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Department of Energy

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MAR 04 1998

DOE-0531-98

Mr. Gene Jablonowski, Remedial Project Manager
U.S. Environmental Protection Agency
Region V, SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

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

Dear Mr. Jablonowski and Mr. Schneider:

SUBMITTAL OF IMPLEMENTATION PLAN FOR SCABBLING OF THE PLANT 8 MUFFLE FURNACE AREA

The purpose of this letter is to submit the enclosed document, "Focused Implementation Plan for the Surface Concrete Removal Demonstration in the Plant 8 Muffle Furnace Area," to the U.S. Environmental Protection Agency (U.S. EPA) and Ohio Environmental Protection Agency (OEPA) for review and approval. The enclosed implementation plan serves as the sole design documentation being submitted for regulatory approval, pursuant to the Operable Unit 3 (OU3) Integrated Remedial Design/Remedial Action (RD/RA) Work Plan; however, it is not one of the previously approved regulatory milestones identified in the work plan. This implementation plan is focused only on scabbling of the first floor of the Muffle Furnace Area, which is being performed independent of the Plant 8 Complex Decontamination and Dismantlement (D&D) project. Since the removal of that surface concrete is governed by the OU3 Record of Decision (ROD) for Final Remedial Action, regulatory approval is requested. Accordingly, this focused implementation plan has been prepared consistently with OU3 RD/RA strategies presented in the OU3 Integrated RD/RA Work Plan. Due to the focused nature of this remedial activity and the target start date of April 13, 1998, it is requested that the review and comment period for the regulatory agencies be limited to 30 days. Comments received within 30 days would allow the Department of Energy (DOE) to promptly resolve any concerns prior to the target start date for the demonstration.

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The implementation plan describes the applicable RD elements developed for the removal of approximately 1,148 square feet of the 1,705 square feet's footprint defined for the first floor of the Muffle Furnace Area. The OU3 ROD requires removal of the top inch of concrete in the Muffle Furnace Area of Plant 8 (among several other areas in OU3) and disposal of that waste off-site. This scabbling activity is being implemented under the site's agreement with the DOE Office of Science and Technology, Deactivation and Decommissioning Focus Area. This agreement allows the Fernald Environmental Management Project (DOE-FEMP) to demonstrate new and innovative, proven technologies under the Large Scale Technology Demonstration Project. Previous field demonstrations under that project began at the FEMP in 1996 during the Plant 1 Complex - Phase I D&D project, and were documented in the Plant 1 Complex - Phase I Project Completion Report.

It should be noted that the primary focus of the concrete scabbling activity is for technology demonstration. Based on an initial evaluation of the scabbling technology, Centrifugal Shot Blasting, it appears that approximately 30 percent of the concrete surface area for the first floor of the Muffle Furnace Area will not be accessible at this time due to the stand-off distance (i.e., accessibility near vertical barriers and other immobile obstructions) of the particular equipment being demonstrated. As such, the implementation plan does not make any claims to be able to complete the concrete removal requirement for the first floor of the Muffle Furnace Area under this demonstration. The Plant 8 Complex D&D project will be designed to complete all remaining concrete scabbling.

If you have any questions, please contact Art Murphy at (513) 648-3132.

Sincerely,

Johnny Reising

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Murphy

Enclosure: As Stated

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FOCUSED IMPLEMENTATION PLAN FOR SURFACE CONCRETE REMOVAL DEMONSTRATION IN THE PLANT 8 MUFFLE FURNACE AREA

FEBRUARY 1998

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U. S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

DOCUMENT CONTROL NO. 2503-PL-0005 (REV. B)

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FOCUSED IMPLEMENTATION PLAN FOR SURFACE CONCRETE REMOVAL DEMONSTRATION IN THE PLANT 8 MUFFLE FURNACE AREA

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ATTACHMENTS

Attachment 1 Floor Plan of Muffle Furnace Area
Attachment 2 Photographs

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1.0 INTRODUCTION

1.1 Project Statement

In accordance with the strategy for implementing remedial action for Operable Unit 3 (OU3) at the Fernald Environmental Management Project (FEMP), pursuant to the OU3 Integrated Remedial Design/Remedial Action (RD/RA) Work Plan (DOE 1997), this focused implementation plan has been prepared to document applicable engineering design elements and implementation strategies for the removal of a specified quantity of surficial concrete from the first floor of the Plant 8 Muffle Furnace Area. The removal and off-site disposition of the top inch of concrete from the first floor of the Plant 8 Muffle Furnace Area was identified as a requirement, among several other areas in OU3 that contain the highest levels of technetium-99 (Tc-99) in debris, in the OU3 Record of Decision for Final Remedial Action (ROD) (DOE 1996). The OU3 Integrated RD/RA Work Plan further specified the removal and off-site disposition of this concrete.

Although the decontamination and dismantlement (D&D) of the Plant 8 Complex, which includes the Muffle Furnace Area, is not planned for project implementation until fiscal year 2002, decontamination activity in support of that D&D project is being accelerated as a result of a U.S. Department of Energy (DOE) field technology demonstration initiative. The decontamination activity includes the removal of the top inch of most of the concrete from the first floor of the Muffle Furnace Area, which is estimated to include approximately 1,148 square feet of the 1,705 square feet footprint defined for that first floor process area. The field demonstration of new and innovative, proven technologies is sponsored by the DOE Office of Science and Technology, Deactivation and Decommissioning Focus Area - Large Scale Technology Demonstration (LSTD) Project. Other field demonstrations under this program began at the FEMP in 1996 during the Plant 1 Complex - Phase I D&D project and were documented in the Project Completion Report for that project (DOE 1998).

The three primary reasons for implementing this field demonstration at this time are to:

- continue to meet the FEMP's commitment for LSTD demonstrations under a 1995 agreement between the site and the DOE Office of Science and Technology;

- apply a recently developed and proven technology to an area in OU3 that can benefit from such technology to meet a requirement of the OU3 ROD for Final Remedial Action; and

- act in accordance with DOE's statement in the Responsiveness Summary of the OU3 ROD that "DOE is thoroughly committed to the review-and-improve philosophy...and will continue to invest in technology advancement to benefit its remediation projects."

1.2 Scope of Work

The technology chosen for the demonstration is called Centrifugal Shot Blasting. The demonstration will provide an opportunity to assess an in situ approach to volumetric decontamination of concrete floor surfaces. The objectives of the demonstration include the following:

- reduction in the quantity of concrete that will be handled for disposition offsite;
- reduction in the amount of secondary waste that will be generated during the decontamination process;
- provide a cost effective concrete decontamination process; and
- provide a direct comparison to baseline concrete removal technologies.

The specific scope of work includes the removal of the top inch of concrete in the first floor of the Muffle Furnace Area (Process Area 4) of Plant 8, an area having dimensions of approximately 31 feet x 55 feet. Due to a stand-off limitation of the technology around vertical obstructions (e.g., fixed columns) and floor anomalies (e.g., trench grating), it is estimated that only 1,148 square feet of the 1,705 square feet in the Muffle Furnace Area will be removed using this technology. Removal of the top inch from the estimated 557 square feet of remaining concrete will be performed in conjunction with the D&D subcontract associated with the Plant 8 Complex. The implementation plan for the D&D of the Plant 8 Complex will specify the requirement to remove all remaining surface concrete down to one inch for the remaining Muffle Furnace Area, including both first and second floors.

The centrifugal shot blasting technology will remove and collect waste produced during the removal of the concrete while also controlling the potential spread of contamination in the operating area using built-in engineering controls and operating procedures.

1.3 Project Area Description

The first floor of the Muffle Furnace Area was delineated in the OU3 Remedial Investigation/Feasibility Study (RI/FS) Work Plan Addendum (DOE 1993), which was described in text in Section D.9.3.12 and illustrated in Figure 8A-1 as Process Area 4. From that process area definition, a more detailed plan view of the project area was prepared during project design and is shown as Attachment 1 (Drawing No. 08X-5500-X-03726). Three photographs of the project area are shown in Attachment 2.

The Muffle Furnace Area includes a single-hearth furnace built in the 1950s, which was used only for a three-week test period in 1983 and was closed in-place in 1985. The furnace was operated with variable retention times to obtain complete oxidation of the feed material. Materials fed into the furnace during the 1983 test period included off-specification green salt and filter cake with a high lime content. Upon completion of the test, the furnace was run to "dead bed", thereby recovering end product — calcium uranate. The end product was returned to the production operation in the Ore Refinery Plant.

As a result of the OU3 ROD adoption of 105 grams of Tc-99 (a trace impurity in recycled uranium) as the allowable mass for on-property disposal of OU3 debris, the OU3 ROD identified the areas in OU3 having the greatest source terms of Tc-99. Since the Muffle Furnace Area of Plant 8 was found to contain a significant quantity of Tc-99, it was identified as one of the four areas in OU3 that would have to undergo surface concrete removal prior to disposing of the remaining concrete in the On-Site Disposal Facility (OSDF). Since only the first floor of the Muffle Furnace Area will be scabbled under this technology demonstration, surface concrete residing on the second floor of this process area will take place under the scope of the Plant 8 Complex D&D project.

2.0 PROJECT EXECUTION

2.1 Preparatory Actions

Safe shutdown of Plant 8 is ongoing, as of the preparation of this document, but is expected to be complete by mid-March 1998. Safe Shutdown preparation includes removal of any hold-up material present in process equipment and conveyance lines, removal of salvageable equipment, utility disconnection, and sealing building openings to ensure a contained work environment.

The technology demonstration subcontract will be written in a manner similar to OU3 D&D subcontracts, whereas the subcontractor will have to adhere to the performance specifications (discussed in Section 2.2) included in the procurement documentation. Under the subcontract statement of work (SOW), the technology subcontractor will prepare a work plan, subject to FEMP review and approval, that describes the specific system design for removing concrete. The work plan will describe methods and equipment for removing concrete, including equipment to be used for controlling, filtering, and collection of waste generated during removal activities. The work plan will also describe the methods and equipment used to contain contaminants. The subcontractor will also submit for review the manufacturer's technical information on all materials to be used, including the intended use and application instructions.

2.2 Method/Equipment Requirements

The subcontractor will be required to supply a system with all equipment necessary to remove the top inch of concrete over as much of the first floor in the Muffle Furnace Area as possible given the limitations of the technology, including equipment to control, filter, and collect waste generated from the process. The specifications for the concrete removal system include the following features:

- integral vacuum system with pre-filters and high efficiency particulate air (HEPA) filters;
- controlled, dustless process;
- no use of water on surfaces that would allow Tc-99 to migrate;
- equipment shall be portable;
- equipment should be easily decontaminated for free-release after project completion;
- equipment shall implement waste management technology that minimizes secondary waste; and
- the equipment shall have a vacuum design that allows the operator to fill, seal, remove, and replace the waste collection drum under negative pressure vacuum conditions/enclosures.

The subcontractor will also be required to satisfy the following requirements:

- provide method(s) and equipment necessary to remove concrete to within twelve inches, with a goal of reaching within ten inches, of vertical barriers such as curbs, piers, and walls;
- identify, supply, and erect local containment in accordance with applicable project specifications for ventilation and containment;
- provide all replacement filters, gaskets, and hand tools, as needed; and
- meet the requirements of 10 CFR 835 (Radiological Control).

The application of the Centrifugal Shot Blasting Technology will be performed in accordance with applicable D&D strategies developed for the OU3 Final Remedial Action, which are described in the OU3 Integrated RD/RA Work Plan. Specifically noted elements of the planning/design strategies for this demonstration are the incorporation of applicable performance specifications, including: (1) Debris/Waste Handling Criteria; (2) Removing/Fixing Radiological Contamination; and (3) Ventilation and Containment; and (4) Decontamination of Tools, Equipment, and Materials, into project plans. Health and Safety requirements are specified in a project Health & Safety Plan and Matrix, and radiological protection requirements will be specified in the Radiological Work Permit (RWP) that will be prepared shortly before activity begins.

2.3 Waste Management

Waste collection, handling, and management will be done in accordance with applicable provisions of the performance specification — Debris/Waste Handling Criteria, which has been incorporated into the project-specific Waste Management Plan. The performance specification — Debris/Waste Handling Criteria — is substantively identical to Specification 01120 included in Appendix B of the OU3 Integrated RD/RA Work Plan.

Waste estimates for this technology demonstration are listed below (category letter designations refer to the OU3 debris categories introduced in Table 2-2 of the OU3 Integrated RD/RA Work Plan):

- Category E (Concrete) = 96 cu. ft. (unbulked); 144 cu. ft. (bulked)
- Category I (Misc.) = 296 cu. ft. (unbulked); 740 cu. ft. (bulked)

Removed concrete will be collected in standard 55-gallon metal drums. Due to the weight restriction of 850 pounds for each drum, it is not expected that the scabbled concrete will fill a drum to volume capacity. Void space in these drums will be filled with personal protective equipment (PPE), which makes up the bulk of the Category I material. Based on technical data provided by a prospective supplier of Centrifugal Shot Blasting Technology, approximately one drum of steel shot (similar to "BBs") (also Category I debris) will be consumed during the process of removing the above-referenced concrete volume and become entrained in the pulverized concrete. The "consumed" steel shot becomes pulverized over successive use/cycles in the equipment until the shot is light enough in weight to be collected by the centrifugal separation mechanism and deposited in the self-contained waste drum. Any remaining steel shot will be handled as Tc-99 contaminated waste for off-site disposition.

All waste streams (Categories E and I) will be enclosed in 55-gallon drums and shipped off-site

to the DOE Nevada Test Site (NTS). The waste volume estimates noted above equate to approximately 35 55-gallon drums. The estimated 35 drums will be sealed, labeled, and transported from the waste queuing area (located in the project Laydown Area) to the designated interim storage location until off-site disposition can be performed. The Plant 1 Storage Pad has been identified as the preferred interim storage location for the drummed waste. Although a projected time frame for off-site disposition has not yet been determined, the drums will be put in the queue for off-site shipment along with other FEMP legacy wastes. Therefore, the duration for interim storage of Tc-99 contaminated wastes generated from this project depends on off-site shipment scheduling for legacy waste. The drummed waste will be tracked using the Sitewide Waste Information, Forecasting and Tracking System (SWIFTS), as described in Section 3.3.2.2 of the OU3 Integrated RD/RA Work Plan.

2.4 Air Monitoring

Radiological air monitoring will be performed in the work area to assess occupational airborne radioactivity exposure concentrations. Action limits will be specified in the RWP. A combination of breathing zone and general area sampling will be performed during the project to assess airborne radioactivity. Airborne radioactivity areas will be posted around locations that exceed 10 percent of the Derived Air Concentration (DAC) limits for the applicable isotopes. Based on results of industrial hygiene air surveillance during previous field demonstrations at other, non-FEMP test locations, the Centrifugal Shot Blaster has been shown to be very effective and reliable in collecting and filtering air. The efficient air contaminant capture and filtration characteristic of this system is due to the use of HEPA filtration. HEPA filtration is considered Best Available Technology (BAT) for particulate radiological air contaminants and it exceeds BAT for concrete dust. To ensure that the Centrifugal Shot Blasting system provides optimal air filtration for this project, it will be tested and certified through the site HEPA filter "DOP test" program.

CAP88PC modeling was performed for this activity. Results indicate that the potential effective dose equivalent for this activity is less than 0.1 mrem per year. Therefore, continuous environmental monitoring or sampling of the discharge of the vacuum system is not required and will not be performed. Periodic monitoring will also not be performed since the duration of the actual scabbling activity will be limited to a short duration of several weeks, which would not allow the results to have any bearing on future work.

Furthermore, the project area resides in a contained environment, thereby limiting any potential releases to the interior of the structure. Exterior openings and air conveyance systems leading to and from the first floor of the Muffle Furnace Area will have been sealed during safe shutdown.

2.5 Quality Assurance

The demonstration subcontractor's adherence to the criteria specified in this implementation plan, the project SOW, and approved work plan(s) will be overseen by FEMP project management representatives (Section 3.1 describes the project management structure and responsibilities). To assess whether or not the required scabbling depth of one inch has been met, FEMP project management will employ the services of a certified surveyor who will establish transits and depths in representative locations over the project area. Depth verification will be performed using standard surveying techniques and equipment (theodilite, level, etc.). The primary intent of depth verification is to precisely monitor the incremental removal of the floor surface.

A grid system will be laid out upon the floor surface and multiple benchmarks will be established inside and outside the demonstration area. The grid will be marked in such a manner that repeatable measurements can be made at the same horizontal location once an area has been scabbled. Measurements will be taken at the direction of the project lead and then recorded in a field log book with time and date. A summary of the results from the survey measurements will be recorded for project reporting (see Section 4.0) and technology performance purposes.

3.0 PROJECT MANAGEMENT

3.1 Project Oversight

This LSTD project will be managed by representatives from the respective Technology Programs departments for Fluor Daniel Fernald (FDF), the FEMP environmental remediation contractor, and the U.S. Department of Energy, Office of Science and Technology. In support of the direct management by Technology Program managers, individuals representing FDF disciplines of Safety & Health, Industrial Hygiene, Radiological Engineering, Facility Shutdown, Waste Management, Facilities D&D Planning/Engineering, Environmental Compliance, and Quality Assurance will provide technical expertise to ensure that project objectives are met. The DOE Office of Safety Assessment will also provide oversight through a Facility Representative to the DOE Fernald Area Office whose responsibilities will be to perform independent field oversight of all remedial activities performed under this demonstration project. The Facilities Representative will have the authority to stop work if conditions warrant such action. The DOE Fernald Area Office may also conduct focused inspections in the areas of 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.

3.2 Subcontractor Procurement

It is expected that the subcontractor for this demonstration will be obtained through sole source contracting since only one supplier has been identified by the DOE Office of Science and Technology as having the equipment which removes and manages contaminated residues (dust and waste concrete) in accordance with the stringent dust and waste collection criteria. Furthermore, the prospective supplier recently participated in "Technology Evaluations of Scabbling Demonstrations" conducted at Florida International University in which the Centrifugal Shot Blasting Technology demonstrated significant improvements over targeted baseline technologies. Other known companies considered for this demonstration were removed from the list of potential suppliers due to either their inability to demonstrate experience with nuclear environments or their inability to meet the dust and waste collection criteria.

4.0 PROJECT SCHEDULE AND REPORTING

Based on initial performance estimates, which do not include an agreed upon schedule from the prospective technology demonstration subcontractor, the anticipated duration for this demonstration is two months. This period of time includes preparatory actions, mobilization, execution, and demobilization. The current target start and finish dates for this period are April 13 - July 12, 1998.

Within 60 days following the completion of the field demonstration, a project completion report will be prepared and submitted to the U.S. Environmental Protection Agency (U.S. EPA) and Ohio EPA which summarizes the results of the concrete removal demonstration as it relates to the OU3 final remedial action requirements. A statement will be included in the report which identifies the areal footage, depth, and waste volume of concrete removed. That information will be compared to the quantity of surface concrete required by the OU3 ROD. Should the demonstration prove to be successful in effectively removing surface concrete, this technology will be added to the list of approved methods in the D&D performance specifications for surface removal of concrete.

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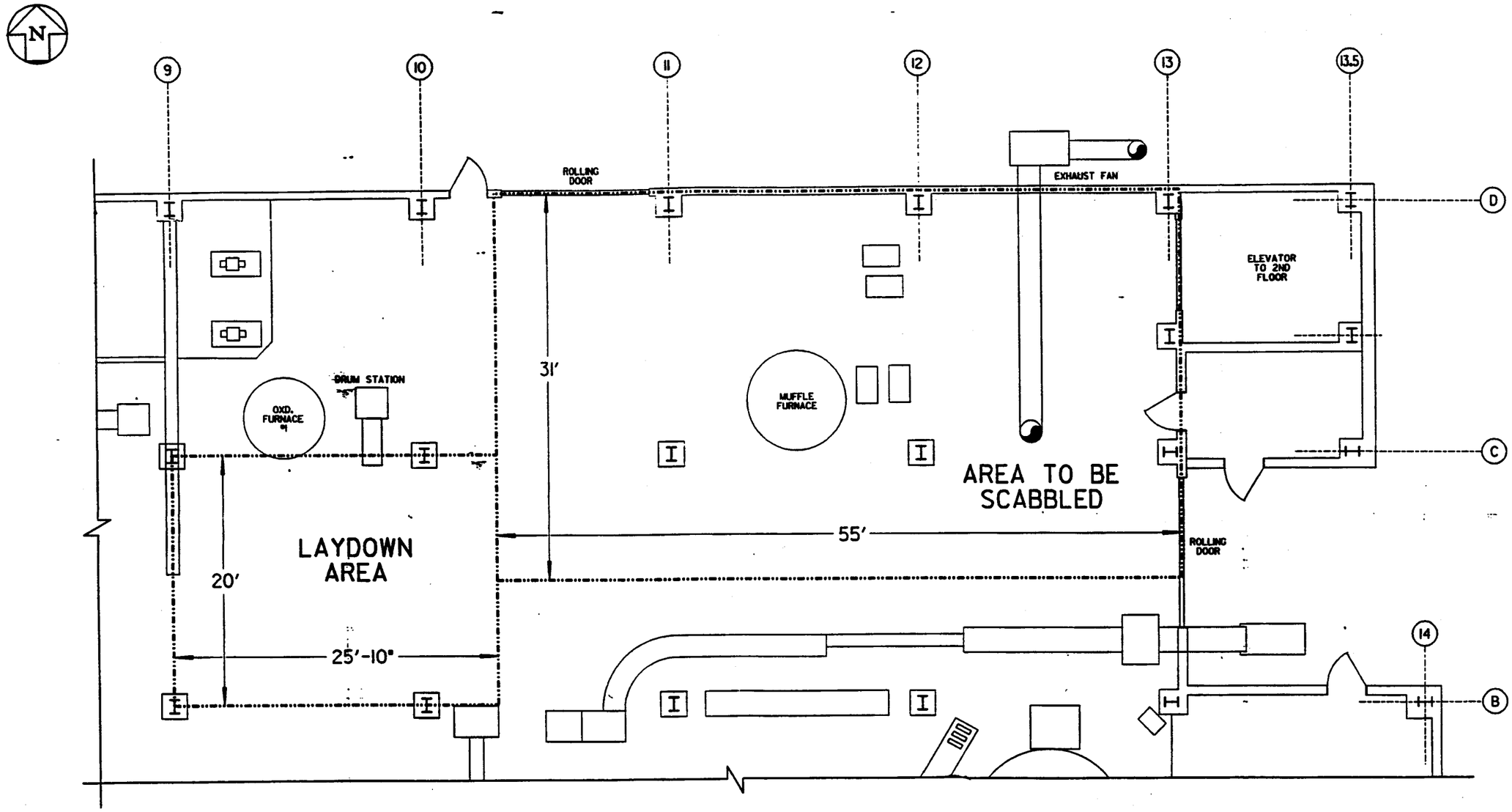

1st FLOOR PLAN

SCALE: 1/4" = 1'-0"

LEGEND

AREA TO BE SCABBLED - 1705 SQ. FT.

LAYDOWN AREA - 517 SQ. FT.

ATTACHMENT 1 14

INFORMATION ONLY

REVISIONS	DATE	DWN. BY	APPD.	NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
				0	ISSUE FOR SYSTEM	1/6/98	SJS	[illegible]	

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CONFIGURATION MANAGEMENT DRAWING

CONSULTANT ENGINEER DATE

APPROVALS				
CIVIL & STR.			SAFETY ENG.	
ELECTRICAL			MAINTENANCE	
ENGINEER			FIRE PROTECT.	
INSTRUMENT			WASTE MANAGE.	PA ENGR 1/6/98
MECHANICAL			SECURITY	
			CRU	
CHECKED	[illegible]			
APPROVED	[illegible] 1/6/98			

Fernald Environmental Management Project

FLUOR DANIEL FERNALD

U.S. DEPARTMENT OF ENERGY

RECOVERY PLT. 8A — FIRST FLOOR

PLANT 8A SCABBLING DEMONSTRATION (TECHNOLOGY PROGRAMS)

DATE 1/14/98 DRAWN S.J.SMOY

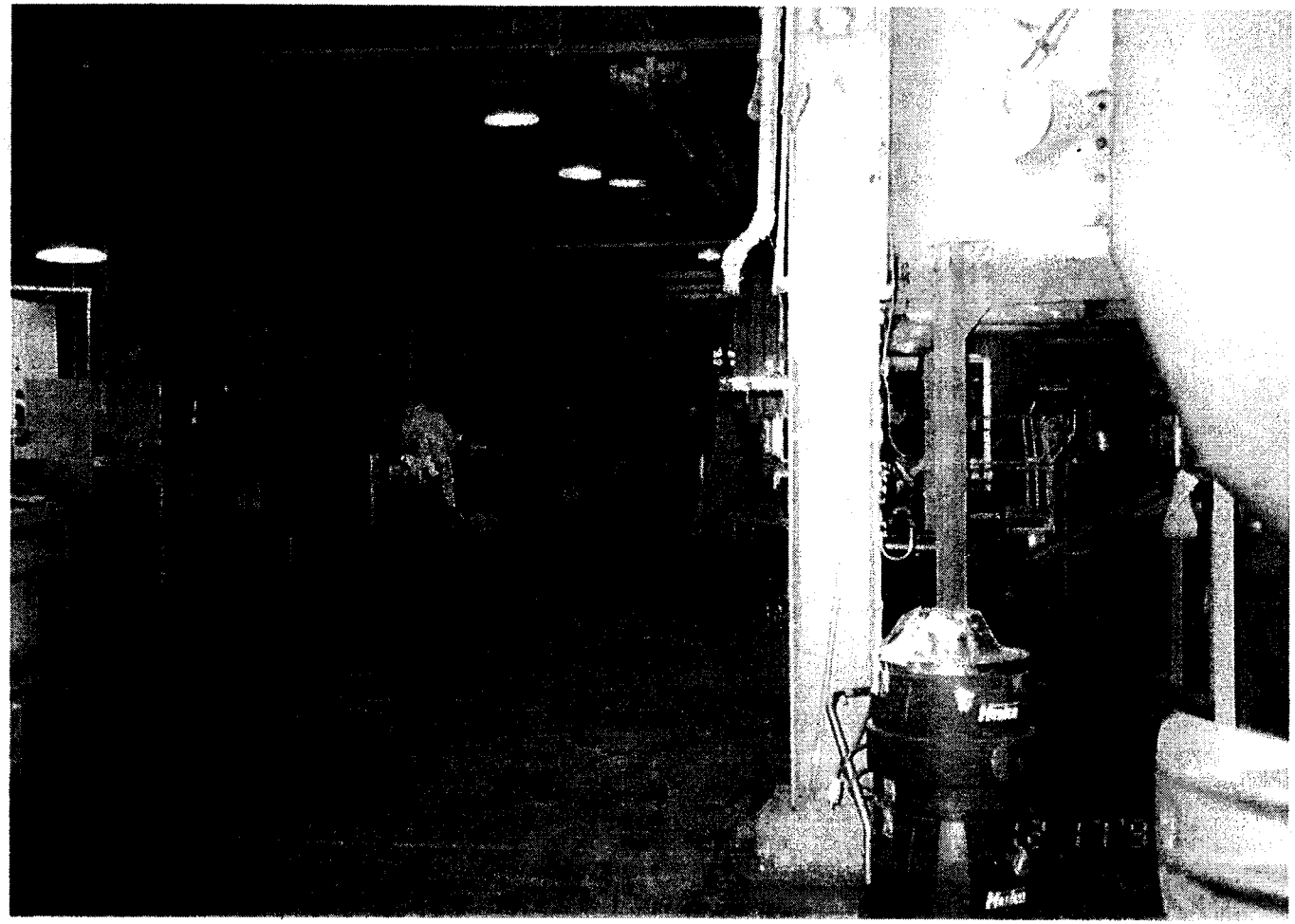
08X-5500-X-03726 | 0

FILE NAME: /STEVE/08XX5726.DGN

ATTACHMENT 2

PHOTOGRAPHS

Roll	Photograph Number	Description
6789	8	Facing west, Plant 8 concrete floor in the Muffle Furnace Area (first floor), Muffle Furnace is in the upper right of photo.
6800	1	Facing northeast, Plant 8 concrete floor in the Muffle Furnace Area (first floor). Muffle Furnace standing on support legs.
6800	2	Facing east, Plant 8 concrete floor in the Muffle Furnace Area (first floor). Muffle Furnace is in the upper left of photo.



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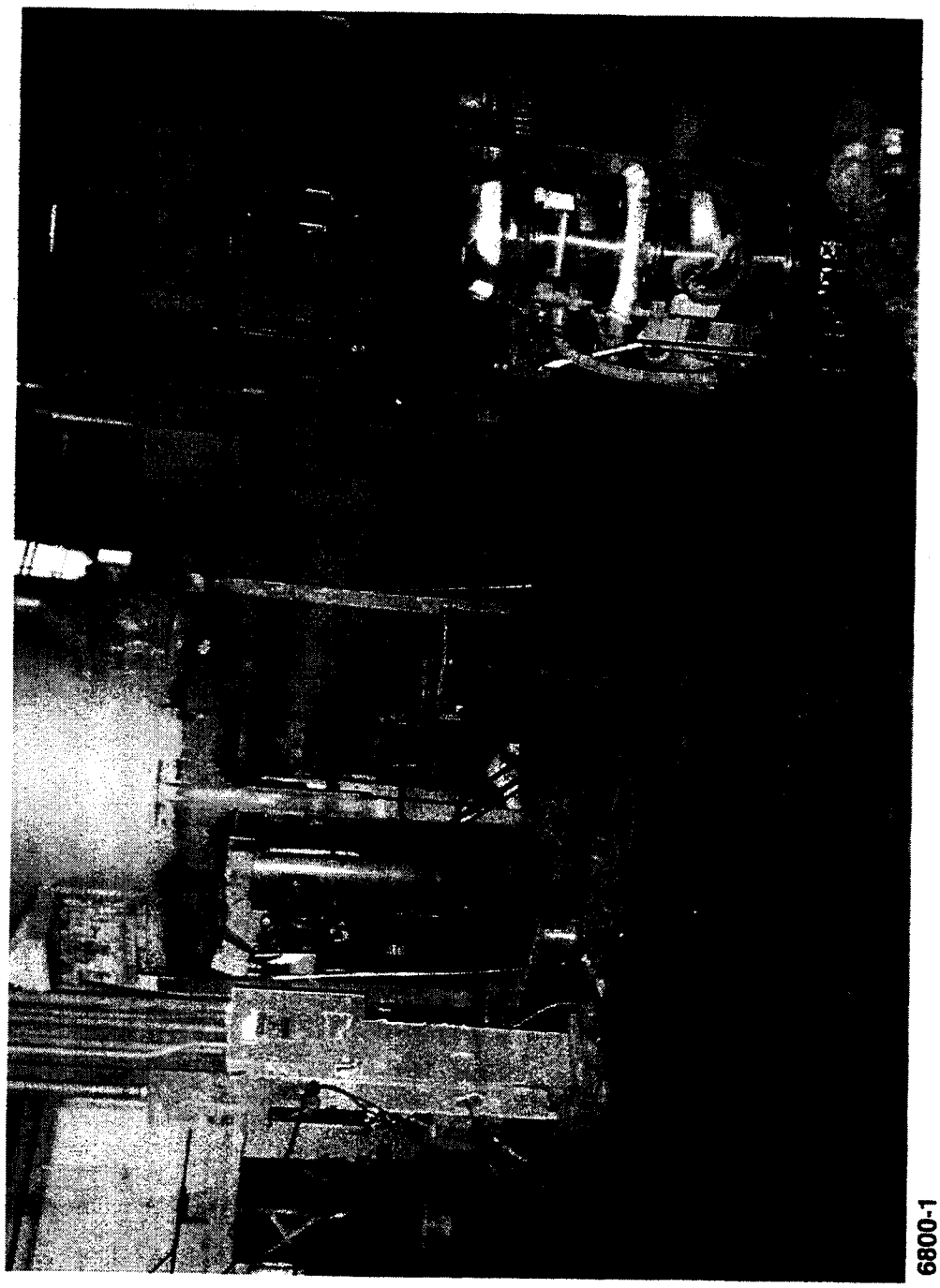

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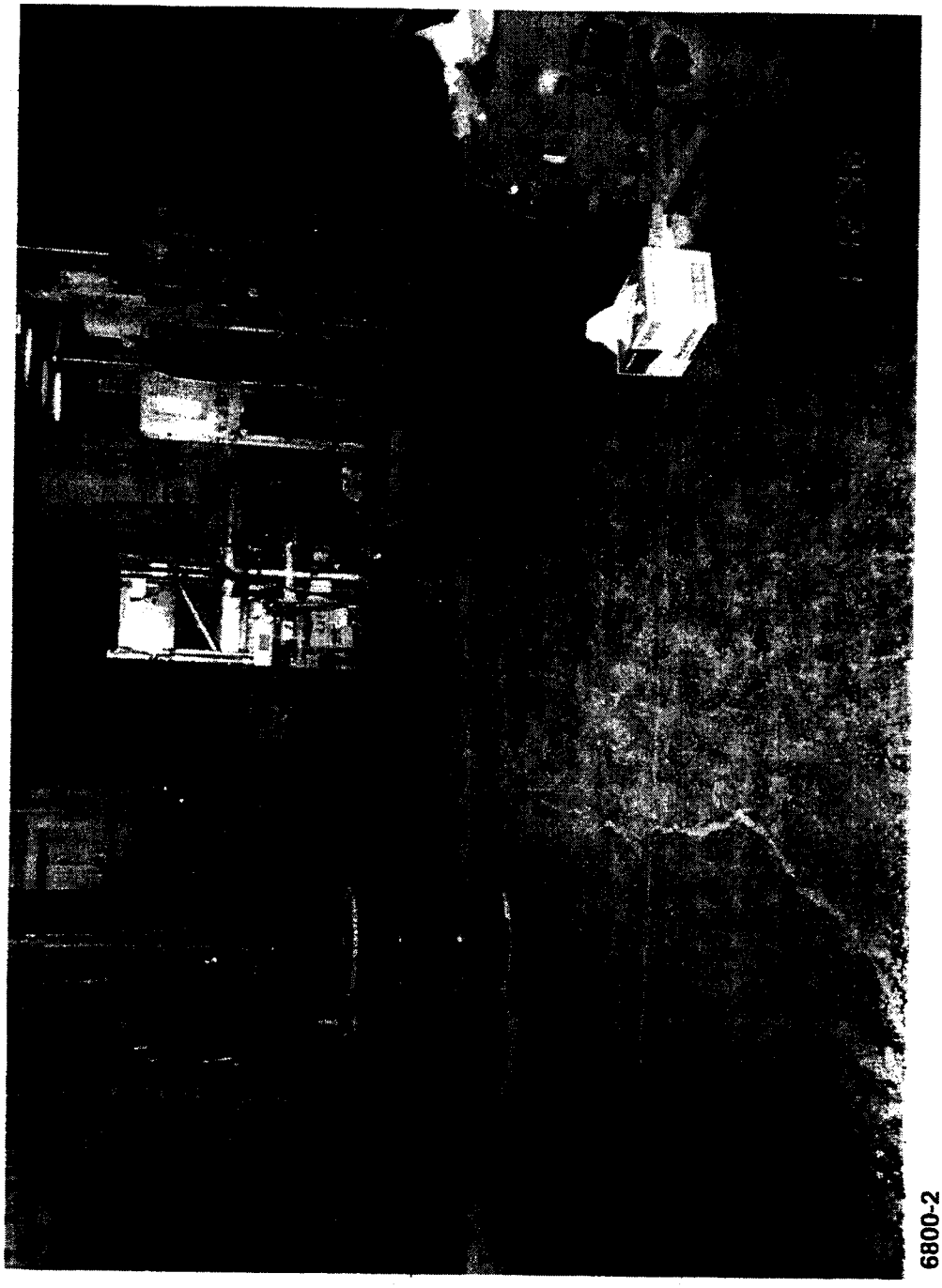

6800-2