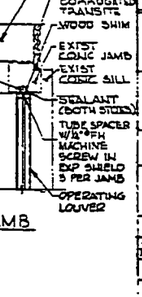

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LOUVER DETAILS @ DRY PRCESSING AREA
SCALE: ½"=1'-0"

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UNITED STATES DEPARTMENT OF ENERGY

SANDERS & THOMAS, INC.
AN STV ENGINEERS PROFESSIONAL FIRM
POTTSTOWN PA. 19464

DOE CONTRACT: NO. DE-AC05-82-OR-0894 A-E NO. 4860

PROJECT NAME
REACTIVATION OF UF_6-UF_4 REDUCTION FACILITY

DRAWING TITLE
BUILDING ELEVATIONS & SECTION

ARCHITECTURAL

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED	CHECKED	DATE	CHECKED BY
HENDRICKSON	5-24-82	HENDRICKSON		5-24-82	BECHTEL

PLANT FMPC

WC HILL 7-9-82 | RB WATSON 7-9-82

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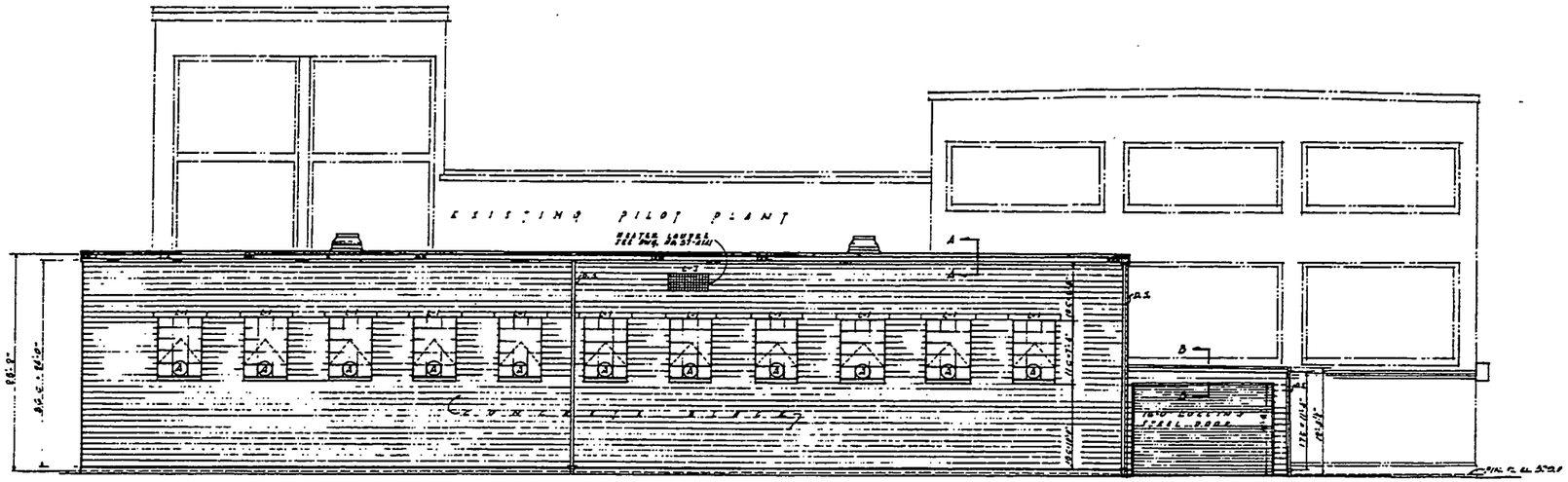
37-A130

3701



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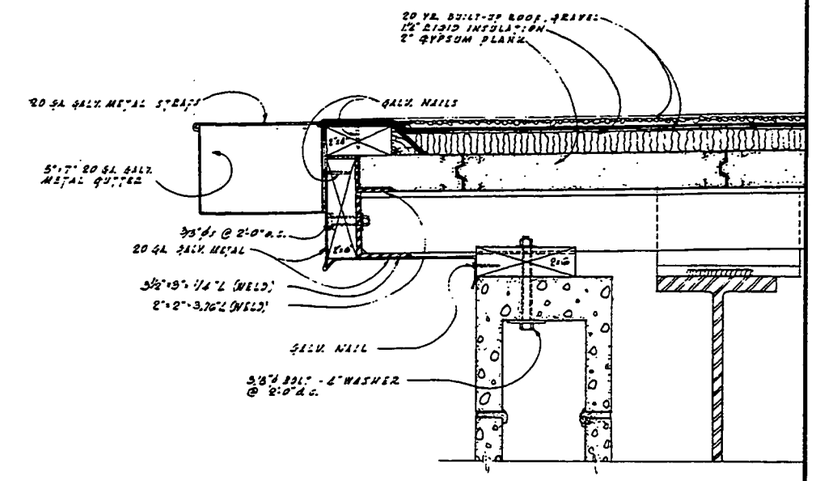

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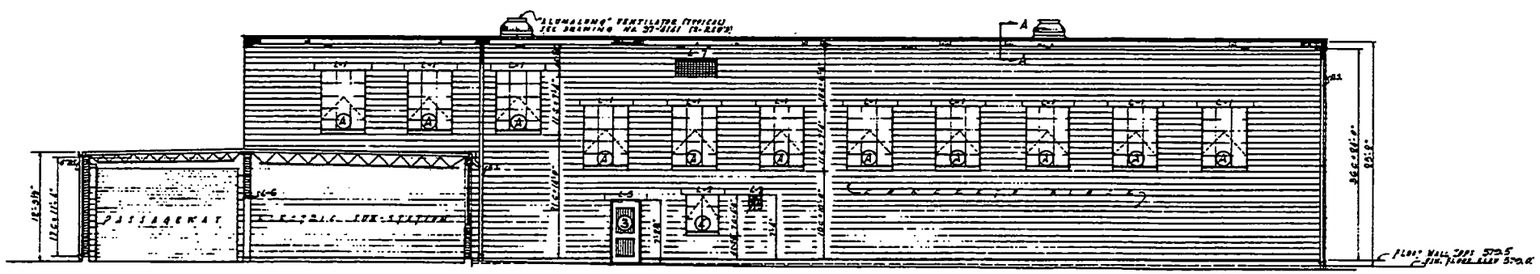

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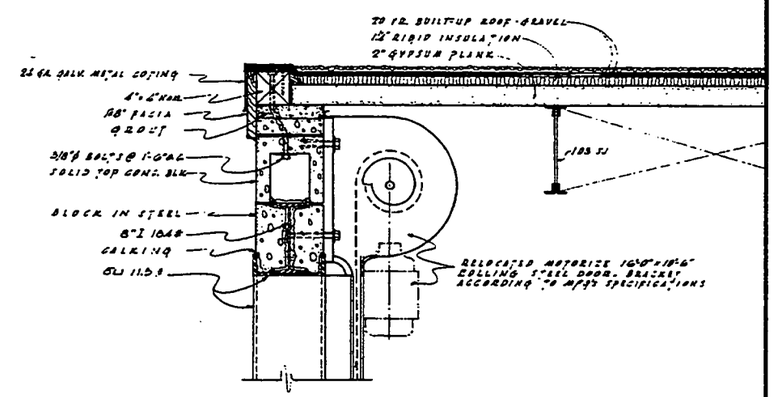

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000159

⚠ NOTE:
SINGLE PLY "TROCAL" ROOFING HAS BEEN INSTALLED ON (HIGH ROOF) MAIN ROOF ONLY

WINDOW SCHEDULE								
MARK	NO. REQD	SIZE	DESCRIPTION	CATALOGUE NO.	LINTEL			REMARKS
A	30	5'-0 7/8" x 6'-0"	COMM. PROJECTED	A35161	PRECAST CONC.	MARK L-1		
B	1	6'-8 7/8" x 6'-0"	" "	A45161	" "	"	L-2	
C	2	10'-8 7/8" x 6'-0"	" "	2-A35161	" "	"	L-3	3/8" MULLION
D	1	6'-8 7/8" x 2'-1"	" "	A45141	" "	"	L-4	
E	1	3'-8 7/8" x 2'-1"	" "	B25141	" "	"	L-2	FLUSHED GLASS

LINTEL SCHEDULE					
MARK	NO. REQD	SIZE	MATL.		DESCRIPTION
L-1	30	7 7/8" x 7 7/8" x 6'-4"	PRECAST	CONC.	2-#8's DEFORMED BOTTOM REINF.
L-2	1	7 7/8" x 7 7/8" x 5'-0"	"	"	" " " "
L-3	2	7 7/8" x 7 7/8" x 7'-6"	"	"	2-#8's " " "
L-4	2	7 7/8" x 7 7/8" x 3'-0"	"	"	2-#8's, TOP - 2-#8's BOTTOM, RESAW & SLIT STIRRUPS
L-5	4	7 7/8" x 7 7/8" x 4'-0"	"	"	2-#8's BOTTOM REINF.
L-6	1	7 7/8" x 7 7/8" x 2'-6"	"	"	2-#8's BOTTOM, 2-#8's TOP, RESAW & SLIT STIRRUPS
L-7	2	7 7/8" x 7 7/8" x 6'-0"	"	"	2-#8's BOTTOM REINF.
L-8	1	7"x5'-0"x1/2"	PLATE		1/2" STL PLATE
L-9	1	8"x8"x15'-6"	STEEL		8" WF 31#
L-10	1	8"x15'-6", 8"x18'-6"	"		8" I 18.4#, 8" I 11.5#
L-11	1	8"x17'-6", 8"x16'-6"	"		" "

L-12	2-8"x3"x1/2" x 3'-6 1/2" - 1 REQD.		

REF. DWG. NO.	REF. DWG. TITLE

NO.	REVISIONS	DATE	BY
⚠	ADDED NOTE	7-20-61	RJ

DESIGN APPROVAL

DIVISION	SIGNATURE	DATE
[illegible]	[illegible]	5/10/61
PRODUCTION		
TECHNICAL	[illegible]	5/10/61
MAINTENANCE	[illegible]	5/10/61

IN PL. & AC. 37A 5500 A 00555 NO.

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

"PILOT PLANT ANNEX"
"ARCHITECTURAL"
"EAST & WEST ELEVATIONS"

DEPARTMENT: TECHNICAL
PROJECT NO. 37-11 CP-F-56-3
DRAWN: V.A.M. CHECKED: [illegible] 5-17-61
TRACED: APPROVED: [illegible]
DATE: MAY 14, 56
SCALE AS SHOWN
DWG. NO. 37-A130
REV. 1

37-1131

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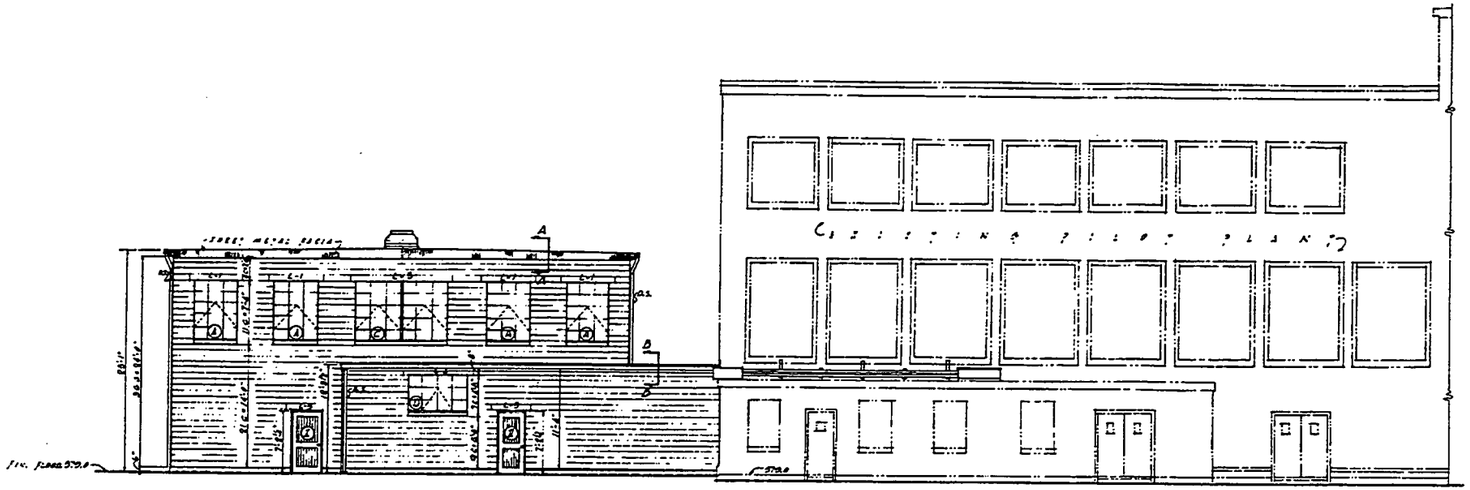

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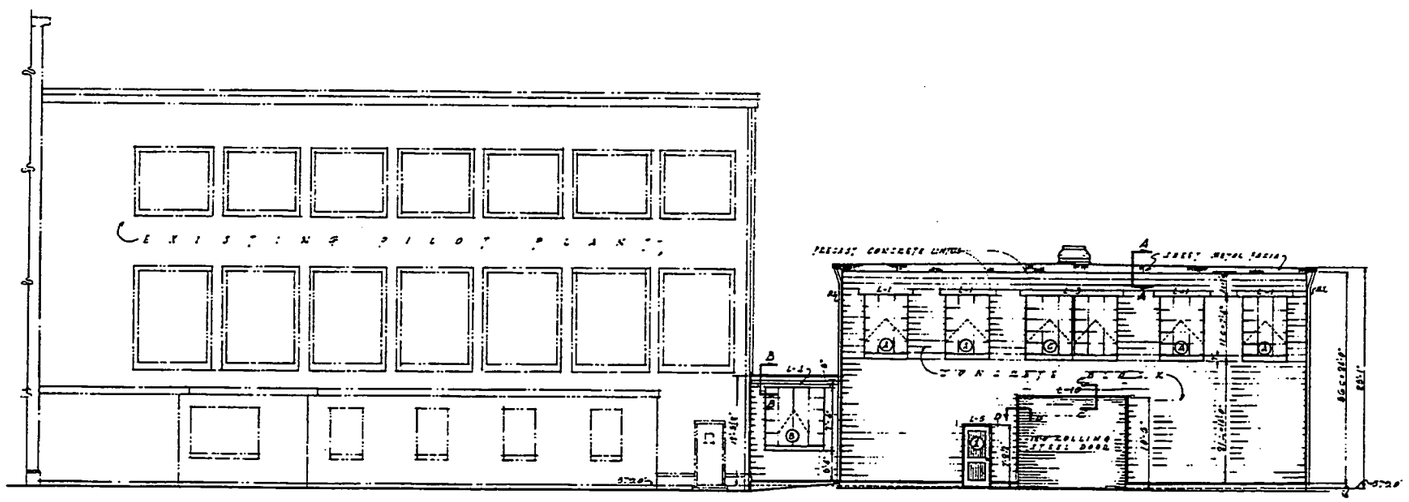

SOUTH ELEVATION
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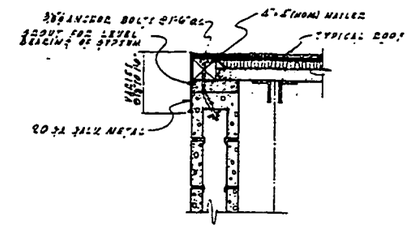
⚠ NOTE:
SINGLE-PLY "TROCAL" ROOFING HAS BEEN INSTALLED ON (HIGH ROOF) MAIN ROOF ONLY



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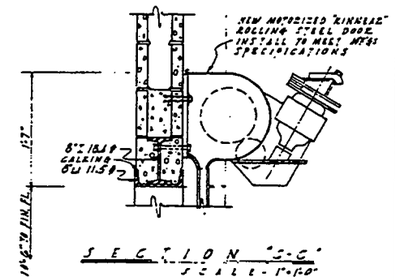

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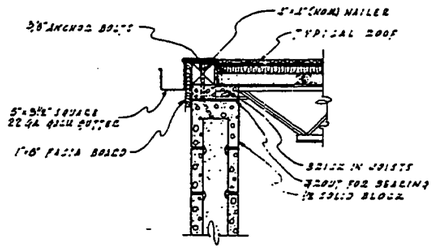

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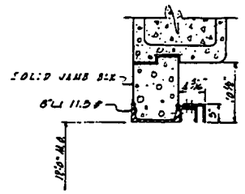

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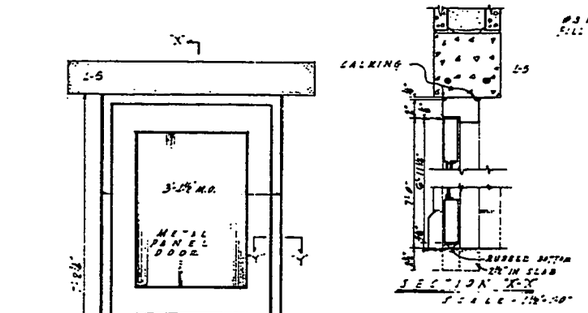

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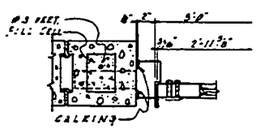

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TYPICAL EXTERIOR DOOR

INDEX CODE	REF. NO.
	37A 5500 A 00556

000160

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

PILOT PLANT ANNEX
ARCHITECTURAL
NORTH & SOUTH ELEVATIONS

DESIGN APPROVAL

DIVISION	SIGNATURE	DATE
HEATING & VENT.	N. Blank	5/12/56
PRODUCTION		
TECHNICAL		
MAINTENANCE	R. Bales	5/17/56

REF. DWG. NO.	REF. DWG. TITLE

NO.	REVISIONS	DATE	BY
1	ADDED NOTE	7-12-65	REC.

DEPARTMENT TECHNICAL
PROJECT NO. 37-11 CP-F-55-3
DRAWN U.N.M. TRACED
DATE 12 MAY, 56
SCALE AS SHOWN
CHECKED
APPROVED 5-17-56
DWG. NO. 37-1131
REV. 1

NTED	REV.
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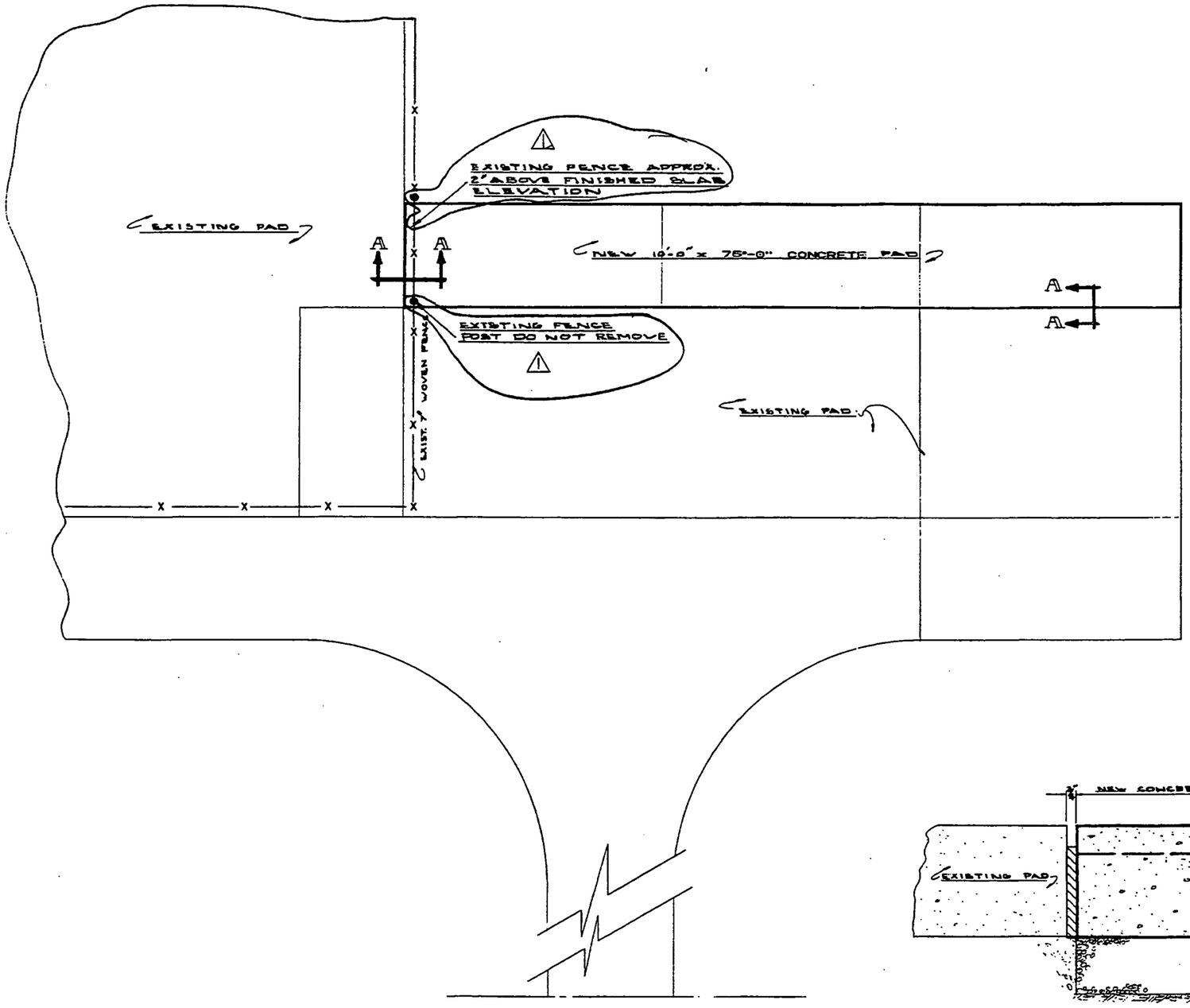
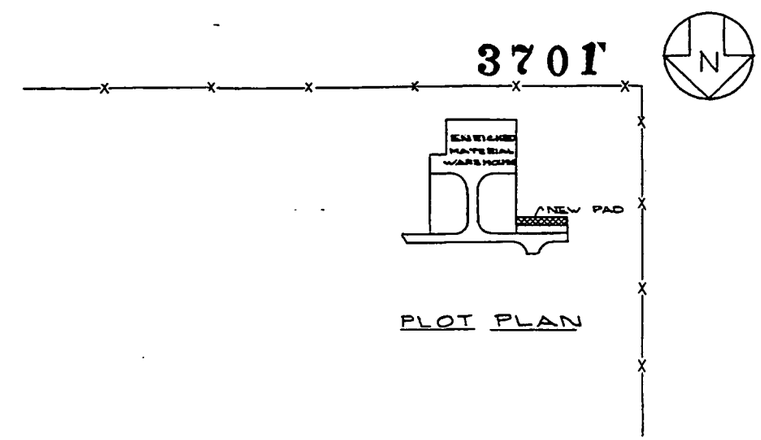
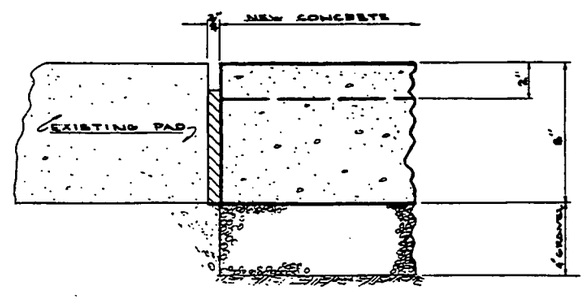
-57	0
57	1
0-57	1
-57	1
-57	1

13-4105





PLOT PLAN



SECTION A-A

NOTES

1. SLAB REINFORCEMENT TO BE 6"x6" 6 GAGE WELDED WIRE MESH TO MEET A.S.T.M. SPEC.
2. EXPANSION JOINT FILLER SHALL MEET A.A.S.H.O. SPEC. M 33-48
3. HOT POURED JOINT SEALING COMPOUND SHALL MEET A.S.T.M. D 1190-52 I

INDEX CODE			
PL. & AC.	DIVIS.	SER. NO.	
13X	5500	S	00286

DESIGN APPROVAL		
DIVISION	SIGNATURE	DATE
HEALTH & SAFETY		
PRODUCTION		
TECHNICAL		
MAINTENANCE		

REF. DWG. NO.	REF. DWG. TITLE	NO.	REVISIONS	DATE	BY
		1	ADDED NOTES	9/10/57	

ARCH. & STR. J.E. Johnson Aug. 14, 1957
MECHANICAL
ELECTRICAL
CHEMICAL
PROJ. ENGR. J.E. Johnson Aug. 7, 1957

000161

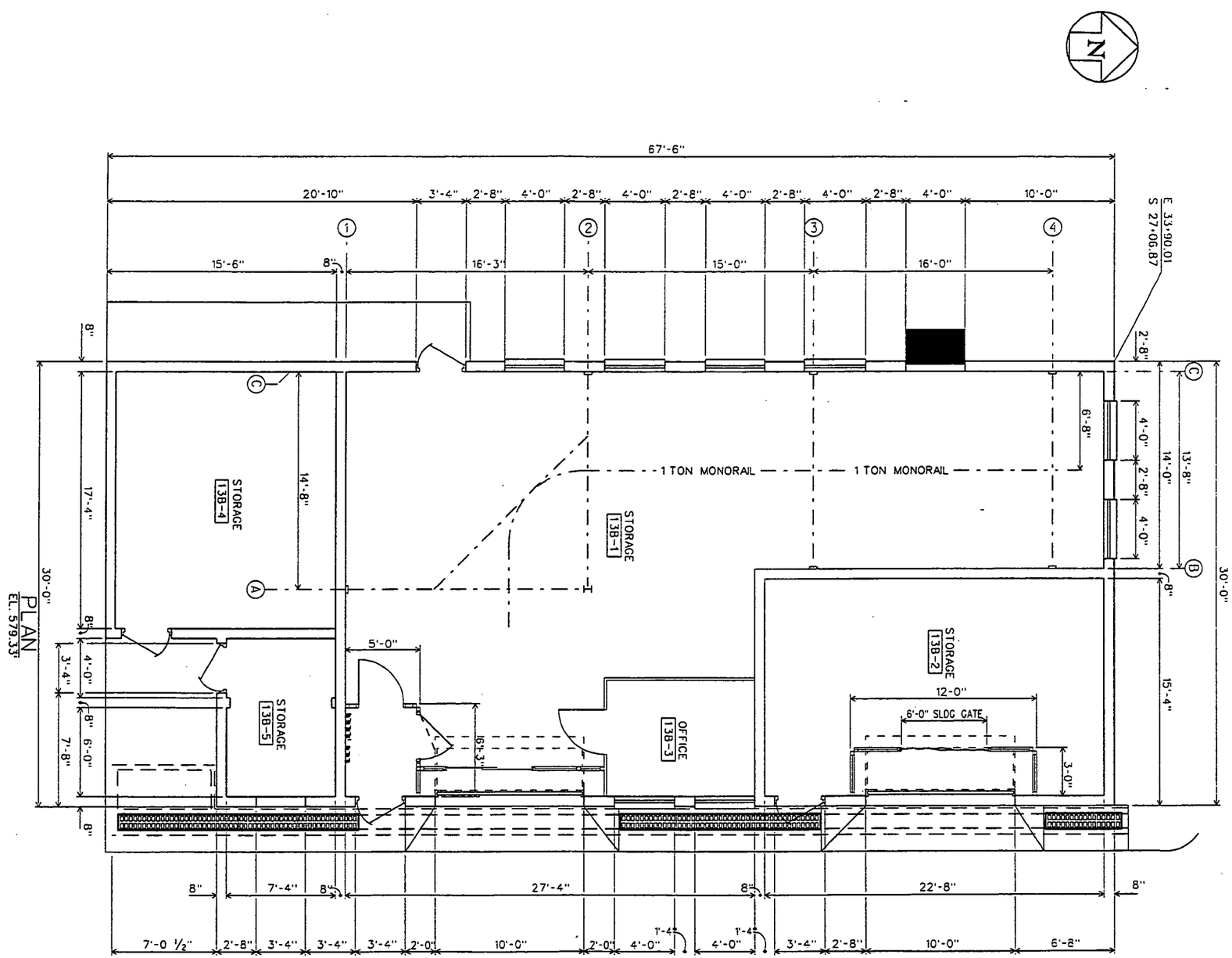
NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

ENLARGEMENT
PILOT PLANT
STORAGE PAD

DEPARTMENT TECHNICAL
PROJECT NO. 13-101 [redacted] JOB ORDER B-8139
DRAWN D. Simpson TRACED
CHECKED J.S. Larson 8-14-57 APPROVED J.E. Johnson 8-15-57
DATE 8-7-57
SCALE
DWG. NO. 13-4105
REV. 1

3701



000162

SKETCH #4234-2 PILOT PLANT MAINTENANCE BUILDING

FILE NAME: Res4234/bldg_13B.dgn

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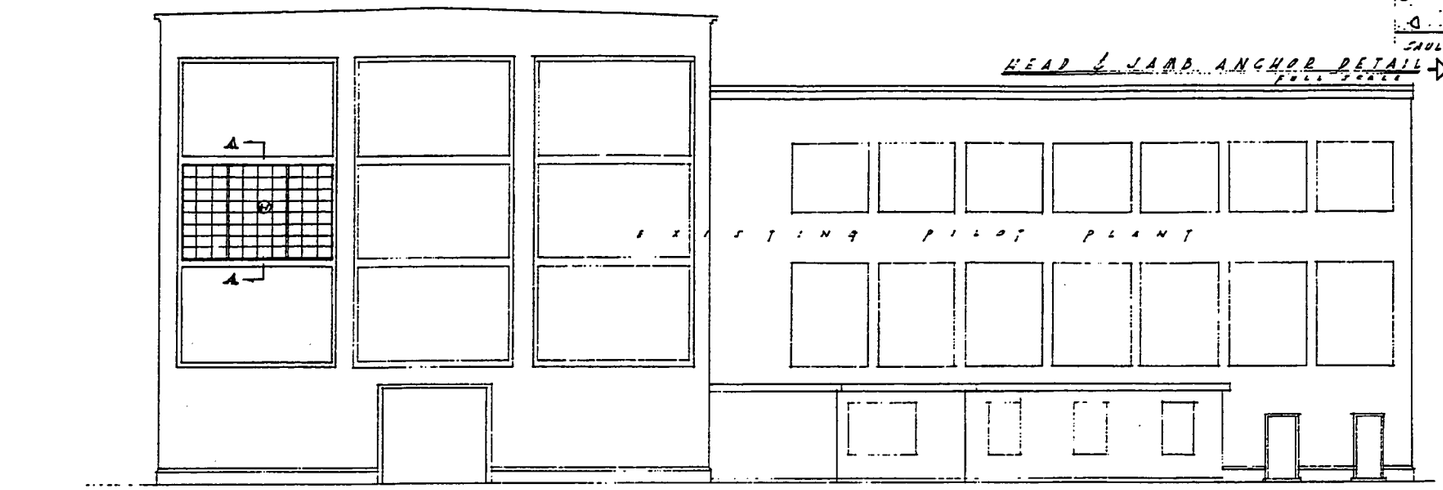
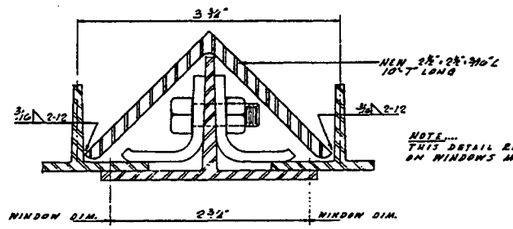
27-56	0
3-56	0
9-56	0
22-56	0
9-56	1
8-56	1
14-56	1

13-2048

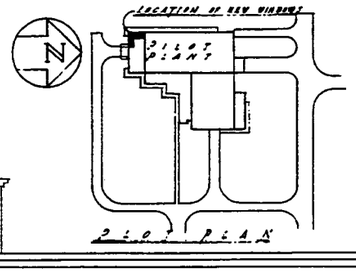
3701



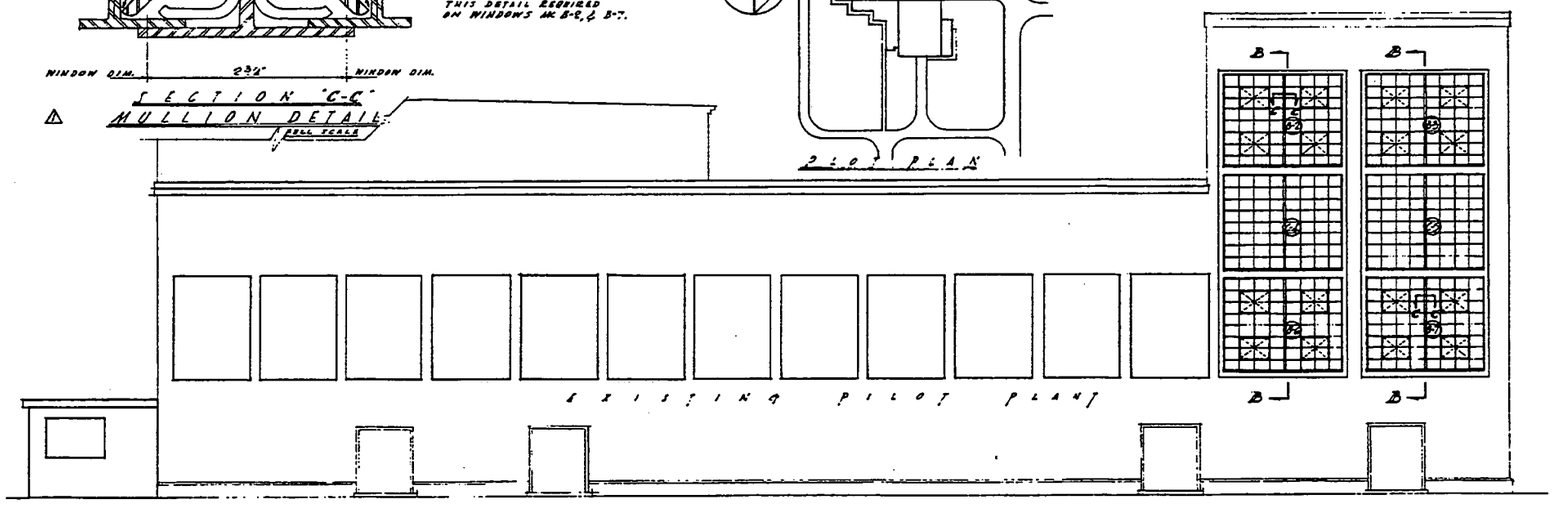
SOUTH ELEVATION
SCALE - 1/8" = 1'-0"



SECTION "C-C"
MULLION DETAIL
FULL SCALE

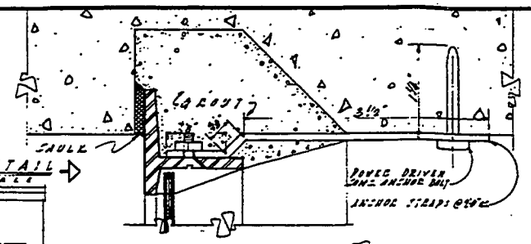


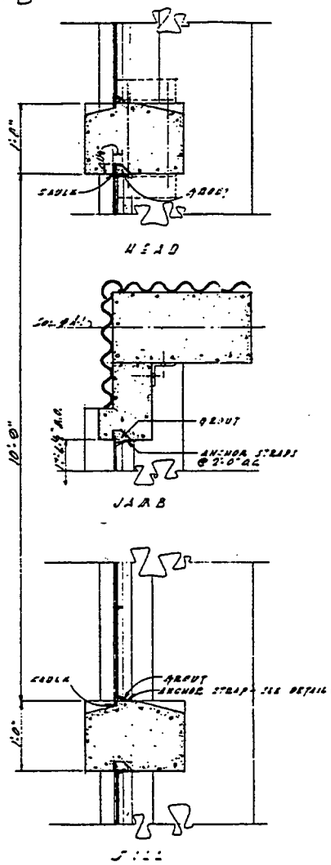
PLOT PLAN



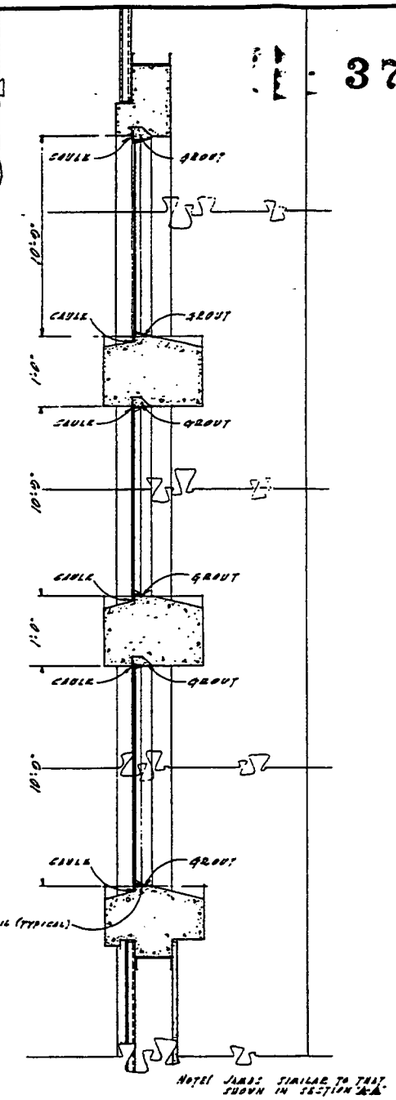
WEST ELEVATION
SCALE - 1/8" = 1'-0"

HEAD & JAMB ANCHOR DETAIL
FULL SCALE





SECTION "A-A"
SCALE - 1" = 1'-0"



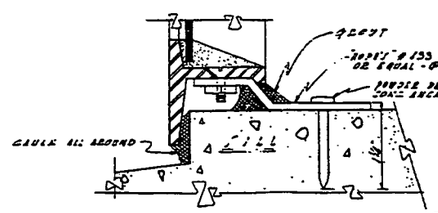
SECTION "B-B"
SCALE - 1" = 1'-0"

GENERAL NOTES

1. MULLIONS FOR NEW WINDOWS SHALL CONFORM TO AISC RECOMMENDATION FOR WINDOWS 8 LIGHTS HIGH.
2. EXISTING WINDOWS ARE "DUCO" STL. CASE PIVOT WINDOWS.
3. ALL WINDOWS ARE TO BE SECURELY ANCHORED AS SHOWN OR SUCH OTHER METHOD UPON APPROVAL BY N.L.O. ENG.
4. EXISTING GROUT IN JAMB & HEAD NOTCH TO BE REMOVED BEFORE SETTING WINDOWS.
5. ALL WINDOW OPENING DIMENSIONS TO BE FIELD CHK'D BEFORE FABRICATION.
6. ALL WELDING TO BE IN ACCORDANCE WITH AWS STANDARDS.

WINDOW SCHEDULE

MARK	SIZE	DESCRIPTION	CATALOGUE NO.	WORK TO BE DONE	REMARKS
A-1	17'-2½" × 10'-0"	FIXED	2-A38, 1-A6	REPLACED (NEW)	SPRING LATCH & CHAIN
B-2	13'-2½" × 10'-0"	PIVOTED	2-A482415	REVAMP (EXISTING SASH BENT)	- - -
B-3	- -	-	-	REPLACED (NEW)	- - -
C-4	- -	FIXED	2-A48	REPLACED (NEW)	- - -
B-7	- -	PIVOTED	2-A482415	REVAMPED (EXISTING SASH BENT)	- - -
B-2	- -	-	-	REPLACED (NEW)	- - -
C-5	- -	FIXED	5-A48	REPLACED (NEW)	- - -



SILL ANCHOR DETAIL
FULL SCALE

DESIGN APPROVAL

DIVISION	SIGNATURE	DATE
[illegible]		
[illegible]		
PRODUCTION		
TECHNICAL		
MAINTENANCE	R.S. [illegible]	4-25-56

REF. DWG. NO.	REF. DWG. TITLE

NO.	REVISIONS	DATE	BY
1	ADDED MULLION DETAIL - SECTION "C-C"	5-2-56	V.K.K.

000163

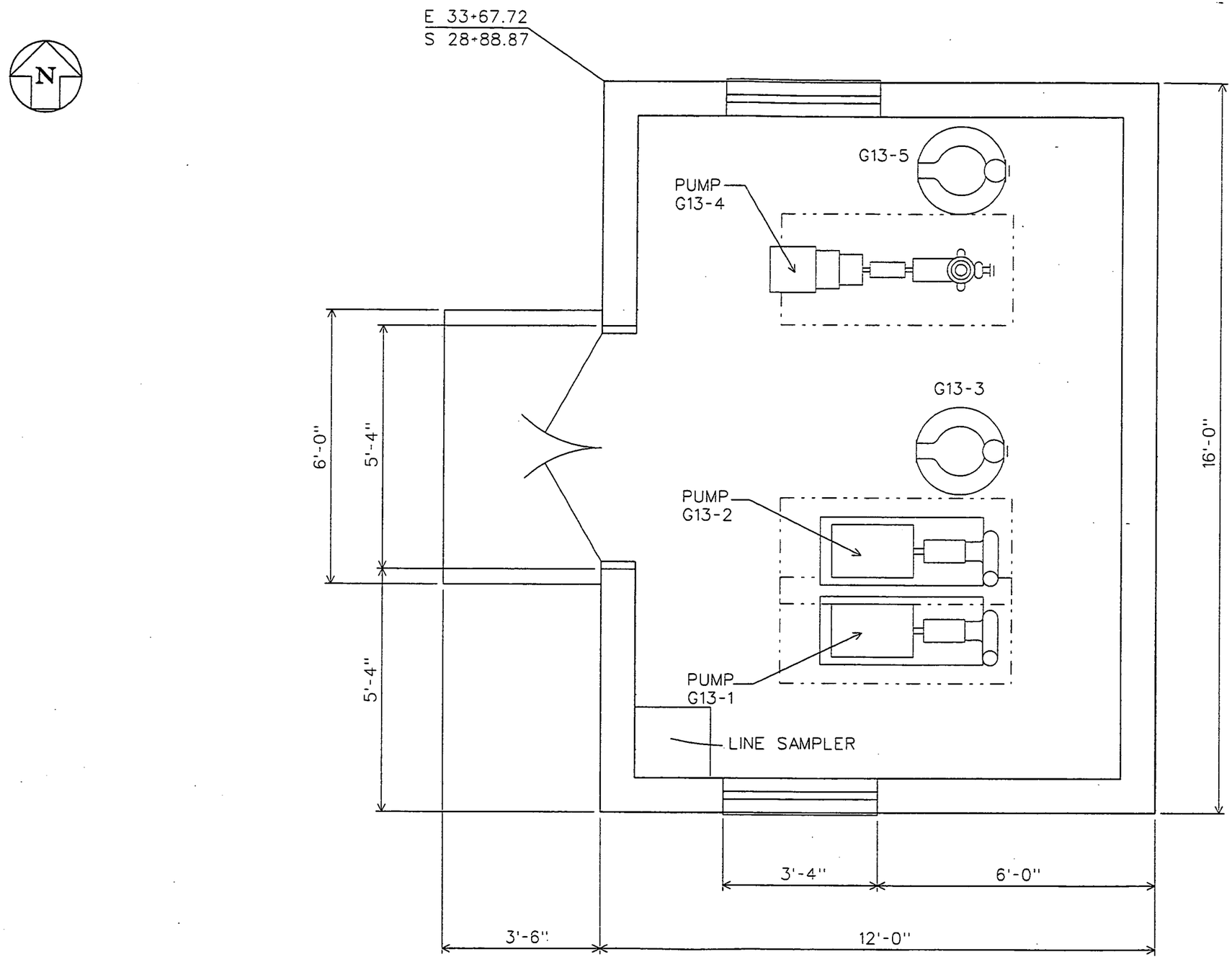
INDEX CODE			
PL. & AN.	DISC.	CL.	SER. NO.
13B	5500	A	00236

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

PILOT PLANT - EXTRACTION AREA
ARCHITECTURAL
FENESTRATION REPAIRS

DEPARTMENT: MECHANICAL
PROJECT NO. 13-76 | CP-F-56-25
DRAWN: V.K.K. | CHECKED: JSL | APPROVED: 4-27-56
TRACED: V.K.K.
DATE: April 26, 56
SCALE: 1" = 1'-0"
DWG. NO. 13-2048
REV. 1



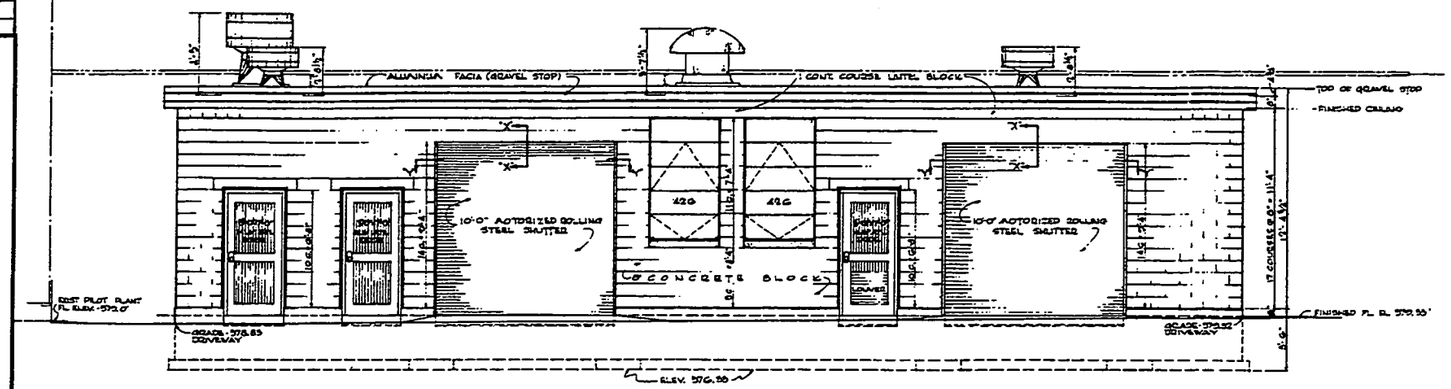
PLAN
EL. 579.0'

SKETCH #4234-3 PILOT PLANT PUMP HOUSE

FILE NAME: Res4234/Bldg_13c.dgn

13-4064

3701



EAST ELEVATION
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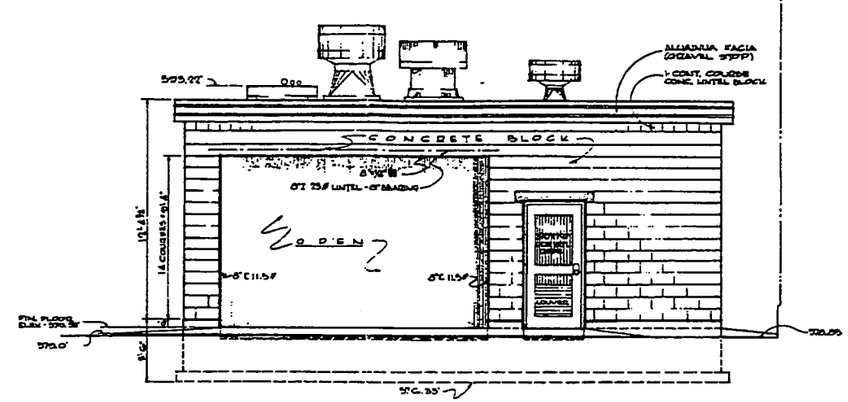

SOUTH ELEVATION
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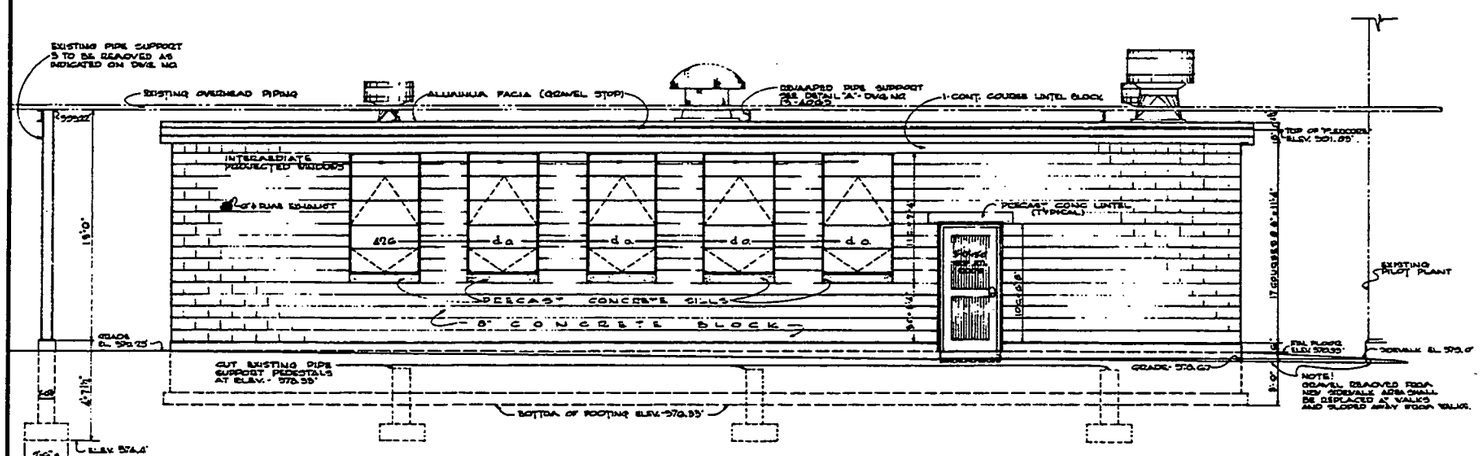
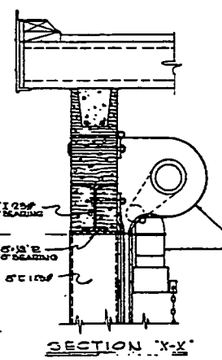


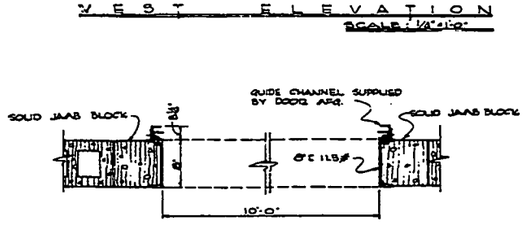
WEST ELEVATION
SCALE: 1/8" = 1'-0"

NORTH ELEVATION
SCALE: 1/8" = 1'-0"

000165



SECTION "X-X"



SECTION "Y-Y"

AUTOMATIC DOOR DETAILS
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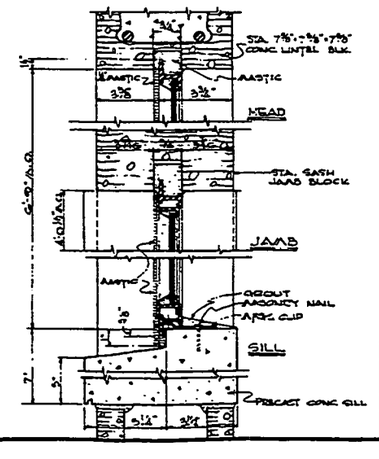

TYPICAL WINDOW DETAILS
SCALE: 3" = 1'-0"

INDEX CODE			
PL & AR.	ORIG.	CL.	SCR. NO.
13C	5500	A	00253

DESIGN APPROVAL		
DIVISION	SIGNATURE	DATE
[illegible]	[illegible]	7/19/50
[illegible]	[illegible]	7/19/50

NATIONAL LEAD COMPANY OF OHIO
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

U.S. ATOMIC ENERGY COMMISSION

MAINTENANCE SHOP & STORAGE BUILDING
ARCHITECTURAL
ELEVATIONS AND DETAILS

DEPARTMENT TECHNICAL			
PROJECT NO. 19-75	CP-F-5G-27		
DRAWN V.N.H. / TRACED	CHECKED J.D.L. 7-5-50 / APPROVED [illegible]	REV. 0	
DATE 7-5-50	DWG. NO. 13-4064-A		
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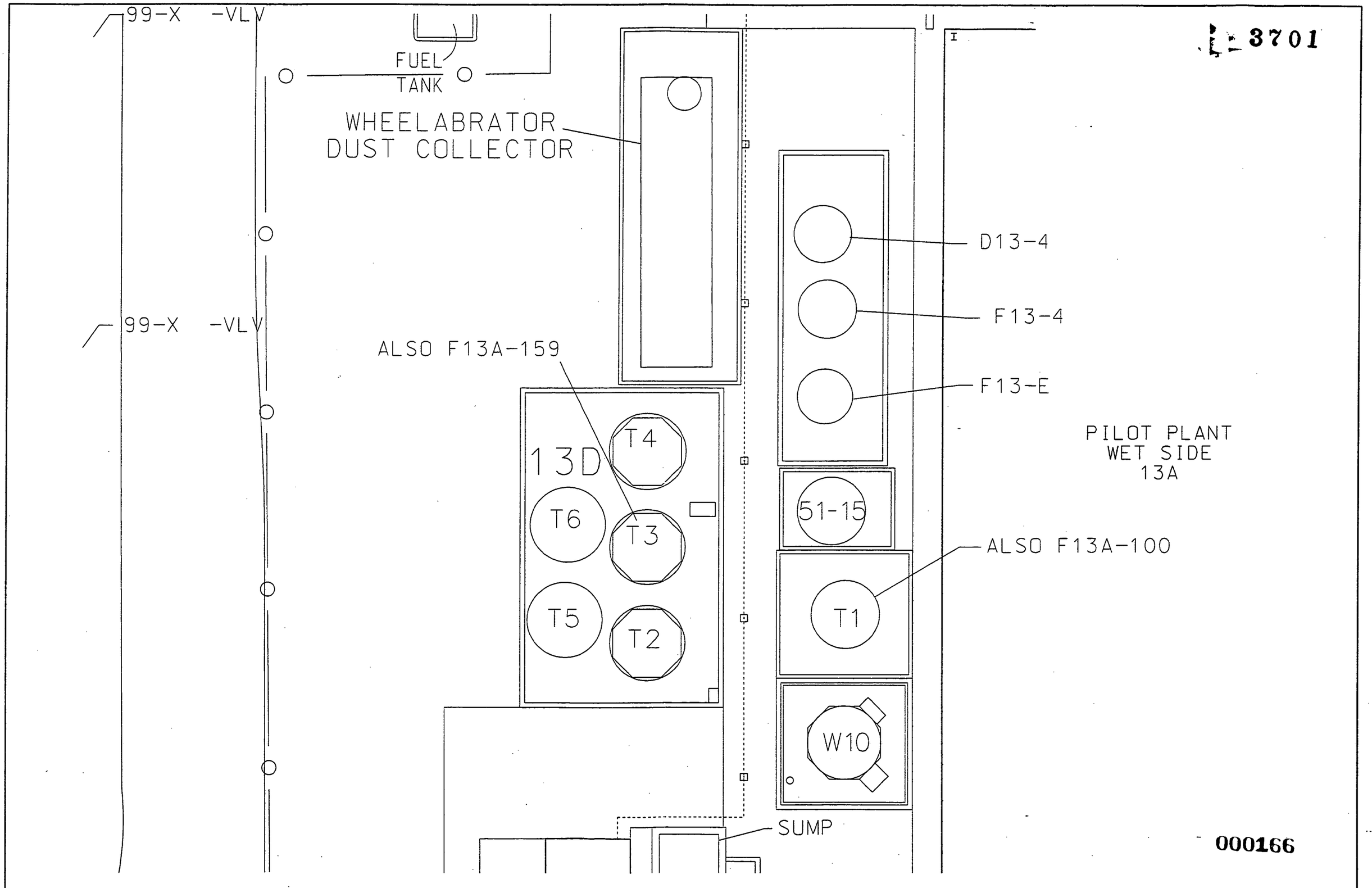
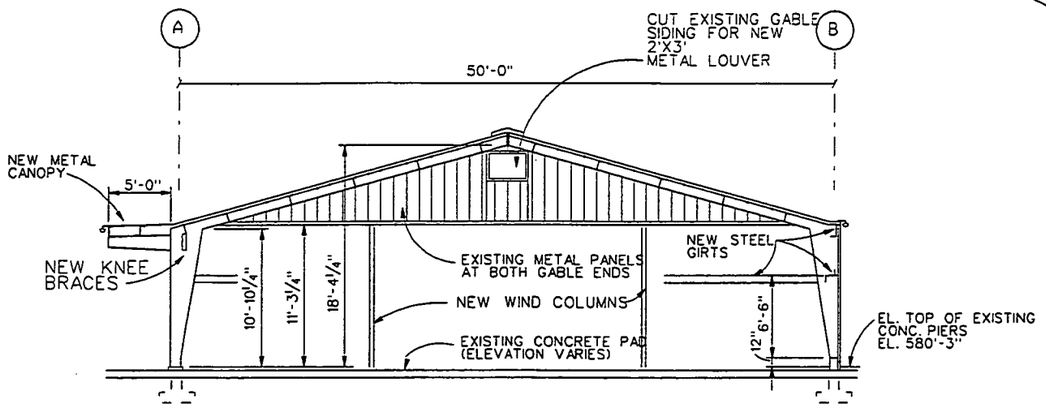
REF. DWG. NO.	REF. DWG. TITLE	NO.	REVISIONS	DATE	BY



SKETCH #4234-4 PILOT PLANT THORIUM TANK FARM

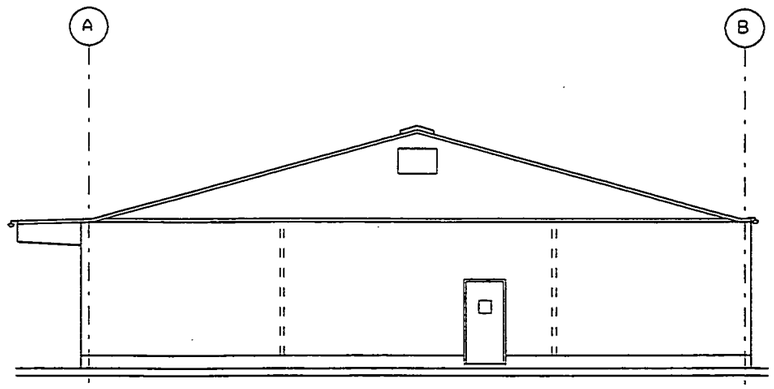
FILE NAME: Res4234/AREA13D.dgn

3701



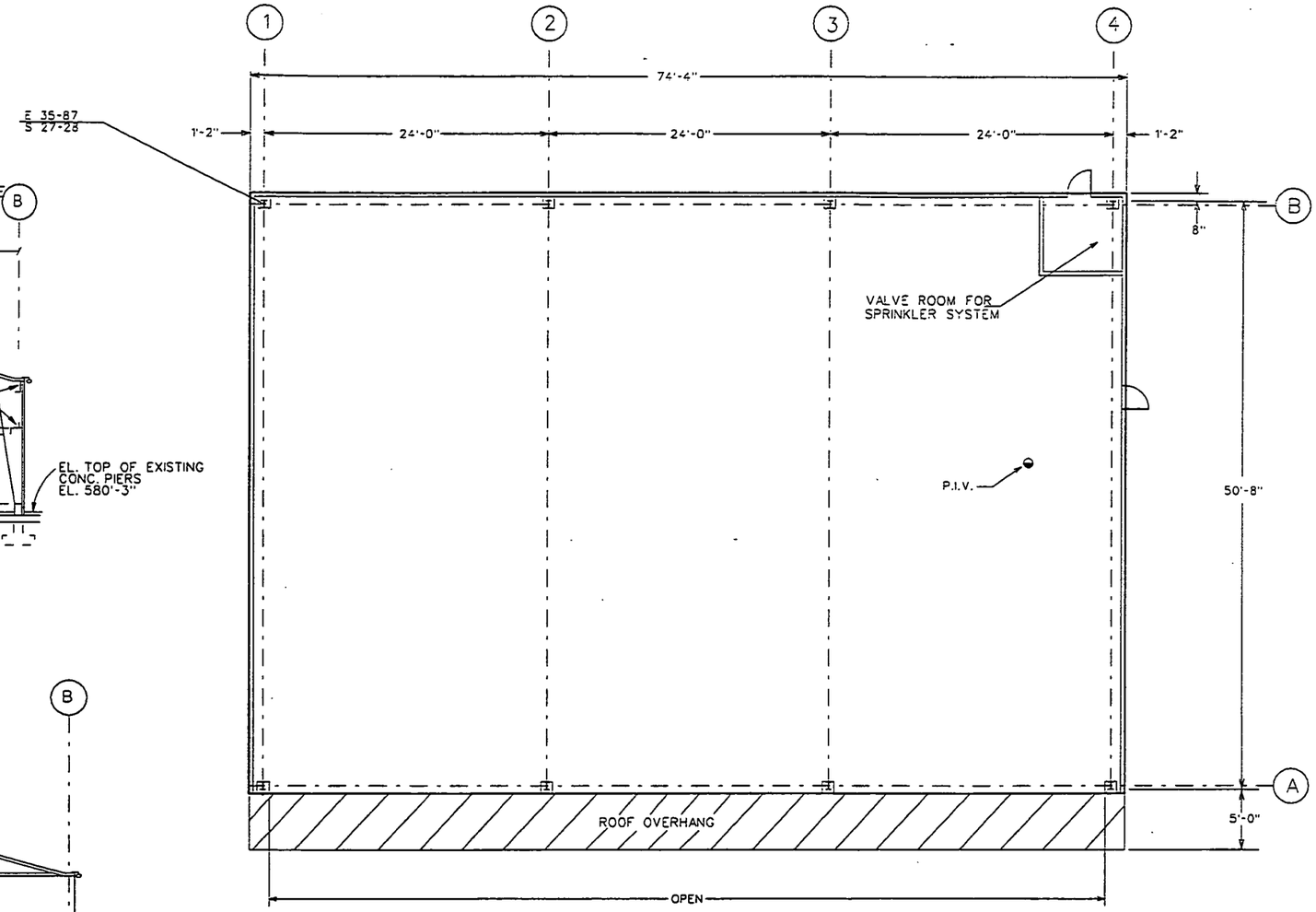
TRANSVERSE SECTION

SCALE: N.T.S.



EAST ELEVATION

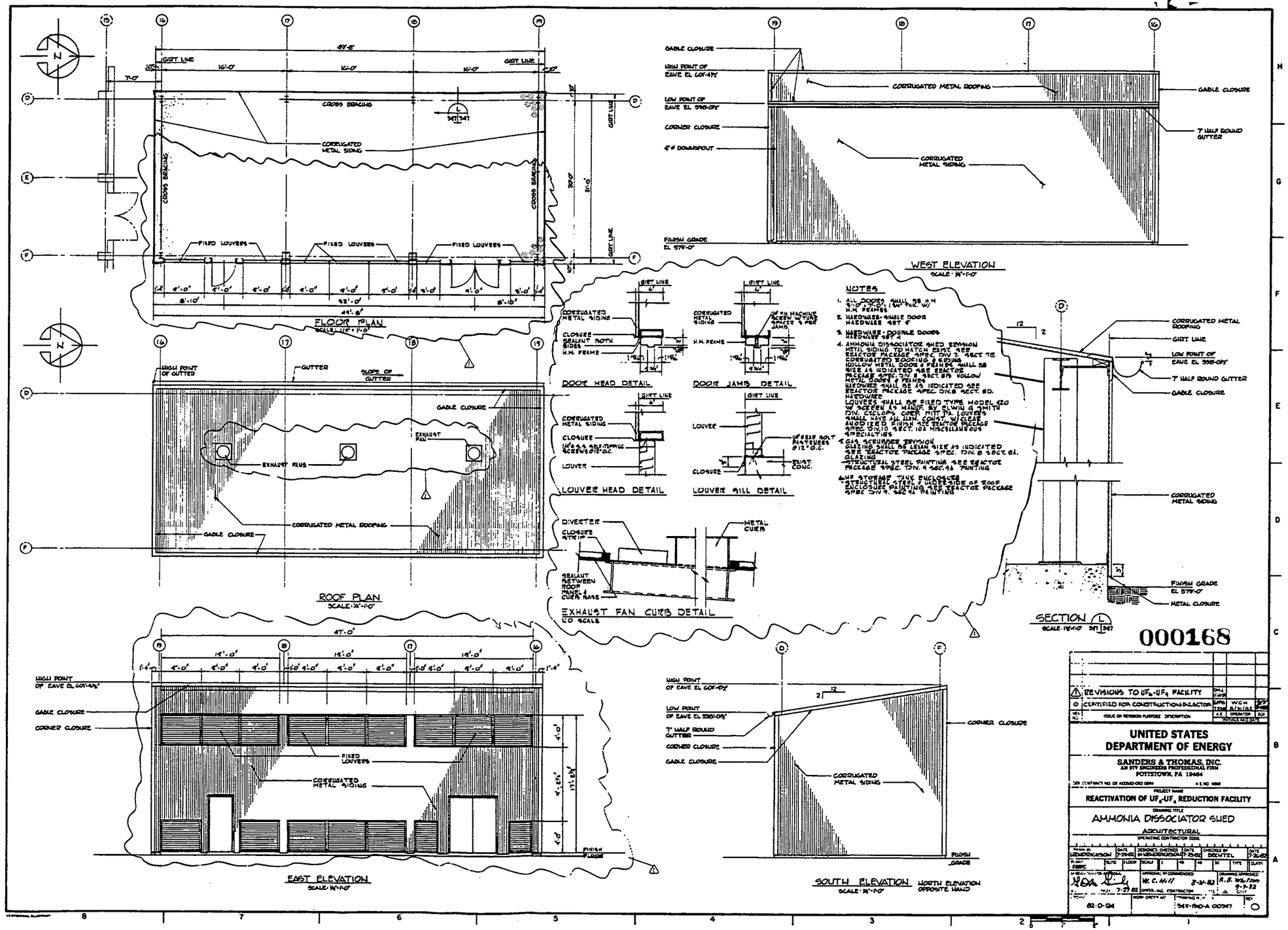
SCALE: N.T.S. NOTE: WEST ELEVATION SIMILAR BUT NO DOOR



000167

SKETCH #4234-5 PILOT PLANT SHELTER PLAN & ELEVATIONS

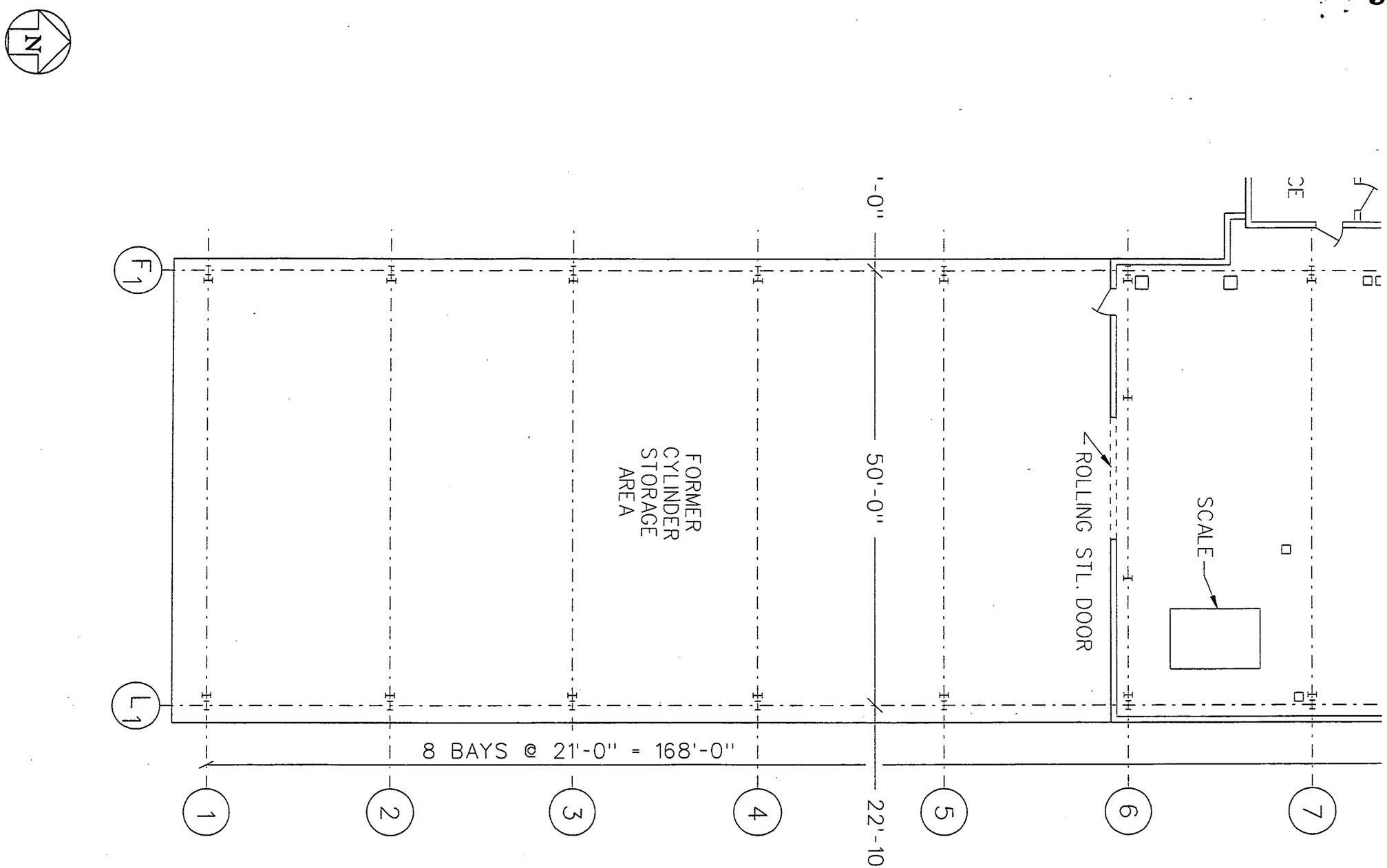
FILE NAME: Res4234/bldg54B.dgn



PILOT PLANT DISSOCIATION SHELTER PLAN & ELEVATIONS

FILE NAME: Res4234/bldg54C.dgn

3701



000169

SKETCH #4234-8 PILOT PLANT PAD

FILE NAME: Res4234/area74U.dgn

APPENDIX E

PHOTOGRAPHS

A number of photographs were compiled for the Pilot Plant Complex D&D project. The Building/Component/Location (exterior or interior) for each photograph is identified below:

Page 1 Top – Pilot Plant Aerial, southwest looking northeast
Page 1 Bottom – Pilot Plant Aerial, south looking north
Page 2 Top – Pilot Plant Aerial, north looking south
Page 2 Bottom – Pilot Plant Aerial, northeast looking southwest
Page 3 Top – Building 13A Exterior, south side
Page 3 Bottom – Pilot Plant Aerial, west looking east
Page 4 Top – Building 13B Exterior, northwest corner
Page 4 Bottom – Building 13A Exterior, south side
Page 5 Top – Building 54A Exterior, north side
Page 5 Bottom – Component 13D, southwest looking northeast
Page 6 Top – Building 54A Interior
Page 6 Bottom – Building 54A Interior
Page 7 – Building 37 Interior, looking southeast

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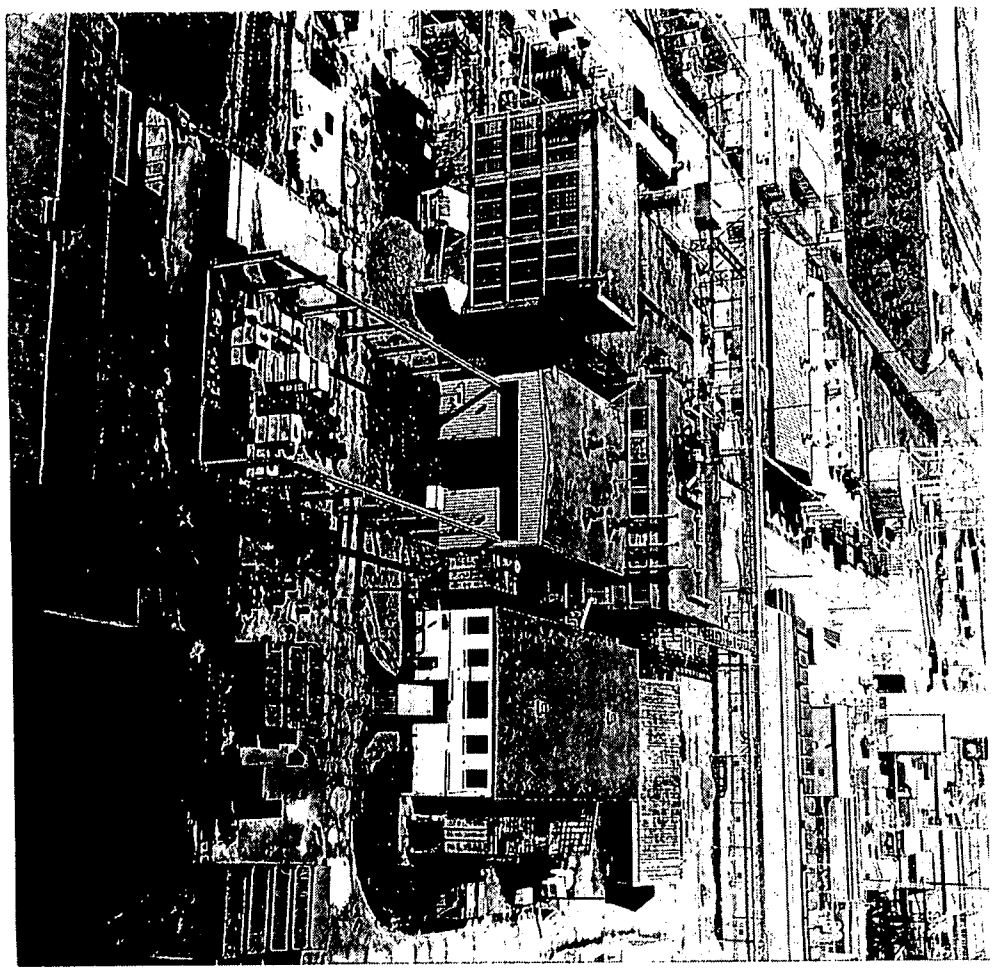
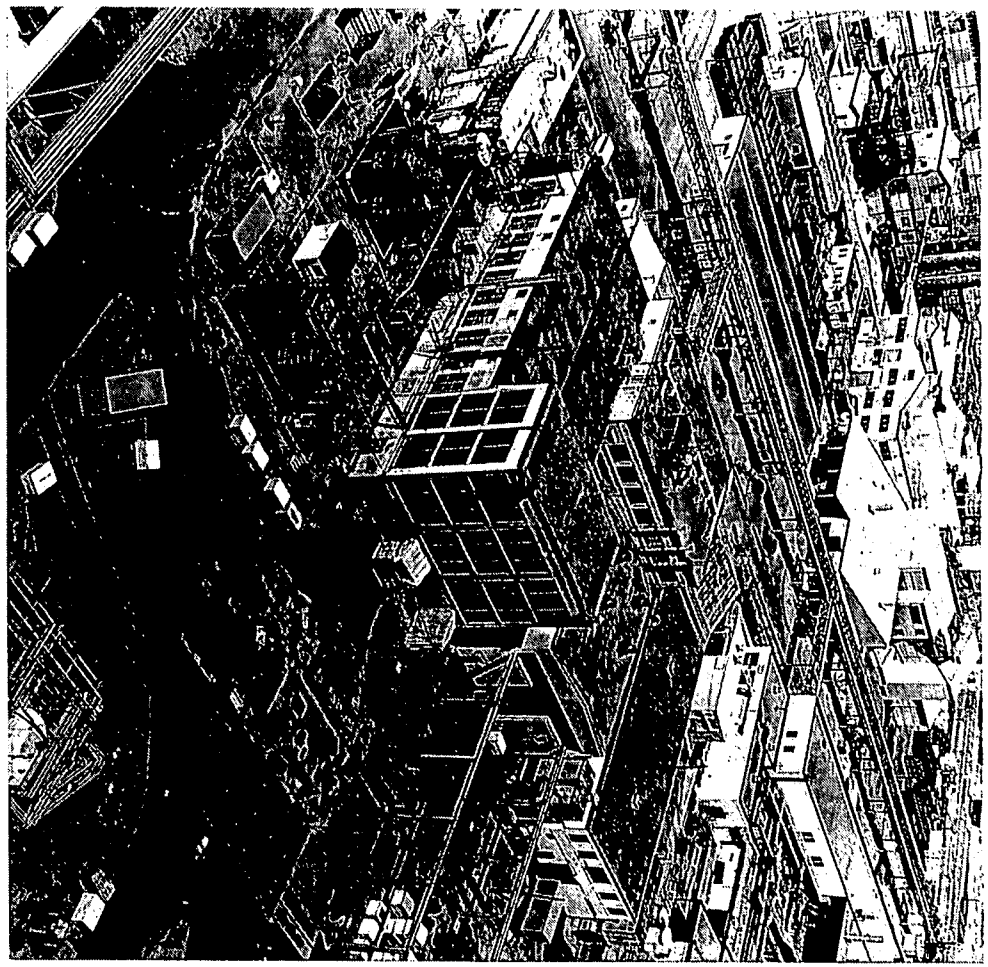
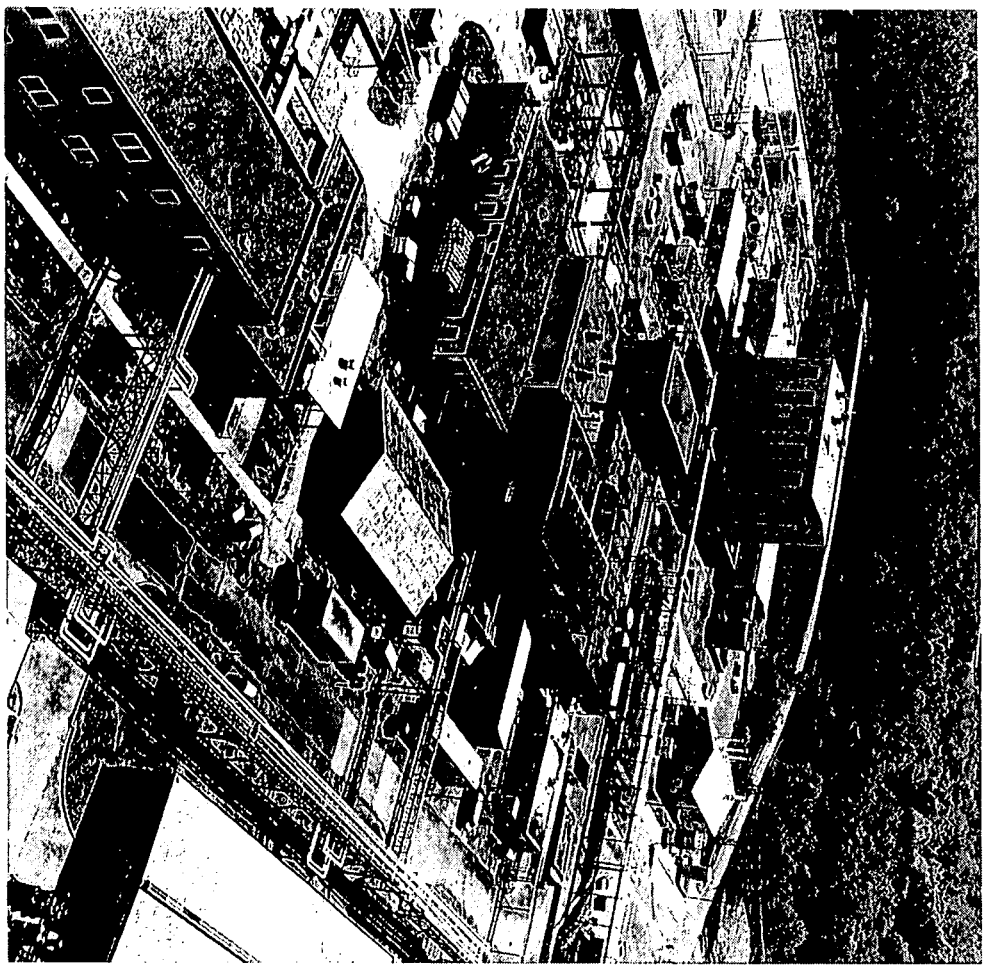


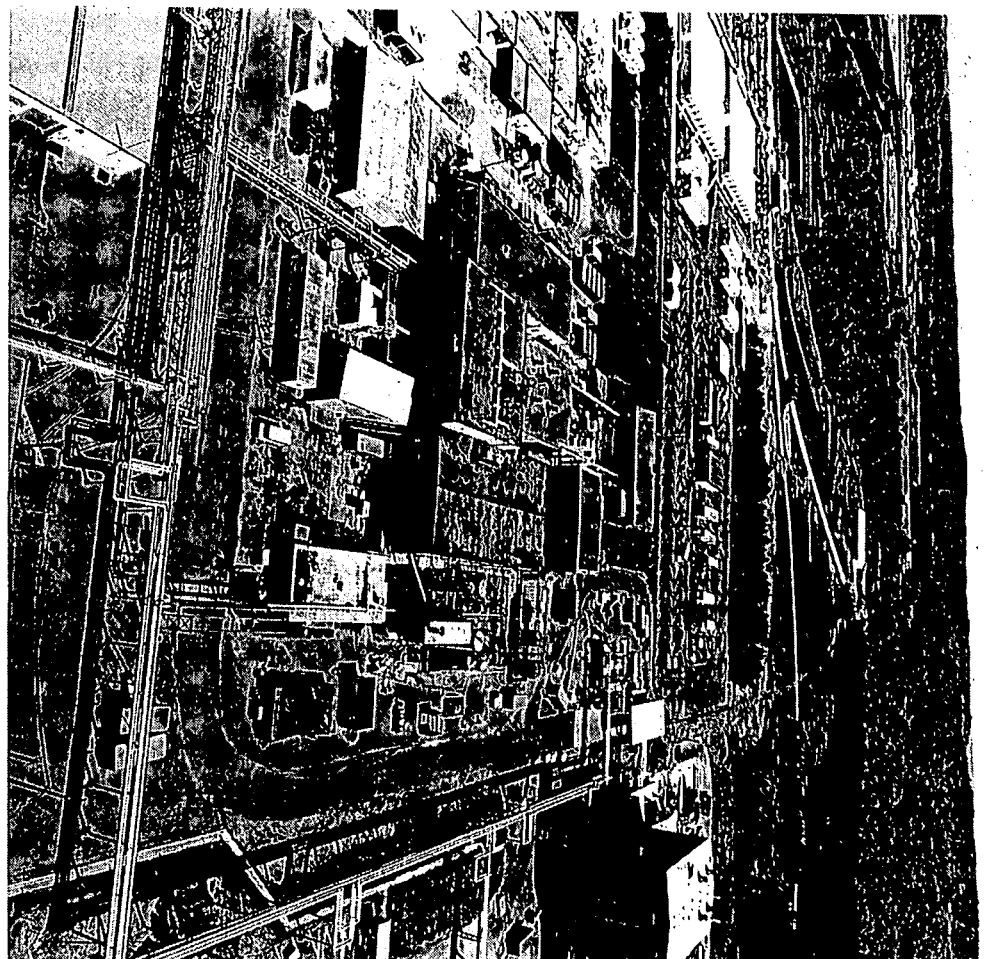


PILOT PLANT COMPLEX

000172

3701





PILOT PLANT COMPLEX

000173

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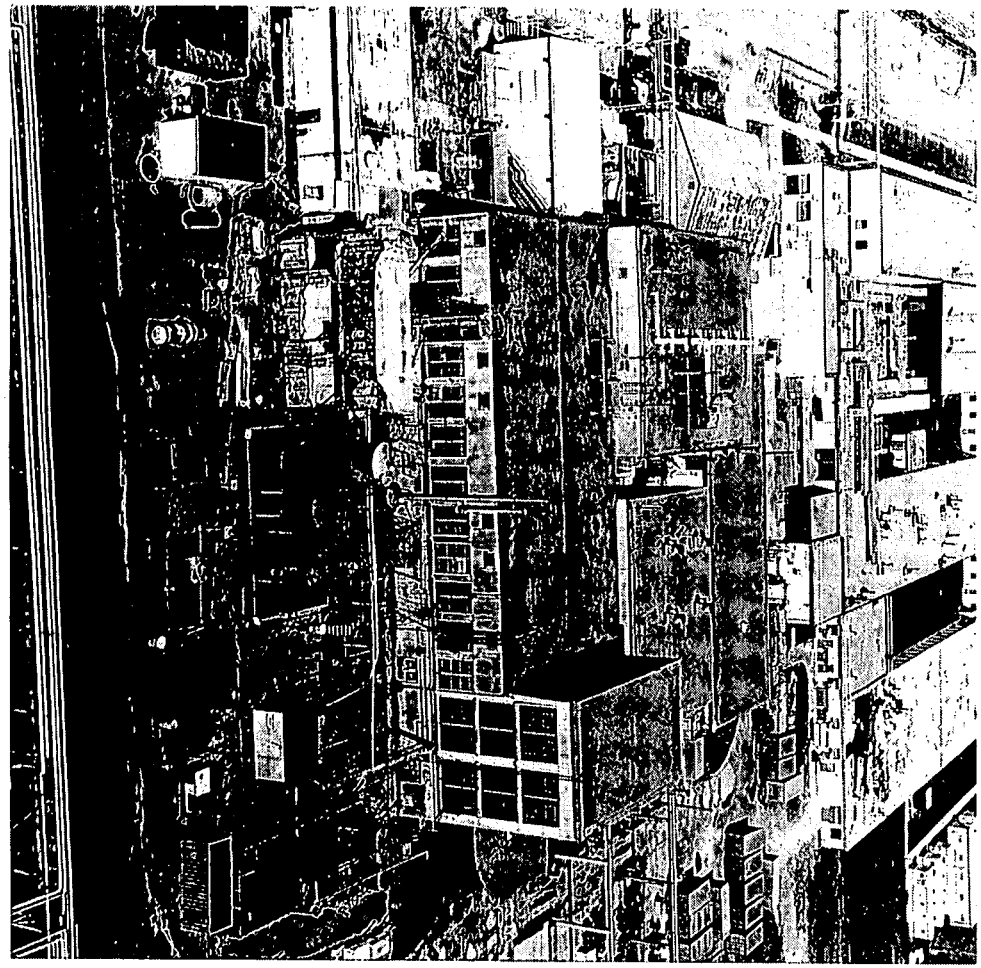
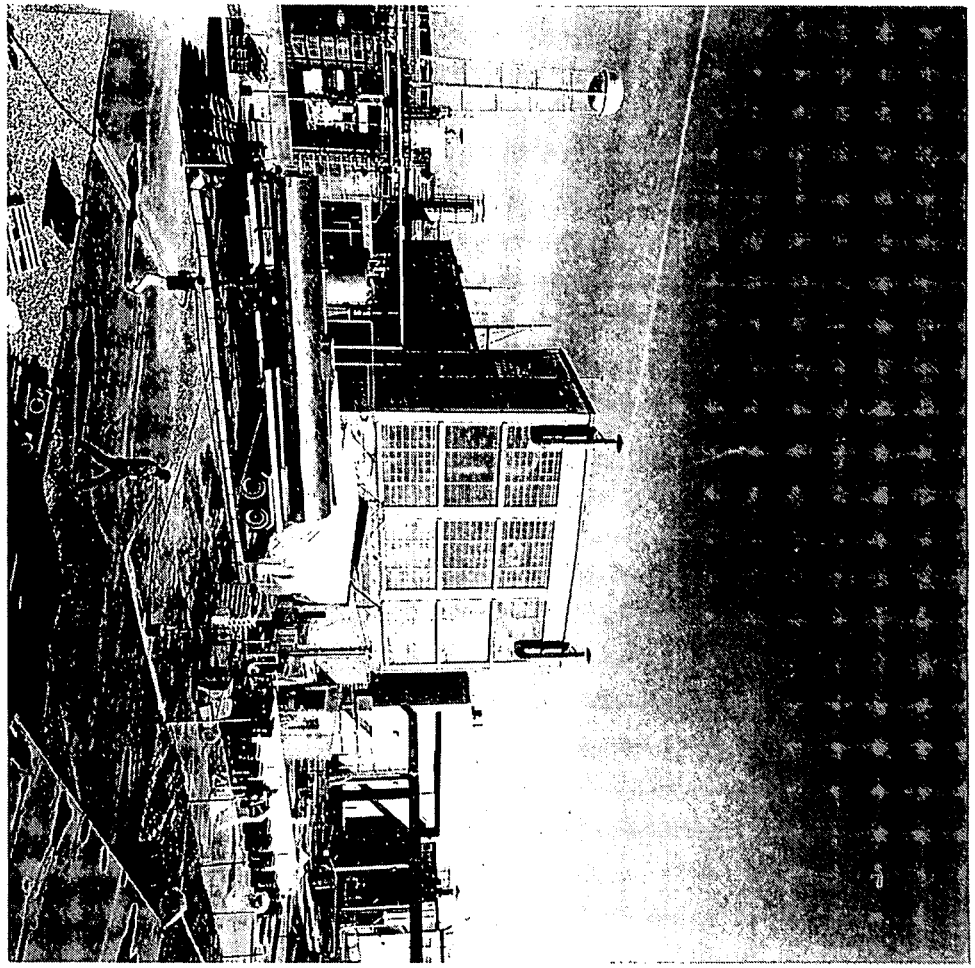
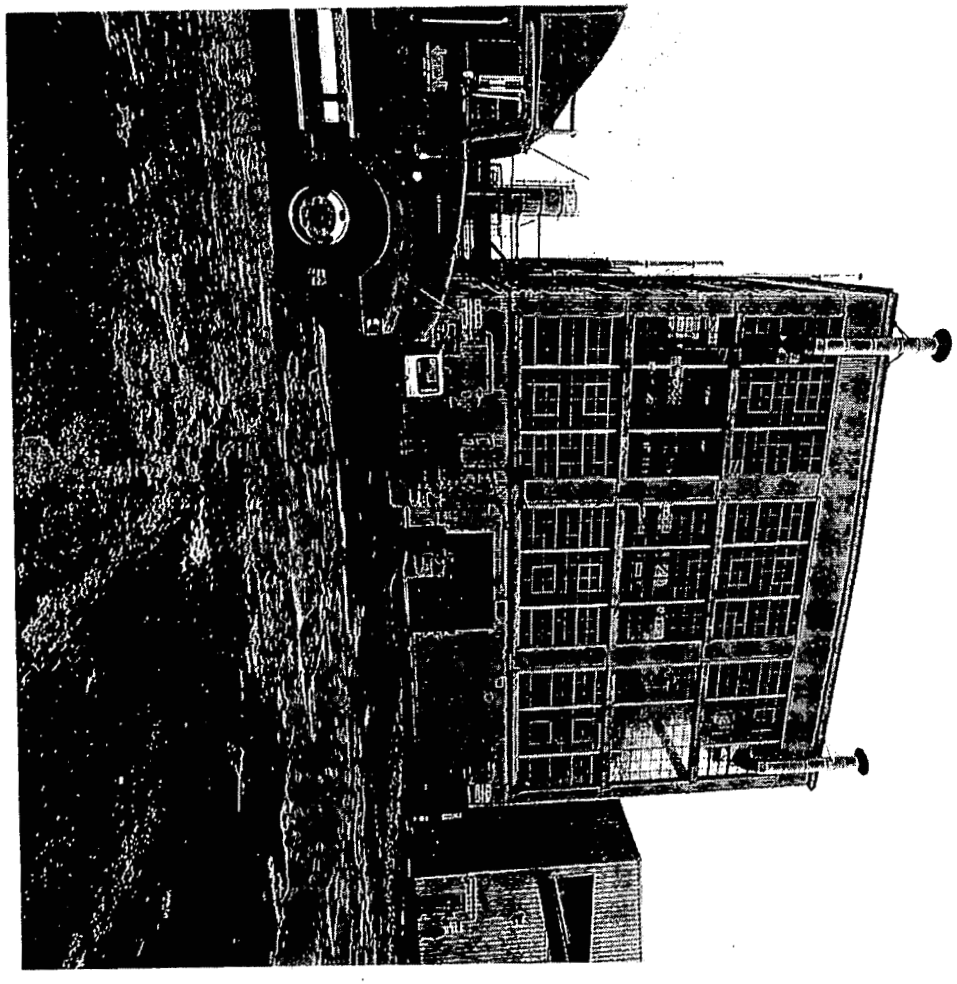


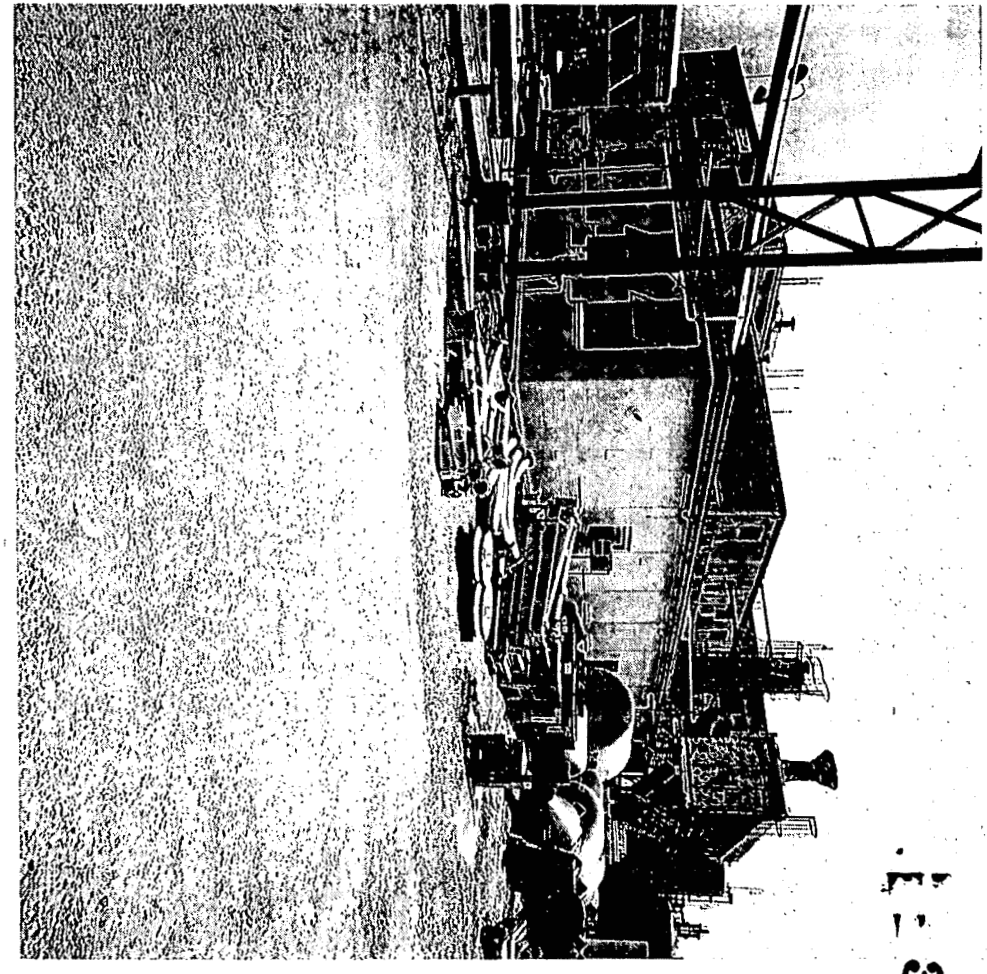


PILOT PLANT COMPLEX

000174

37011

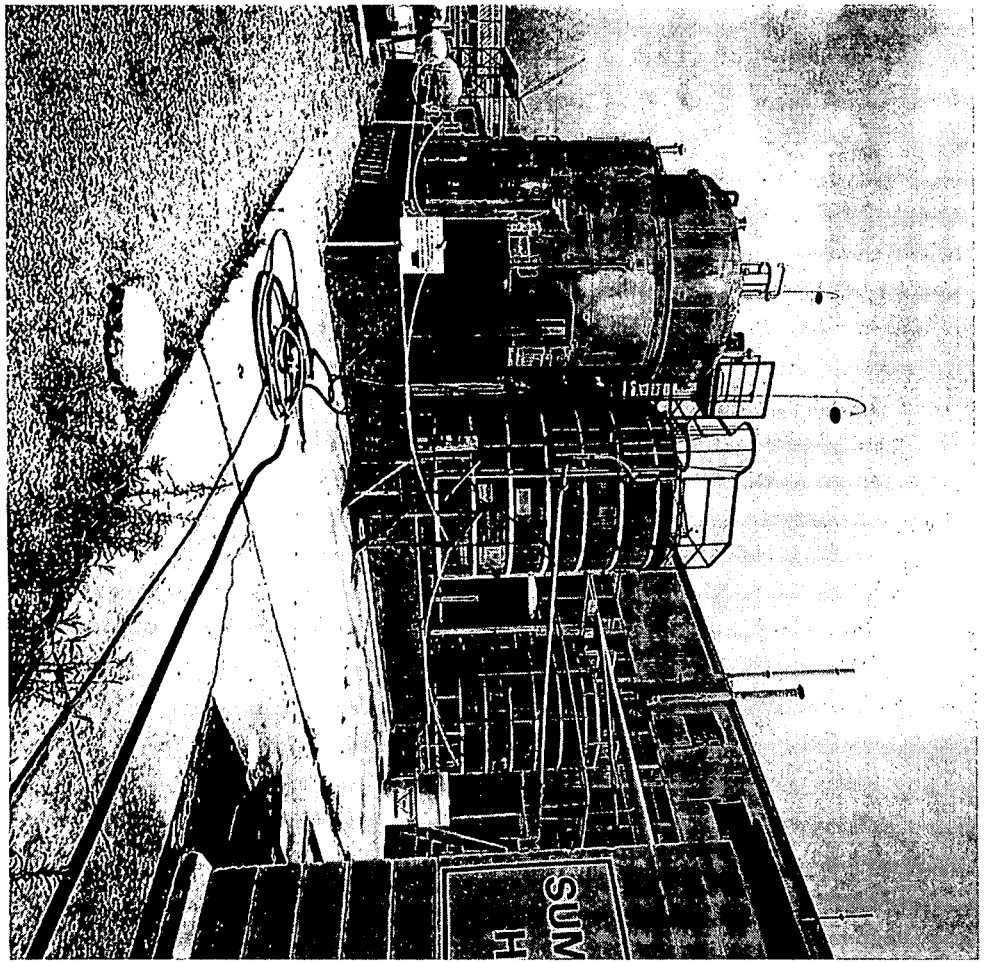


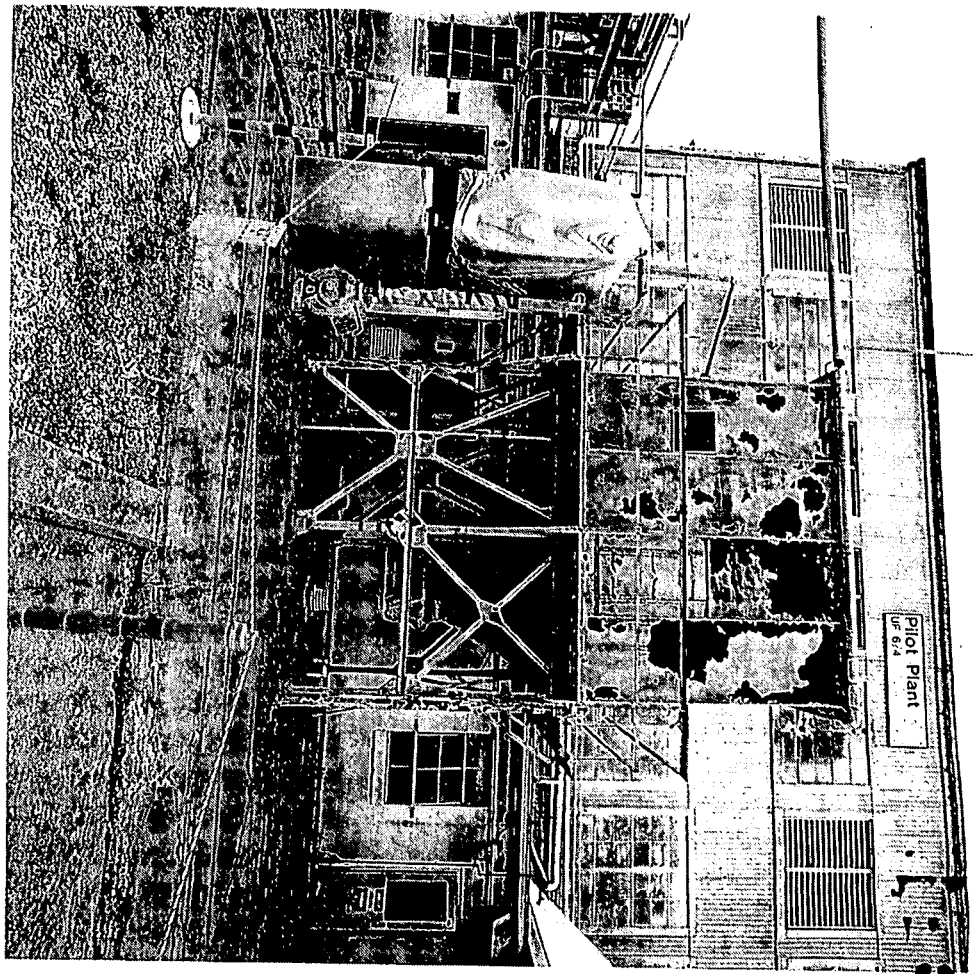


PILOT PLANT COMPLEX

000175

E-3701





PILOT PLANT COMPLEX

000176

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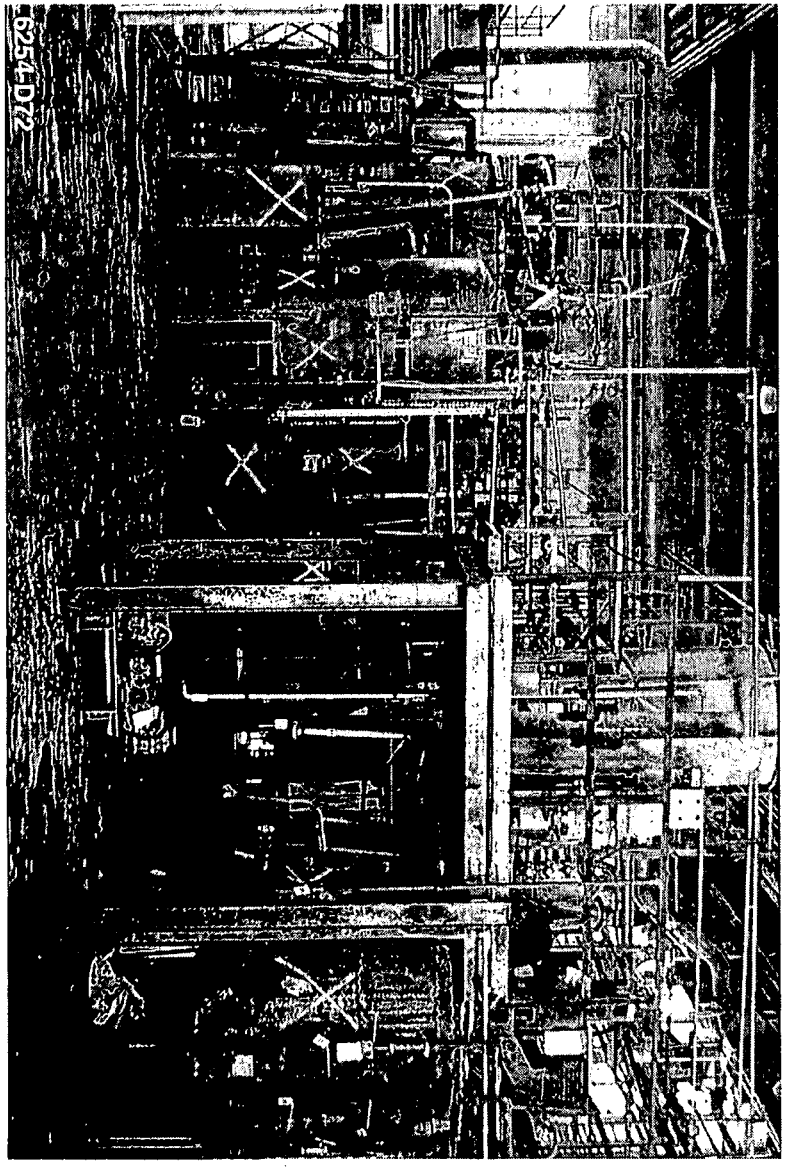
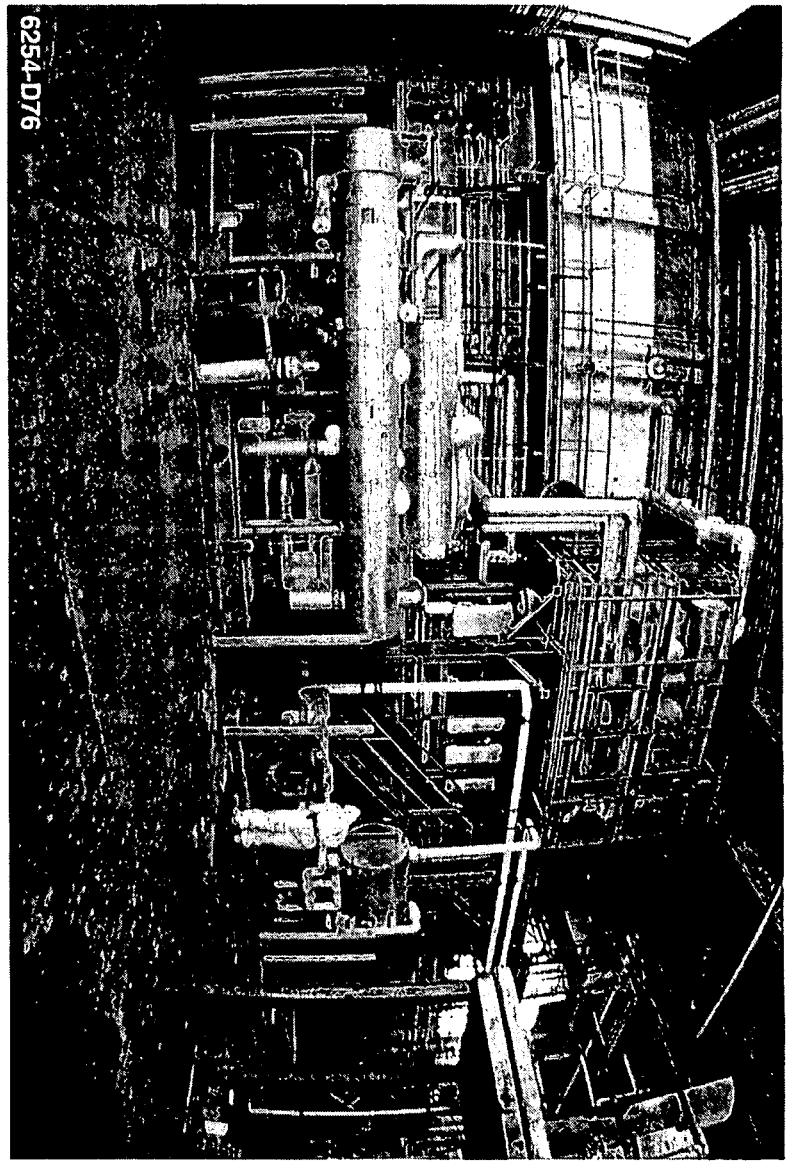
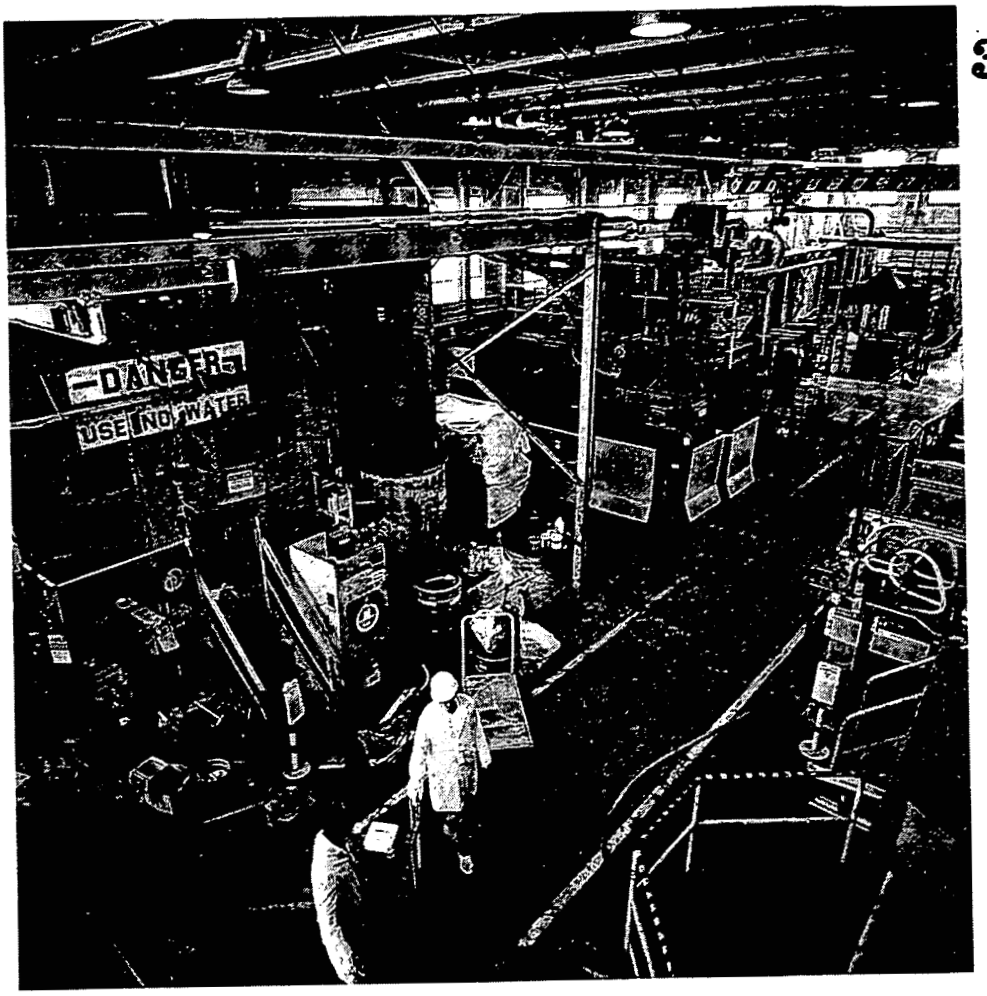




PILOT PLANT COMPLEX

000177

F 8701



PILOT PLANT COMPLEX