DOE/RL-2000-42
Revision 0

Radioactive Air Emissions Notice of Construction for Plutonium Finishing Plant Project W-460, "Plutonium Stabilization and Handling"

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

United States Department of Energy
P.O. Box 550
Richland, Washington 99352

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Janis Aardal 6-5-2000
Release Approval Date

DOES NOT CONTAIN CLASSIFIED OR UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION

Reviewing Official / ADC: Roger E. Berry

Date 6/2/2000

Approved for public release; further dissemination unlimited

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CONTENTS

ATTACHMENTS

FIGURES

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR PLUTONIUM FINISHING PLANT PROJECT W-460, -- "PLUTONIUM STABILIZATION AND HANDLING"

1.0 INTRODUCTION

The following description and any attachments and references are provided to the Washington State Department of Health (WDOH), Division of Radiation Protection, Air Emissions & Defense Waste Section as a notice of construction (NOC) in accordance with Washington Administrative Code (WAC) 246-247, Radiation Protection – Air Emissions. The WAC 246-247-060, "Applications, registration, and licensing", states "This section describes the information requirements for approval to construct, modify, and operate an emission unit. Any NOC requires the submittal of information listed in Appendix A."

Additionally, the following description, attachments, and references are provided to the U.S. Environmental Protection Agency (EPA) as an NOC, in accordance with Title 40 Code of Federal Regulations (CFR), Part 61, "National Emission Standards for Hazardous Air Pollutants". The information required for submittal to the EPA is specified in 40 CFR 61.07. The potential emissions from this activity are estimated to provide greater than 0.1 millirem year total effective dose equivalent (TEDE) to the hypothetical offsite maximally exposed individual (MEI) and commencement is needed within a short time. Therefore, this application also is intended to provide notification of the anticipated date of initial startup in accordance with the requirement listed in 40 CFR 61.09(a)(1), and it is requested that approval of this application also constitutes EPA acceptance of this initial startup notification. Written notification of the actual date of initial startup, in accordance with the requirement listed in 40 CFR 61.09(a)(2), will be provided later.

This NOC covers the activities associated with the construction and operation activities involving stabilization and/or repackaging of plutonium in the 2736-ZB Building. A new exhaust stack will be built and operated at the 2736-ZB Building to handle the effluents associated with the operation of the stabilization and repackaging process. Figures provided are based on preliminary design.

For the activities covered under this NOC, the unabated and abated TEDE to the hypothetical MEI is 1.67 E+03 and 8.34 E-01 millirem per year, respectively.

2.0 FACILITY LOCATION (REQUIREMENT 1)

U. S. Department of Energy, Richland Operations Office
825 Jadwin Avenue
P.O. Box 550
Richland, Washington 99352-3562

The coordinates for the proposed new stack (296-Z-7) are as follows:

2736-ZB Building, 200 West Area
Latitude: 46° 33′ 00″
Longitude: 119° 37′ 60″

3.0 RESPONSIBLE MANAGER (REQUIREMENT 2)

The responsible manager for the activities described under this NOC is as follows:

Mr. L. D. Romine, Director
Materials Disposition Division
U.S. Department of Energy,
P.O. Box 550
Richland, Washington 99352
(509) 376-4747

4.0 TYPE OF PROPOSED ACTION (REQUIREMENT 3)

The proposed action results in the construction of a new major emission unit.

5.0 STATE ENVIRONMENTAL POLICY ACT (REQUIREMENT 4)

The proposed action is categorically exempt from the requirements of the *State Environmental Policy Act* under WAC 197-11-845.

6.0 PROCESS DESCRIPTION (REQUIREMENT 5)

Project W-460 will provide the equipment and modifications necessary for the Plutonium Finishing Plant (PFP) to stabilize and/or repackage plutonium and uranium, oxide and metals, for long-term storage. Within the 2736-Z Building, existing vault storage cubicles will be modified to accommodate larger, long-term storage canisters.

Project W-460 consists of distinct modules. A brief description of the Project W-460 modules and processes are provided as follows.

- #1-Stabilization Module. The Stabilization Module consists of the material preparation area, furnace area and the product fill area. In the material preparation area, canned items containing plutonium-bearing materials are received, measured for accountability, and placed into a furnace tray (or boat) for insertion into a furnace in the furnace area. The module also provides a waste pathway to dispose of the waste cans and plastic. In the furnaces, the material in the boats will be heated to greater than 950°C for at least 2 hours, as specified in DOE Standard 3013 (DOE-STD-3013, *Criteria for Safe Storage of Plutonium Metals and Oxides*). The material will be cooled and placed in a convenience can, sampled to verify dryness and inserted into the Bagless Transfer System (BTS) Module.

- #2-BTS Module. In the BTS Module, the filled convenience cans will be received from the Stabilization Module and placed into an inner can. The inner can head space will be backfilled with helium. A plug will be welded to the inner wall of the container, and the middle of the weld would be cut (maintaining glovebox confinement at all times).

- #3-Inner Can Leak Test Module. The Inner Can Leak Test Module will receive an inner welded container (BTC). Operations in this module will verify the BTC meets or exceeds the leak tightness requirements of DOE Standard 3013.

- #4-Outer Can Weld Module. The Outer Can Weld Module will receive a leak-checked BTC. The BTC will be placed in an outer container. The outer can head space would be backfilled with helium, and an outer container lid would be welded onto the container in accordance with the requirements of DOE Standard 3013.

- #5-Outer Can Leak Test Module. The Outer Can Leak Test Module will receive an outer welded container (3013 package) and operations in this module will verify the package meets or exceeds the leak tightness requirements of 3013.

- #6-NDA Laboratory Modification Module. The Non-Destructive Analysis (NDA) Laboratory will receive the 3013 package and analyze the 3013 package for isotopic distribution, heat load and container baseline.

- #7-Vault Modification Module. The secure vault storage locations in the 2736-Z Building will be modified to accommodate the 3013 packages. These packages will be sealed, offering no additional potential-to-emit (PTE). No modifications to the existing 2736-Z Building ventilation system, exhausting through minor stack 296-Z-6, will be made.

- #8-Infrastructure Modification Module. Project W-460 will modify existing infrastructure support systems. Capacities of ventilation systems will be verified and enhanced if necessary. Configuration of the systems will be modified, if necessary, to provide appropriate separation of PFP and process enclosure ventilation. New systems will be installed if no system currently exists. Addition of a new major exhaust stack and associated compliant monitoring equipment is planned. Equipment pads for a nitrogen system and a gas bottle storage area will be installed.

Additional details regarding Project W-460 can be found in HNF-SD-W460-CDR-001, Rev. 1, *Conceptual Design Report – Plutonium Stabilization and Handling, Project W-460*, and HNF-SD-W460-FDC-001, Rev. 1, *Functional Design Criteria - Plutonium Stabilization and Handling (PuSH) Project W-460.*

Plutonium and uranium that will be processed in the stabilization and repackaging process under Project W-460 will be in the form of oxides and pure metal (Figure 1). Americium, plutonium, and uranium oxides will be stabilized by heating the material in an oven to a temperature of greater than 950°C for a minimum of 2 hours.

The gloveboxes have two exhaust systems, normal and emergency. The normal exhaust exit points have a roughing filter and fire screen inside the glovebox. Immediately outside each normal exhaust connection is a testable high-efficiency particulate air (HEPA) filter. The design temperature inside the glovebox is approximately 40°C. This is the normal glovebox exhaust temperature. The emergency exhaust exits do not have any filters or screens inside the glovebox or immediately outside the glovebox. The normal and emergency exhaust lines are combined and routed to the process exhaust HEPA filter system, where the temperature will be below the 40°C glovebox temperature.

The offgas temperature from the furnaces will be a maximum 4 cubic foot per minute (cfm) at 1,000°C. Each furnace will have an exhaust outlet line inside the glovebox that will segregate the furnace offgas from the nitrogen atmosphere within the glovebox. The four exhaust lines (one per furnace) will combine inside the glovebox and pass through a ceramic HEPA-grade filter. The temperature of the offgas at that point should be about 150°C. The ceramic filter is designed for 980°C. After the filter, the offgas would leave the glovebox and enter the glovebox exhaust header. In the header, the offgas will mix with the approximately 300 cfm of glovebox exhaust (maximum temperature of 40°C) before reaching the two testable stages of HEPA filters. The 4 cfm of furnace exhaust will not significantly raise the temperature of the exhaust stream entering the process exhaust HEPA filter system.

In-line monitoring equipment will be provided for determining the moisture/volatile content of the material processed. An alternative method exists to use thermogravimetric mass spectrometer analysis. The material will be considered thermally stabilized when there is less than 0.5 percent loss on ignition (LOI). Representative samples of 100 percent of the packages will be subjected to LOI testing (glovebox GB-642D). The LOI process will verify dryness and suitability for packaging. The LOI process will heat a sample taken from each material batch. The sample will be weighed and placed into a muffle furnace where the sample will undergo a heating cycle similar to the stabilization process. After the heating cycle is completed, the sample will be weighed again and the beginning and ending weights compared. If the beginning and ending weights differ by less than 0.5 percent, the material will go to final packaging in the BTS Module. If the difference in weights is greater than 0.5 percent, the material will be sent back through the stabilization process until the LOI result is less than 0.5 percent. The furnaces will be heated electrically. The purge gas in the LOI furnace will be 1 cfm of air. The temperature of the offgas will be approximately 1,150°C to 1,200°C. The offgas will be discharged directly to the glovebox where the offgas will mix with the approximately 13°C nitrogen atmosphere in the LOI glovebox.

Another alternative method (to LOI) for determining the moisture content of the processed material has been approved by DOE and may be implemented in the future. The method, supercritical fluid extraction (SFE), involves placing representative samples of stabilized material from a batch into porous sample cells in a glovebox. Supercritical carbon dioxide (CO_2, approximately 100°C and 3,000 psi) is passed through the sample, solubilizing water in the sample. The solubilized water is carried in the fluid stream to a spectrometer for water detection and quantification. The measured fluid stream, composed of CO_2 and water, is released into the glovebox atmosphere. In normal operation, it is expected the SFE effluent would be only CO_2.

All stabilized plutonium-bearing materials will be containerized in an inner-welded and outer-welded container (i.e., the aforementioned 3013 package) and placed in secure vault storage (2736-Z Building) pending final disposition. No modification to the existing 2736-Z Building ventilation system, which exhausts through the 296-Z-6 stack, will be made.

7.0 ANNUAL POSSESSION QUANTITY AND PHYSICAL FORM
(REQUIREMENTS 8, 10, AND 11)

The following discusses two annual possession quantities. One quantity is for those activities associated with modifications during construction affecting the existing 2736-ZB Building ventilation system, and subsequent continued emissions through the existing 296-Z-5 exhaust stack. The other quantity is for those activities that will result in emissions through the proposed new stack (296-Z-7).

The annual possession quantity for modifications during construction activities affecting the existing 2736-ZB Building ventilation system (exhausting through the existing 296-Z-5 exhaust stack) was estimated based on emissions from calendar year 1998. It was conservatively estimated that during modifications, residual contamination on the ductwork might be knocked loose and be re-introduced to the existing ventilation system. The total measured release from the 296-Z-5 exhaust stack for calendar year 1998, as documented in DOE/RL-99-41 (*Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 1998*), was used as a basis for estimating the annual possession quantity. These data indicate that total alpha was not detected and total beta was 1.2×10^{-7} curies. Therefore, for conservatism, 100 times the 1998 emissions from the 296-Z-5 stack (i.e., 1.2×10^{-5} curies) is the maximum annual possession quantity anticipated during construction activities associated with Project W-460. The existing ventilation and monitoring systems for the 2736-ZB Building will remain operational during modification/construction activities. Alarms will be activated in the event of off-normal emissions. Work would cease until the source/extent of the contamination could be assessed. Work control procedures will be modified and implemented to ensure personnel and public safety before continuation of activities.

The annual possession quantity for operations (i.e., stabilization and packaging activities) resulting in emissions through the new stack (296-Z-7) is based on a conservative estimate for the maximum amount of material that could be stabilized and repackaged in a year. The annual possession quantity for Project W-460 assumed an annual throughput of 1.6 metric tonnes plutonium (100 percent plutonium-239), 1.1 metric tonnes uranium (100 percent uranium-233), and 0.01 metric tonnes americium (100 percent americium-241).

The physical form of all radionuclides encountered during construction, stabilization, and packaging activities would be expected to be dry particulates. The physical form of all radionuclides emitted is expected to be particulate.

Potential radionuclides expected to be encountered during construction, stabilization, and packaging activities include: uranium-235, uranium-238, plutonium-238, plutonium-239, plutonium-240, plutonium-241, plutonium-242, americium-241, and americium-243.

8.0 ABATEMENT TECHNOLOGY AND CONCEPTUAL DRAWING(S)
(REQUIREMENTS 6 AND 7)

Excavation activities, as necessary to support Project W-460 (e.g., installation of the nitrogen system and gas bottle storage pads and new stack) will be conducted in a similar fashion as those activities performed for the 200 West Area Regional Drainfield (Project L-281, September 1998). For example (as discussed in the "Notice of Construction for Guzzler Excavation and Backfilling Activities in Support of the L-281: 200 West Area Regional Drainfield," approved by WDOH, September 8, 1998), during excavation in potentially contaminated areas, the soils will be surveyed over every linear and vertical foot before excavation. Any hot specks detected will be removed and containerized before the excavation is allowed to continue, unless located at the bottom of the excavation (these specks will be covered with clean fill).

For the purpose of this NOC the term hot speck and speck are used interchangeably. A hot speck/speck is defined as a very small amount (i.e., a pebble, metal turning, etc.) of contamination reading up to 500,000 counts-per minute (cpm) beta-gamma and/or >50 cpm alpha. The contaminated soil will be (in piles) from the "clean" soil during excavation. Contaminated soil will be controlled using water, fixatives or covers.

If the radiological contamination is determined to be more extensive, the spread of contamination will be controlled both during the excavation and during the backfilling of the soil. A minimal amount of water could be applied using a hand-held sprayer to control the generation of dust (and contamination).

After the backfilling of the excavation where radiologically contaminated soil in the excavation has been removed and used as backfill, the area will be surveyed to verify no radiological contamination is present on the soil surface. If contamination is present on the surface, the soil either will be removed and containerized or covered with clean fill material or fixatives to prevent the spread of the contamination. The area will be radiologically posted, both during and after completion of the project.

Figure 2 shows the overall ventilation schematic emission sources, identifying safety systems, structures and components. This figure depicts the general flow patterns for the various offgas systems. Figures 3 through 7 contain general schematics of the proposed ventilation system modifications for the 2736-ZB Building.

For clarity, additional preliminary engineering drawings are provided in Attachment A. These drawings detail the following:

- Location of filters on exhaust systems of gloveboxes and furnaces: Drawing # H-2-829445
- Location of high-temperature equipment: Drawings # H-2-829969 and H-2-829971; two furnace sketches supporting Drawing H-2-829969
- Direction and path of airflow: Drawing # H-2-829442
- Location of sampling lines on new stack (296-Z-7): Drawing # H-2-829485
- Location of additional controls on ventilation system: Drawing # H-2-829443.

Emissions resulting from work performed within the 2736-ZB Building will be exhausted out the existing 296-Z-5 stack, which contains two stages of HEPA filtration with a minimum efficiency of 99.95 percent for particles with a median diameter of 0.3 micron. The average flow rate in 1998 was reported to be 4.9 cubic meters per second (10,000 cubic feet per minute) (DOE/RL-99-41).

Project W-460 stabilization and packaging activities will be conducted predominantly in Rooms 642 and 641 (Figures 8 and 9). The resulting emissions will be exhausted through the new stack (296-Z-7) that will contain two stages of HEPA filtration (credit taken for only one stage) with a minimum efficiency of 99.95 percent for particles with a median diameter of 0.3 micron. The maximum flowrate from the new stack is projected to be 0.8 cubic meter per second (1,800 cubic feet per minute).

9.0 MONITORING SYSTEM (REQUIREMENT 9)

The existing 296-Z-5 stack exhausts filtered air from the 2736-ZB Building. Emission sampling consists of a record sampler for particulate radionuclides. This stack is registered with WDOH, with emissions estimated or verified using methods approved by the EPA and WDOH. Most recent data are reported in DOE/RL-99-41.

The existing 296-Z-6 stack exhausts filtered air from the 2736-Z Building. Emission sampling consists of a record sampler for particulate radionuclides. This stack is registered with WDOH, with emissions estimated or verified using methods approved by the EPA and WDOH. Most recent data are reported in DOE/RL-99-41.

The new stack (296-Z-7) will exhaust filtered air from stabilization and packaging activities conducted in the 2736-ZB Building. The stack/emission sampling will consist of a continuous air monitor record sampler for particulate radionuclides and flow monitor (Attachment A, Drawing # H-2-829485).

10.0 RELEASE RATES (REQUIREMENTS 12 AND 13)

As discussed in Section 7.0, the annual possession quantity for construction activities modifying the 2736-ZB Building resulting in continued emissions from the existing ventilation system was estimated. Activities associated with modifications to the existing 2736-ZB Building ventilation system will not introduce new material. It was conservatively estimated that during modifications, residual contamination on the ductwork might be knocked loose and re-introduced to the existing ventilation system. The total measured release from the 296-Z-5 exhaust stack for calendar year 1998 was provided as a basis for a conservative estimate of this annual possession quantity. For conservatism, it is assumed that the annual possession quantity for this activity will not exceed 100 times the annual emissions from the existing 2736-ZB 296-Z-5 exhaust stack, as documented in DOE/RL-99-41. That is, total alpha was not detected, and total beta was 1.2×10^{-7} curies; therefore, the annual possession quantity is estimated to be 1.2×10^{-5} curies. The 296-Z-5 stack exhaust will be operated in a continuous mode.

The annual possession quantity for stabilization and packaging activities (with potential emissions through the new 296-Z-7 stack) was multiplied by the conservative release factor of 1.0 E-03 for particulates and solutions (40 CFR 61, Appendix D). Although the furnace(s) will operate at temperatures near 1,000°C, the boiling point temperature of plutonium, americium, and uranium oxides and metals is well above 1,000°C. At high temperatures, the oxides will undergo transformation to a pure metal state. For americium, plutonium, and uranium oxides, the transformation begins to occur at a temperature of approximately 1,150°C, 1,500°C, and 2,800°C, respectively. The boiling point of metallic americium, plutonium and uranium occurs at 2,607°C, 3,232°C, and 3,818°C, respectively. The release rate conservatively assumes that all material is stabilized and repackaged. Pure metals only will be repackaged. The new stack will be operated in a continuous mode.

11.0 OFFSITE IMPACT (REQUIREMENTS 14 AND 15)

Summary and synopsis outputs from CAP88-PC are provided in Attachment B.

12.0 COST FACTORS AND FACILITY LIFETIME (REQUIREMENTS 16 AND 17)

Requirement 16 is not applicable because a best available radionuclide control technology (BARCT) demonstration is provided (Attachment C).

The maximum design life of the project is approximately 11 years (completion on or before October 1, 2010).

13.0 TECHNOLOGY STANDARDS (REQUIREMENT 18)

The 296-Z-5 and 296-Z-6 stacks are registered emissions units with WDOH. The design and operation of these stacks will not be modified to support Project W-460.

The new stack (296-Z-7) will be a registered emissions unit with WDOH. The new stack will meet control technology standards listed in WAC 246-247-110(18). Drawing H-2-829485 (Attachment A) pertains to the installation design of the new stack monitoring system. The stack monitoring system will use two shrouded probes located in the exhaust stream within the stack at an elevation of approximately 25 feet abovegrade. The location of the probes was selected to ensure good mixing before sampling, to provide accessibility for maintenance, and to stay away from the top of the stack to minimize wind effects. Each probe will have a separate sample line to deliver a sample stream to stack monitoring equipment located at the base of the stack. One sample line will be dedicated to continuous alpha monitoring and the other sample line will be dedicated to a record filter. The sample flow will be maintained proportional to the stack flow. A stack mass flow sensor will be located near the location of the shrouded probes. Inspection and test ports will be provided.

Fail and radiation high alarms will be provided on the alpha monitor. Alarm signals will be tied into an existing annunciator panel and will be used to notify operators of any off-normal conditions requiring immediate corrective action. Sample pumps located downstream of the alpha monitor and record sampler in the pump skid will draw representative samples from the stack stream. Exhaust from the pumps will be returned to the stack above the sample location.

Qualification of the stack monitoring system will follow the standard ANSI/HPS N13.1. Acceptance criteria are summarized in Table 4 of that standard. Testing will be conducted on a scale model of the stack to characterize the mixing and flow patterns of the stack configuration. Additional testing on the completed stack will be conducted to validate the system to ensure representative sampling at the location of the shrouded probes. Depositional losses in the sample lines will be evaluated using the Deposition 4.0 computer code as described in Paragraph 6.4.1 of ANSI/HPS N13.1. Results of qualification testing and analysis will be documented and issued in a final report.

14.0 REFERENCES

AIR 92-107, letter, A.W. Conklin, Washington State Department of Health, to J.D. Bauer, U.S. Department of Energy, Richland Operations Office, no subject, October 5, 1992.

ANSI/HPS N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities*, American National Standards Institute, Inc.

DOE-STD-3013-96 and/or latest revision, *Criteria for Safe Storage of Plutonium Metals and Oxides.*

DOE/RL-99-41, *Radionuclide Air Emissions Report for the Hanford Site Calendar Year 1998*, June 1999, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

HNF-SD-CP-SAR-021, Rev 1, *Plutonium Finishing Plant Final Safety Analysis Report*, Fluor Daniel Hanford, Richland, Washington..

HNF-SD-W460-CDR-001, Rev. 1, *Conceptual Design Report – Plutonium Stabilization and Handling, Project W-460*, Fluor Daniel Hanford, Richland, Washington.

HNF-SD-W460-FDC-001, Rev. 1, *Functional Design Criteria - Plutonium Stabilization and Handling (PuSH) Project W-460*, Fluor Daniel Hanford, Richland, Washington.

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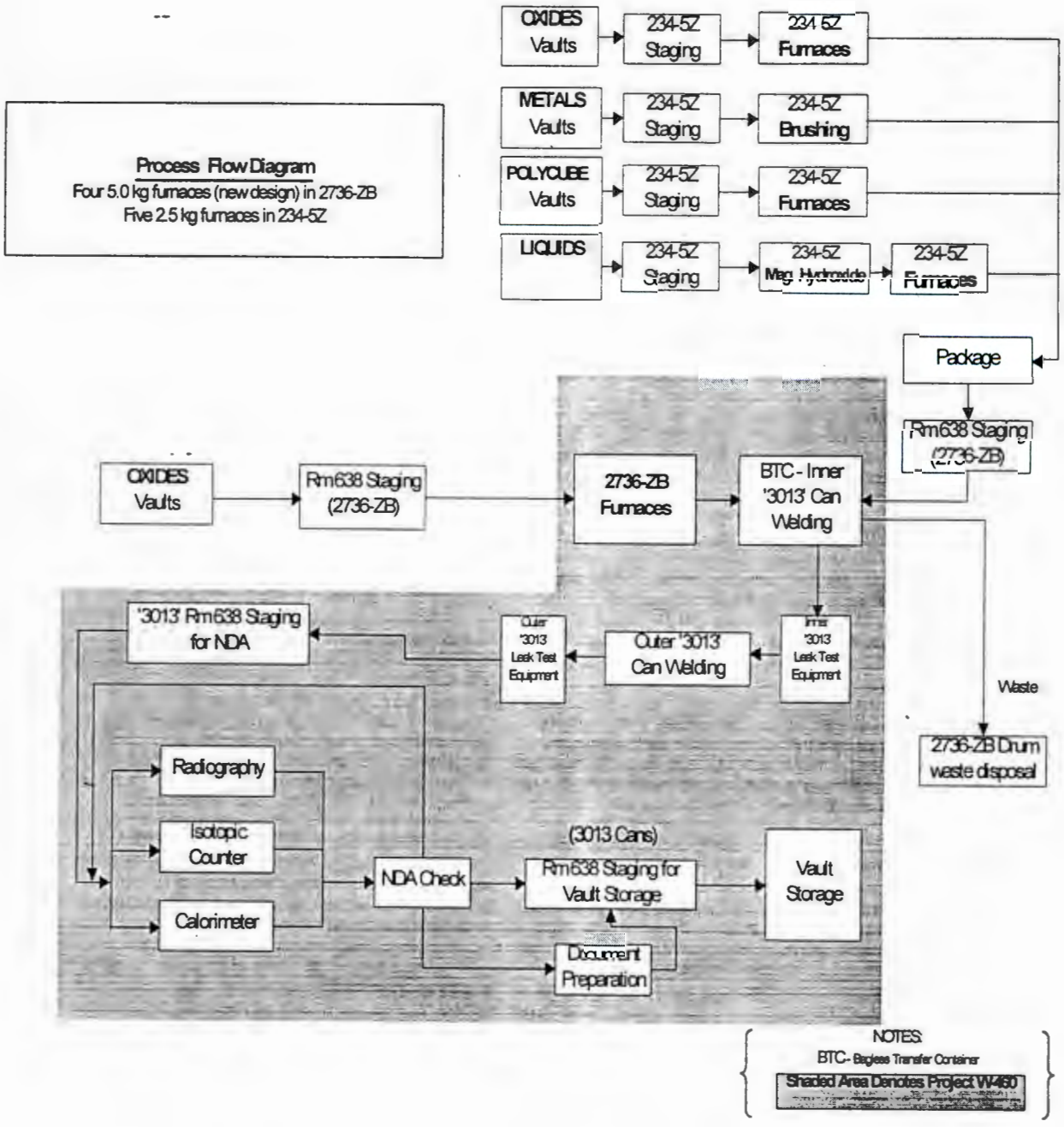

Figure 1. Process Flow Diagram.

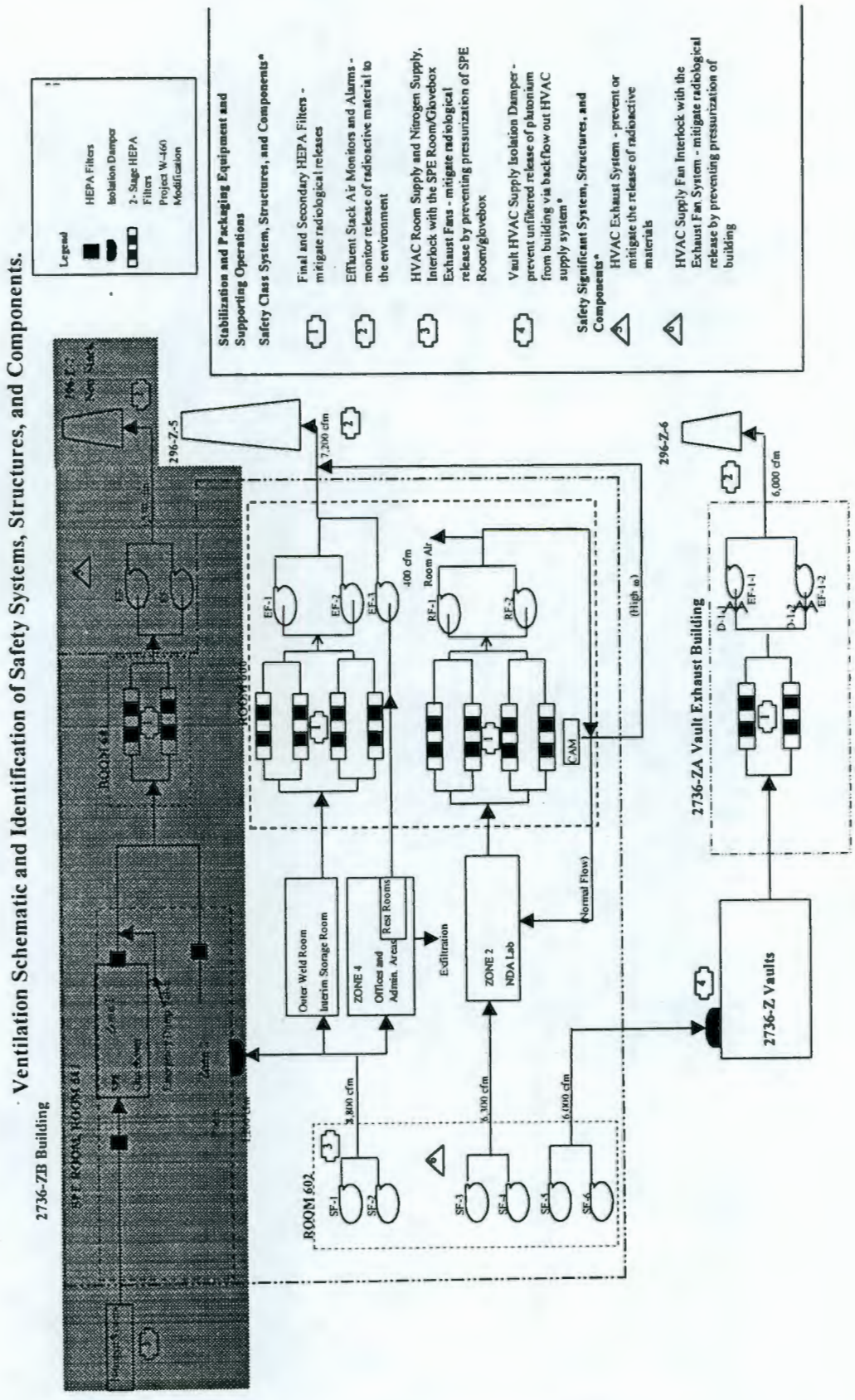

Figure 2. Ventilation Schematic for Project W-460.

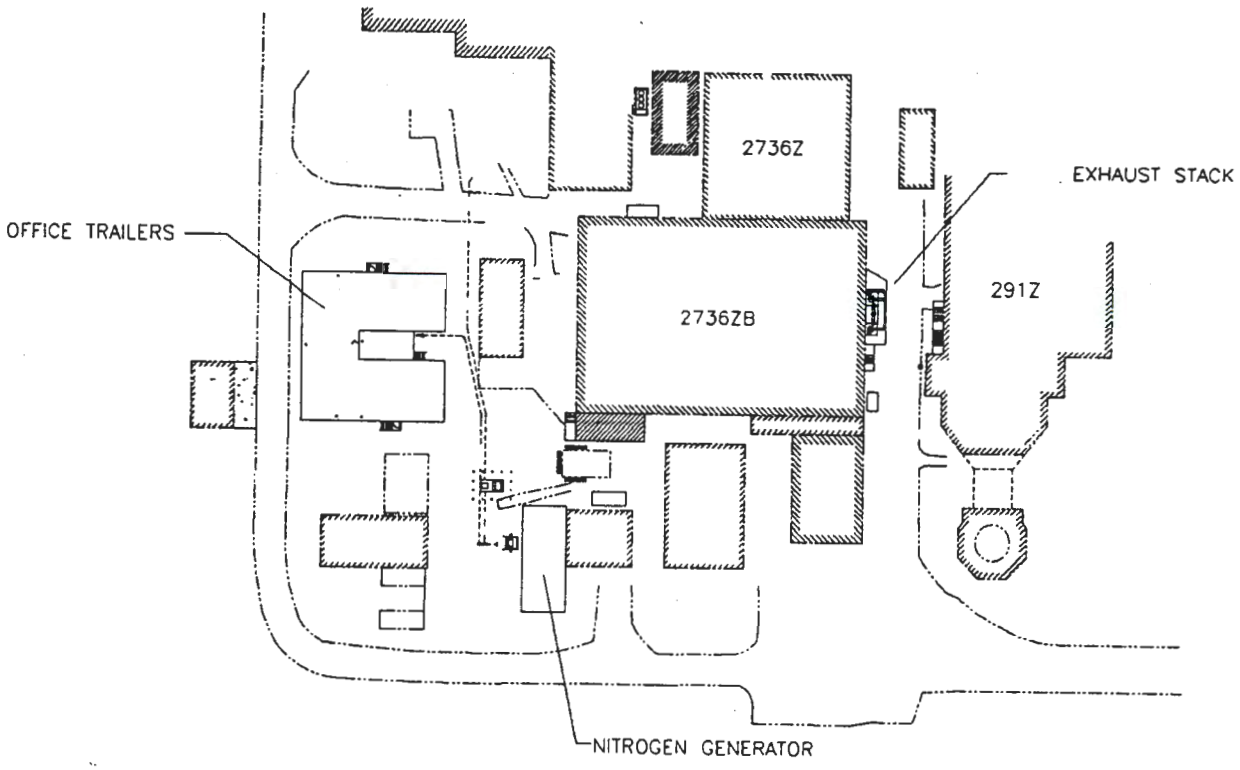

Figure 3. Site Plan.

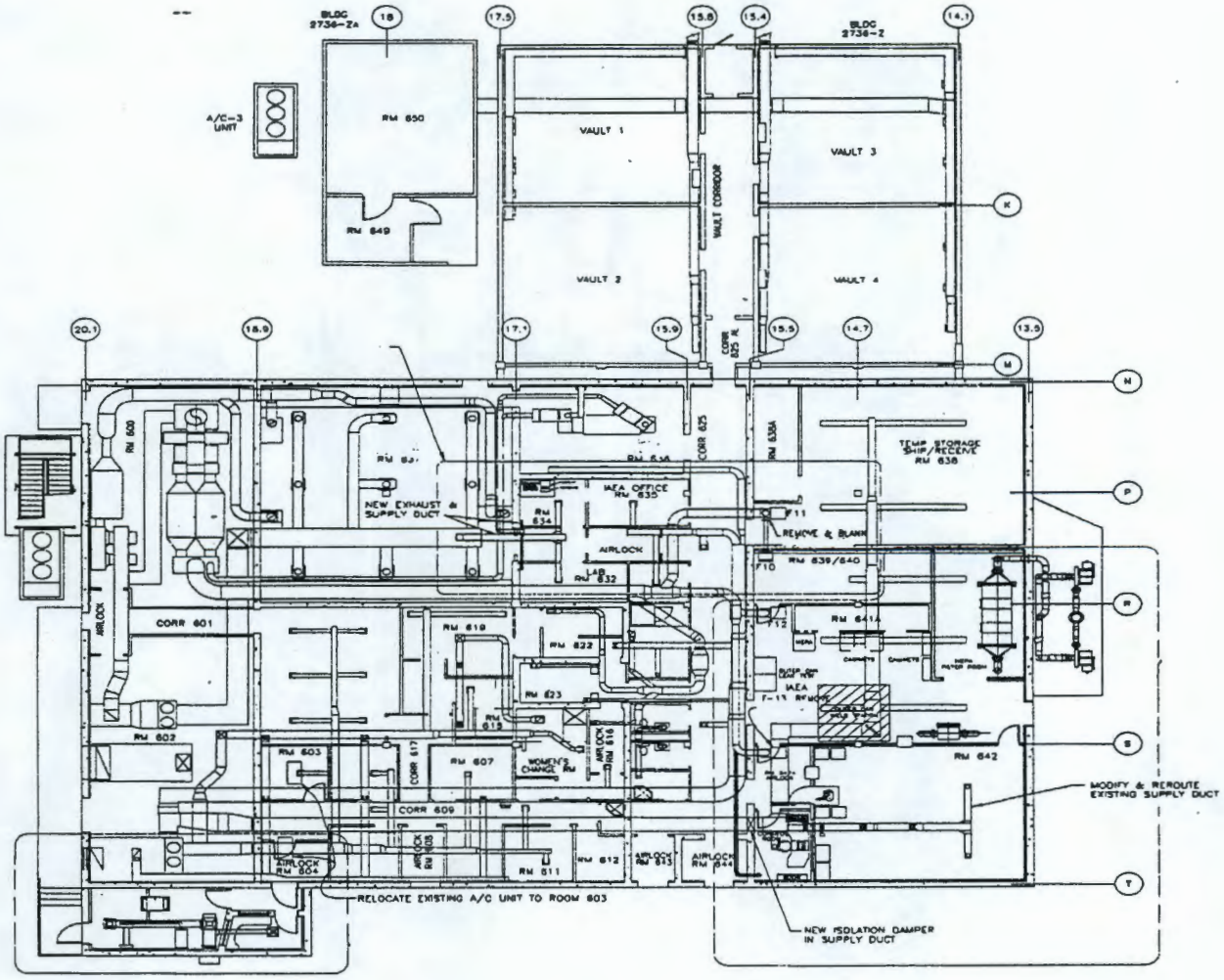

Figure 4. 2736-ZB Floor Plan.

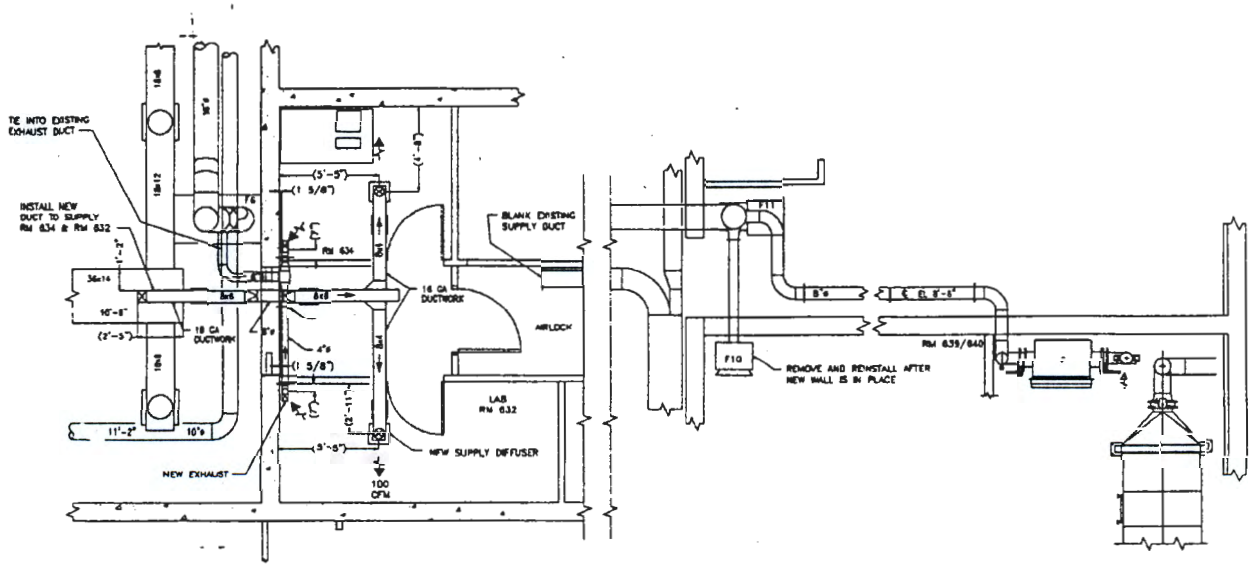

Figure 5. 2736-ZB Building Existing Ventilation System Modifications.

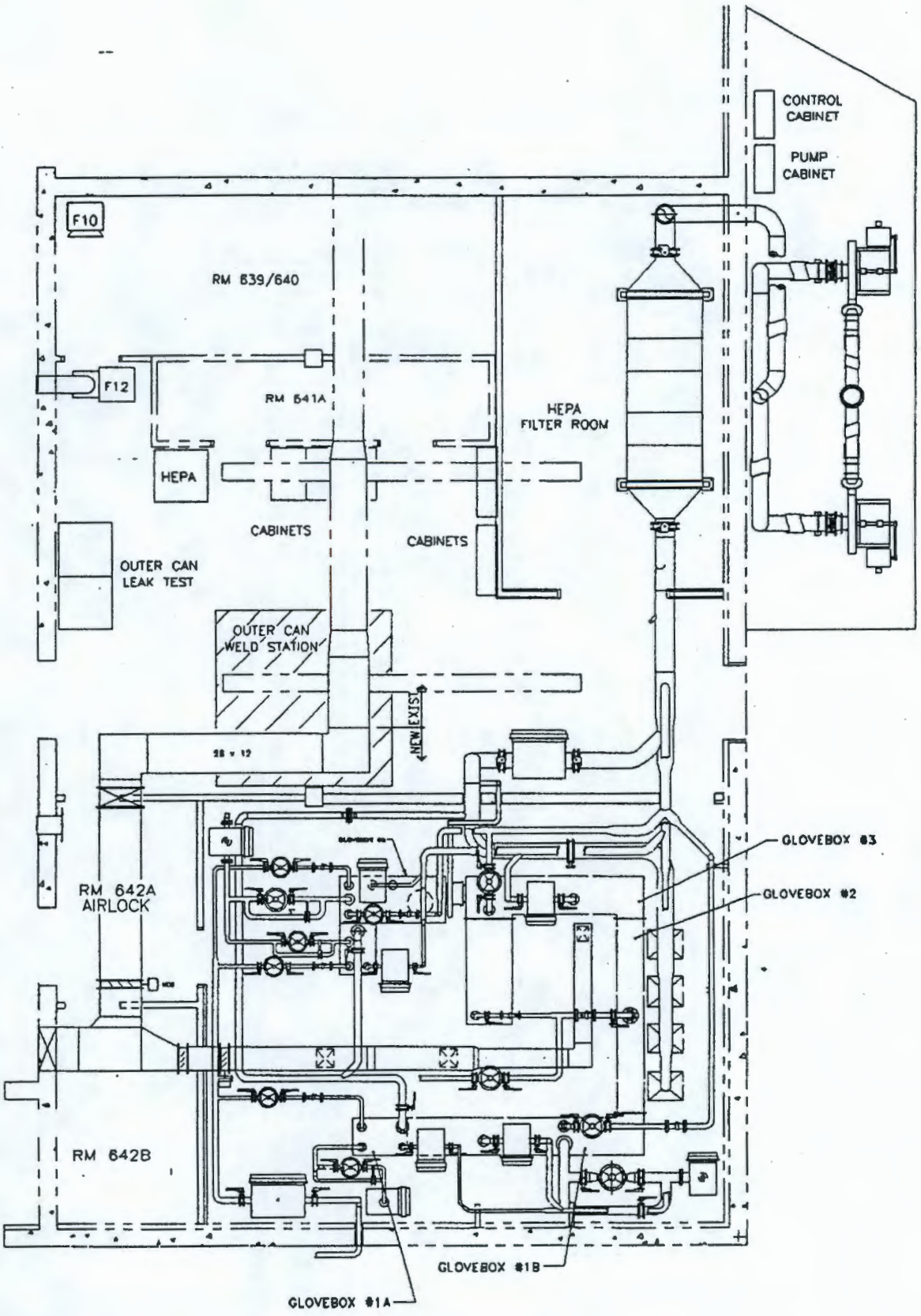

Figure 6. 2736-ZB Building New Process Ventilation System.

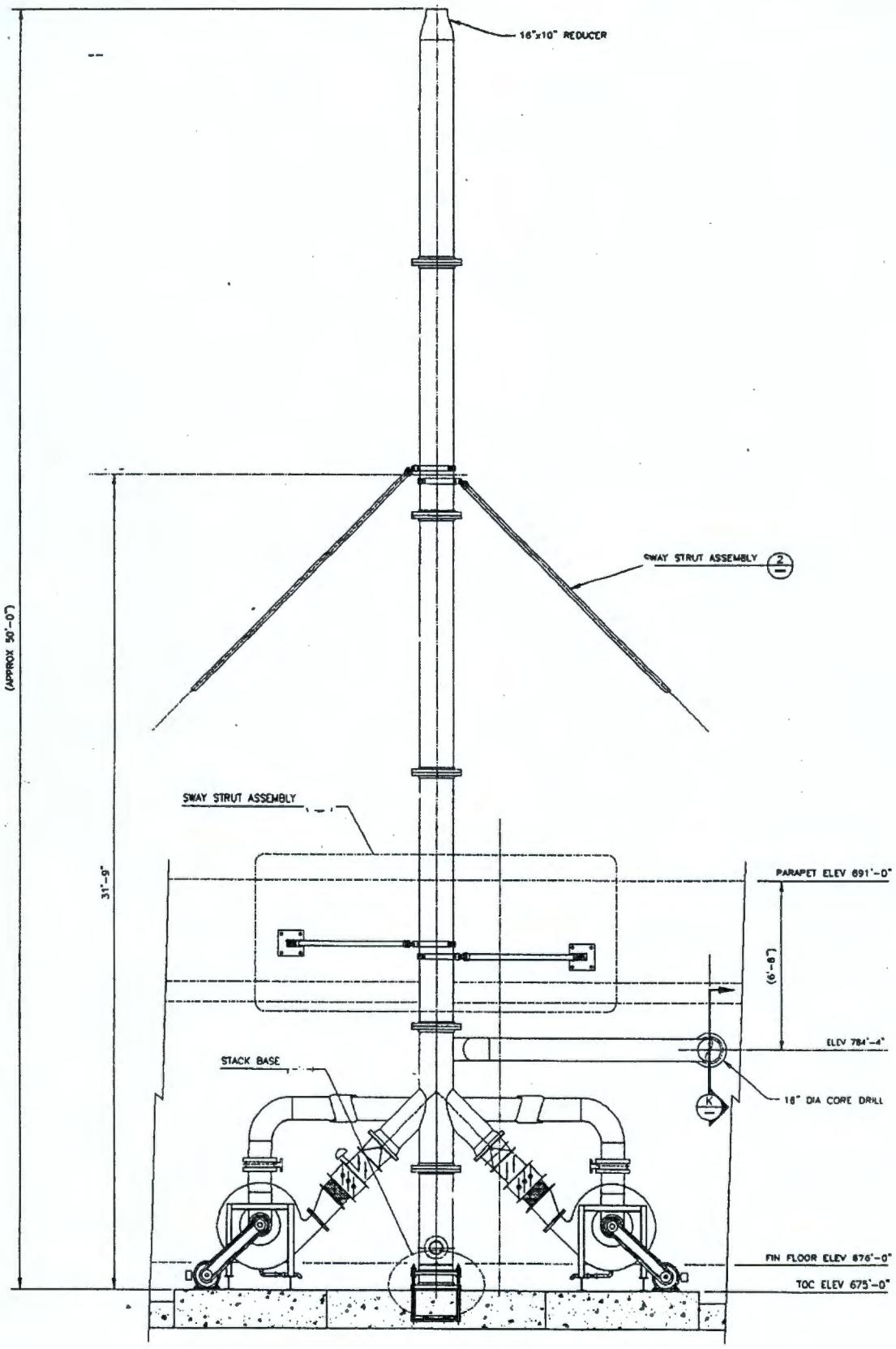

Figure 7. 2736-ZB Building New Process Exhaust System Stack.

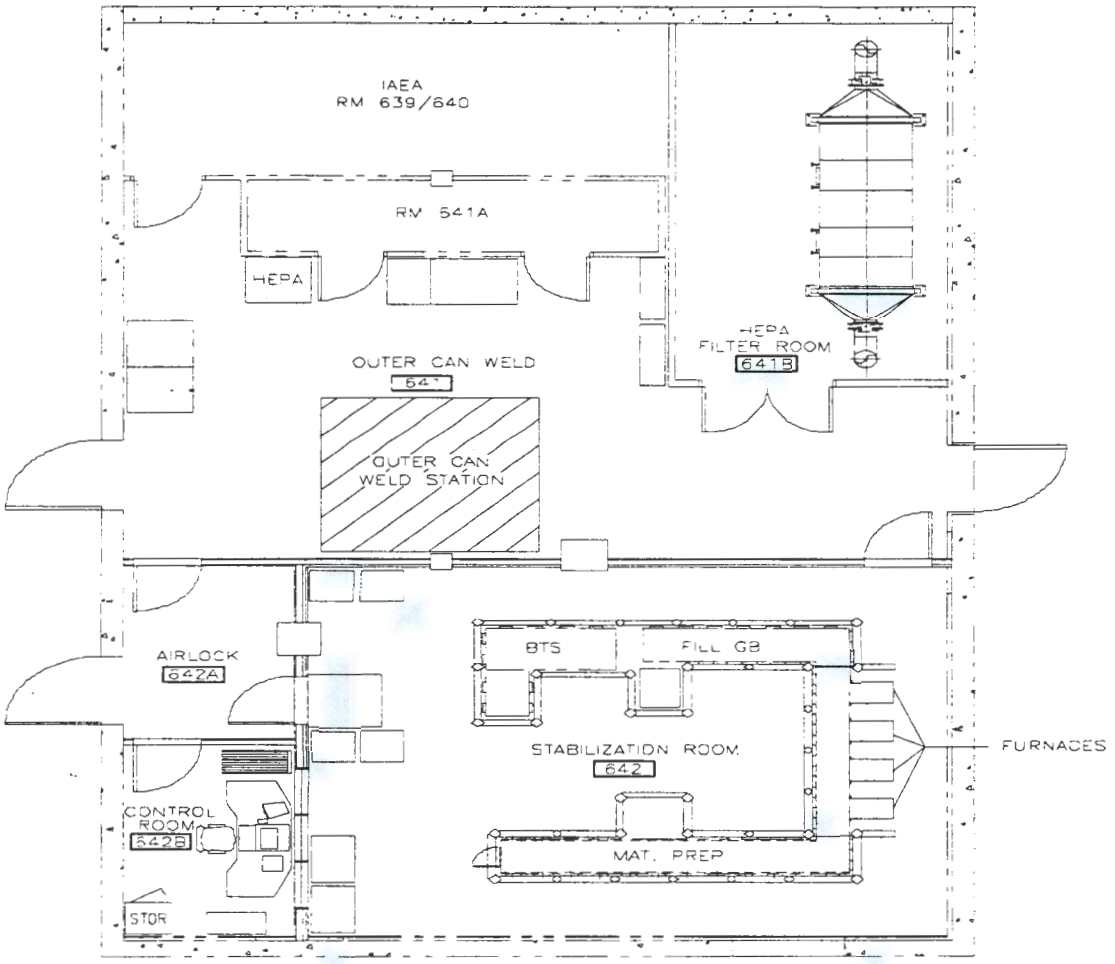

Figure 8. 2736-ZB Building, Rooms 641/642 Layout.

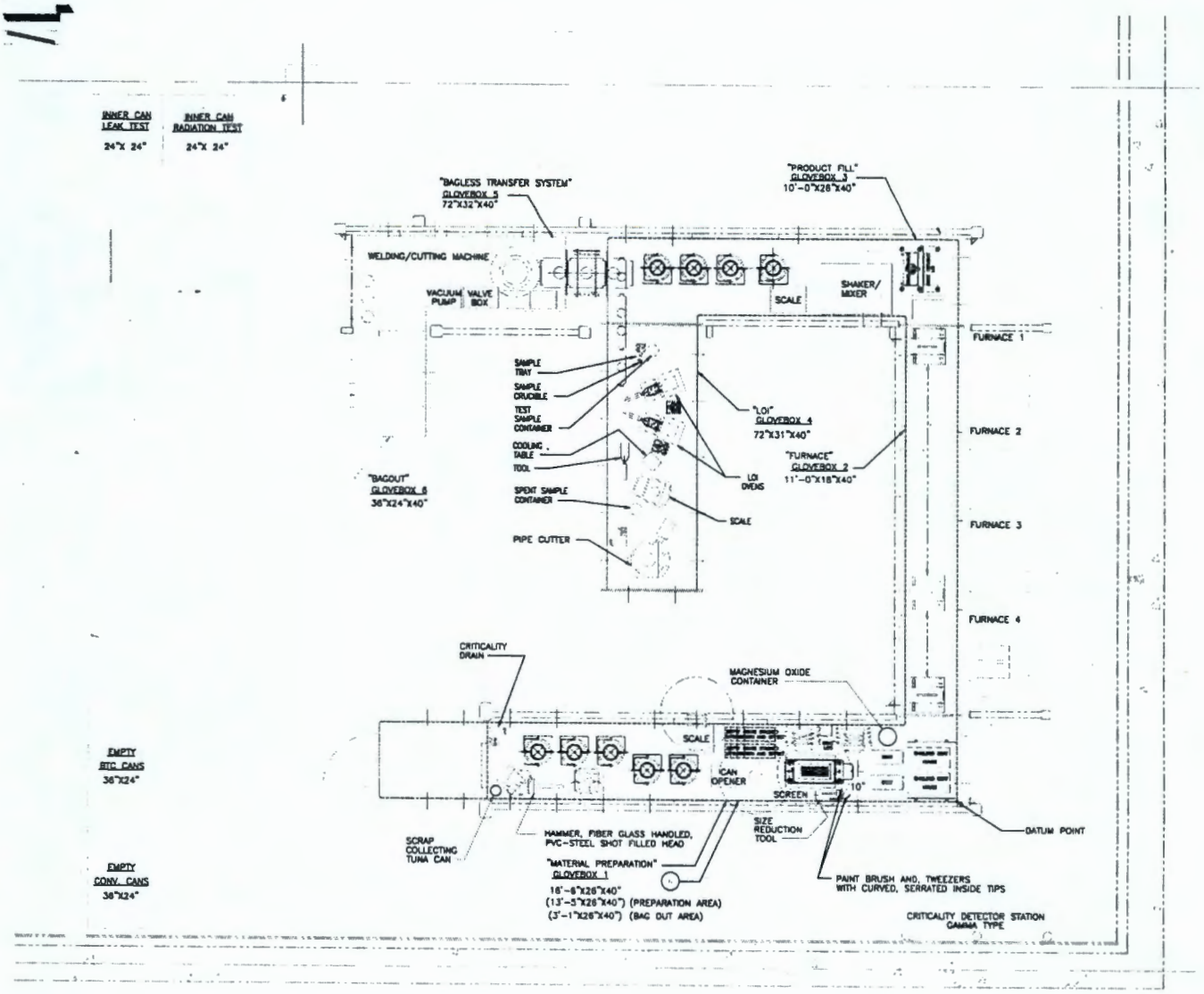

Figure 9. 2736-ZB Building, Room 642 Glovebox Layout.

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ATTACHMENT A

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PRELIMINARY ENGINEERING DRAWINGS

- Location of filters on exhaust systems of gloveboxes and furnaces: Drawing # H-2-829445 (sheet 1 of 5).
- Location of high-temperature equipment: Drawings # H-2-829969 (sheet 1 of 1) and H-2-829971 (sheet 1 of 1); 2 furnace sketches supporting Drawing H-2-829969.
- Direction and path of airflow: Drawing # H-2-829442 (sheet 1 of 1).
- Location of sampling lines on new stack (296-Z-7): Drawing # H-2-829485 (sheets 1 and 2 of 2).
- Location of additional controls on ventilation system: Drawing # H-2-829443 (sheets 1 – 9 of 9).

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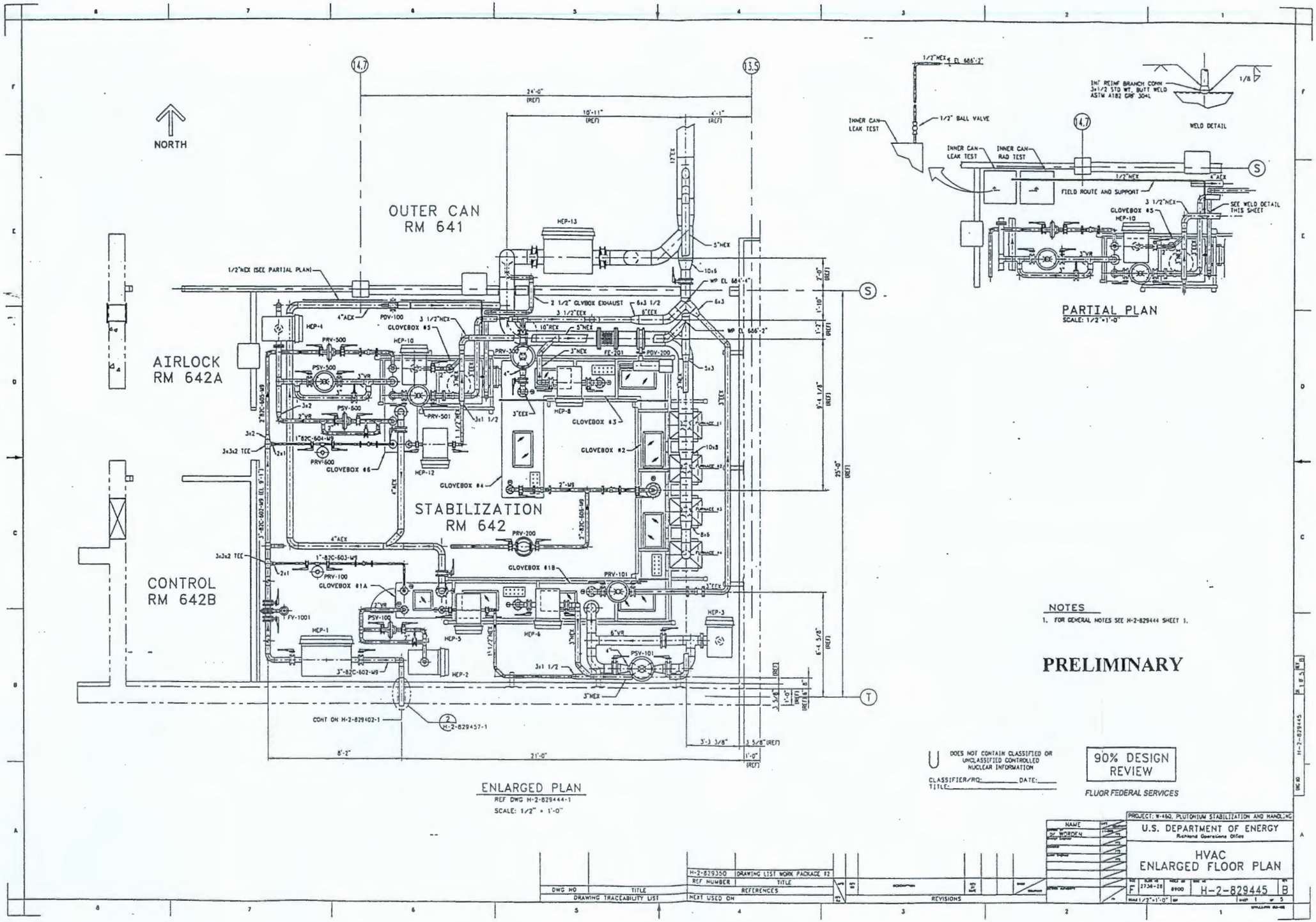


ENLARGED PLAN
REF DWG H-2-829444-1
SCALE: 1/2" = 1'-0"

PARTIAL PLAN
SCALE: 1/2"=1'-0"

NOTES
1. FOR GENERAL NOTES SEE H-2-829444 SHEET 1.

PRELIMINARY

U DOES NOT CONTAIN CLASSIFIED OR UNCLASSIFIED CONTROLLED NUCLEAR INFORMATION
CLASSIFIER/RO:_____ DATE:____
TITLE:_____

90% DESIGN REVIEW

FLUOR FEDERAL SERVICES

DWG NO	TITLE
DRAWING TRACEABILITY LIST	
H-2-829350	DRAWING LIST WORK PACKAGE #2
REF NUMBER	TITLE
REFERENCES	
NEXT USED ON	

NO	DESCRIPTION	DATE	BY
REVISIONS			

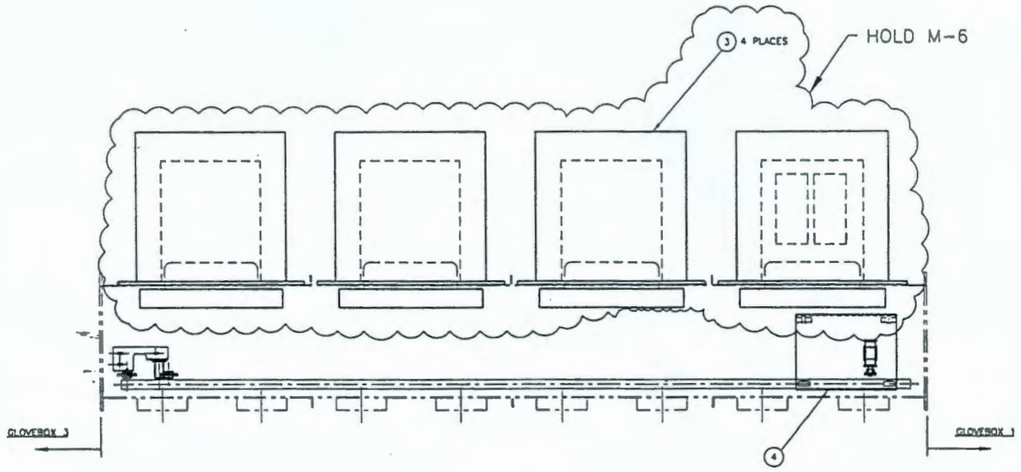
NAME	DATE
DF WORDEN	

PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC
ENLARGED FLOOR PLAN

SIZE	JOB NO	DRAWING NO	REV
F	2736-28	H-2-829445	B

SCALE 1/2"=1'-0" SHEET 1 OF 5

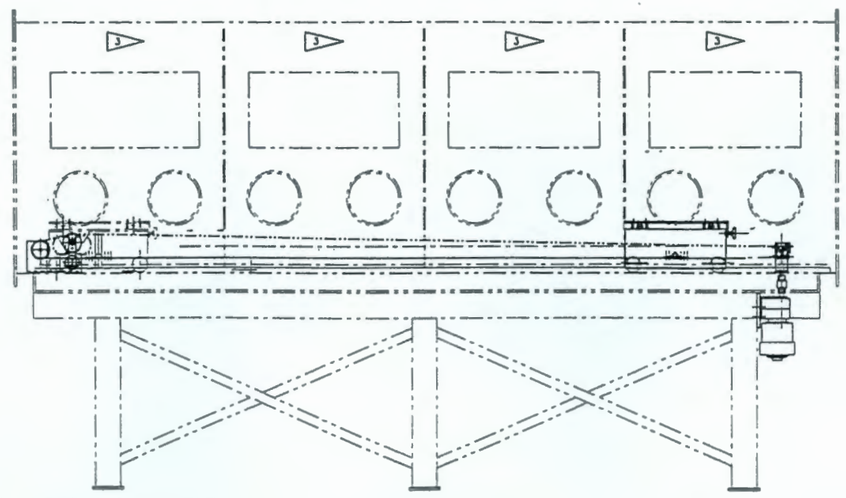
ATT A-1

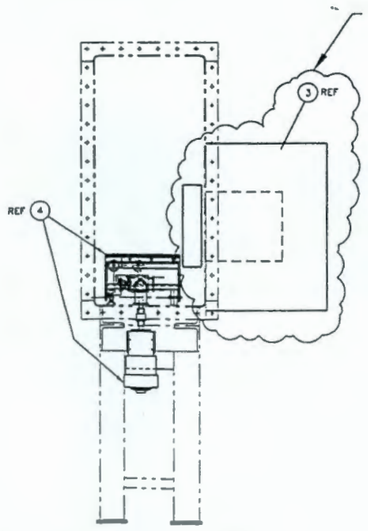


PLAN VIEW
SCALE: 1/8

PARTS/MATERIAL LIST						
QTY H120 -010	PART/DASH NUMBER	NOMENCLATURE/DESCRIPTION	MATERIAL/REFERENCE	SH	ITEM NO
SAFETY	-010	ASSEMBLY			1
					2
SC 4	H-2-829966	ASSEMBLY, FURNACE			3
GS 1	H-2-829965-010	ASSEMBLY, TROLLEY			4
					5
					6

2 HOLD M-6





1 ASSEMBLY
SCALE: 1/8

HOLD TABLE		
HOLD NO.	DESCRIPTION	EXPECTED RLSE DATE
M-8	ITEM 3, FURNACE ASSEMBLY	6/30/00

GENERAL NOTES

1. EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH CONSTRUCTION SPECIFICATION W-460-C2
2. SAFETY CLASSIFIED ITEMS ARE IDENTIFIED AS FOLLOWS: SAFETY CLASS (SC), SAFETY SIGNIFICANT (SS), OR GENERAL SERVICE (GS).
3. FURNACE TEMPERATURE DISPLAY READOUT IS LOCATED OUTSIDE GLOVEBOX

PRELIMINARY

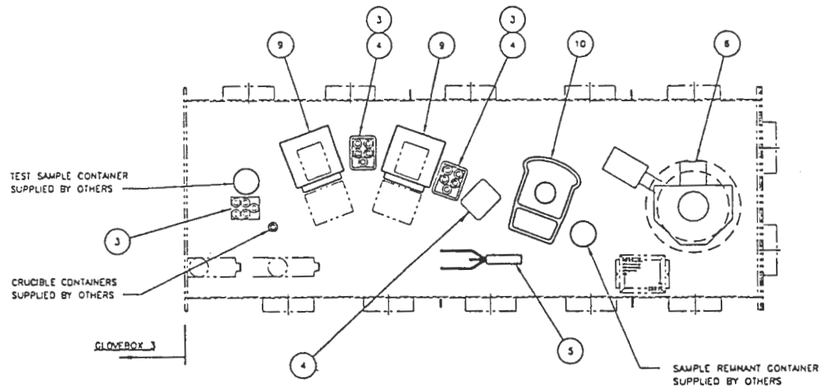
FLUOR FEDERAL SERVICES

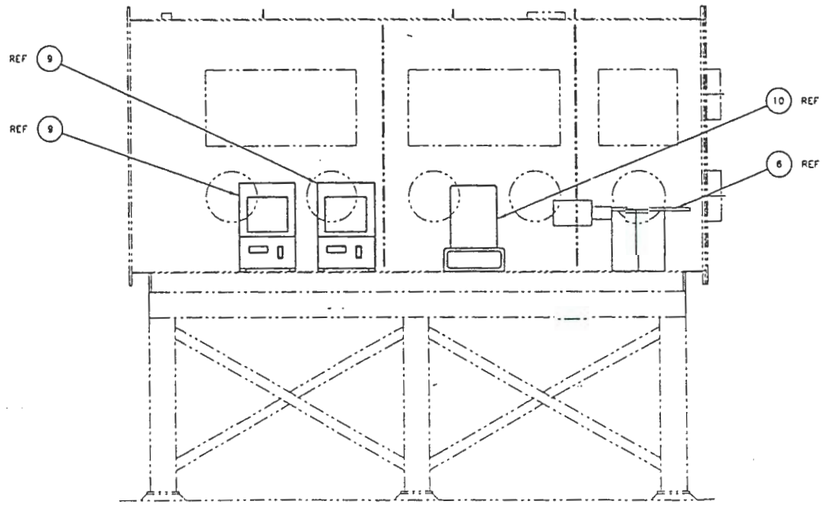
M-2-8293:0	DRAWING LIST WORK PACKAGE 12	0	ISSUED FOR CONSTRUCTION		
REF NUMBER	TITLE				
DWG NO	TITLE	REFERENCES			
DRAWING TRACEABILITY LIST		NEXT USED ON H-2-829941			

REVISIONS

PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
MECHANICAL
GLOVEBOX GB-642B
EQUIPMENT ASSEMBLY
F 2736-Z8 4700 H-2-829969 0
AS NOTED SHEET 1 OF 1

PARTS/MATERIAL LIST						
QTY	REQD -010	PART/DASH NUMBER	NOMENCLATURE/DESCRIPTION	MATERIAL/REFERENCE	SH	ITEM NO
SAFETY 2	X	-010	ARRANGEMENT, GLOVEBOX #6			1
						2
GS	3	H-2-829975-001	CRUCIBLE TRAY			3
GS	2	H-2-829975-010	COOLING TABLE			4
GS	1	H-2-829975-030	CRUCIBLE FORK			5
GS	1	H-2-829980-010	ASSEMBLY, PIPE CUTTER			6
						7
						8
GS	2	FB 1300	MUFFLE FURNACE	BARNSTEAD THERMOLYNE		9
GS	1	AB104-S	ANALYTICAL BALANCE	METTLER TOLEDO		10





1 GLOVEBOX ASSEMBLY
SCALE: 1/8

PRELIMINARY

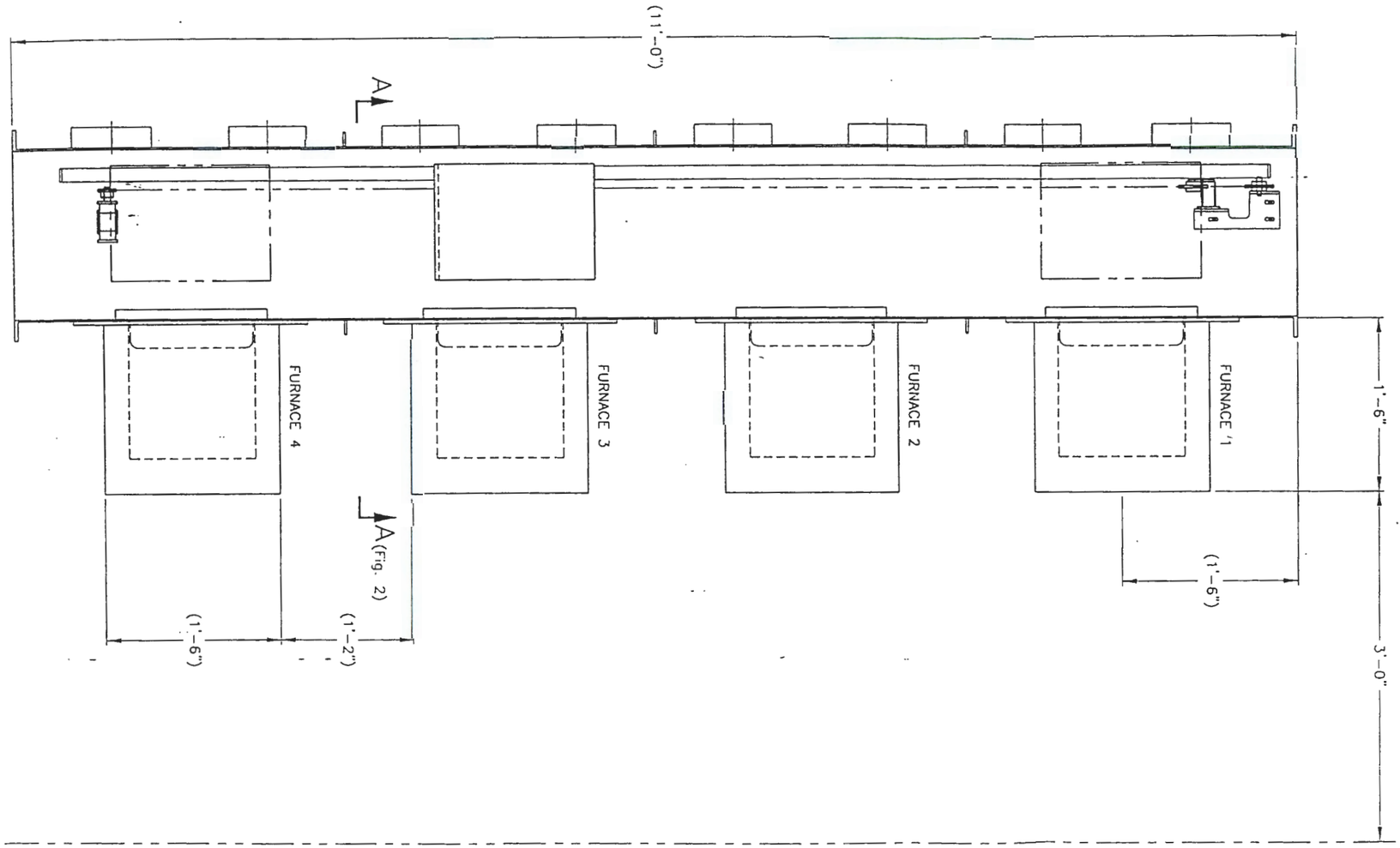
GENERAL NOTES

1. EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH CONSTRUCTION SPECIFICATION W-460-C2, SECTION 13095.
2. SAFETY CLASSIFIED ITEMS ARE IDENTIFIED AS FOLLOWS: SAFETY CLASS (SC), SAFETY SIGNIFICANT (SS), OR GENERAL SERVICE (GS).

DRAWING TRACEABILITY LIST			REVISIONS			
DWG NO	TITLE	REFERENCES				
		REF NUMBER	TITLE			
		NEXT USED ON H-2-829941	H-2-829350 DRAWING LIST WORK PACKAGE 12	0	APPROVED FOR CONSTRUCTION	

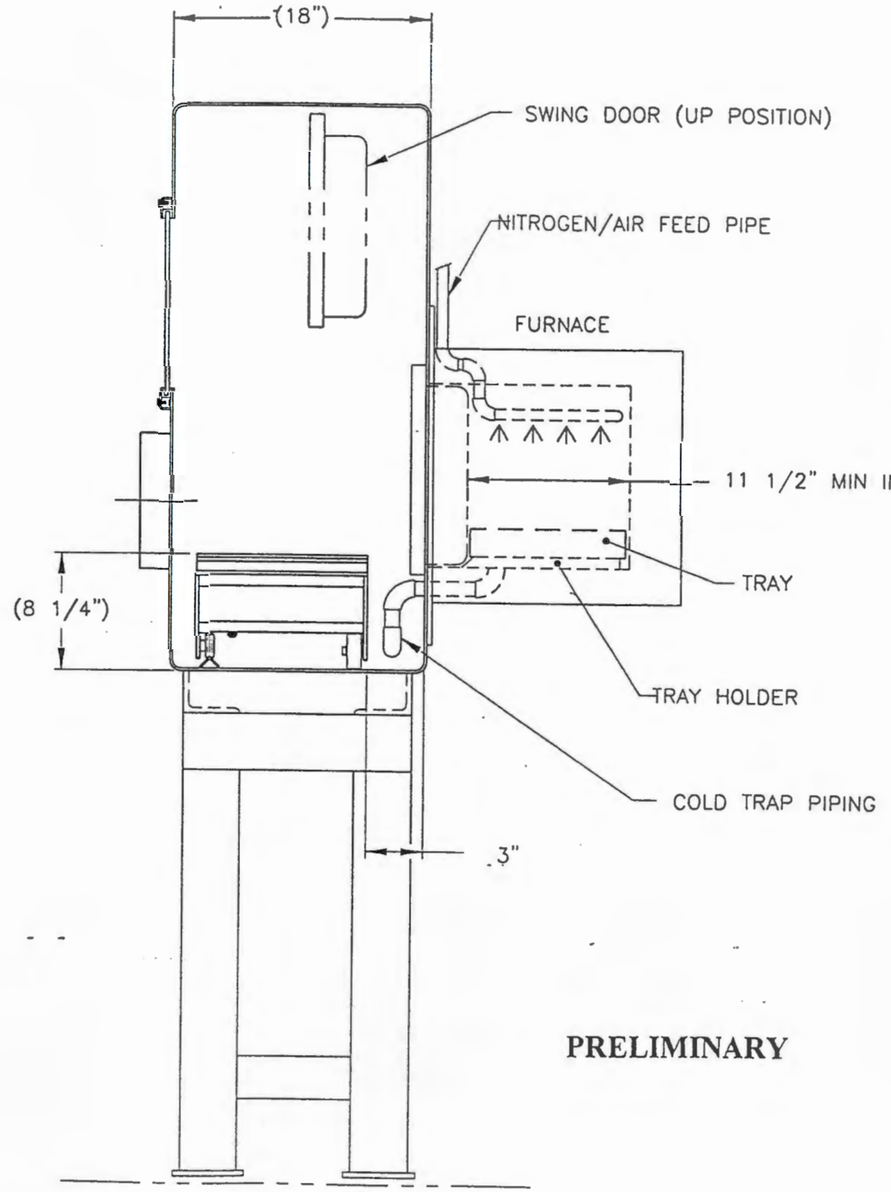
FLUOR FEDERAL SERVICES

PROJECT	W-460, PLUTONIUM STABILIZATION AND HANDLING
	U.S. DEPARTMENT OF ENERGY Richland Operations Office
	MECHANICAL GLOVEBOX GB-642D EQUIPMENT ASSEMBLY
SIZE F	H-2-829971 REV 0
SCALE AS SHOWN	SHEET 1 OF 1



PRELIMINARY

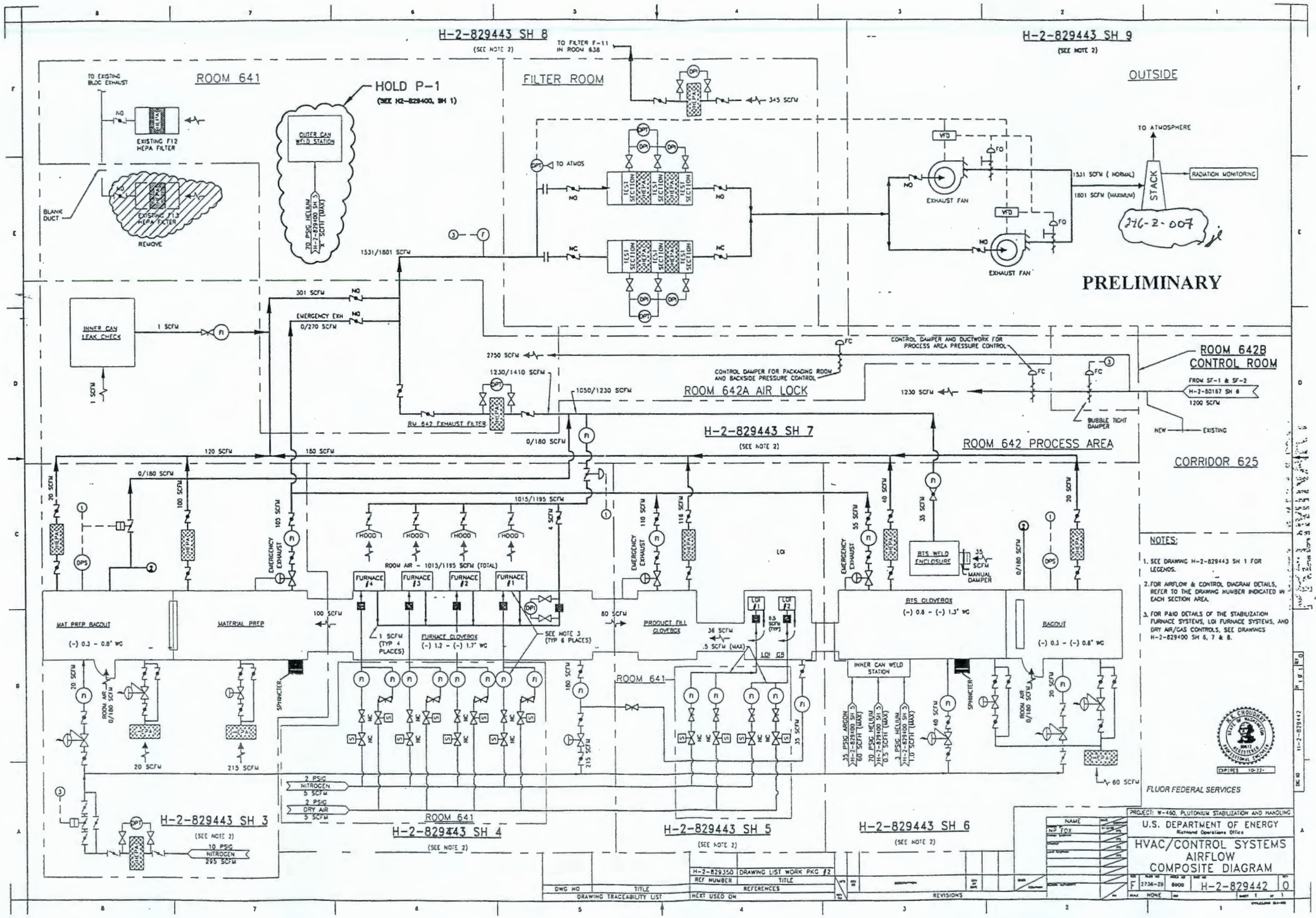
Furnace sketch (1 of 2) supporting Drawing H-2-829969.

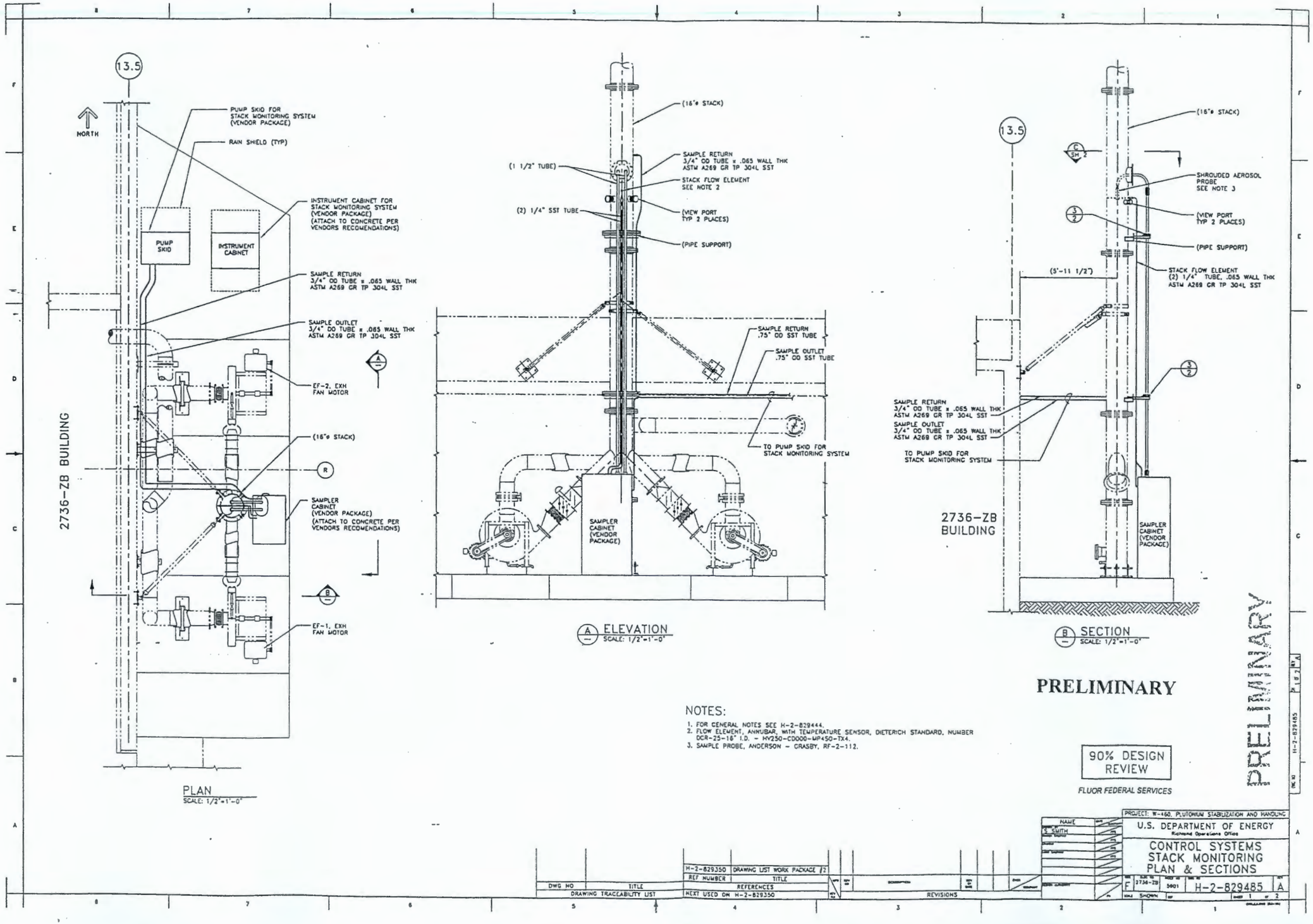


SECTION A–A
SCALE: NONE

PRELIMINARY

Furnace sketch (2 of 2) supporting Drawing H-2-829969.


H-2-829443 SH 8
(SEE NOTE 2)
TO FILTER F-11 IN ROOM 638
H-2-829443 SH 9
(SEE NOTE 2)
ROOM 641
HOLD P-1
(SEE H2-829400, SH 1)
FILTER ROOM
OUTSIDE
TO EXISTING BLDG EXHAUST
EXISTING F12 HEPA FILTER
BLANK DUCT
EXISTING F13 HEPA FILTER
REMOVE
OUTER CAN WELD STATION
TO PSIG HELIUM H1-2-829400 SH 5
X SCFH (MAX)
345 SCFM
TO ATMOS
1531/1801 SCFM
EXHAUST FAN
EXHAUST FAN
1531 SCFM (NORMAL)
1801 SCFM (MAXIMUM)
TO ATMOSPHERE
STACK
RADIATION MONITORING
276-2-007
PRELIMINARY
INNER CAN LEAK CHECK
1 SCFM
301 SCFM
EMERGENCY EXH 0/270 SCFM
2750 SCFM
1230/1410 SCFM
1050/1230 SCFM
CONTROL DAMPER FOR PACKAGING ROOM AND BACKSIDE PRESSURE CONTROL
CONTROL DAMPER AND DUCTWORK FOR PROCESS AREA PRESSURE CONTROL
ROOM 642A AIR LOCK
1230 SCFM
ROOM 642B CONTROL ROOM
FROM SF-1 & SF-2 H-2-80167 SH 6
1200 SCFM
BUBBLE TIGHT DAMPER
NEW
EXISTING
RV 642 EXHAUST FILTER
0/180 SCFM
H-2-829443 SH 7
(SEE NOTE 2)
ROOM 642 PROCESS AREA
CORRIDOR 625
120 SCFM
150 SCFM
0/180 SCFM
20 SCFM
100 SCFM
105 SCFM
1015/1195 SCFM
4 SCFM
110 SCFM
115 SCFM
55 SCFM
40 SCFM
35 SCFM
20 SCFM
HOOD
ROOM AIR - 1015/1195 SCFM (TOTAL)
EMERGENCY EXHAUST
FURNACE #4
FURNACE #3
FURNACE #2
FURNACE #1
LOI
BTS WELD ENCLOSURE
35 SCFM MANUAL DAMPER
0/180 SCFM
MAT PREP BAGOUT
(-) 0.3 - 0.8" WC
MATERIAL PREP
100 SCFM
1 SCFM (TYP 4 PLACES)
FURNACE GLOVEBOX
(-) 1.2 - (-) 1.7" WC
SEE NOTE 3 (TYP 6 PLACES)
80 SCFM
PRODUCT FILL GLOVEBOX
36 SCFM
.5 SCFM (MAX)
LOI #1
LOI #2
0.5 SCFM (TYP)
LOI GB
BTS GLOVEBOX
(-) 0.8 - (-) 1.3" WC
BAGOUT
(-) 0.3 - (-) 0.8" WC
INNER CAN WELD STATION
35 PSIG ARGON 20 SCFM (MAX)
70 PSIG HELIUM 0.5 SCFM (MAX)
3 PSIG HELIUM 10 SCFM (MAX)
ROOM AIR 0/180 SCFM
SPRINKLER
20 SCFM
215 SCFM
60 SCFM
2 PSIG NITROGEN 5 SCFM
2 PSIG DRY AIR 5 SCFM
10 PSIG NITROGEN 295 SCFM
ROOM 641
H-2-829443 SH 3
(SEE NOTE 2)
H-2-829443 SH 4
(SEE NOTE 2)
H-2-829443 SH 5
(SEE NOTE 2)
H-2-829443 SH 6
(SEE NOTE 2)
NOTES:
1. SEE DRAWING H-2-829443 SH 1 FOR LEGENDS.
2. FOR AIRFLOW & CONTROL DIAGRAM DETAILS, REFER TO THE DRAWING NUMBER INDICATED IN EACH SECTION AREA.
3. FOR P&ID DETAILS OF THE STABILIZATION FURNACE SYSTEMS, LOI FURNACE SYSTEMS, AND DRY AIR/GAS CONTROLS, SEE DRAWINGS H-2-829400 SH 6, 7 & 8.
FLUOR FEDERAL SERVICES
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS AIRFLOW COMPOSITE DIAGRAM
H-2-829442
DRAWING TRACEABILITY LIST
H-2-829350 DRAWING LIST WORK PKG #2
REFERENCES
REVISIONS



PRELIMINARY

NOTES:

1. FOR GENERAL NOTES SEE H-2-829444.
2. FLOW ELEMENT, ANNUBAR, WITH TEMPERATURE SENSOR, DIETERICH STANDARD, NUMBER DSR-25-16" I.D. - MV250-CDDDD-WP450-TX4.
3. SAMPLE PROBE, ANDERSON - GRASBY, RF-2-112.

90% DESIGN REVIEW

FLUOR FEDERAL SERVICES

PRELIMINARY

DRAWING TRACEABILITY LIST

DWG NO	TITLE
H-2-829350	DRAWING LIST WORK PACKAGE 12

REFERENCES

REF NUMBER	TITLE
NEXT USED ON H-2-829350	

REVISIONS

NAME	DATE
S SMITH	

PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING

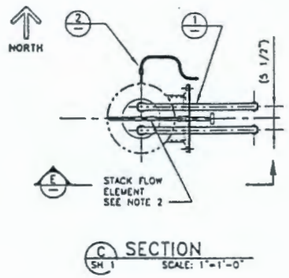
U.S. DEPARTMENT OF ENERGY
Richland Operations Office

CONTROL SYSTEMS
STACK MONITORING
PLAN & SECTIONS

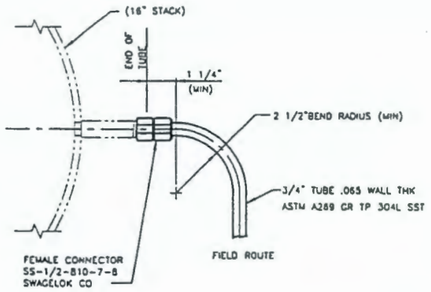
SIZE	DWG NO	REV
F	H-2-829485	A

SCALE: AS SHOWN

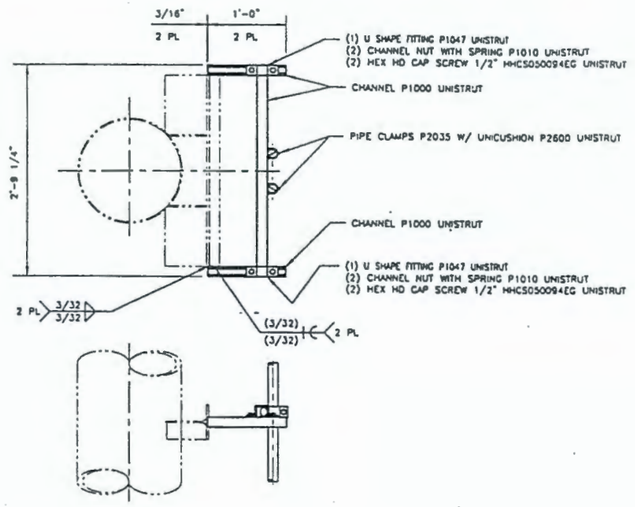
SHEET 1 OF 2



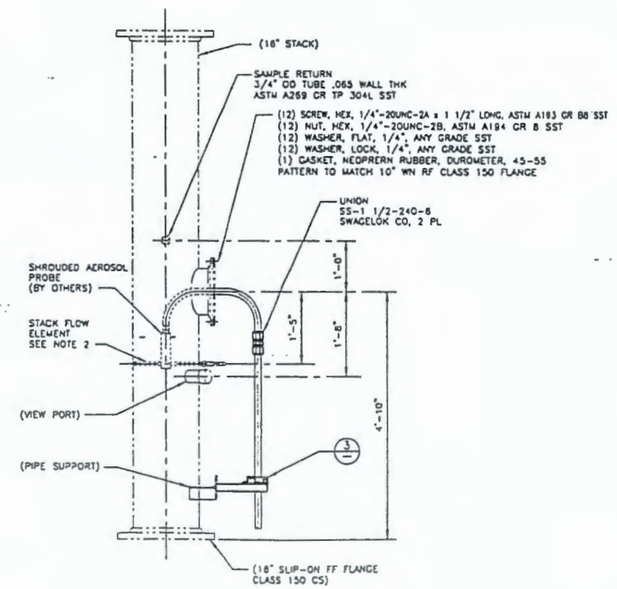
C SECTION
SH. 1 SCALE: 1"=1'-0"



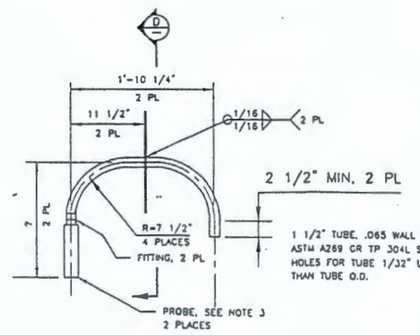
2 DETAIL–SAMPLE RETURN PORT
SCALE: NTS



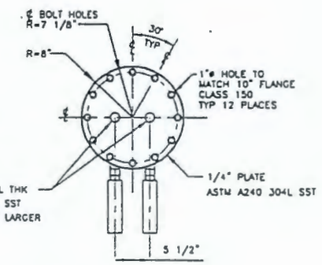
3 DETAIL
SCALE: 1 1/2" = 1'-0"



E SECTION
SCALE: 1"=1'-0"



1 DETAIL
SCALE: 1 1/2"=1'-0"



D SECTION
SCALE: 1 1/2"=1'-0"

PRELIMINARY

FOR NOTES SEE SHEET 1

90% DESIGN REVIEW

FLUOR FEDERAL SERVICES

PRELIMINARY

DWG NO	TITLE
H-2-829350	DRAWING LIST WORK PACKAGE 17
REF NUMBER	TITLE

DRAWING TRACEABILITY LIST
REFERENCES
NEXT USED ON SHEET 1
REVISIONS

NAME	
S SMITH	

PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING

U.S. DEPARTMENT OF ENERGY
Richland Operations Office

CONTROL SYSTEMS
STACK MONITORING
PLAN, SECTIONS & DETAILS

F	2734-28	9901	H-2-829485	A

SHEET 2

LINE TYPES:

- HVAC DUCT LINE
- PIPING LINE
- NEW LINE OR EQUIPMENT
- INSTRUMENTATION OR EQUIPMENT
- EXISTING LINE OR EQUIPMENT
- ELECTRICAL SIGNAL
- COMMUNICATION SYSTEM LINK (SOFTWARE, DATA, SERIAL, PARALLEL)
- PNEUMATIC SIGNAL
- PURCHASED PACKAGE
- FLOW DIRECTION
- INSULATED LINE

VALVES:

- BALL VALVE (BV)
- GLOBE VALVE (GV)
- BUTTERFLY DAMPER VALVE (BFD)
- 3-WAY VALVE
- NEEDLE VALVE (NV)
- CHECK VALVE (CV)
- GATE VALVE (GV)
- MANUAL DAMPER (D)
- DAMPER VALVE, SPRING OPPOSED
- PRESSURE (VACUUM) BALANCED REGULATOR (PRV), SELF-CONTAINED

ACTUATORS:

- CYLINDER ACTUATOR, SPRING OPPOSED
- CYLINDER ACTUATOR, SPRING OPPOSED, SINGLE ACTING W/HAND ACTUATOR
- SOLENOID OPERATOR
- HAND ACTUATOR
- PRESSURE BALANCED DIAPHRAGM
- DIAPHRAGM OPERATOR, SPRING OPPOSED

HVAC & MISCELLANEOUS DEVICES:

- FLANGE
- PRESSURE SENSING TIP (LOCAL)
- PRESSURE SENSING TIP (CORRIDOR 625)
- PRESSURE SENSING TIP (OUTSIDE ATM)
- QUICK CONNECTOR, FEMALE
- QUICK CONNECTOR, MALE
- CONNECT TO LIKE NUMBER
- 120 CFM — AIRFLOW/INFILTRATION
- HEP-XXX — HIGH EFFICIENCY PARTICULATE AIR FILTER (HEPA)
- F-XX — FILTER
- MOTORIZED FAN DRIVE
- EF-X — CENTRIFUGAL FAN W/ BACK DRAFT DAMPER
- STACK — EXHAUST STACK
- MCC — MOTOR CONTROL CENTER/MOTOR STARTER
- VFD — VARIABLE FREQUENCY DRIVE

MISCELLANEOUS ABBREVIATIONS

ADJ	ADJUSTABLE
ATM	ATMOSPHERE
BDD	BACK DRAFT DAMPER
BTS	BAGLESS TRANSFER SYSTEM
BV	BALL VALVE
CV	CHECK VALVE
D	DAMPER
DR	DRAIN
EF	EXHAUST FAN
FC	FAIL CLOSED
FO	FAIL OPEN
GS	GENERAL SERVICE
GV	GATE OR GLOBE VALVE
HMI	HUMAN MACHINE INTERFACE (PC)
HOA	HAND-OFF-AUTO
HP	HORSEPOWER
LO	LOCKED OPEN
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NV	NEEDLE VALVE
SC	SAFETY CLASS
SCR	SILICON CONTROLLED RECTIFIER
SP	SET-POINT
SS	SAFETY SIGNIFICANT
V	VALVE

INSTRUMENTATION SYMBOLS:

- SHARED DISPLAY/CONTROL BY THE MICON
  XXX = SOFTWARE GENERATED ALARM SIGNALS FROM ANALOG INPUT TO MICON
  AAH = ANALYZER ALARM HIGH (O2 LEVEL)
  FAL = FLOW ALARM LOW
  PAL = PRESSURE ALARM LOW
  PDAH = PRESSURE DIFFERENTIAL ALARM HIGH
  PDAL = PRESSURE DIFFERENTIAL ALARM LOW
  TAH = TEMPERATURE ALARM HIGH
- INPUT/OUTPUT INTERFACE AT MICON LOCAL CONTROL UNIT (LCU) XX = AI, DI, OR DO
  AI = ANALOG INPUT
  DI = DIGITAL INPUT
  DO = DIGITAL OUTPUT
- SHARED DISPLAY/CONTROL BY THE PLC/HMI
  XXX = SOFTWARE GENERATED ALARM SIGNALS FROM ANALOG INPUT TO MICON
  AAH = ANALYZER ALARM HIGH (O2 LEVEL)
  FAL = FLOW ALARM LOW
  PAL = PRESSURE ALARM LOW
  PDAH = PRESSURE DIFFERENTIAL ALARM HIGH
  PDAL = PRESSURE DIFFERENTIAL ALARM LOW
  TAH = TEMPERATURE ALARM HIGH
- PROGRAMMABLE LOGIC CONTROL (PLC) INTERLOCK (SOFT)
- INTERLOCK LOGIC (HARDWIRED)
- PANEL FRONT MOUNTED INSTRUMENT
- PANEL REAR MOUNTED INSTRUMENT
- COLOR — PANEL FRONT MOUNTED INDICATING LIGHT
  C = GREEN
  R = RED
- COLOR — LOCAL MOUNTED INDICATING LIGHT
  G = GREEN
  R = RED
- LOCAL MOUNTED INSTRUMENT
- TE — TEMPERATURE ELEMENT WITH WELL
- TI — TEMPERATURE INDICATOR WITH ELEMENT & WELL
- TE — TEMPERATURE ELEMENT, SURFACE
- TE — TEMPERATURE ELEMENT WITHOUT WELL
- ANALYSIS SENSOR (DEFINED)
- AVERAGING PITOT TUBE W/ FLOW STRAIGHTENING VANES
- CONVERTER
  I = CURRENT
  P = PNEUMATIC
- VARIABLE AREA FLOWMETER W/INTEGRAL NEEDLE VALVE

INSTRUMENT IDENTIFICATION LETTERS

	FIRST-LETTER		SUCCEEDING-LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED	

GENERAL NOTES:

1. ABBREVIATIONS ARE IN ACCORDANCE WITH ASME Y1.1-1989.
2. FIRST LETTER "A" (ANALYSIS) IS DEFINED OUTSIDE A TAGGING BUBBLE.
3. SUCCEEDING LETTER "Y" IS DEFINED OUTSIDE A TAGGING BUBBLE, UNLESS THE FUNCTION IS SELF-EVIDENT, I.E.: SOLENOID VALVE.
4. THE TERMS "HIGH" AND "LOW", WHEN APPLIED TO POSITIONS OF VALVES ARE DEFINED AS FOLLOWS:
   - "HIGH" DENOTES THAT THE VALVE IS IN THE FULLY OPEN POSITION
   - "LOW" DENOTES THAT THE VALVE IS IN THE FULLY CLOSED POSITION.
5. INSTRUMENTATION LEGEND AND SYMBOLS ARE GENERALLY IN ACCORDANCE WITH ANSI/ISA S5.1-1984 AND S5.3-1983.
6. SEE CONSTRUCTION DRAWINGS AND SPECIFICATIONS FOR IDENTIFICATION OF SPECIFIC SYSTEM, STRUCTURE OR COMPONENT SAFETY CLASSIFICATION.
7. THE SET-POINTS OF PRESSURE REGULATING VALVES (PRV) FOR REGULATING THE GLOVEBOX PRESSURE (VACUUM) ARE NOMINAL VALUES (APPROXIMATELY WIDRANCE BETWEEN FULL OPEN AND FULL CLOSE).
8. ALL INDICATORS AND TRANSMITTERS (FIs, FITs, DPIs AND DPITs) THAT MEASURES PRESSURE DIFFERENTIAL FROM TWO DIFFERENT SOURCES ARE EQUIPPED WITH A 3-VALVE MANIFOLD TO ISOLATE THE INSTRUMENTS FROM THE PROCESS FOR IN-PLACE CALIBRATION AND MAINTENANCE OF THE INSTRUMENTS WITHOUT SHUTTING DOWN THE PROCESS. SEE THE DETAILED DRAWINGS FOR IDENTIFICATIONS OF VALVES.
9. A VALVE THAT IS DESIGNATED AS A SAFETY RELIEF VALVE (SRV) IS INTENDED TO PROTECT AGAINST EMERGENCY PRESSURE CONDITIONS THAT ARE HAZARDOUS TO PERSONNEL AND/OR EQUIPMENT.
10. THE TERM "EMERGENCY EXHAUST" SHOWN ON SHEETS 3, 5, 6 AND 8 ARE CONSTRUED TO MEAN "MAKE-UP EXHAUST" IN CASE THE "NORMAL EXHAUST" COULD NOT MAINTAIN THE DESIRED GLOVEBOX PRESSURE (VACUUM), THE PRESSURE OF THE GLOVEBOXES 1a, 3 AND 5 ARE MAINTAINED AS DESCRIBED IN THE SYSTEM DESCRIPTION ON SHEET 2. HOWEVER, IF THE PRESSURE (VACUUM) DECREASES, IN ANY ONE OF THE GLOVEBOXES, TO -0.5" WG, VALVES PRV-101, PRV-300 OR PRV-501 STARTS OPENING TO "MAKE-UP" THE PRESSURE OF THE RESPECTIVE GLOVEBOX UNTIL THE DESIRED PRESSURE IS ACHIEVED, AND THEN CLOSES.
11. FOR FURNACE TEMPERATURE CONTROLS, AND NITROGEN AND DRY AIR PURGE CONTROLS, SEE DRAWING H-2-829400 SH 6, 7 & 8.
12. INITIALLY THE OPERATING FILTER PLENUM WILL BE USED AND THE STANDBY FILTER WILL BECOME OPERATING FILTER WHEN THE INITIAL FILTER IS SWITCHED TO STANDBY.
13. INITIALLY THE OPERATING EXHAUST AIR FAN WILL BE USED AND THE STANDBY EXHAUST AIR FAN WILL BECOME OPERATING EXHAUST AIR FAN WHEN THE INITIAL EXHAUST AIR FAN IS SWITCHED TO STANDBY.
14. SUFFIX ALL EQUIPMENT, INSTRUMENT AND VALVE TAGGINGS WITH "-25BA", FOR EXAMPLE: DPIT-101 BECOMES DPIT-101-25BA.
15. EQUIPMENT COMPONENT IDENTIFIER NUMBERS SHALL BE IN ACCORDANCE WITH SD-CP-RD-024.

HOLD TABLE		
HOLD NO.	DESCRIPTION	EXPECTED RLSE DATE
P-2	PENDING W-460-PSAR RESOLUTION	5/30/00

PRELIMINARY

FLUOR FEDERAL SERVICES

DRAWING TRACEABILITY LIST

DWG NO	TITLE
H-2-829350	DRAWING LIST WORK PACKAGE 12

REFERENCES — NEXT USED ON

REVISIONS

NAME	DATE
N.P. FOX	11/29/99

PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING

U.S. DEPARTMENT OF ENERGY
Richland Operations Office

HVAC/CONTROL SYSTEMS AIRFLOW & CONTROL DIAG NOTES AND LEGENDS

F | 23736-28 | 7004 | H-2-829443 | 0

SHEET 1 OF 9

H-2-829443

SYSTEM DESCRIPTION

ZONE PRESSURE CONTROL

AIRFLOW TO PROCESS ROOM 642 AND THE GLOVEBOXES (6) ARE ACHIEVED BY VENTILATION CONTROL (PRESSURE DIFFERENTIAL), BY DIRECTING AIR FROM THE LESS CONTAMINATED AREAS TOWARD AREAS OF HIGHER CONTAMINATION, THEN TO THE HIGH-EFFICIENCY PARTICULATE AIR (HEPA) FILTERS, BACK DRAFT DAMPERS AND EXHAUST STACK.

ZONE	REFERENCE POINT	PRESSURE
I	GLOVEBOXES	-0.30" TO -0.80" WG (BAGOUT/AIRLOCK)
		-0.50 TO -1.7" WG (MAX)
IIB	ROOM 642	-0.20" TO -0.30" WG

ZONE I

BAGOUT GLOVEBOXES 642A AND 642F DOORS ARE ADMINISTRATIVELY CONTROLLED. EITHER DIFFERENTIAL PRESSURE SWITCH DPISL-100 OR DPISL-600 AT <0.1" WG OPENS EXHAUST DAMPER PDV-100 AND PARTIALLY CLOSES DAMPER PDV-200 ALLOWING AIRFLOW THROUGH THE RESPECTIVE DOOR. EXHAUST DAMPER PDV-100 IS INTERLOCKED WITH FURNACE HOOD EXHAUST DAMPER PDV-200. WHEN EXHAUST DAMPER PDV-100 IS CLOSED, EXHAUST DAMPER PDV-200 OPENS TO A PRESET MAXIMUM OPENED POSITION, AND WHEN EXHAUST DAMPER PDV-100 IS OPENED, EXHAUST DAMPER PDV-200 CLOSES TO A PRESET MINIMUM CLOSED POSITION, VIA MECHANICAL STOPS, TO MAINTAIN THE EXHAUST FLOW BETWEEN 1015 TO 1195 SCFM.

FOUR GLOVEBOXES ARE BLANKETED WITH INERT GAS (NITROGEN) AND ARE CONTROLLED BY THE NITROGEN GAS SUPPLY PRESSURE REGULATING VALVES PRV-100, PRV-200, PRV-500, PRV-600. THESE GAS SUPPLY VALVES MAINTAIN AND BLANKET THE FOLLOWING GLOVEBOXES WITH NITROGEN GAS WITHIN THE FOLLOWING PRESSURES (VACUUM) RANGES:

GLOVEBOX	PRESSURE RANGE
642A BAGOUT	- 0.3" TO - 0.8" WG
642A MAT'L PREP.	- 1.2" TO - 1.7" WG
642B, 642C & 642D	- 1.2" TO - 1.7" WG
642E	- 0.8" TO - 1.3" WG
642F	- 0.3" TO - 0.8" WG

NITROGEN GAS FLOW TO THE LOI GLOVEBOX (4) IS CONTROLLED BY A MANUAL VALVE BFO-400, AND INDICATED LOCALLY AT FLOW INDICATOR FI-400.

THE GLOVEBOXES ARE MONITORED BY OXYGEN SENSORS FOR LOSS OF INERT GAS. ELECTRICAL POWER INTO THE GLOVEBOXES ARE INTERLOCKED TO SHUT OFF AT 4% OXYGEN LEVEL (HIGH OXYGEN LEVEL / LOSS OF INERT GAS), AFTER 3 MINUTESSSS TIME DELAY.

THE FOUR GLOVEBOX PRESSURE WITH RESPECT TO ROOM PRESSURE, ARE INDICATED LOCALLY ON DPISL-100, DPI-200, DPI-500, AND DPISL-600. GLOVEBOXES 642A THRU 642E PRESSURE ARE REMOTELY MONITORED AND ALARMED ON THE HMI SCREEN IN THE SPE CONTROL ROOM AND ON THE MICON SYSTEM.

GLOVEBOXES 642A, 642C & 642E ARE PROVIDED WITH EMERGENCY EXHAUST (MAKEUP) VALVES THAT OPENS WHEN THE GLOVEBOX PRESSURE (VACUUM) DECREASES TO <-0.5" WG.

WHEN BOTH OF THE EXHAUST FANS ARE STOPPED OR WHEN ROOM 642 EXHAUST FILTER HEP-13 IS BEING REPLACED, INTERLOCK FOR LOW-LOW EXHAUST FLOW WITH A SETPOINT OF LESS THAN 250 SCFM IS PROVIDED AT THE EXHAUST FLOW PANEL EP-1-258A TO AUTOMATICALLY SHUTOFF THE NITROGEN SUPPLY TO GLOVEBOXES AND THUS, MAINTAIN PLUTONIUM CONFINEMENT.

GLOVEBOXES 642A (BAGOUT), 642A (MAT'L PREP), 642E & 642F ARE PROVIDED WITH VACUUM SAFETY RELIEF VALVES SRV-100, SRV-101, SRV-500, AND SRV-600 THAT OPEN AT THE MAXIMUM NEGATIVE PRESSURE OF -3.5 WG. THE VACUUM SAFETY RELIEF VALVES HAVE BYPASS VALVES THAT CAN BE MANUALLY OPENED. THE BYPASS WILL PROVIDE ROOM AIR TO THE GLOVEBOXES WHEN THE NITROGEN GAS SYSTEM IS NO LONGER REQUIRED. DURING SHUTDOWN/MAINTENANCE THE BYPASS VALVES ARE MONITORED WITH A LIMIT SWITCH, WHICH INDICATES THE VALVE POSITION ON THE HMI SCREEN.

ZONE IIB (ROOM 642)

THE SUPPLY AIR TO ROOM 642 IS CONTROLLED BY A MODULATING DAMPER PDV-900. FV-1000 IS HARD WIRED DIRECTLY TO THE EXHAUST FLOW SWITCHES FIT-1000A/FSL-1000A AND FIT-1000B/FSL-1000B WHICH MONITORS THE AIR FLOW IN THE PROCESS EXHAUST LINE. FV-1000 OPENS WHEN THERE IS A NORMAL EXHAUST FLOW IN THE EXHAUST LINE AND THE SUPPLY AIR IS MADE AVAILABLE TO ROOM 642. FV-1000 CLOSES, AND THE SUPPLY AIR TO ROOM 642 IS TERMINATED WHEN THERE IS A LOW-LOW FLOW IN THE EXHAUST LINE. THE MODULATING DAMPER PDV-900 IS CONTROLLED BY THE ROOM PRESSURE DIFFERENTIAL TRANSMITTER, DPIT-900, LOCATED IN ROOM 642. THIS DPIT-900 SENDS AN ANALOG SIGNAL TO THE LOCAL DPIC-900 (IN ROOM 502), AND TO THE MICON SYSTEM OUTPUT. ROOM 642 PRESSURE DIFFERENTIAL RELATIVE TO ATMOSPHERE IS MAINTAINED BETWEEN -0.20" WG AND -0.30" WG.

ZONE IIB

THE SUPPLY AIR TO ROOM 641 IS CONTROLLED BY A MODULATING DAMPER PDV-901. THIS MODULATING DAMPER PDV-901 IS CONTROLLED BY AN EXISTING CONTROLLER DPC-2 THAT MAINTAINS ROOM PRESSURE DIFFERENTIAL RELATIVE TO ATMOSPHERE. SEE DRAWING H-2-80167 SH 1 FOR SYSTEM DESCRIPTION OF DPC-2.

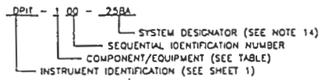
PROCESS AREA EXHAUST SYSTEM CONTROL

THE PROCESS AREA EXHAUST SYSTEM CONSISTS OF TWO BANKS OF HEPA FILTER TRAINS AND TWO REDUNDANT VARIABLE SPEED EXHAUST FANS EF-1 AND EF-2 WITH THEIR RESPECTIVE DISCHARGE DAMPERS HV-X AND HV-Y.

INITIALLY, THE SPEED OF FAN EF-1 OR EF-2 IS GRADUALLY INCREASED BY A PREDETERMINED RAMP UP TIME, TO OBTAIN THE DESIRED PRESSURE IN THE EXHAUST DUCT AND GLOVEBOXES. THE OPERATOR AT THE MICON STATION, OR LOCALLY AT THE VARIABLE FREQUENCY DRIVE CAN CONTROL THE SPEED OF THE FAN. PLENUM PRESSURE DIFFERENTIAL IS SENSED BY THE PDIT-1000 WHICH SENDS AN ANALOG SIGNAL TO THE LOCAL DPIC-1101 (LOCATED IN ROOM 602), AND TO THE MICON. NORMALLY, THE MICON DPIC-EXH CONTROLS THE FAN SPEED TO MAINTAIN THE CONSTANT PLENUM PRESSURE OF -8.0" WG. IN CASE OF TROUBLE IN THE MICON SYSTEM, THE LOCAL DPIC-1101 WILL MAINTAIN THE CONSTANT PLENUM PRESSURE. WHEN THE OPERATING FAN TRIPS OR THE DISCHARGE DAMPER FAILS TO OPEN, THE STANDBY FAN WILL AUTOMATICALLY START INSTANTANEOUSLY (WITHOUT ANY RAMP UP TIME) AND CLOSE THE FAILED OPERATING FAN DISCHARGE DAMPER. IN CASE THAT THE OPERATING FAN FAILS, AND THE STANDBY FAN FAILS TO OPERATE, BOTH DISCHARGE DAMPERS HV-1110 AND HV-1210 GOES TO FAIL OPEN POSITION. AN INTERLOCK IS PROVIDED VIA LOW-LOW EXHAUST FLOW SENSOR FE-1000 TO SHUT OFF THE NITROGEN GAS SUPPLY VALVE FV-1001.

THE HEPA FILTER EXHAUST TRAINS ARE ADMINISTRATIVELY CONTROLLED, AND MANUALLY SWITCHED FROM THE ACTIVE EXHAUST TRAIN TO THE STANDBY FOR HEPA FILTER REPLACEMENT OR MAINTENANCE.

INSTRUMENTATION IDENTIFICATION

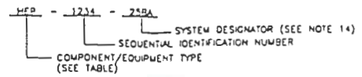


COMPONENT/EQUIPMENT NO TABLE

NUMBER	DESCRIPTION
1	GLOVEBOX GB-642A
2	GLOVEBOX GB-642B
3	GLOVEBOX GB-642C
4	GLOVEBOX GB-642D
5	GLOVEBOX GB-642E
6	GLOVEBOX GB-642F
7	BTS WELD ENCLOSURE
8	INNER CAN LEAK CHECK
9	ROOM 641 & 642
10	HOOD FILTER & FILTER PLENUM
11	EXHAUST FAN EF-1
12	EXHAUST FAN EF-2

IDENTIFICATIONS

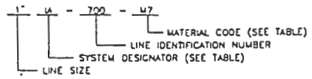
EQUIPMENT IDENTIFICATION



COMPONENT/EQUIPMENT TYPE TABLE

SYMBOL	DESCRIPTION
EF	EXHAUST FAN
GB	GLOVEBOX
HEP	HEPA FILTER

LINE IDENTIFICATION



SYSTEM DESIGNATOR TABLE

SYMBOL	DESCRIPTION
DR	DRAIN
EXH	EXHAUST
I	INSTRUMENT SENSING LINE
IA	INSTRUMENT AIR
N2	NITROGEN GAS
VT	VENTILATION

LINE IDENTIFICATION NUMBER TABLE

NUMBER	DESCRIPTION
100-199	UNUSED
200-299	UNUSED
300-399	UNUSED
400-499	UNUSED
500-599	UNUSED
600-699	NITROGEN GAS (N2)
700-799	INSTRUMENT AIR (IA)
800-899	UNUSED
900-999	UNUSED
1000-1099	UNUSED

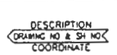
MATERIAL CODE TABLE

PIPE CODE	DESCRIPTION
113	316 SS TUBING, INSTRUMENT
133	COPPER TUBING, INSTRUMENT
U7	CARBON STEEL PIPE
U9	STAINLESS STEEL PIPE

INTERLOCK SCHEDULE

INTERLOCK	EVENT	ACTION	REF DWG/SH NO
1/1	BAGOUT GLOVEBOX 642A OR 642F DIFFERENTIAL PRESSURE DECREASES TO <-0.1" WG	OPEN BAGOUT EXHAUST DAMPER PDV-100 & PARTIALLY CLOSE FURNACE HOOD EXHAUST DAMPER PDV-200.	H-2-829443 SH 3, 4 & 6
1/2	HIGH OXYGEN (LOSS OF NITROGEN) IN GLOVE BOXES 642A, 642C OR 642E	SHUT OFF ELECTRICAL POWER TO GLOVEBOXES IN ROOM 642, AFTER 5 MINUTES TIME DELAY.	H-2-829443 SH 3, 5 & 6 H-2-829467 SH 1
1/3 (SS)	LOW-LOW EXHAUST FLOW (SS) (FLOW LESS THAN 250 SCFM)	CLOSE BUBBLE TIGHT DAMPER FV-1000 (SS) AND CLOSE NITROGEN SUPPLY VALVE FV-1001 (SS)	H-2-829443 SH 3, 7 & 8 H-2-829487 SH 5
1/4	HS-1110 IS IN AUTO POSITION, HS-LL3 IS IN EF-1 POSITION, AND HS-EF1 IS IN RUN POSITION - OR - EF-2 SHUTS DOWN	START PRIMARY EXHAUST FAN EF-1, OPEN DAMPER HV-1110, SHUT DOWN EXHAUST FAN EF-2, AND CLOSE DAMPER HV-1210	H-2-829443 SH 9
1/5	HS-1210 IS IN AUTO POSITION, HS-LL3 IS IN EF-2 POSITION, AND HS-EF2 IS IN RUN POSITION - OR - EF-1 SHUTS DOWN	START STANDBY EXHAUST FAN EF-2, OPEN DAMPER HV-1210, SHUT DOWN EXHAUST FAN EF-1, AND CLOSE DAMPER HV-1110	H-2-829443 SH 9
1/6	HS-EXH IN MICON POSITION HS-EXH IN LOCAL POSITION - OR - LOSS OF MICON POWER	MICON CONTROLLER PDIC-EXH ENABLED, AND LOCAL CONTROLLER DPIC-1101 DISABLED MICON CONTROLLER PDIC-EXH DISABLED, AND LOCAL CONTROLLER DPIC-1101 ENABLED	H-2-829443 SH 9
1/7	HS-642 IN MICON POSITION HS-642 IN LOCAL POSITION - OR - LOSS OF MICON POWER	MICON CONTROLLER PDIC-642 ENABLED, AND LOCAL CONTROLLER DPIC-900 DISABLED MICON CONTROLLER PDIC-642 DISABLED, AND LOCAL CONTROLLER DPIC-900 ENABLED	H-2-829443 SH 7
1/8	ROOM 642 FIRE/SECURITY ALARM	CLOSE ROOM FILTER EXHAUST ISOLATION VALVE AV-200 CLOSE CONTROL DAMPER PDV-900	H-2-829443 SH 7

OFF-PAGE CONNECTOR IDENTIFICATION



NOTE:

1. FOR GENERAL NOTES AND LEGENDS, SEE SHEET 1.

PRELIMINARY

FLUOR FEDERAL SERVICES

DRAWING TRACEABILITY LIST

DWG NO	TITLE

REFERENCES

REF NUMBER	TITLE
H-2-829350	DRAWING LIST WORK PACKAGE 2

NEXT USED ON

REVISIONS

NAME	DATE
NO FOR	

PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING

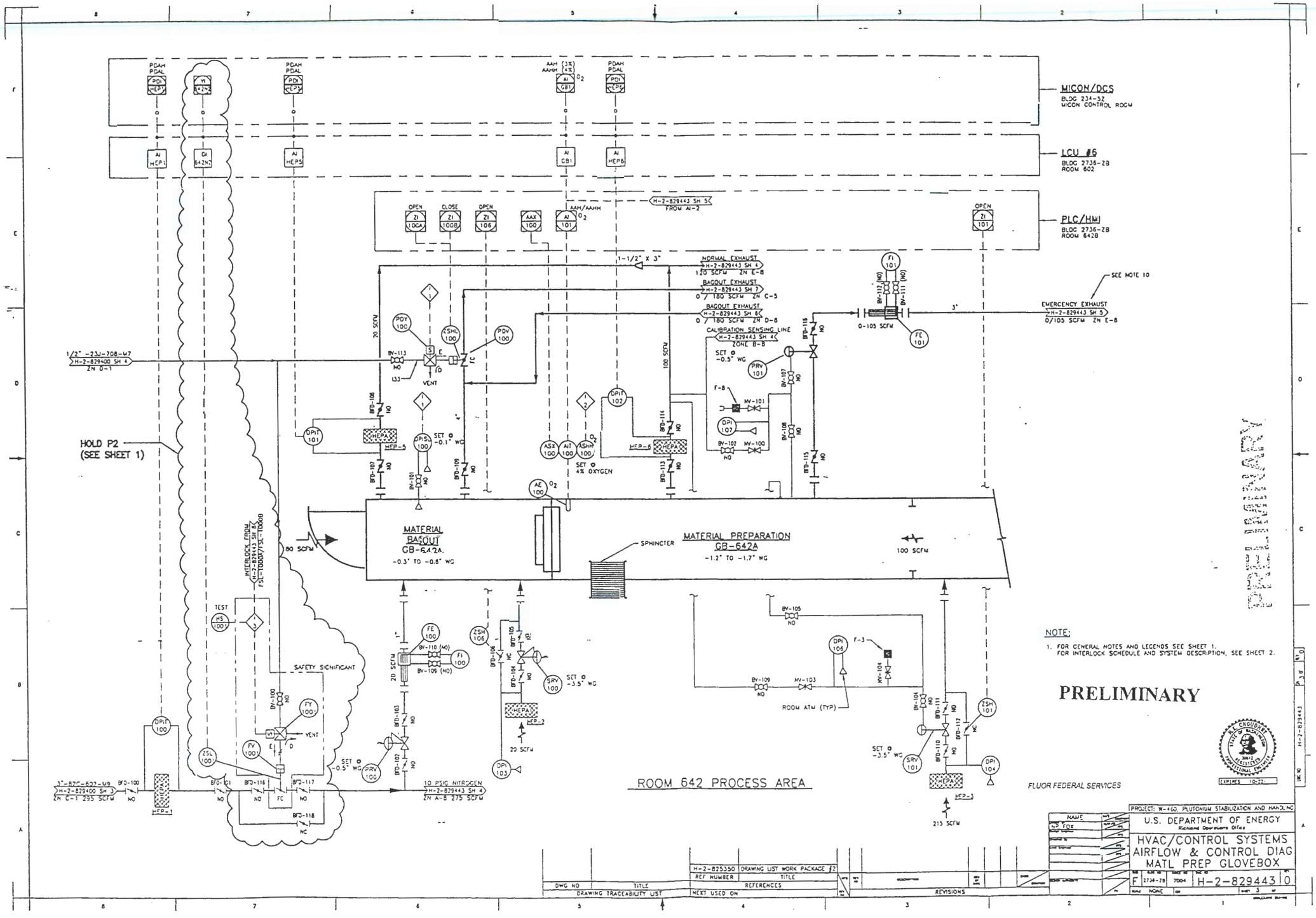
U.S. DEPARTMENT OF ENERGY
Richland Operations Office

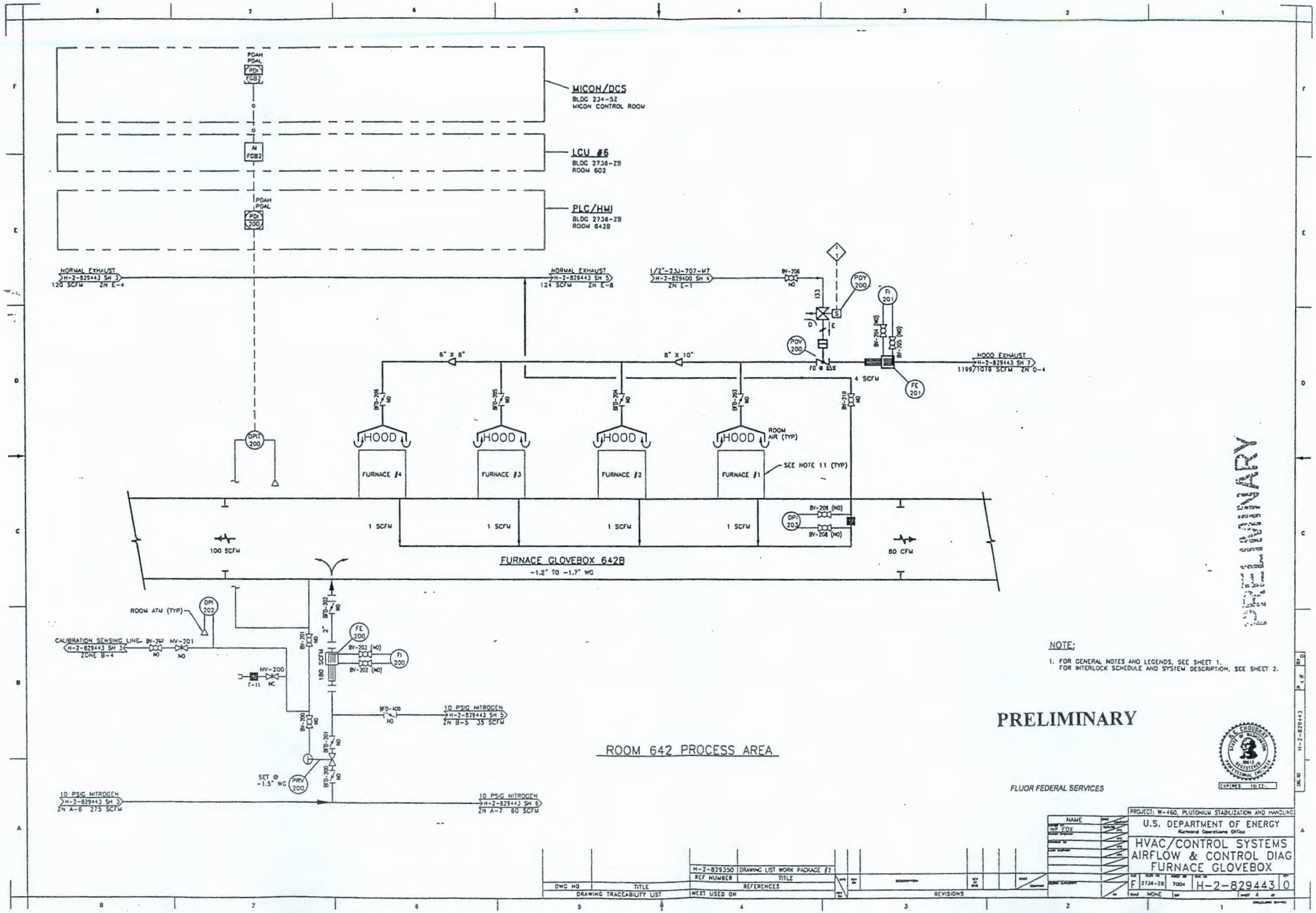
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
INTERLOCKS & SYS DESC

DRAWN	DATE	PROJECT NO	DWG NO	REV
F	2730-28	7004	H-2-829443	0

SCALE NONE SHEET 2 OF

ATT A-10


MICON/DCS
BLDG 234-5Z
MICON CONTROL ROOM
LCU #6
BLDG 2736-ZB
ROOM 602
PLC/HMI
BLDG 2736-ZB
ROOM 642B
NORMAL EXHAUST
BAGOUT EXHAUST
BAGOUT EXHAUST
EMERGENCY EXHAUST
SEE NOTE 10
CALIBRATION SENSING LINE
1/2" -23J-708-M7
HOLD P2
(SEE SHEET 1)
MATERIAL BAGOUT GB-642A
-0.3" TO -0.8" WG
SPHINCTER
MATERIAL PREPARATION GB-642A
-1.2" TO -1.7" WG
100 SCFM
80 SCFM
ROOM ATM (TYP)
SAFETY SIGNIFICANT
10 PSIG NITROGEN
ROOM 642 PROCESS AREA
215 SCFM
NOTE:
1. FOR GENERAL NOTES AND LEGENDS SEE SHEET 1.
FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SHEET 2.
PRELIMINARY
FLUOR FEDERAL SERVICES
U.S. DEPARTMENT OF ENERGY
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
MATL PREP GLOVEBOX
H-2-829443 10


MICON/DCS
BLDG 2734-5Z
MICON CONTROL ROOM
LCU #6
BLDG 2736-ZB
ROOM 602
PLC/HMI
BLDG 2736-ZB
ROOM 642B
NORMAL EXHAUST
H-2-829443 SH 3
120 SCFM ZN E-4
NORMAL EXHAUST
H-2-829443 SH 5
124 SCFM ZN E-8
1/2"-2JJ-707-M7
H-2-829400 SH 4
ZN E-1
BV-206 NO
PDY 200
FI 201
PDV 200
BV-204 (NO)
BV-205 (NO)
HOOD EXHAUST
H-2-829443 SH 7
1199/1019 SCFM ZN D-4
FE 201
8" X 8"
8" X 10"
10 @ 8.5%
4 SCFM
BFD-204 NO
BFD-205 NO
BFD-203 NO
BV-210 NO
HOOD
ROOM AIR (TYP)
SEE NOTE 11 (TYP)
FURNACE #4
FURNACE #3
FURNACE #2
FURNACE #1
DPIT 200
1 SCFM
BV-209 (NO)
BV-208 (NO)
DPI 203
100 SCFM
80 CFM
FURNACE GLOVEBOX 642B
-1.2" TO -1.7" WG
ROOM ATM (TYP)
DPI 202
CALIBRATION SENSING LINE
H-2-829443 SH 3C
ZONE B-4
BV-207 NO
NV-201 NO
NV-200 NC
F-11
BFD-202 NO
2"
180 SCFM
FE 200
FI 200
BV-203 (NO)
BV-202 (NO)
BV-208 NO
BFD-201 NO
BFD-200 NO
BFD-400 NO
10 PSIG NITROGEN
H-2-829443 SH 5
ZN B-5 35 SCFM
SET @ -1.5" WG
PRV 200
10 PSIG NITROGEN
H-2-829443 SH 3
ZN A-6 275 SCFM
10 PSIG NITROGEN
H-2-829443 SH 6
ZN A-7 60 SCFM
ROOM 642 PROCESS AREA
NOTE:
1. FOR GENERAL NOTES AND LEGENDS, SEE SHEET 1.
FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SHEET 2.
PRELIMINARY
FLUOR FEDERAL SERVICES
EXPIRES 10-22-
PRELIMINARY
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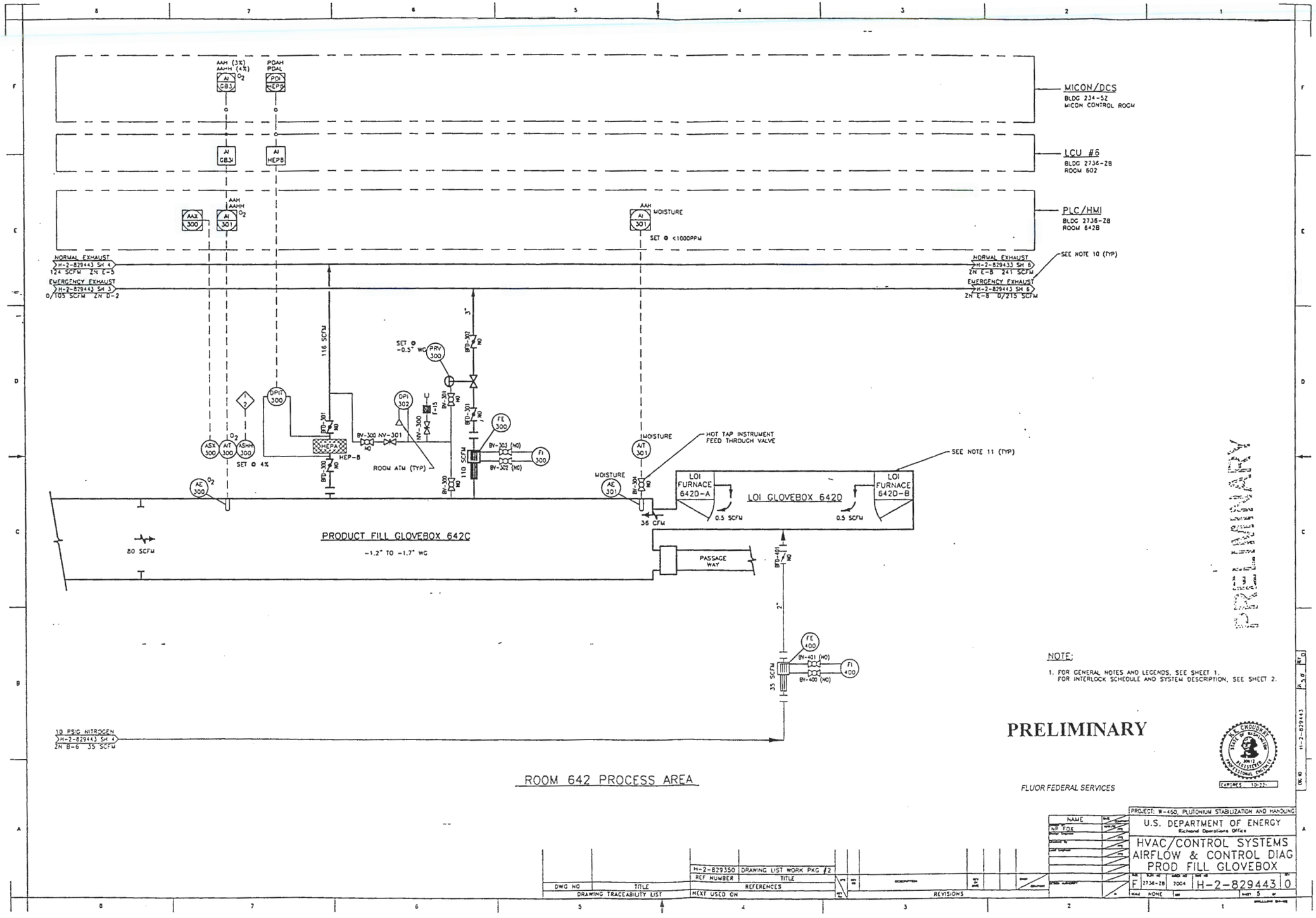
REF NUMBER TITLE
DWG NO TITLE
DRAWING TRACEABILITY LIST
REFERENCES
NEXT USED ON
REVISIONS
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
FURNACE GLOVEBOX
F 2734-ZB 7004 H-2-829443 0
SCALE NONE



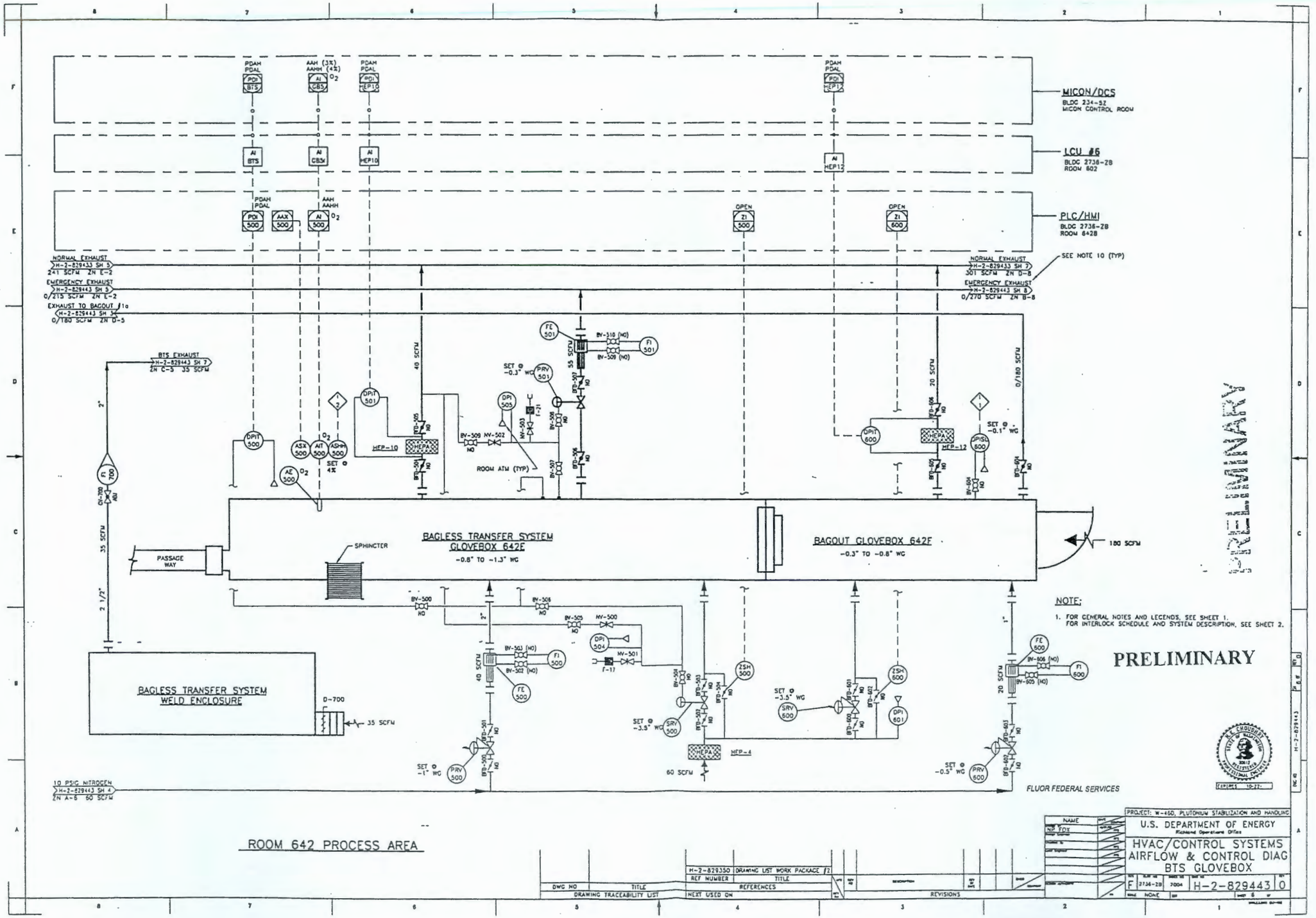
NOTE:

1. FOR GENERAL NOTES AND LEGENDS, SEE SHEET 1.
   FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SHEET 2.

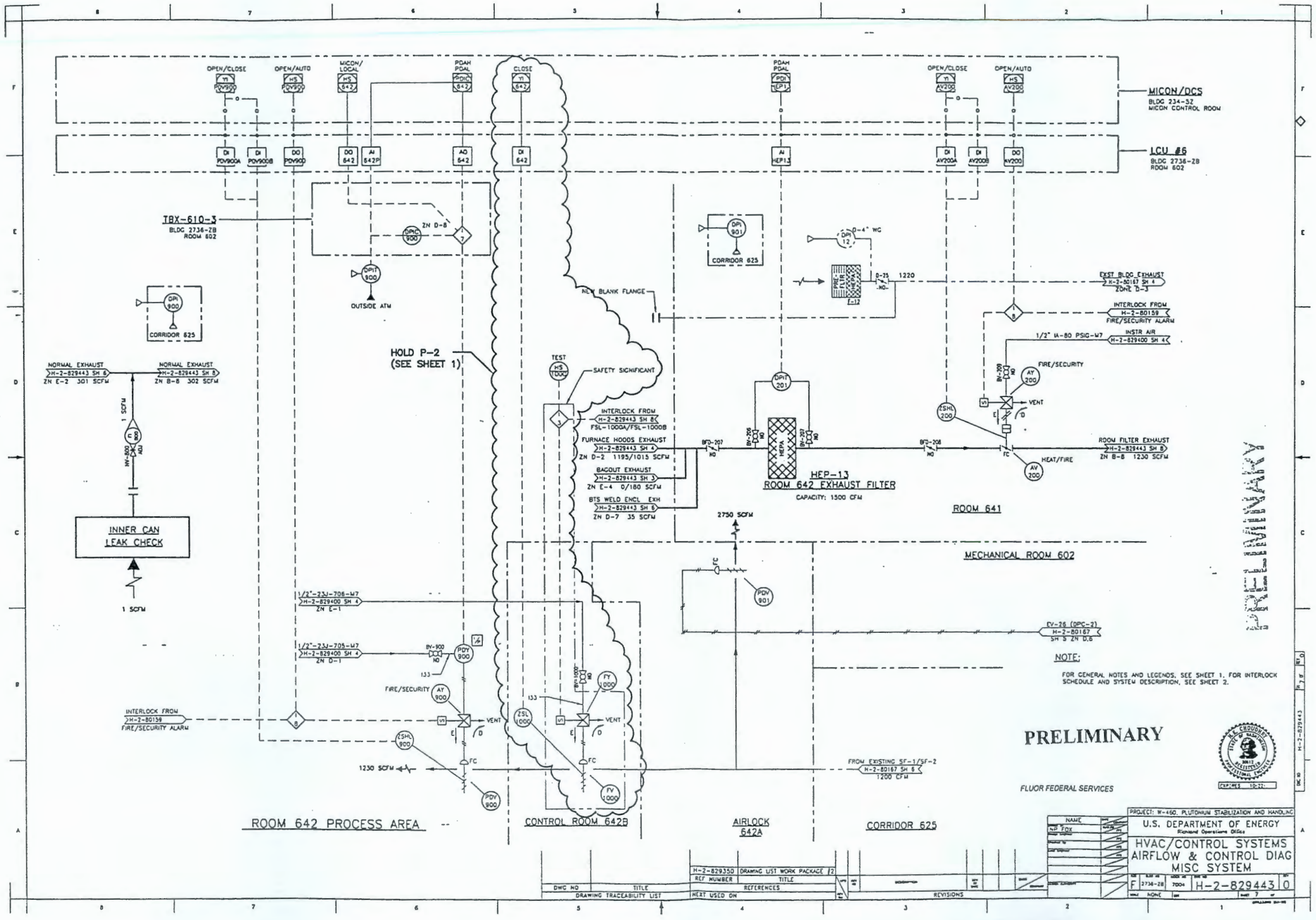
PRELIMINARY

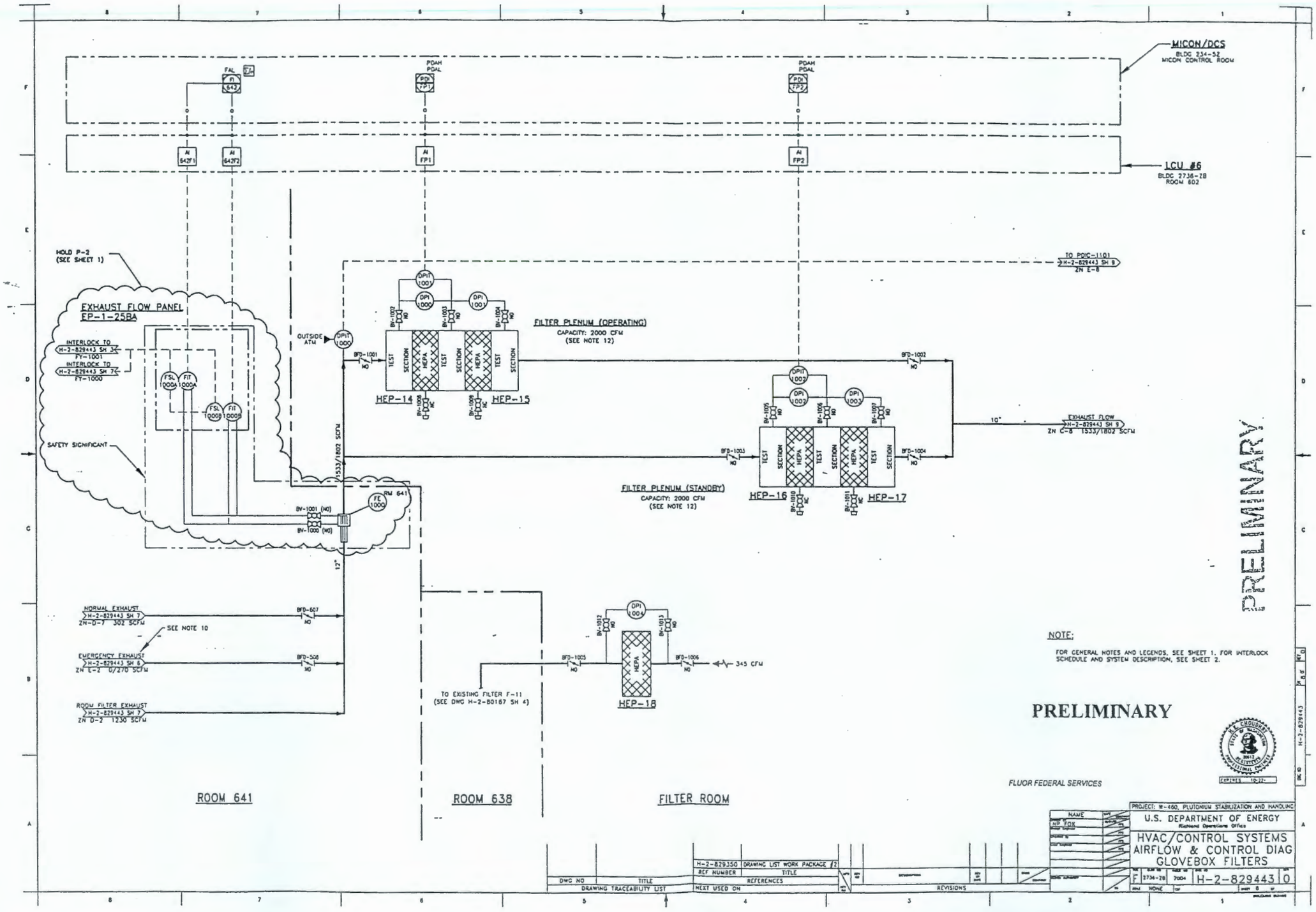
FLUOR FEDERAL SERVICES

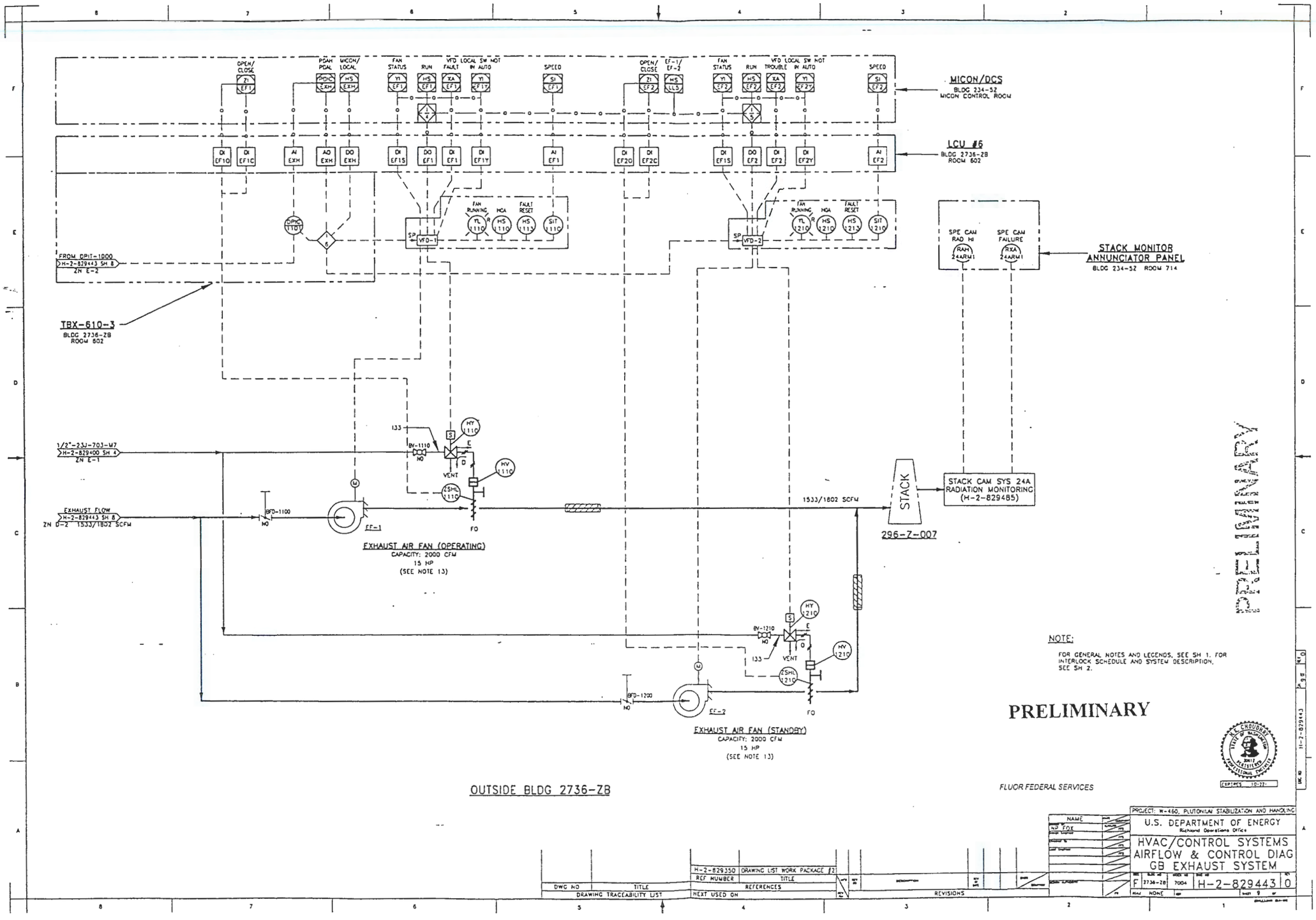
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
PROD FILL GLOVEBOX
H-2-829443 0


MICON/DCS
BLDG 234-5Z
MICON CONTROL ROOM
LCU #6
BLDG 2736-ZB
ROOM 602
PLC/HMI
BLDG 2736-ZB
ROOM 642B
NORMAL EXHAUST
H-2-829433 SH 5
241 SCFM ZN E-2
EMERGENCY EXHAUST
H-2-829443 SH 5
0/215 SCFM ZN E-2
EXHAUST TO BAGOUT #1a
H-2-829443 SH 5
0/180 SCFM ZN D-5
NORMAL EXHAUST
H-2-829433 SH 7
301 SCFM ZN D-8
EMERGENCY EXHAUST
H-2-829443 SH 8
0/270 SCFM ZN B-8
SEE NOTE 10 (TYP)
BTS EXHAUST
H-2-829443 SH 7
ZN C-5 35 SCFM
BAGLESS TRANSFER SYSTEM
GLOVEBOX 642E
-0.8" TO -1.3" WG
BAGOUT GLOVEBOX 642F
-0.3" TO -0.8" WG
PASSAGE WAY
SPHINCTER
BAGLESS TRANSFER SYSTEM
WELD ENCLOSURE
HEPA-4
HEP-10
HEP-12
ROOM ATM (TYP)
180 SCFM
35 SCFM
60 SCFM
10 PSIG NITROGEN
H-2-829443 SH 4
ZN A-6 60 SCFM
NOTE:
1. FOR GENERAL NOTES AND LEGENDS, SEE SHEET 1.
FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SHEET 2.
PRELIMINARY
FLUOR FEDERAL SERVICES
ROOM 642 PROCESS AREA
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
BTS GLOVEBOX
H-2-829443 0
DRAWING TRACEABILITY LIST
H-2-829350 DRAWING LIST WORK PACKAGE 12
REVISIONS

ATT A-14


MICON/DCS
BLDG 234-5Z
MICON CONTROL ROOM
LCU #6
BLDG 2736-ZB
ROOM 602
OPEN/CLOSE
OPEN/AUTO
MICON/LOCAL
PDAH PDAL
CLOSE
TBX-610-3
BLDG 2736-ZB
ROOM 602
ZN D-8
OUTSIDE ATM
CORRIDOR 625
NEW BLANK FLANGE
HOLD P-2
(SEE SHEET 1)
NORMAL EXHAUST
ZN E-2 301 SCFM
NORMAL EXHAUST
ZN B-8 302 SCFM
1 SCFM
INNER CAN
LEAK CHECK
1 SCFM
TEST
SAFETY SIGNIFICANT
INTERLOCK FROM
H-2-829443 SH 8
FSL-1000A/FSL-1000B
FURNACE HOODS EXHAUST
H-2-829443 SH 4
ZN D-2 1195/1015 SCFM
BAGOUT EXHAUST
H-2-829443 SH 3
ZN E-4 0/180 SCFM
BTS WELD ENCL EXH
H-2-829443 SH 8
ZN D-7 35 SCFM
HEP-13
ROOM 642 EXHAUST FILTER
CAPACITY: 1500 CFM
ROOM 641
2750 SCFM
MECHANICAL ROOM 602
0-4" WG
0-.75
.NO.
1220
EXST BLDG EXHAUST
H-2-80167 SH 4
ZONE D-3
INTERLOCK FROM
H-2-80159
FIRE/SECURITY ALARM
1/2" IA-80 PSIG-W7
INSTR AIR
H-2-829400 SH 4
FIRE/SECURITY
VENT
HEAT/FIRE
ROOM FILTER EXHAUST
H-2-829443 SH 8
ZN B-8 1230 SCFM
1/2"-ZJ-706-W7
H-2-829400 SH 4
ZN E-1
1/2"-ZJ-705-W7
H-2-829400 SH 4
ZN D-1
FIRE/SECURITY
VENT
INTERLOCK FROM
H-2-80158
FIRE/SECURITY ALARM
1230 SCFM
EV-26 (DPC-2)
H-2-80167
SH 5 ZN D,6
FROM EXISTING SF-1/SF-2
H-2-80167 SH 6
1200 CFM
NOTE:
FOR GENERAL NOTES AND LEGENDS, SEE SHEET 1. FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SHEET 2.
PRELIMINARY
FLUOR FEDERAL SERVICES
ROOM 642 PROCESS AREA
CONTROL ROOM 642B
AIRLOCK 642A
CORRIDOR 625
PRELIMINARY
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
MISC SYSTEM
H-2-829443 0
DRAWING TRACEABILITY LIST
H-2-829350 DRAWING LIST WORK PACKAGE 12
REVISIONS


MICON/DCS
BLDG 234-5Z
MICON CONTROL ROOM
LCU #6
BLDG 2736-ZB
ROOM 602
HOLD P-2
(SEE SHEET 1)
EXHAUST FLOW PANEL
EP-1-25BA
INTERLOCK TO H-2-829443 SH 3C FY-1001
INTERLOCK TO H-2-829443 SH 7C FY-1000
SAFETY SIGNIFICANT
1533/1802 SCFM
OUTSIDE ATM
FILTER PLENUM (OPERATING)
CAPACITY: 2000 CFM
(SEE NOTE 12)
HEP-14
HEP-15
TO POIC-1101
H-2-829443 SH 9
ZN E-8
EXHAUST FLOW
H-2-829443 SH 9
ZN C-8 1533/1802 SCFM
FILTER PLENUM (STANDBY)
CAPACITY: 2000 CFM
(SEE NOTE 12)
HEP-16
HEP-17
NORMAL EXHAUST
H-2-829443 SH 7
ZN D-7 302 SCFM
SEE NOTE 10
EMERGENCY EXHAUST
H-2-829443 SH 6
ZN E-2 0/270 SCFM
ROOM FILTER EXHAUST
H-2-829443 SH 7
ZN D-2 1230 SCFM
TO EXISTING FILTER F-11
(SEE DWG H-2-80167 SH 4)
345 CFM
HEP-18
ROOM 641
ROOM 638
FILTER ROOM
NOTE:
FOR GENERAL NOTES AND LEGENDS, SEE SHEET 1. FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SHEET 2.
PRELIMINARY
PRELIMINARY
FLUOR FEDERAL SERVICES
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
GLOVEBOX FILTERS
H-2-829443 0
DRAWING TRACEABILITY LIST
REVISIONS


MICON/DCS
BLDG 234-5Z
MICON CONTROL ROOM
LCU #6
BLDG 2736-ZB
ROOM 602
STACK MONITOR
ANNUNCIATOR PANEL
BLDG 234-5Z ROOM 714
TBX-610-3
BLDG 2736-ZB
ROOM 602
FROM DPIT-1000
H-2-829443 SH 8
ZN E-2
1/2"-23J-703-M7
H-2-829400 SH 4
ZN E-1
EXHAUST FLOW
H-2-829443 SH 8
ZN D-2 1533/1802 SCFM
1533/1802 SCFM
STACK
296-Z-007
STACK CAM SYS 24A
RADIATION MONITORING
(H-2-829485)
EXHAUST AIR FAN (OPERATING)
CAPACITY: 2000 CFM
15 HP
(SEE NOTE 13)
EXHAUST AIR FAN (STANDBY)
CAPACITY: 2000 CFM
15 HP
(SEE NOTE 13)
OUTSIDE BLDG 2736-ZB
PRELIMINARY
NOTE:
FOR GENERAL NOTES AND LEGENDS, SEE SH 1. FOR INTERLOCK SCHEDULE AND SYSTEM DESCRIPTION, SEE SH 2.
PRELIMINARY
FLUOR FEDERAL SERVICES
PROJECT: W-460, PLUTONIUM STABILIZATION AND HANDLING
U.S. DEPARTMENT OF ENERGY
Richland Operations Office
HVAC/CONTROL SYSTEMS
AIRFLOW & CONTROL DIAG
GB EXHAUST SYSTEM
H-2-829443 0
DRAWING TRACEABILITY LIST
REVISIONS

ATTACHMENT B

SUMMARY AND SYNOPSIS OF CAP88-PC MODELING

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C A P 8 8 - P C

Version 2.00

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
Apr 26, 2000 02:58 pm

Facility: Z-Plant
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-460

Effective Dose Equivalent
(mrem/year)

1.67E+03

At This Location: 19230 Meters East Southeast
Dataset Name: Project W-460
Dataset Date: Apr 26, 2000 02:58 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200W10.WND

Apr 26, 2000 02:58 pm

SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 19230 Meters East Southeast
Lifetime Fatal Cancer Risk: 1.17E-02

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
GONADS	2.79E+02
BREAST	2.83E+01
R MAR	1.77E+03
LUNGS	3.68E+03
THYROID	2.78E+01
ENDOST	2.18E+04
RMNDR	9.71E+02
EFFEC	1.67E+03

RADIONUCLIDE EMISSIONS DURING THE YEAR 2000

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
PU-239	Y	1.00	9.9E+01	9.9E+01
U-233	Y	1.00	1.1E+01	1.1E+01
AM-241	W	1.00	4.5E+01	4.5E+01

SITE INFORMATION

Temperature:	12 degrees C
Precipitation:	16 cm/y
Mixing Height:	1000 m

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 15.
Diameter (m): 0.

Plume Rise
Momentum (m/s): 7.
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.000	0.000	0.000
Fraction From Assessment Area:	1.000	1.000	1.000
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

19230 24380

C A P 8 8 - P C

Version 2.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment
Apr 26, 2000 02:58 pm

Facility: Z-Plant
Address: Hanford Site
City: Richland
State: WA Zip: 99336

Source Category:
Source Type: Stack
Emission Year: 2000

Comments: Project W-460

Dataset Name: Project W-460
Dataset Date: Apr 26, 2000 02:58 pm
Wind File: C:\CAP88PC2\WNDFILES\HS200W10.WND

Apr 26, 2000 02:58 pm

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	2.79E+02
BREAST	2.83E+01
R MAR	1.77E+03
LUNGS	3.68E+03
THYROID	2.78E+01
ENDOST	2.18E+04
RMNDR	9.71E+02
EFFEC	1.67E+03

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	3.86E+01
INHALATION	1.63E+03
AIR IMMERSION	1.41E-05
GROUND SURFACE	5.65E-01
INTERNAL	1.67E+03
EXTERNAL	5.65E-01
TOTAL	1.67E+03

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
PU-239	9.58E+02
U-233	3.97E+01
AM-241	6.77E+02
TOTAL	1.67E+03

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
LEUKEMIA	1.46E-03
BONE	9.32E-04
THYROID	3.15E-06
BREAST	2.34E-05
LUNG	6.01E-03
STOMACH	1.68E-05
BOWEL	9.13E-06
LIVER	3.18E-03
PANCREAS	1.24E-05
URINARY	9.01E-06
OTHER	1.52E-05
TOTAL	1.17E-02

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	1.84E-04
INHALATION	1.15E-02
AIR IMMERSION	2.93E-10
GROUND SURFACE	1.18E-05
INTERNAL	1.17E-02
EXTERNAL	1.18E-05
TOTAL	1.17E-02

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
PU-239	7.68E-03
U-233	5.23E-04
AM-241	3.46E-03
TOTAL	1.17E-02

Apr 26, 2000 02:58 pm
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SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

	Distance (m)	
Direction	19230	24380
N	3.5E+02	2.4E+02
NNW	3.9E+02	2.6E+02
NW	4.3E+02	2.9E+02
WNW	3.1E+02	2.1E+02
W	2.4E+02	1.7E+02
WSW	2.1E+02	1.5E+02
SW	2.4E+02	1.7E+02
SSW	3.1E+02	2.1E+02
S	4.3E+02	3.0E+02
SSE	6.2E+02	4.2E+02
SE	1.2E+03	8.1E+02
ESE	1.7E+03	1.1E+03
E	1.2E+03	7.7E+02
ENE	7.0E+02	4.7E+02
NE	4.9E+02	3.3E+02
NNE	3.6E+02	2.5E+02

Apr 26, 2000 02:58 pm
--

SUMMARY
Page 6

INDIVIDUAL LIFETIME RISK (deaths)
(All Radionuclides and Pathways)

	Distance (m)	
Direction	19230	24380
N	2.4E-03	1.6E-03
NNW	2.6E-03	1.7E-03
NW	2.9E-03	2.0E-03
WNW	2.1E-03	1.4E-03
W	1.6E-03	1.1E-03
WSW	1.4E-03	9.5E-04
SW	1.6E-03	1.1E-03
SSW	2.1E-03	1.4E-03
S	3.0E-03	2.0E-03
SSE	4.3E-03	2.8E-03
SE	8.4E-03	5.6E-03
ESE	1.2E-02	7.7E-03
E	8.0E-03	5.3E-03
ENE	4.8E-03	3.2E-03
NE	3.4E-03	2.2E-03
NNE	2.5E-03	1.6E-03

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ATTACHMENT C

DISCUSSION OF BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY

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DISCUSSION OF BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY
(REQUIREMENT 16)

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Pursuant to WAC 246-247-110(16), providing cost factors for construction, operation, and maintenance of the proposed control technology components is not required because the following best available radionuclide control technology (BARCT) discussion is provided. The BARCT is defined by WAC 246-247-030 as follows:

> "Technology that will result in a radionuclide emission limitation based on the maximum degree of reduction for radionuclides from any proposed newly constructed or significantly modified emission units that the licensing authority determines is achievable on a case-by-case basis. A BARCT compliance demonstration must consider energy, environmental, and economic impacts, and other costs through examination of production processes, and available methods, systems and techniques for control of radionuclide emissions. A BARCT compliance demonstration is the conclusion of an evaluative process that results in the selection of the most effective control technology from all know feasible alternatives. In no event shall application of BARCT result in emissions of radionuclides that could exceed the applicable standards of WAC 246-247-040. Control technology that meets BARCT requirements also meets ALARCT requirements."

As stated in WAC 246-247-120, only those radionuclides comprising more than 10 percent of the unabated dose need to be evaluated. All of the dose is due to particulate radionuclides. The Washington State Department of Health has provided guidance that HEPA filters generally are considered BARCT for particulate emissions (AIR 92-107).

It is proposed, pursuant to the quoted citation and the cited WDOH guidance that the ventilation system described in Section 8.0 and the controls (engineering and administrative) described in Section 9.0 be approved as BARCT for the proposed activities.

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