M-32

Department of Energy
Ohio Field Office
West Valley Area Office
P.O. Box 191
West Valley, NY 14171

November 17, 1994

Mr. Gary C. Comfort
Headquarters
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Transmittal of Information for the Vitrification Facility Nuclear Regulatory Commission (NRC) Readiness Notebook

Dear Mr. Comfort:

An aspect of the West Valley Demonstration Project (WVDP) Vitrification operational readiness activities is the development of the Vitrification Facility NRC Readiness Notebook (Notebook) for NRC. The purpose of the Notebook is to ensure that NRC is provided with the necessary information to support their effort in assessing the operational readiness to commence radioactive vitrification operations at WVDP. The documentation provided as enclosures includes: updated P&IDs and general arrangement drawings; preliminary test schedule; Vitrification Load-In Facility, Cooling Tower Water, and Cell Walls and Ex-Cell Arrangement System Descriptions. Enclosure A provides instructions for incorporating the information into the Notebook. Enclosure B provides the current schedule for the planned release of information for incorporation into the Notebook.

It is the goal of WVDP to ensure NRC is provided with the necessary information in a timely manner to support their effort in assessing the operational readiness of radioactive vitrification operations at WVDP. If there are any questions regarding this matter, contact J. J. May at (716) 942-2161 or W. S. Ketola at (716) 942-4314.

Sincerely,

Tom Rowland

T. J. Rowland, Director
West Valley Area Office

Enclosures: See Page 2

cc: T. W. McIntosh, DOE-HQ, EM-323, w/enc.
J. Furia, NRC Region 1, w/enc.
F. W. Damerow, WVNS, MS 51, w/o enc.

JJM:027:94 - 0024:94:10

JJM/smn

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Enclosures: A. Instructions for Updating the Contents of the Vitrification Facility NRC Readiness Notebook Volumes I, III, and IV (3 copies)

B. Vitrification Facility NRC Readiness Notebook Transmittal Schedule (3 copies)

C. Table of Contents (3 copies)

D. P&ID Drawing List and Drawings (3 copies)

E. General Arrangement Drawing List and Drawings (3 copies)

F. Preliminary Overall Test Schedule (3 copies)

G. Vitrification Load-In Facility System Description (3 copies)

H. Vitrification Facility Cooling Tower Water System Description (3 copies)

I. Cell Walls and Ex-Cell Arrangement System Description (3 copies)

Attachment A
Instructions for Updating the Contents of the
Vitrification Facility NRC Readiness Notebook, Volumes I, III, VI

In Volume I of your Notebook series, replace the Table of Contents with the attached Table of Contents. This version reflects the replacement of a canceled system description with another system description.

Also in Volume I, Section 1.2: P&IDs, of your NRC Notebook, replace the list of P&ID drawings, dated 9/26/94, with the attached list of drawings titled, Section 1.2: P&IDs, dated 10/27/94. Note that the vertical lines appearing to the left of the drawing numbers on the drawing list indicate the drawings to add or replace in your NRC Readiness Notebook.

The drawings in your P&ID package will go into this section behind the drawing list. Drawing numbers, names, and number of sheets per drawing are identified in the title block which appears on the bottom right corner of each drawing. Carefully match the drawing numbers (paying particular attention to the number of sheets per drawing) to the drawings in your NRC Notebook and replace each drawing with its updated version. Drawings should be added in the sequence indicated on the drawing list.

In Section 1.3: General Arrangements, of your NRC Notebook, replace the list of General Arrangement drawings, dated 9/26/94, with the attached list of drawings titled, Section 1.3: General Arrangements, dated 10/27/94. The drawings in your General Arrangement package will go into this section behind the drawing list. Add or replace drawings as above.

After you have completed adding or replacing drawings, you may wish to compare the drawing lists included in the front of sections, 1.2: P&IDs and 1.3: General Arrangements, to the actual order of drawings in your NRC Notebook.

In Volume III, add the Vitrification Load-In Facility System Description (System 63M) behind tab 1.4.9. Add the Vitrification Facility Cooling Tower Water System Description (System 63CW) behind tab 1.4.11, and add the Cell Walls and Ex-Cell Arrangement System Description (System 63F) behind tab 1.4.12.

In Volume VI, section 4.2, add the Preliminary Overall Test Schedule.

After you have completed adding system descriptions and the test schedule, you may wish to compare the actual order of documents in your notebook series to the revised Table of Contents in the front of Volume I.

Vitrification Facility NRC Readiness Notebook Transmittal Schedule

B

SECTION	TITLE	DATE ANTICIPATED	PREVIOUS TRANSMITTALS
1.0	Design Information		
1.1	Process Flow Diagrams		
	Cold Chemical System	7/16/93	7/16/93
	Vitrification	6/30/94	
1.2	Process & Instrumentation Diagrams	On-Going	9/28/94
1.3	General Arrangement Drawings		
1.3.1	Vitrification Facility	On-Going	7/29/94
1.3.2	Tank Farm	On-Going	7/29/94
1.3.3	High Level Waste Interim Storage (CPC & EDR)	On-Going	7/16/93
1.3.4	Ex-Cell Off-Gas Areas of the 01-14 Building	On-Going	9/28/94
1.4	System Descriptions		
1.4.1	High-Level Waste Vitrification Facilities Description	1/16/94	7/29/94
1.4.2	55 - Sludge Mobilization and Transfer	10/31/94	
1.4.3	63G - Waste Header	7/16/93	7/16/93
1.4.4	63H - In-Cell Off-Gas and Vessel Vent	7/16/93	6/29/94
1.4.5	63I - Vitrification Main Process	9/30/94	
1.4.6	63J - Canister Decontamination	1/16/94	8/30/93
1.4.7	63K - In-Cell Remote Handling, Maintenance and Viewing	12/31/94	
1.4.8	63L - Canister Welding	6/15/94	2/25/94
1.4.9	63M - Vitrification Load In & Load Out	9/30/94	10/28/94
1.4.10	63P - Vitrification Process Chemistry	9/30/94	
1.4.11	63CW - Vitrification Cooling Tower Water	10/31/94	10/28/94
1.4.12	63F - Cell Walls and Ex-Cell Arrangement	10/28/94	10/28/94
1.4.13	63DW - Vitrification Demineralized Water	11/1/93	11/30/93
1.4.14	63ED - Vitrification Electric Power Distribution	4/30/94	4/29/94
1.4.15	63FO - Fuel Oil	9/30/94	7/29/94
1.4.16	63FP - Fire Detection and Protection	8/31/94	
1.4.17	63IA - Vitrification Instrument Air	12/1/93	3/30/94
1.4.18	63PW - Vitrification Potable Water	10/31/94	
1.4.19	63SC - Vitrification Steam and Condensate	1/31/94	4/29/94
1.4.20	63UA - Vitrification Utility Air	12/1/93	1/31/94
1.4.21	63UW - Vitrification Utility Water	11/1/93	8/30/93
1.4.22	63VH - Vitrification Vent Header	Canceled	
1.4.23	63WW - Vitrification Drains	8/31/94	8/23/94
1.4.24	64 - Vitrification Ex-Cell Off-Gas	1/31/94	3/30/94
1.4.25	65 - Vitrification Cold Chemical	11/1/93	5/27/94
1.4.26	66 - Vitrification Closed Loop Cooling Water	11/1/93	8/30/93
1.4.27	67 - Vitrification HVAC	10/31/94	
1.4.28	68 - High-Level Waste Interim Storage	6/30/95	
1.4.29	69A - Vitrification Sampling	2/28/95	
1.4.30	69B - Vitrification Sample Transfer	1/16/94	4/29/94
1.4.31	90 - Analytical and Environmental Laboratory	Canceled	
1.4.32	200A - Instrumentation Hardware	Combined 200B	
1.4.33	200B - Instrumentation Software	Combined 200A	
2.0	Operational Readiness Review (ORR)		
2.1	ORR Plan of Action	7/30/93	7/30/93
2.2	ORR Tree		
3.0	Readiness Logic		
3.1	Integrated Vitrification Logic Schedule	On-Going	7/29/94
4.0	Testing		
4.1	Test Program Plan (WVNS-TPL-63-001)	7/30/93	7/30/93
4.2	Overall Test Schedule	On-Going	10/28/94
4.3	Integrated Test Plan	Canceled	
4.4	Performance Tests		
4.4.1	Specifications	Moved to SDs	3/30/94
4.4.2	Reports	Per Test Plan	

Note: Shaded sections have been previously transmitted or are included with this transmission.

Rev. 10/26/94

Vitrification Facility
NRC Readiness Notebook

Table of Contents

1.4.19 63SC - Vitrification Steam and Condensate
1.4.20 63UA - Vitrification Utility Air
1.4.21 63UW - Vitrification Utility Water
1.4.22 63VH - Vitrification Vent Header - **Canceled**
1.4.23 63WW - Vitrification Drains
1.4.24 64 - Vitrification Ex-Cell Off-Gas

VOLUME V

1.4.25 65 - Vitrification Cold Chemical
1.4.26 66 - Vitrification Closed Loop Cooling Water
1.4.27 67 - Vitrification HVAC
1.4.28 68 - High-Level Waste Interim Storage
1.4.29 69A - Vitrification Sampling
1.4.30 69B - Vitrification Sample Transfer
1.4.31 90 - Analytical and Environmental Laboratory - **Canceled**
1.4.32 200A - Instrumentation Hardware - **Combined with 200B**
1.4.33 200B - Instrumentation Software - **Combined with 200A**

VOLUME VI

2.0 Operational Readiness Review (ORR)
- 2.1 ORR Plan of Action
- 2.2 ORR Tree

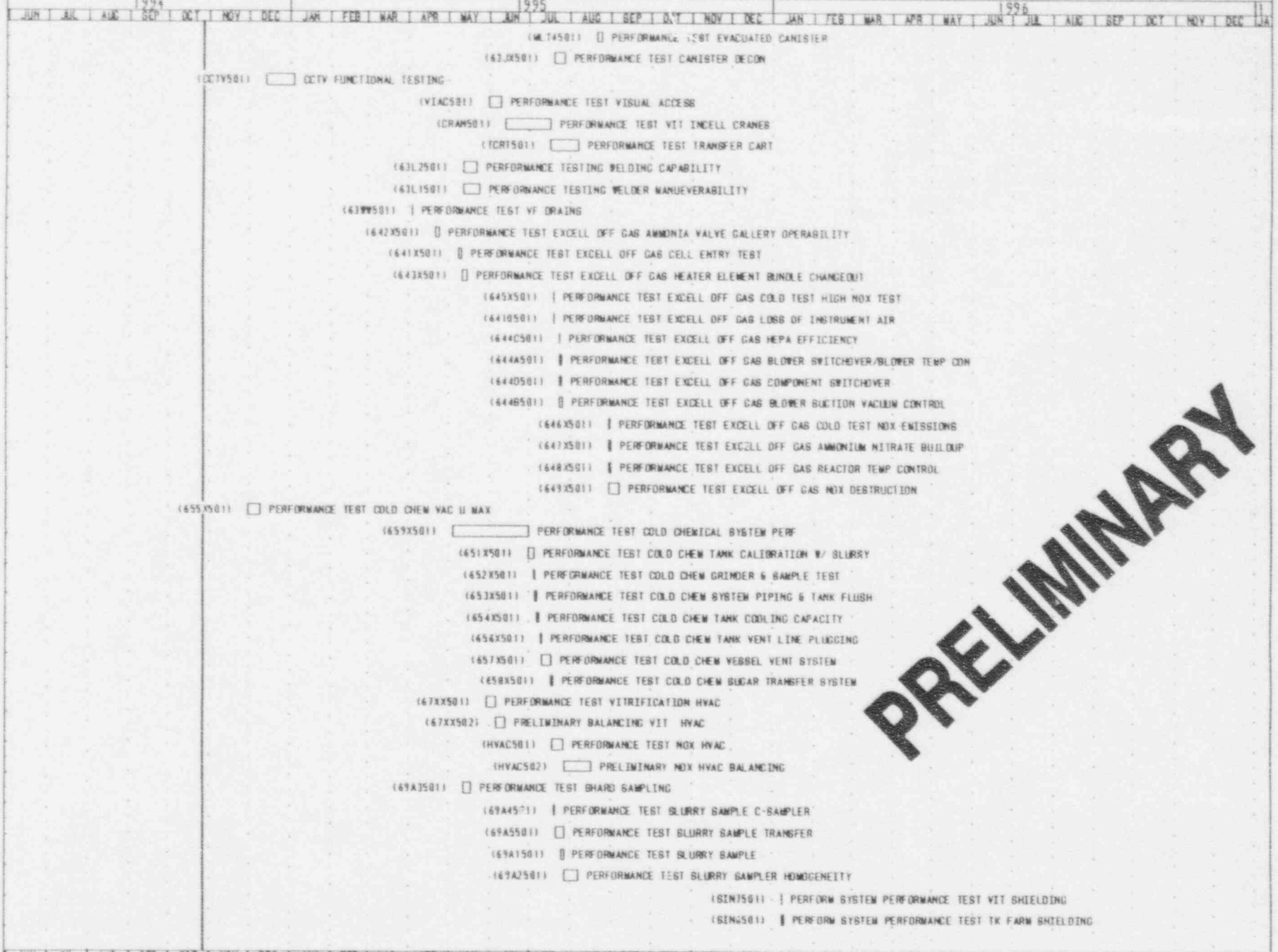
3.0 Readiness Logic
- 3.1 Integrated Vitrification Logic Schedule

4.0 Testing
- 4.1 Test Program Plan (WVNS-TPL-63-001)
- 4.2 Overall Test Schedule
- 4.3 Integrated Test Plan - **Canceled**

VOLUME VII

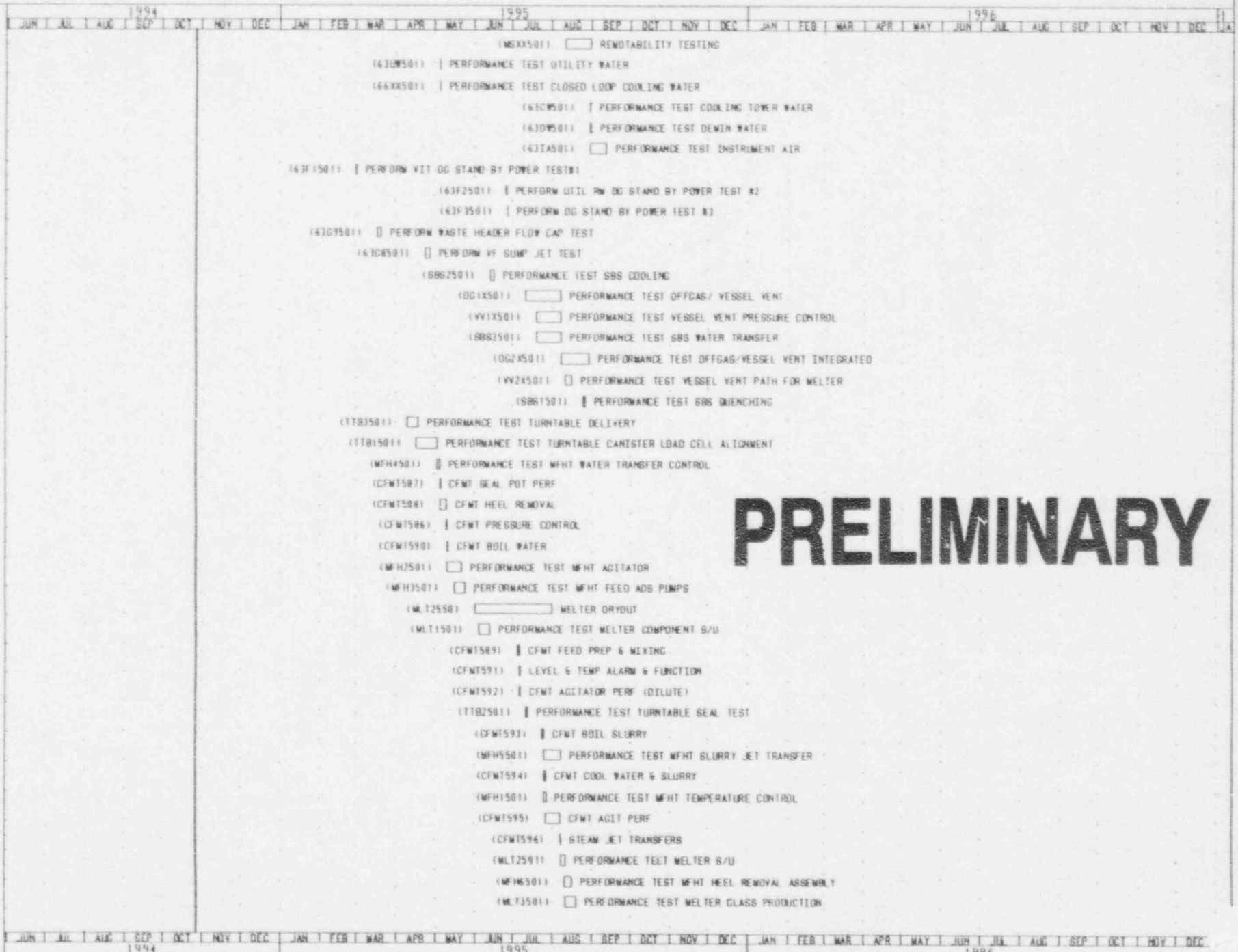
4.4 Performance Tests
- 4.4.1 Specifications - to be included in System Descriptions
- 4.4.2 Reports

VIT PERFORMANCE TEST SCHEDULE



PRELIMINARY

VIT PERFORMANCE TEST SCHEDULE



PRELIMINARY

900-D-2318 Sht:001 Rev:009 Title: Waste Mobil. Pump P&ID 8D-1-M6

900-D-2318 Sht:002 Rev:007 Title: Waste Mobil Pump P&ID 8D-1-M4

900-D-2318 Sht:003 Rev:006 Title: Waste Mobil Pump P&ID 8D-1-M3

900-D-2318 Sht:004 Rev:006 Title: Waste Mobil Pump P&ID 8D-1-M2

900-D-2318 Sht:005 Rev:006 Title: Waste Mobil Pump P&ID 8D-1-M1

900-D-2318 Sht:006 Rev:007 Title: Waste Mobil Pump P&ID 8D-2-M6

900-D-2318 Sht:007 Rev:007 Title: Waste Mobil Pump P&ID 8D-2-M5

900-D-2318 Sht:008 Rev:008 Title: Waste Mobil Pump P&ID 8D-2-M3

900-D-2318 Sht:009 Rev:007 Title: Waste Mobil Pump P&ID 8D-2-M2

900-D-2318 Sht:010 Rev:009 Title: Waste Mobil Pump P&ID 8D-2-M1

900-D-2731 Sht:001 Rev:003 Title: VF STACK SAMPLING SYSTEM P AND ID

900-D-2803 Sht:001 Rev:000 Title: Cold Chemical building H&V air flow diagram and P&ID

900-D-4072 Sht:001 Rev:000 Title: WTF INTERIM CHEM. & SLUDGE WASH WATER ADD. SYS P&ID

900-D-4525 Sht:001 Rev:003 Title: WTF INTERIM CHEM & SLUDGE WASH WATER ADDITION SYS P&ID

900-E-705 Sht:01A Rev:006 Title: CTS ABB & LEGEND PROCESS & INSTRUM DIA

900-E-705 Sht:01B Rev:001 Title: JET CONTROL

900-E-705 Sht:01C Rev:000 Title: JET CONTROL

900-E-705 Sht:01D Rev:002 Title: MFHT BUBBLER CONTROL

900-E-705 Sht:01E Rev:002 Title: CFMT BUBBLER CONTROL

900-E-705 Sht:01F Rev:000 Title: INDEX VIT & 01/14

900-E-705 Sht:002 Rev:020 Title: CTS concentrator feed makup tk. 63 v001 P&ID

900-E-705 Sht:003 Rev:017 Title: CTS melter feed hold tk 63 v011 P&ID

900-E-705 Sht:004 Rev:015 Title: CTS waste header V-045 vit. cell P&ID

900-E-705 Sht:005 Rev:010 Title: CTS - ADS sample pump & P&ID

900-E-705 Sht:006 Rev:011 Title: CTS fht ads pump 63g011 P&ID

900-E-705 Sht:007 Rev:011 Title: CTS INTERNAL MELTER THERMOCOUPLES

900-E-705 Sht:008 Rev:014 Title: CTS MELTER COOLING SYSTEM

900-E-705 Sht:009 Rev:018 Title: CTS MELTER PNEUMATIC INSTRUMENTATION

900-E-705 Sht:010 Rev:014 Title: CTS MELTER AND HEATER POWER SUPPLY AND CONTROLS

900-E-705 Sht:011 Rev:015 Title: SAMPLER FOR V001 & V011 PROCESS & INSTR. DIA.

900-E-705 Sht:012 Rev:015 Title: CTS TURNTABLE

900-E-705 Sht:014 Rev:017 Title: CTS PRIMARY SCRUBBER SCRUB SECTION

900-E-705 Sht:015 Rev:014 Title: CTS PRIMARY SCRUBBER RECEIVER TANK

900-E-705 Sht:016 Rev:006 Title: CTS GLASS LEVEL DETECTOR SYSTEM

900-E-705 Sht:019 Rev:014 Title: CTS VESSEL VENT SYSTEM

900-E-705 Sht:021 Rev:012 Title: CTS melt off gas sys preheater & hemes P&ID

900-E-705 Sht:022 Rev:017 Title: CTS vessel off gas filters & heaters P&ID

900-E-705 Sht:023 Rev:013 Title: canister decontamination Tank 63-V-044 P&ID

900-E-705 Sht:024 Rev:008 Title: CTS-MAINTENANCE & CAPPING STATION P&ID

900-E-705 Sht:025 Rev:004 Title: Ex-Cell Vent Header P&ID

903-D-013 Sht:001 Rev:007 Title: P&ID STS UTILITY WATER SYSTEM

903-D-014 Sht:001 Rev:016 Title: P&ID STS UTILITY & INSTRUMENT AIR

903-D-014 Sht:002 Rev:011 Title: STS P&ID (V&S Bldg) UTILITY & INST. AIR

903-D-016 Sht:001 Rev:017 Title: STS P&ID FILTRATION & COOLING SECTION

903-D-017 Sht:001 Rev:011 Title: STS P&ID ION EXCHANGE SECTION SHEET 1

903-D-018 Sht:001 Rev:011 Title: STS P&ID ION EXCHANGE SECTION SHEET 2

903-D-019 Sht:001 Rev:013 Title: STS P&ID FINAL FILTRATION & STORAGE

903-D-020 Sht:001 Rev:011 Title: STS P&ID ZEOLITE FILL & SLUICE SECTION

903-D-021 Sht:001 Rev:009 Title: STS P&ID VENTING/CHILLER SECTION

904-D-011 Sht:001 Rev:013 Title: P&ID sludge mobilization sys. 8Q-4Pit

904-D-012 Sht:001 Rev:012 Title: P&ID Sludge mobilization system 8Q-1 pit

904-D-013 Sht:001 Rev:015 Title: P&ID Sludge Mobilization system 8Q-2 pit

904-D-014 Sht:001 Rev:011 Title: P&ID sludge mobilization system 8Q-5 pit

904-D-015 Sht:001 Rev:011 Title: P&ID sludge mobilization sys utility water/checmical system and seal water systems

904-D-016 Sht:001 Rev:005 Title: P&ID sludge mobilization system utility air system

905-D-010 Sht:001 Rev:001 Title: VF SHIELDING GAS & ARGON GAS SYSTEM P&ID

905-D-011 Sht:001 Rev:012 Title: P&ID Vitrification Drainage system high level

905-D-015 Sht:001 Rev:019 Title: P&ID COLD CHEMICAL PREPARATION & FEED SYSTEM

905-D-016 Sht:001 Rev:019 Title: P&ID COLD CHEMICAL PREPARATION & FEED SYSTEM

905-D-017 Sht:001 Rev:018 Title: P&ID COLD CHEMICAL PREPARATION & FEED SYSTEM

905-D-018 Sht:001 Rev:011 Title: P&ID COLD CHEMICAL PREPARATION & FEED SYSTEM

905-D-019 Sht:001 Rev:009 Title: P&ID COLD CHEMICAL STEAM & CONDENSATE SYSTEM

905-D-020 Sht:001 Rev:012 Title: P&ID COLD CHEMICAL UTILITY & INSTRUMENT AIR

905-D-021 Sht:001 Rev:010 Title: P&ID COLD CHEMICAL WATER SYSTEMS

905-D-022 Sht:001 Rev:006 Title: P&ID COLD CHEMICAL ACID & CAUSTIC SYSTEMS

905-D-023 Sht:001 Rev:014 Title: P&ID diesel fuel oil transfer system

905-D-024 Sht:001 Rev:007 Title: P&ID COLD CHEMICAL FIRE PROTECTION

905-D-025 Sht:001 Rev:005 Title: P&ID secondary filter, diesel gen & crane maintenance room

905-D-026 Sht:001 Rev:003 Title: P&ID Vitrification facility utility water system

905-D-027 Sht:001 Rev:004 Title: P&ID vitrification facility non rack cold chemical decon system

905-D-028 Sht:001 Rev:004 Title: P&ID vitrification facility steam system

905-D-029 Sht:001 Rev:016 Title: P&ID vitrification facility instrument & utility air sys

905-D-044 Sht:001 Rev:002 Title: VF SFR & CMR HIGH PRESSURE AIR SYSTEM P&ID

905-D-045 Sht:001 Rev:005 Title: P&ID Vitrification facility instrument rack 3W2-1A

905-D-045 Sht:002 Rev:005 Title: P&ID Vitrification facility instrument rack 3E8-7A

905-D-045 Sht:003 Rev:007 Title: P&ID Vitrification facility instrument rack 2N7-6

905-D-045 Sht:004 Rev:007 Title: P&ID Vitrification facility instrument rack 2N6-5

905-D-045 Sht:005 Rev:005 Title: P&ID Vitrification facility

905-D-045 Sht:006 Rev:004 Title: P&ID Vitrification facility instrument rack 2E9-8

905-D-045 Sht:007 Rev:004 Title: P&ID Vitrification Facility instrument rack 2W3-2

905-D-045 Sht:008 Rev:003 Title: P&ID Vitrification facility instrument rack 3E9-7B

905-D-045 Sht:009 Rev:007 Title: P&ID Vitrification facility instrument rack 3W7

905-D-045 Sht:010 Rev:007 Title: P&ID Vitrification facility instrument rack 2N8

905-D-045 Sht:011 Rev:008 Title: P&ID Vitrification facility instrument rack 3W4

905-D-045 Sht:012 Rev:007 Title: P&ID Vitrification facility instrument rack 3W5 sheet 1

905-D-045 Sht:013 Rev:006 Title: P&ID Vitrification facility instrument rack 3W6

905-D-045 Sht:014 Rev:004 Title: P&ID Vitrification facility instrument rack 3W3

905-D-045 Sht:015 Rev:003 Title: P&ID Vitrification facility instrument rack 3W1

905-D-045 Sht:016 Rev:005 Title: P&ID Vitrification facility instrument rack 2W4

905-D-045 Sht:017 Rev:006 Title: P&ID Vitrification facility instrument rack 2W5

905-D-045 Sht:018 Rev:007 Title: P&ID Vitrification facility instrument rack 3E10

905-D-045 Sht:019 Rev:002 Title: P&ID Vitrification facility instrument rack 2E10

905-D-045 Sht:020 Rev:005 Title: P&ID Vitrification facility instrument rack 3W5 Sheet 2

905-D-046 Sht:001 Rev:025 Title: P&ID vitrification facility utility air system

905-D-046 Sht:002 Rev:014 Title: P&ID vitrification facility instrument air system

905-D-046 Sht:003 Rev:014 Title: P&ID vitrification facility instrument air system

905-D-046 Sht:004 Rev:001 Title: VF P&ID UTILITY AIR SYSTEM

905-D-047 Sht:001 Rev:014 Title: P&ID vitirification facility steam system

905-D-047 Sht:002 Rev:016 Title: P&ID vitrification facility condensate system

905-D-047 Sht:003 Rev:013 Title: P&ID vitrification facility steam system

905-D-048 Sht:001 Rev:010 Title: P&ID vitrification facility utility water system

905-D-048 Sht:002 Rev:014 Title: P&ID vitrification facility demineralized water system

905-D-049 Sht:001 Rev:004 Title: P&ID vitrification facility fire protection systems

905-D-050 Sht:001 Rev:008 Title: P&ID vitrification drainage system low level

905-D-051 Sht:001 Rev:012 Title: P&ID vitrification facility potable water system

905-D-052 Sht:001 Rev:012 Title: Vitrification facility closed loop cooling water system P&ID

905-D-052 Sht:002 Rev:015 Title: Vitrification facility closed loop cooling water system P&ID

905-D-053 Sht:001 Rev:005 Title: P&ID vitrification facility non rack cold chem. decon & slurry system

905-D-053	Sht:002	Rev:011	Title: P&ID vitrification facility non rack cold chem decon & slurry system
905-D-054	Sht:001	Rev:017	Title: P&ID vtirification facility cooling tower water system
905-D-055	Sht:001	Rev:001	Title: VOID PER ECN P&ID vitrification facility off gas condensate system
905-D-056	Sht:001	Rev:006	Title: P&ID vitrification facility vent header system
905-D-057	Sht:001	Rev:004	Title: Vitrification Rest Rooms P&ID
905-D-058	Sht:001	Rev:007	Title: PNEUMATIC SAMPLE TRANSFER SYSTEM P&ID
905-D-058	Sht:002	Rev:000	Title: PNEUMATIC SAMPLE TRANSFER SYSTEM P&ID
905-D-450	Sht:001	Rev:007	Title: HVAC air flow diagram vitrification facility
905-D-451	Sht:001	Rev:007	Title: HVAC air flow diagram & P&ID control room
905-D-452	Sht:001	Rev:016	Title: HVAC P&ID vitrification facility
905-D-452	Sht:002	Rev:010	Title: HVAC P&ID vitrification facility
905-D-452	Sht:003	Rev:005	Title: VS HVAC P&ID VITRIFICATION FACILITY
905-D-453	Sht:001	Rev:009	Title: Vitrification facility HVAC chilled water system P&ID sh 1
905-D-453	Sht:002	Rev:001	Title: Vitrification facility HVAC chilled water system P&ID sh 3
905-D-454	Sht:001	Rev:010	Title: Vitrification facility HVAC chilled water P&ID sh 2
905-E-045	Sht:021	Rev:004	Title: P&ID VITRIFICATION FACILITY INSTRUMENT RACK 3W8
906-D-009	Sht:001	Rev:003	Title: VF EX-CELL OFF-GAS MISCELLANEOUS UTILITIES P&ID
906-D-014	Sht:001	Rev:007	Title: VF MELTER OFF-GAS P&ID MELTER EX CELL OFF GAS SYSTEM

906-D-015 Sht:001 Rev:007 Title: VF MELTER OFF-GAS P&ID MELTER EX CELL OFF GAS SYSTEM

906-D-018 Sht:001 Rev:006 Title: VF MELTER OFF-GAS HVAC AIR FLOW DIAGRAM & P&ID

906-D-019 Sht:001 Rev:001 Title: VOID PER ECN VF MELTER OFF-GAS HVAC AIR FLOW DIAGRAM & P&ID

906-D-025 Sht:001 Rev:007 Title: VF MELTER OFF-GAS P&ID INSTRUMENT RACK 01

906-D-026 Sht:001 Rev:007 Title: VF MELTER OFF-GAS P&ID INSTRUMENT RACK 02

906-D-027 Sht:001 Rev:007 Title: VF MELTER OFF-GAS P&ID INSTRUMENT RACK 02

906-D-028 Sht:001 Rev:006 Title: VF MELTER OFF-GAS P&ID INSTRUMENT RACK 02

906-E-011 Sht:001 Rev:008 Title: VF MELTER OFF-GAS P&ID MELTER EX CELL OFF GAS SYSTEM

906-E-012 Sht:001 Rev:009 Title: VF MELTER OFF-GAS P&ID MELTER EX CELL OFF GAS SYSTEM

906-E-013 Sht:002 Rev:005 Title: VF P&ID MELTER EX-CELL OFF-GAS SYS

906-E-013 Sht:001 Rev:009 Title: VF MELTER OFF-GAS P&ID MELTER EX CELL OFF GAS SYSTEM

906-E-016 Sht:001 Rev:008 Title: VF MELTER OFF-GAS P&ID INSTRUMENT AIR

906-E-017 Sht:001 Rev:005 Title: VF P&ID OFF-GAS TRENCH

Section 1.3.1 Vitrification Facility

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90[illegible]-D-030 Sht:001 Rev:011 Title: General arrangement vitrification facility plan EL 100'

905-D-030 Sht:002 Rev:000 Title: VF GENERAL ARRANGEMENT FUEL OIL STORAGE

905-D-032 Sht:001 Rev:007 Title: General arrangement vitrification facility plan EL 110.25'

905-D-032 Sht:002 Rev:003 Title: VF CONTROL ROOM GENERAL ARRANGEMENT

905-D-034 Sht:001 Rev:005 Title: General arrangement vitrification facility plan EL 124' & above

905-D-038 Sht:001 Rev:005 Title: General arrangement vitrification facility sections

905-D-040 Sht:001 Rev:002 Title: General arrangement vitrification facility plan EL 146.25' & roof

Section 1.3.2 Tank Farm

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900-D-2860 Sht:001 Rev:001 Title: SMS Utilities to pump/dist. pits general arrangement

904-D-060 Sht:001 Rev:006 Title: SMS HLW transfer piping

904-D-060 Sht:002 Rev:005 Title: SMS HLW transfer piping

904-D-060 Sht:003 Rev:005 Title: SMS HLW transfer piping

904-D-060 Sht:004 Rev:006 Title: SMS HLW transfer piping

904-D-060 Sht:005 Rev:015 Title: SMS HLW transfer piping

Section 1.3.3 High Level Waste Storage

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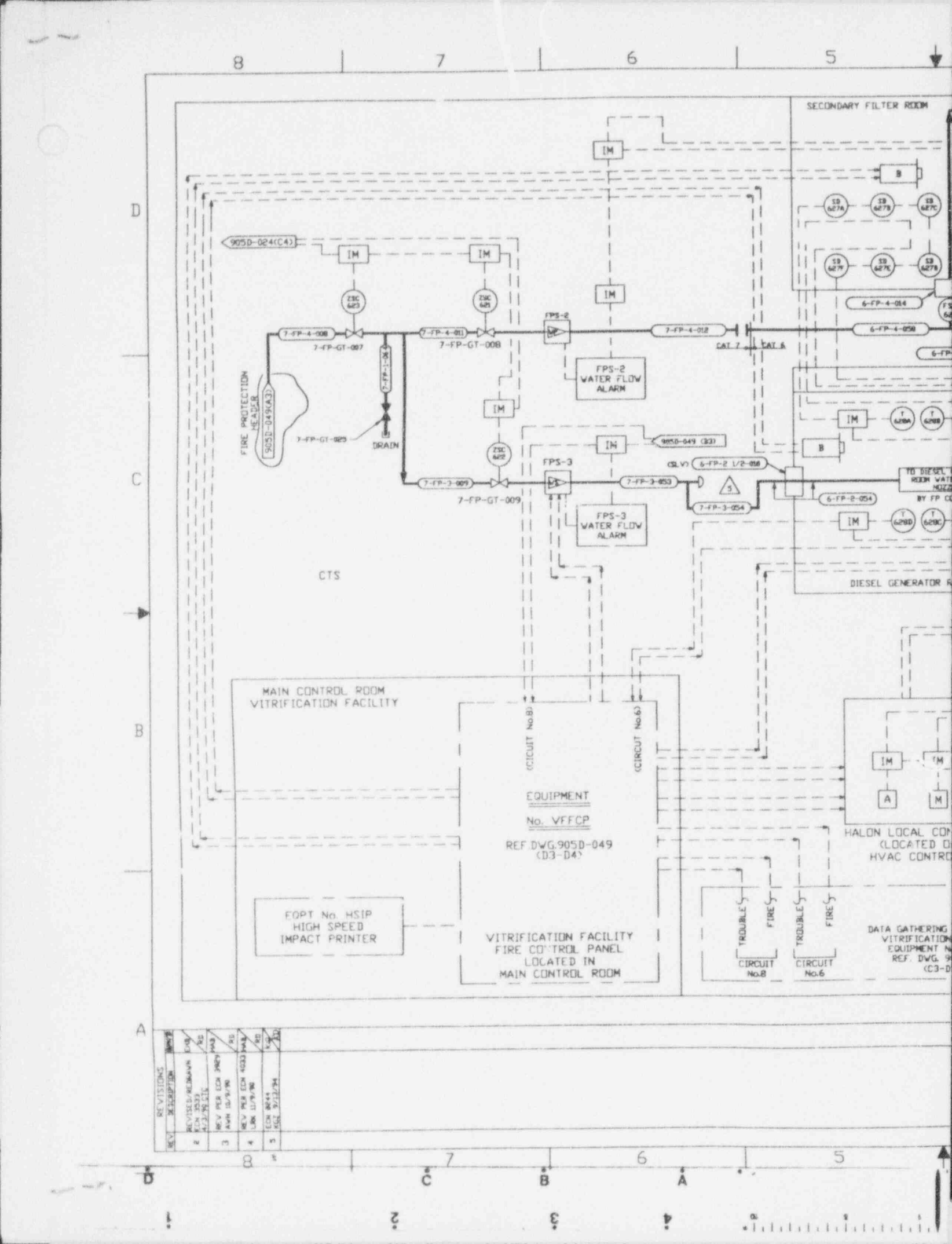
905-D-031 Sht:001 Rev:001 Title: General arrangement vitrification facility EDR, CPC plan EL 100'

905-D-033 Sht:001 Rev:001 Title: General arrangement vitrification facility EDR CPC plan EL 117'

Section 1.3.4 Ex-cell Off-gas 0-14 Building

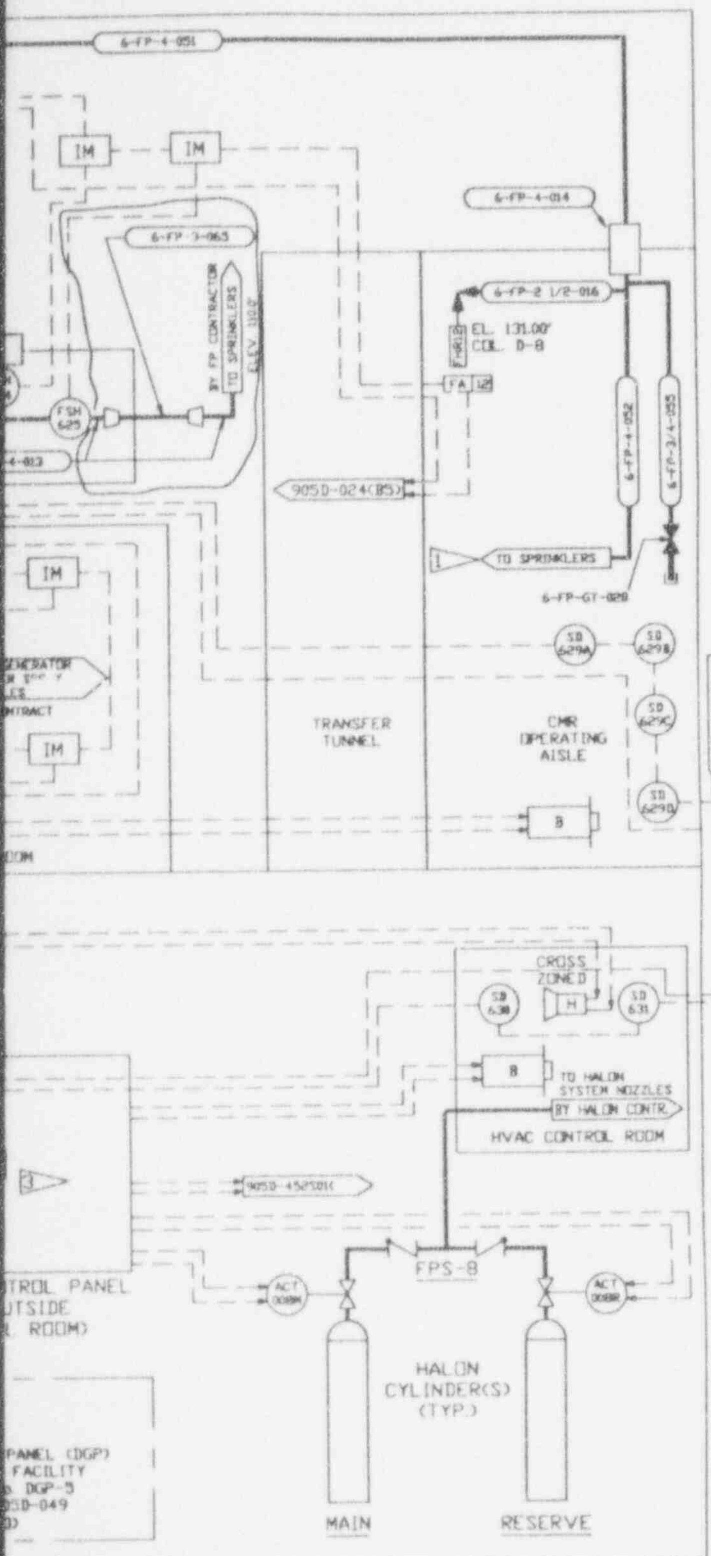
906-D-030	Sht:001	Rev:008	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING 98'
906-D-030	Sht:002	Rev:001	Title: VF GENERAL ARRANGEMENT NOx TRENCH
906-D-030	Sht:003	Rev:003	Title: VF GENERAL ARRANGEMENTS 01/14 BUILDING PLAN EL 98'
906 D-031	Sht:001	Rev:005	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING 116.59'
906-D-032	Sht:001	Rev:005	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING 130'
906-D-033	Sht:001	Rev:005	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING 144'
906-D-034	Sht:001	Rev:005	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING SECTION
906-D-035	Sht:001	Rev:006	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING SECTION
906-D-036	Sht:001	Rev:004	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING PLAN EL 158' ROOF PLAN
906-D-037	Sht:001	Rev:008	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING PLAN EL 124'
906-D-038	Sht:001	Rev:006	Title: VF MELTER OFF-GAS GENERAL ARRANGEMENTS 01/14 BUILDING SECTION


SECONDARY FILTER ROOM
IM
B
905D-024(C4)
7-FP-4-008
7-FP-GT-007
7-FP-4-011
7-FP-GT-008
FPS-2
7-FP-4-012
CAT 7
CAT 6
6-FP-4-014
6-FP-4-050
FPS-2 WATER FLOW ALARM
FIRE PROTECTION HEADER
905D-049(A3)
7-FP-GT-025
DRAIN
7-FP-3-009
7-FP-GT-009
FPS-3
7-FP-3-053
6-FP-2 1/2-058
7-FP-3-054
6-FP-2-054
FPS-3 WATER FLOW ALARM
905D-049 (B3)
CTS
DIESEL GENERATOR R
MAIN CONTROL ROOM
VITRIFICATION FACILITY
(CIRCUIT No.8)
(CIRCUIT No.6)
EQUIPMENT
No. VFFCP
REF DWG.905D-049
(D3-D4)
EQPT No. HSIP
HIGH SPEED
IMPACT PRINTER
VITRIFICATION FACILITY
FIRE CONTROL PANEL
LOCATED IN
MAIN CONTROL ROOM
TROUBLE
FIRE
CIRCUIT No.8
CIRCUIT No.6
HALON LOCAL CO
(LOCATED O
HVAC CONTRO
DATA GATHERING
VITRIFICATION
EQUIPMENT N
REF. DWG. 9
(C3-D
REVISIONS
REV
DESCRIPTION
2
3
4
5
8
7
6
5
D
C
B
A

905D-025 1

REFERENCE DRAWING:

- 900D-1306---SYMBOLS,NOTES,&LEGEND
- 900D-1307---SYMBOLS,NOTES,&LEGEND
- 900D-1308---SYMBOLS,NOTES,&LEGEND
- 905D-003 ---FIRE PROTECTION SYSTEMS VITRIFICATION FACILITY PLAN EL 100.00'
- 905D-004 ---FIRE PROTECTION SYSTEMS VITRIFICATION FACILITY PLAN EL 110.25'
- 905D-006 ---FIRE PROTECTION SYSTEMS VITRIFICATION FACILITY PLAN EL 131.00'
- 905D-452S01-VITRIFICATION SYSTEM HVAC P&ID VITRIFICATION FACILITY



9411280217-01

NOTES:

3. FOR [A], [M], & [IM] SEE DRAWING No. 905D-024.

2. * * BY WVNS

1. THE PORTION OF THE SPRINKLER PIPING RUNNING IN THE CRANE MAINTENANCE ROOM OPERATING AISLE SHALL BE ROUTED BY PURCHASER.

QTY REQ	ITEM NO.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	MATERIAL OR SPEC

PARTS LIST

UNLESS OTHERWISE SPECIFIED

ALL DIM IN INCHES

TOLERANCES-DO NOT SCALE

DRAFTER C. CABR S DATE 6-27-90

ENGR R. T. BIASE

FOR WEST VALLEY NUCLEAR SERVICES CO.,INC. WEST VALLEY, NEW YORK

P&ID SECONDARY FILTER DIESEL GEN. & CRANE MAINTENANCE ROOM

SCALE N/A

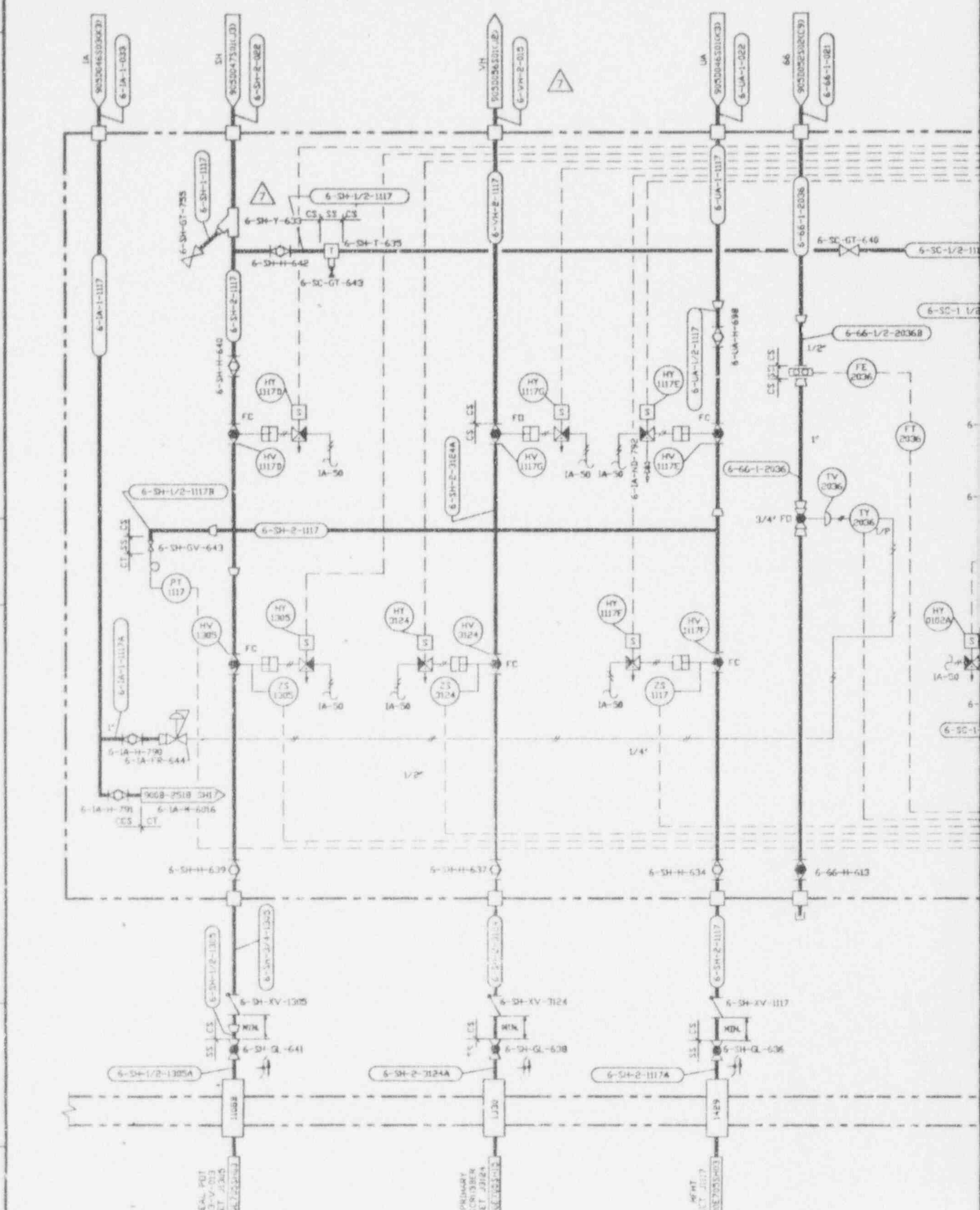
DWG SIZE D

DWG NO. 905D-025 REV 5

SHEET 1 OF

CAD DRAWING-DO NOT REVISE THIS ORIGINAL

905-D-045 S09



IA
SH
VH
UA
GG
6-IA-1-1117
6-SH-2-1117
6-VH-2-1117
6-UA-1-1117
6-GG-1-2036
6-SH-1/2-1117
6-SH-GV-643
6-SH-2-1117
IA-50
FC
SEAL POT
PRIMARY SCRUBBER

NO.	DATE	REVISIONS	DR	CH	APPROVED		
8	9-15-88		TJK	RJL	RJL SN	AJD	MDV
		GENERAL REVISIONS INCLUDING TA 767					
C	2-16-89		MJC	LJV	RJL	TJK FSK	FJES
		GENERAL REVISIONS					
D	6-12-89	ER 1631			JRH		
7	9/8/94	ECN 2548	TMH	KA	JJK		
2	5/14/90	ECN 3610	LRK	DRS	DJR		
3	7/9/91	REV PER ECN 4341	AWN	HAB	DJR		
4	10/14/93	REV PER ECN 6250	DAK	HAB	DJR		
5	11/11/93	REV PER ECN 6891	MJC	HAB	LED		
6	6/14/94	REV PER ECN 7554	JHS	KQ	ERB		

NOTES:

1. IA-50 AIR SERVICE FROM MANIFOLD 6-IA-M-6016. SEE DETAIL ON 9008-2518 SH17.

AC TERMINAL BOX

DC TERMINAL BOX

HY 1117A

HY 1124A

HY 1117B

HY 1117C

HY 2375A

6-SC-GT-646

6-SC-GL-648

6-SC-3-01028

CELL FACE

9411280217-02

FOR DRAWING INDEX SEE DRAWING NO.

EDAICO SERVICES INCORPORATED

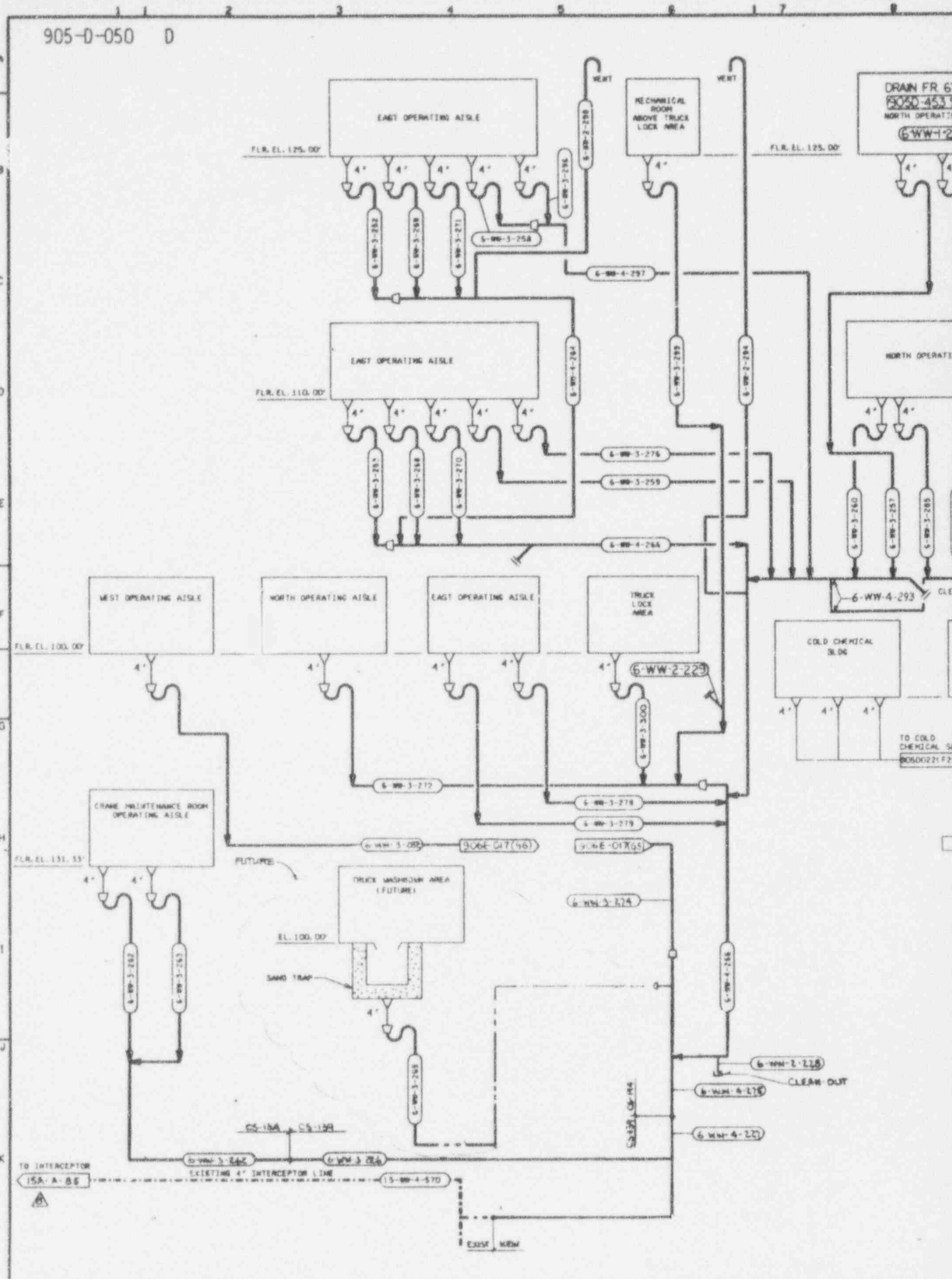
WEST VALLEY NUCLEAR SERVICES CO., INC. WEST VALLEY, NEW YORK

WEST VALLEY DEMONSTRATION PROJECT

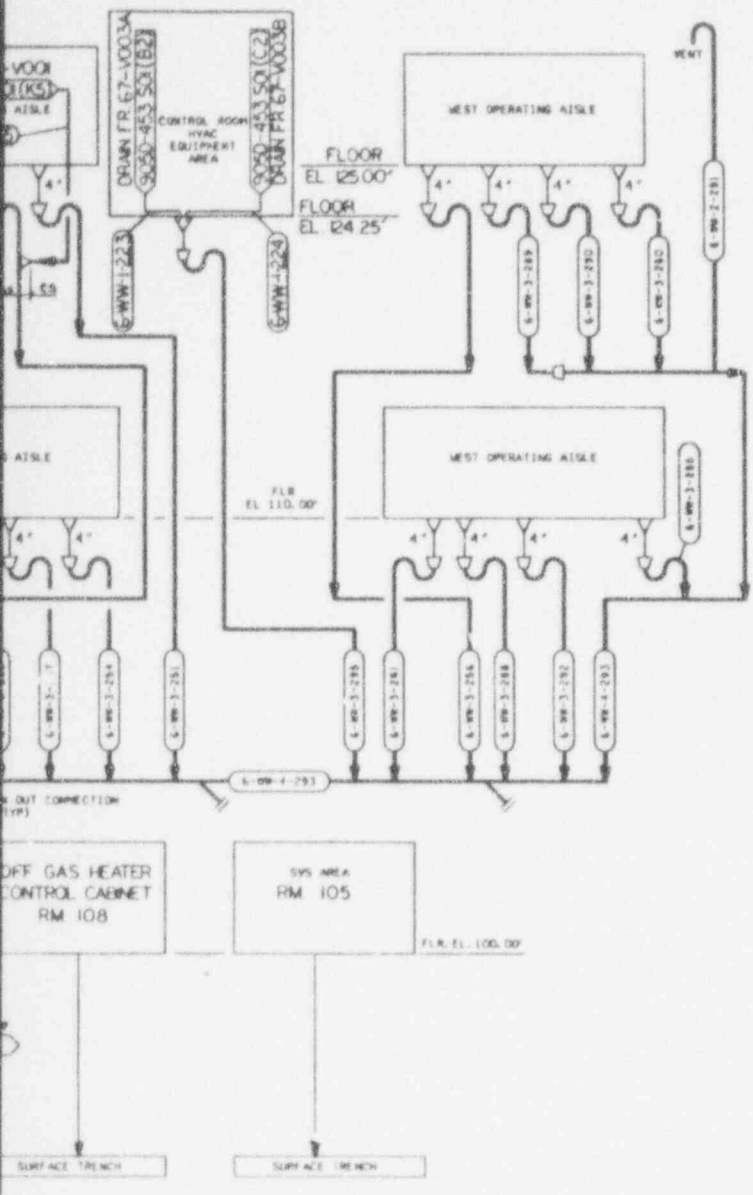
P & ID
VITRIFICATION FACILITY
INSTRUMENT RACK 3W7

DRAWING NO.	REV.
905D-045	7

CAD DRAWING - DO NOT REVISE THIS ORIGINAL


905-D-050 D
EAST OPERATING AISLE
FLR. EL. 125.00'
VENT
MECHANICAL ROOM ABOVE TRUCK LOCK AREA
DRAIN FR. 67
NORTH OPERATING
6-WW-3-258
6-WW-4-297
EAST OPERATING AISLE
FLR. EL. 110.00'
NORTH OPERATING
6-WW-3-276
6-WW-3-259
6-WW-4-264
6-WW-4-293
WEST OPERATING AISLE
NORTH OPERATING AISLE
EAST OPERATING AISLE
TRUCK LOCK AREA
FLR. EL. 100.00'
6-WW-2-229
COLD CHEMICAL BLDG
TO COLD CHEMICAL SUP
6-WW-3-272
6-WW-3-278
6-WW-3-279
CRANE MAINTENANCE ROOM OPERATING AISLE
FLR. EL. 131.33'
6-WW-3-282
906E-017(56)
906E-017(65)
FUTURE
TRUCK WASHDOWN AREA (FUTURE)
6-WW-3-274
EL. 100.00'
SAND TRAP
6-WW-2-228
CLEAN-OUT
6-WW-4-275
6-WW-4-227
CS-13A
CS-13B
TO INTERCEPTOR
15A-A-86
EXISTING 4" INTERCEPTOR LINE
15-WW-4-570
EXIST
NEW

905 D-050



NO.	DATE	REVISION	DR	CH	APPROVED
B	09-19-88	GENERAL REVISION PER EBAR 1093			
C	06-02-88	GENERAL REVISION PER EBAR 1093A			
D	6-29-95	GENERAL REVISION			
0	7/17/96	ER 17446			
5	2-24-98	REV PER ECN 5967	GW		
6	5-5-98	REV PER ECN 6301	PD		
7	11-16-98	REV PER ECN 7059	WIL		
8	9-13-99	REV PER ECN 8250	GW		

LEGEND

EXISTING LINE

NOTES

1. THIS DWG. SUPERSEDES DWG. 905-0-012.
2. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY SYSTEM DESIGNATOR WV.
3. ALL DRAIN LINES TO SLOPE TOWARD SUMP ½ INCH PER FOOT MINIMUM.

REFERENCE DRAWINGS

P&ID VITRIFICATION DRAINAGE SYSTEM HIGH LEVEL WASTE	905-0-011
PIPING PLAN AT EL 124'-0 VITRIFICATION DRAINAGE SYSTEM	905-0-061
VITRIFICATION FACILITY FLOOR DRAINS AT EL 125.00' & EL 130.00'	905-0-082 SO1
VITRIFICATION FACILITY DRAIN PIPING BELOW EL 125.00' & EL 130.00'	905-0-082 SO2
VITRIFICATION FACILITY FLOOR DRAINS AT EL 110.00'	905-0-082 SO3
VITRIFICATION FACILITY DRAIN PIPING BELOW EL 110.00'	905-0-082 SO4
VITRIFICATION FACILITY DRAINAGE PIPING TO INTERCEPTOR	905-0-082 SO5

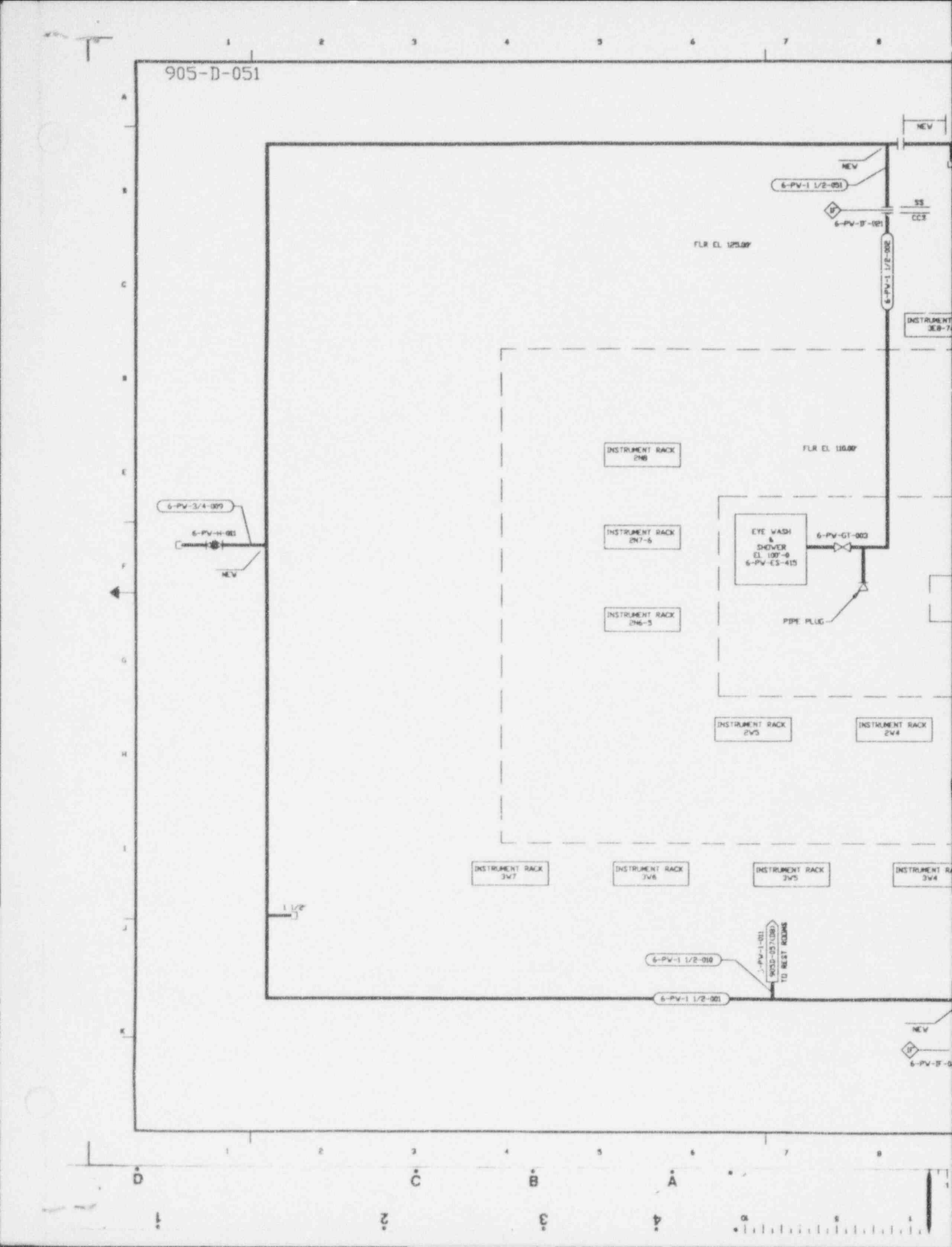
NEEDED TO COMPLETE THIS DRAWING

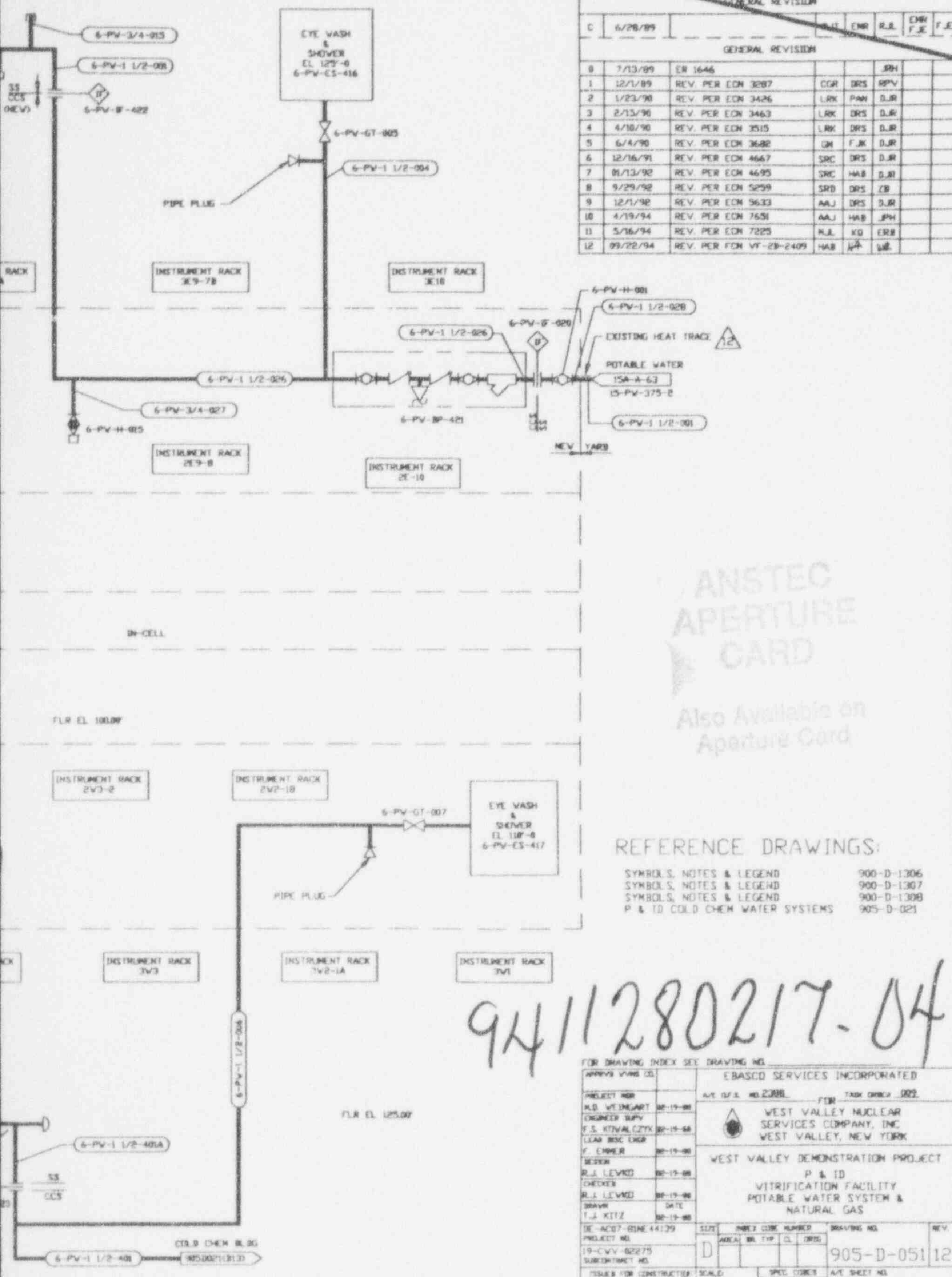
1. INTERFACES WITH ASSOCIATED SYSTEMS.
2. VALVE & INSTRUMENT DETAILS FOR SERVICES DESIGNATED AS FUTURE INSTALLATION.

FOR DRAWING INDEX SEE DRAWING NO.

APPROVED WVNSCO	EBASCO SERVICES INCORPORATED
PROJECT MGR	A/E B.F.S. NO. 2188 TASK ORDER 202
ENGINEER SUPV	FOR
LEAD DISC ENGR	WEST VALLEY NUCLEAR SERVICES COMPANY, INC WEST VALLEY, NEW YORK
DESIGN	WEST VALLEY DEMONSTRATION PROJECT
CHECKED	P & ID VITRIFICATION DRAINAGE SYSTEM LOW LEVEL
DRAWN	
BE-WCOT-91WE-64139 PROJECT NO.	SIZE D; INDEX CODE NUMBER AREA DR ??? SYS; DRAWING NO. 905 D-050; REV. 8
19-CWV-0227S SUBCONTRACT NO.	
ISSUED FOR CONSTRUCTION	SCALE NONE; SPEC. CODE; A/E SHEET NO. 905-0-050 D

94112802 17-03


905-D-051
NEW
NEW
6-PV-1 1/2-051
6-PV-3"-021
SS
CCS
FLR EL 125.00'
6-PV-1 1/2-002
INSTRUMENT RACK 2W8
FLR EL 110.00'
6-PV-3/4-009
6-PV-H-001
NEW
INSTRUMENT RACK 2W7-S
EYE WASH & SHOWER EL 100'-0 6-PV-ES-415
6-PV-GT-003
PIPE PLUG
INSTRUMENT RACK 2W6-S
INSTRUMENT RACK 2W3
INSTRUMENT RACK 2W4
INSTRUMENT RACK 3W7
INSTRUMENT RACK 3W6
INSTRUMENT RACK 3W5
INSTRUMENT RACK 3W4
1 1/2"
6-PV-1 1/2-010
6-PV-1-011
(905D-051,080)
TO REST ROOMS
6-PV-1 1/2-001
NEW
6-PV-3"-0



NO.	DATE	REVISION	DR	CH	APPROVED		
B	8/19/88	GENERAL REVISION	BFR	R.A.	R.A. F.E.	FSK	MDV
C	6/28/89	GENERAL REVISION	RJT	EMR	R.A.	EMR F.E.	F.ES
0	7/13/89	ER 1646			JRH		
1	12/1/89	REV. PER ECN 3287	CGR	DRS	RPV		
2	1/23/90	REV. PER ECN 3426	LRK	PAN	DJR		
3	2/15/90	REV. PER ECN 3463	LRK	DRS	DJR		
4	4/10/90	REV. PER ECN 3515	LRK	DRS	DJR		
5	6/4/90	REV. PER ECN 3682	GM	FJK	DJR		
6	12/16/91	REV. PER ECN 4667	SRC	DRS	DJR		
7	01/13/92	REV. PER ECN 4695	SRC	HAB	DJR		
8	9/29/92	REV. PER ECN 5259	SRD	DRS	ZB		
9	12/1/92	REV. PER ECN 5633	AAJ	DRS	DJR		
10	4/19/94	REV. PER ECN 7651	AAJ	HAB	JPH		
11	5/16/94	REV. PER ECN 7225	RJL	KQ	ERB		
12	09/22/94	REV. PER FCN VF-20-2409	HAB	[illegible]	[illegible]		

REFERENCE DRAWINGS:

SYMBOLS, NOTES & LEGEND	900-D-1306
SYMBOLS, NOTES & LEGEND	900-D-1307
SYMBOLS, NOTES & LEGEND	900-D-1308
P & ID COLD CHEM WATER SYSTEMS	905-D-021

9411280217-04

FOR DRAWING INDEX SEE DRAWING NO. ______

EBASCO SERVICES INCORPORATED

A/E O/S. NO. 2380 TASK ORDER 009

FOR

WEST VALLEY NUCLEAR SERVICES COMPANY, INC.
WEST VALLEY, NEW YORK

WEST VALLEY DEMONSTRATION PROJECT

P & ID
VITRIFICATION FACILITY
POTABLE WATER SYSTEM & NATURAL GAS

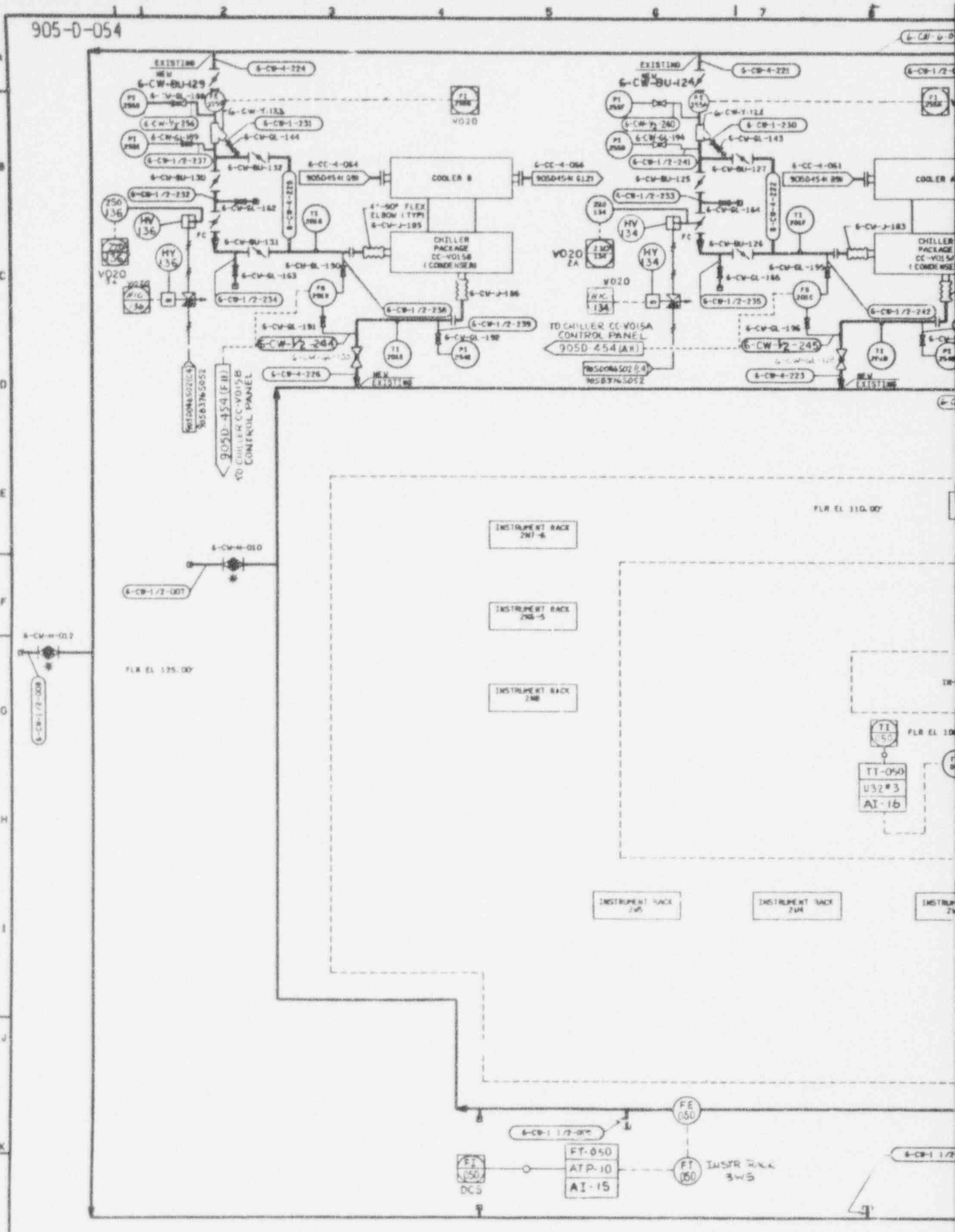
APPRVD VVNS CO.		
PROJECT MGR	M.D. WEINGART	08-19-88
ENGINEER SUPV	F.S. KOWALCZYK	08-19-88
LEAD DISC ENGR	F. EMMER	08-19-88
DESIGN	R.J. LEWKO	08-19-88
CHECKER	R.J. LEWKO	08-19-88
DRAWN	T.J. KITZ	08-19-88

DE-AC07-81NE44139 PROJECT NO.
19-CWV-02275 SUBCONTRACT NO.
ISSUED FOR CONSTRUCTION

SIZE	INDEX CODE NUMBER (AREA, BR. TYP, CL, DRSG)	DRAWING NO.	REV.
D		905-D-051	12

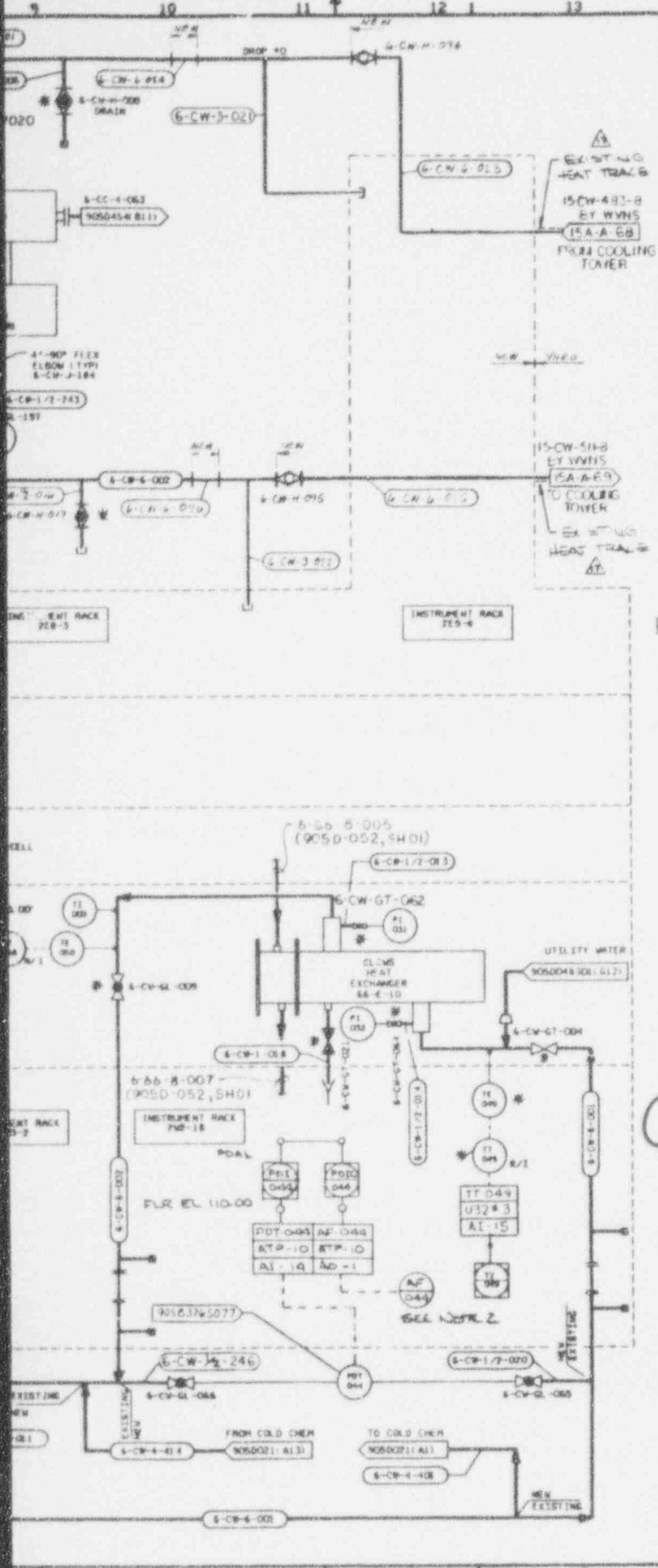
SCALE: NONE
SPEC. CODES
A/E SHEET NO. 905-D-051 B

CAD DRAWING-DO NOT REVISE THIS ORIGINAL



905-D-054
EXISTING
NEW
6-CW-BU-129
6-CW-BU-124
COOLER B
COOLER A
CHILLER PACKAGE CC-V015B (CONDENSER)
4"-90° FLEX ELBOW (TYP)
V020
HV 136
HY 136
HV 134
HY 134
TO CHILLER CC-V015A CONTROL PANEL
905D 454 (AX)
905D-454 (F8)
TO CHILLER CC-V015B CONTROL PANEL
INSTRUMENT RACK 2W7-6
INSTRUMENT RACK 2W6-5
INSTRUMENT RACK 2W8
INSTRUMENT RACK 2W5
INSTRUMENT RACK 2W4
FLR EL 125.00'
FLR EL 110.00'
6-CW-H-010
6-CW-H-012
TI 050
TT-050
U32#3
AI-16
FE 050
FT-050
ATP-10
AI-15
FI 050
DCS
FT 050
INSTR RACK 3W3

D C B A
1 2 3 4



NO.	DATE	REVISION	DR	CH	APPROVED		
B	01-26-89		AJL	PJB	AJL	PJB FSE	PJBS
		GENERAL REVISION					
C	6-28-89		AJL		RJL		
		GENERAL REVISION					
O	7/13/89	ECN 96					
15	6/3/94	REV ECN 7990	TAI	KR			
16	6 28 94	REV PER ECN 7740	GW				
17	09-22-94	REV PER RCN VF-94-2001		AHA	DJR		
4	9-10-90	REV. PER ECN 3907	AWN	DRS	DJR		
5	1-30-91	REV D. PER ECN 4102	REH	HAB	DJR		
6	3/27/91	PER ECN 4117		HAB			
7	6-24-92	ECN 5023	PD				
8	9-25-92	REV PER ECN 5259	PMS	DRS			
9	8-31-93	REV PER ECN 6599	PD	KR			
10	11-24-93	REV PER ECN 7087	GW	HRB			
11	2-16-94	REV/ECN 7262	PD	DRS			
12	3-8-94	REV PER ECN 7216	AAJ	DA			
13	4-20-94	REV PER ECN 7451	AAJ				
14	5-18-94	REV/ECN 7470	PMS	HRB			

NOTES:

1. A SINGLE ASTERISK (*) INDICATES EXISTING VALVES AND/OR EQUIPMENT TO BE RETAINED.
2. ADJUSTABLE FREQUENCY DRIVE LOCATED IN MAIN PLANT CHEMICAL OPERATING AISLE

REFERENCE DRAWINGS:

VITRIFICATION FACILITY HVAC CHILLED WATER SYSTEM P & ID SHEET 2	905-D-454
P & ID COLD CHEMICAL WATER SYSTEMS	905-D-021
INSTRUMENT INSTALLATION DETAILS	905-B-376
COOLING WATER BOOSTER PUMP ELECTRICAL DIAGRAMS	900-D-248
CONTROL WIRING DIAGRAMS	905-B-305

ANSTEC APERTURE CARD

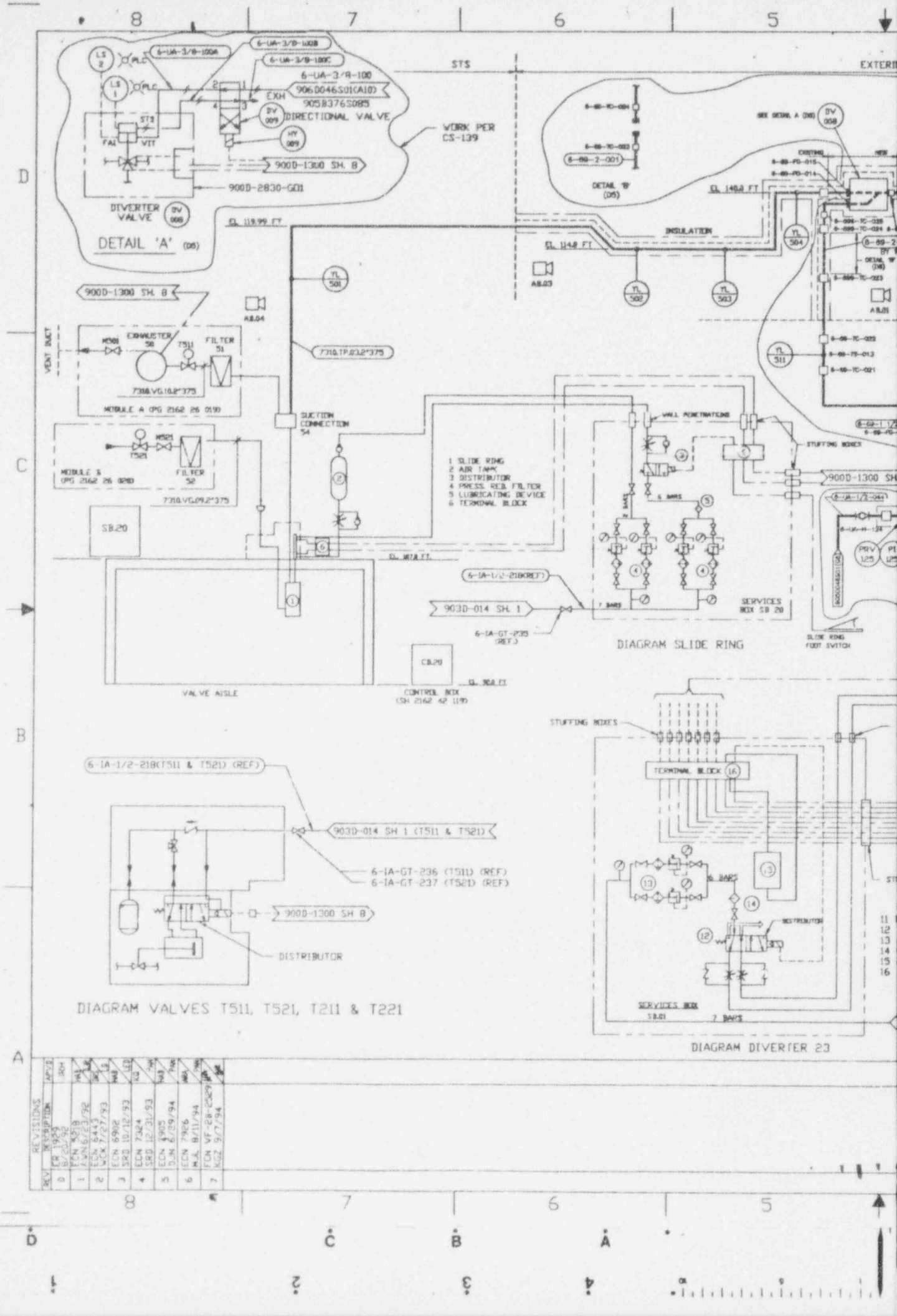
Also Available on Aperture Card

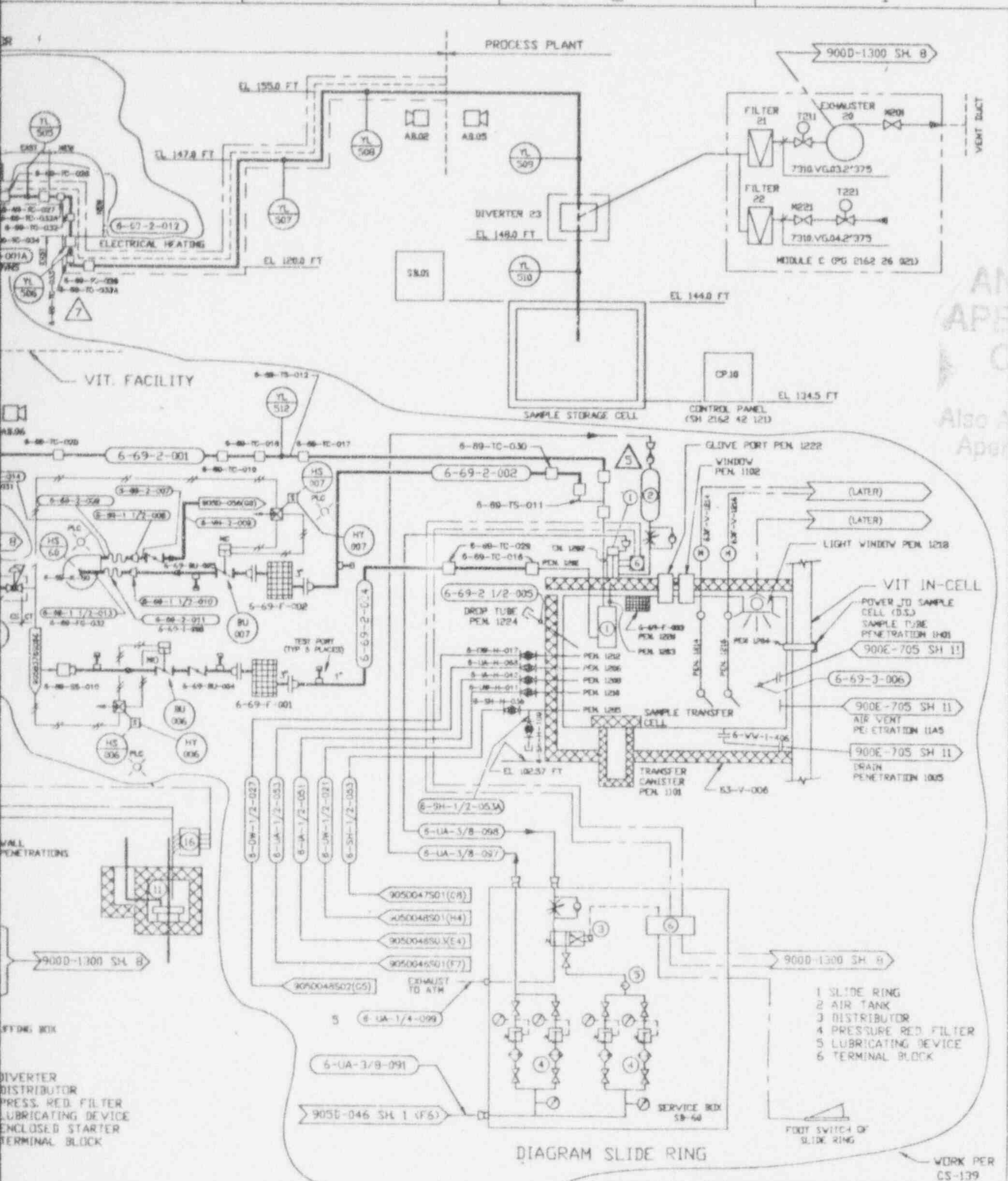
9411280217-05

WVNS APPROVAL

FOR DRAWING INDEX SEE DRAWING NO.

APPR'D WVNS CO.		EBASCO SERVICES INCORPORATED A/E O.F.S. NO. 2388 TASK ORDER 009
PROJECT MGR P J STARFY	10-21-88	FOR WEST VALLEY NUCLEAR SERVICES COMPANY, INC WEST VALLEY, NEW YORK
ENGINEER SUPV P J ...	10-21-88	
LEAD DISC ENGR P J ...	10-21-88	WEST VALLEY DEMONSTRATION PROJECT
DESIGN A J LEWKO	10-21-88	P & ID VITRIFICATION FACILITY COOLING TOWER WATER SYSTEM
CHECKED A J LEWKO	10-15-88	
DRAWN P J SANTOS	DATE 10-11-88	
DE-AC07-81NE44139 PROJECT NO.	SIZE D	DRAWING NO. 905 D 054 REV. 17
19-CWV-00275 SUBCONTRACT NO.		
ISSUED FOR CONSTRUCTION	SCALE NONE	A/E SHEET NO. 905-D-054 C


DETAIL 'A' (D6)
DIVERTER VALVE
DIRECTIONAL VALVE
WORK PER CS-139
DETAIL 'B' (D5)
INSULATION
VENT DUCT
EXHAUSTER 50
FILTER 51
FILTER 52
SUCTION CONNECTION 54
1 SLIDE RING
2 AIR TANK
3 DISTRIBUTOR
4 PRESS. REG. FILTER
5 LUBRICATING DEVICE
6 TERMINAL BLOCK
WALL PENETRATIONS
STUFFING BOXES
SERVICES BOX SB 20
SLIDE RING FOOT SWITCH
DIAGRAM SLIDE RING
VALVE AISLE
CONTROL BOX (SH 2162 42 119)
6-IA-1/2-218(T511 & T521) (REF)
903D-014 SH. 1 (T511 & T521)
6-IA-GT-236 (T511) (REF)
6-IA-GT-237 (T521) (REF)
DISTRIBUTOR
DIAGRAM VALVES T511, T521, T211 & T221
TERMINAL BLOCK 16
SERVICES BOX SB.01
DIAGRAM DIVERTER 23
REVISIONS



QTY REQD	ITEM NO.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	MATERIAL OR SPEC

PARTS LIST

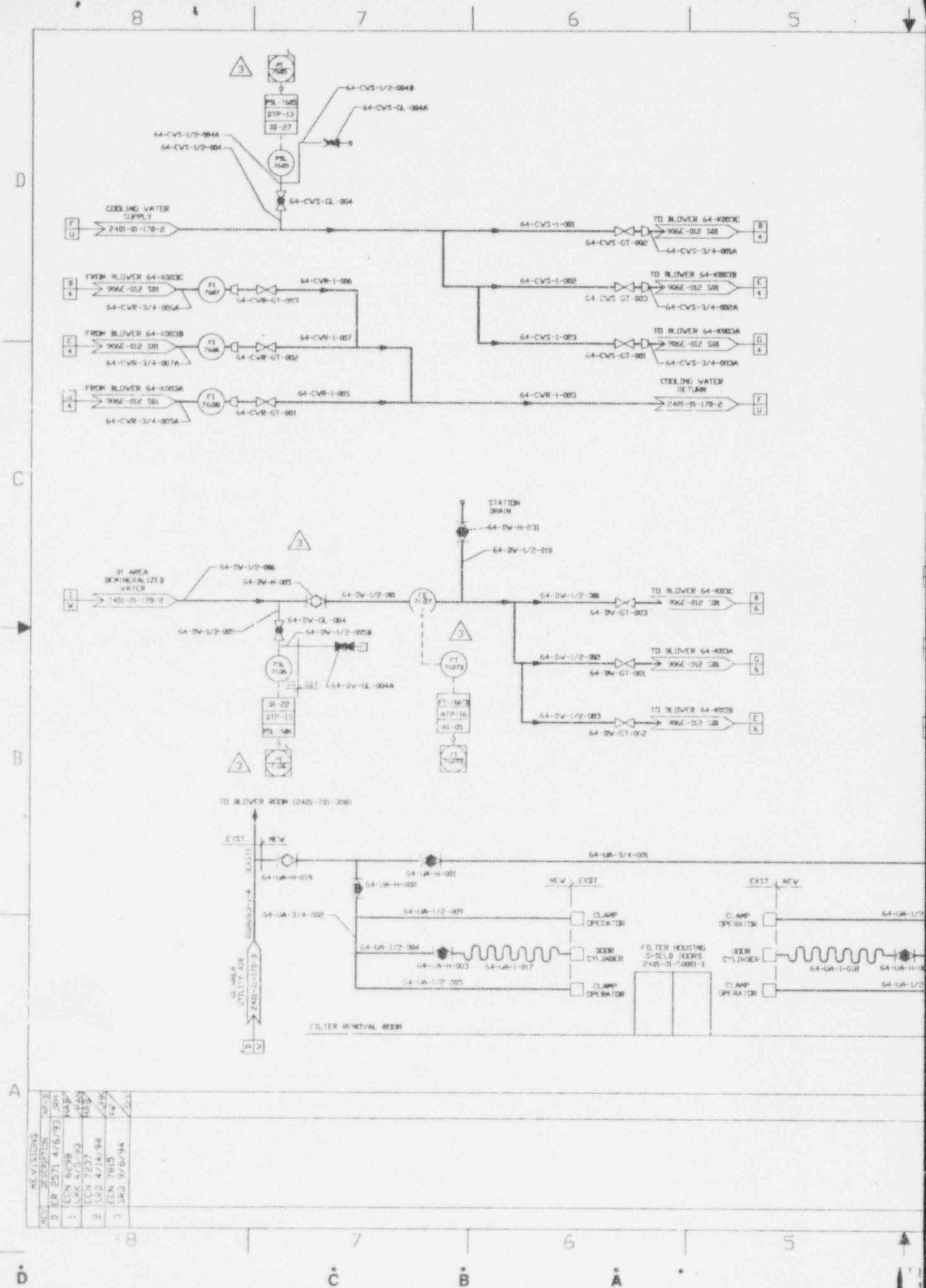
UNLESS OTHERWISE SPECIFIED	DRAFTER A. NICKS	DATE 8/14/90	
NOT APPLICABLE	CHECKER DON SHAFFER	DATE 8-15-90	FOR West Valley Nuclear Services Co., Inc. West Valley, New York
TOLERANCES-DO NOT SCALE	ENGR. L.E. DONOVAN	DATE 8-15-90	
2 PL DEC ± N/A; 3 PL DEC ± N/A; ANGLES ± N/A			PNEUMATIC SAMPLE TRANSFER SYSTEM P & I D
FRACTIONS ± N/A; PLOT 1=1	COG.MGR.APPVL. V. DESCAMP	DATE 8-16-90	
D.SPEC.NO. 1690	FACIL APPVL. P.A. SZALINSKI	DATE 8/17/90	
NEXT ASSEMBLY	Q.A.APPVL. D.L. SHUGARS	DATE 8/17/90	DWG SIZE D; SCALE NONE; DWG NO. 905D-058; REV 7
	OPS.TECH.APPVL. JOHN HORTON	DATE 8/20/90	SHEET 1 OF 2

CAD DRAWING-DO NOT REVISE THIS ORIGINAL

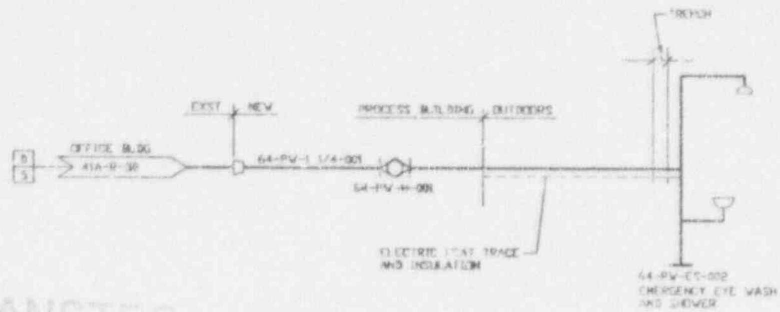
ANSTEC APERTURE CARD

Also Available on Aperture Card

9411280217-06

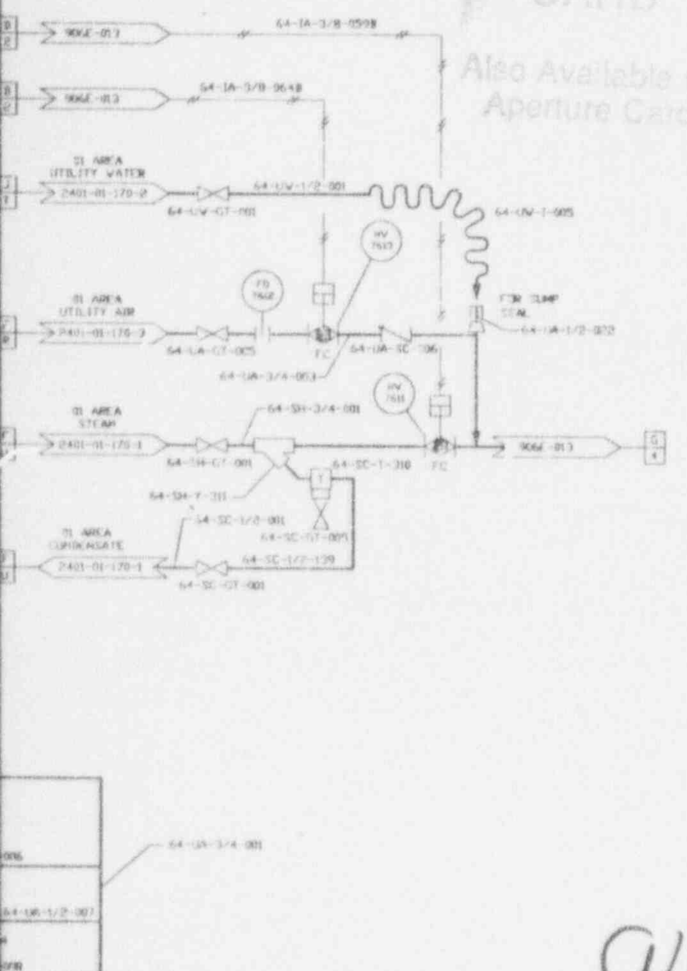


COOLING WATER SUPPLY
2401-01-170-2
64-CVS-1/2-004B
64-CVS-GL-004A
64-CVS-1/2-004A
64-CVS-1/2-004
64-CVS-GL-004
PSL-7685
DTP-13
DI-27
64-CVS-1-001
64-CVS-GT-002
TO BLOWER 64-K003C
906E-012 S01
64-CVS-3/4-001A
FROM BLOWER 64-K003C
64-CVR-3/4-006A
64-CVR-GT-003
64-CVR-1-006
64-CVS-1-002
64-CVS-GT-003
TO BLOWER 64-K003B
64-CVS-3/4-002A
FROM BLOWER 64-K003B
64-CVR-3/4-007A
64-CVR-GT-002
64-CVR-1-007
64-CVS-1-003
64-CVS-GT-001
TO BLOWER 64-K003A
64-CVS-3/4-003A
FROM BLOWER 64-K003A
64-CVR-3/4-005A
64-CVR-GT-001
64-CVR-1-005
COOLING WATER RETURN
STATION DRAIN
64-DW-H-011
64-DW-1/2-010
01 AREA DEMINERALIZED WATER
2401-01-170-2
64-DW-1/2-006
64-DW-H-005
64-DW-1/2-001
64-DW-GL-004
64-DW-1/2-005
64-DW-1/2-005B
64-DW-GL-004A
DR-22
DTP-13
FT-7687B
ATP-16
AI-05
64-DW-1/2-001
64-DW-GT-003
TO BLOWER 64-K003C
64-DW-1/2-002
64-DW-GT-001
TO BLOWER 64-K003A
64-DW-1/2-003
64-DW-GT-002
TO BLOWER 64-K003B
TO BLOWER ROOM (2401-701-308)
EXST
NEW
64-UA-H-019
64-UA-H-001
64-UA-3/4-001
64-UA-H-002
64-UA-3/4-002
64-UA-1/2-009
64-UA-1/2-004
64-UA-H-003
64-UA-I-017
64-UA-1/2-005
CLAMP OPERATOR
DOOR CYLINDER
FILTER HOUSING SHIELD DOORS 2401-01-5001-1
01 AREA UTILITY AIR 2401-01-170-3
64-UA-I-018
FILTER REMOVAL ROOM
REVISIONS
REV
DESCRIPTION
0 ER 2571 4/6/93
1 ECN 6298 LRK 4/21/93
2 ECN 7237 SRD 4/14/94
3 ECN 7815 SRD 9/6/94



ANSTEC APERTURE CARD

Also Available on Aperture Card



NOTES:

1. ALL INSTRUMENT NUMBERS PREFIXED BY SYSTEM NO "64"

REFERENCE DRAWINGS:

UTILITY ROUTING FLOW DIAGRAM STEAM,CONDENSATE,& DIESEL OIL	2401-01-170-1
UTILITY ROUTING DIAGRAM WATER SYSTEMS	2401-01-170-2
VF MELTER OFF-GAS SYSTEM P&ID	906E-011
VF MELTER OFF-GAS SYSTEM P&ID	906E-012
VF MELTER OFF-GAS SYSTEM P&ID	906E-013
VF MELTER OFF-GAS SYSTEM P&ID	906D-014
VF MELTER OFF-GAS SYSTEM P&ID	906D-015
INSTRUMENT AIR SYSTEM P&ID	906E-016
UTILITY FLOW DIAGRAM PLANT AIR, INSTRUMENT AIR	2401-01-170-3
FIRST FLOOR PLUMBING PLAN OFFICE BUILDING	41A-R-20
SYMBOLS NOTES AND LEGENDS	900D-1306
SYMBOLS NOTES AND LEGENDS	900D-1307
SYMBOLS NOTES AND LEGENDS	900D-1308

9411280217-07

QTY REQD	ITEM NO.	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	MATERIAL OR SPEC

PARTS LIST

UNLESS OTHERWISE SPECIFIED	DRAFTER C.ROBLEE	DATE 10/17/92
ALL DIMS. IN INCHES	CHECKER DONALD R. SHAFFER	DATE 3/25/93
TOLERANCES-DO NOT SCALE	ENGR RICHARD W. MARTIN	DATE 3/25/93
2 PL. DEC ± N/A; 3 PL. DEC ± N/A; ANGLES ± N/A		
FRACTIONS ± N/A	COG ENGR APPVL T.F. COTTRELL	DATE 3/25/93
DISPEC NO. 2071	SYS ENGR APPVL R.J. VANCE	DATE 4/6/93
NEXT ASSEMBLY	DA/QA R.N. KRAPF	DATE 4/6/93
	QE COORD JOHN HORTON	DATE 4/6/93

WVNS CONTRACT NO.

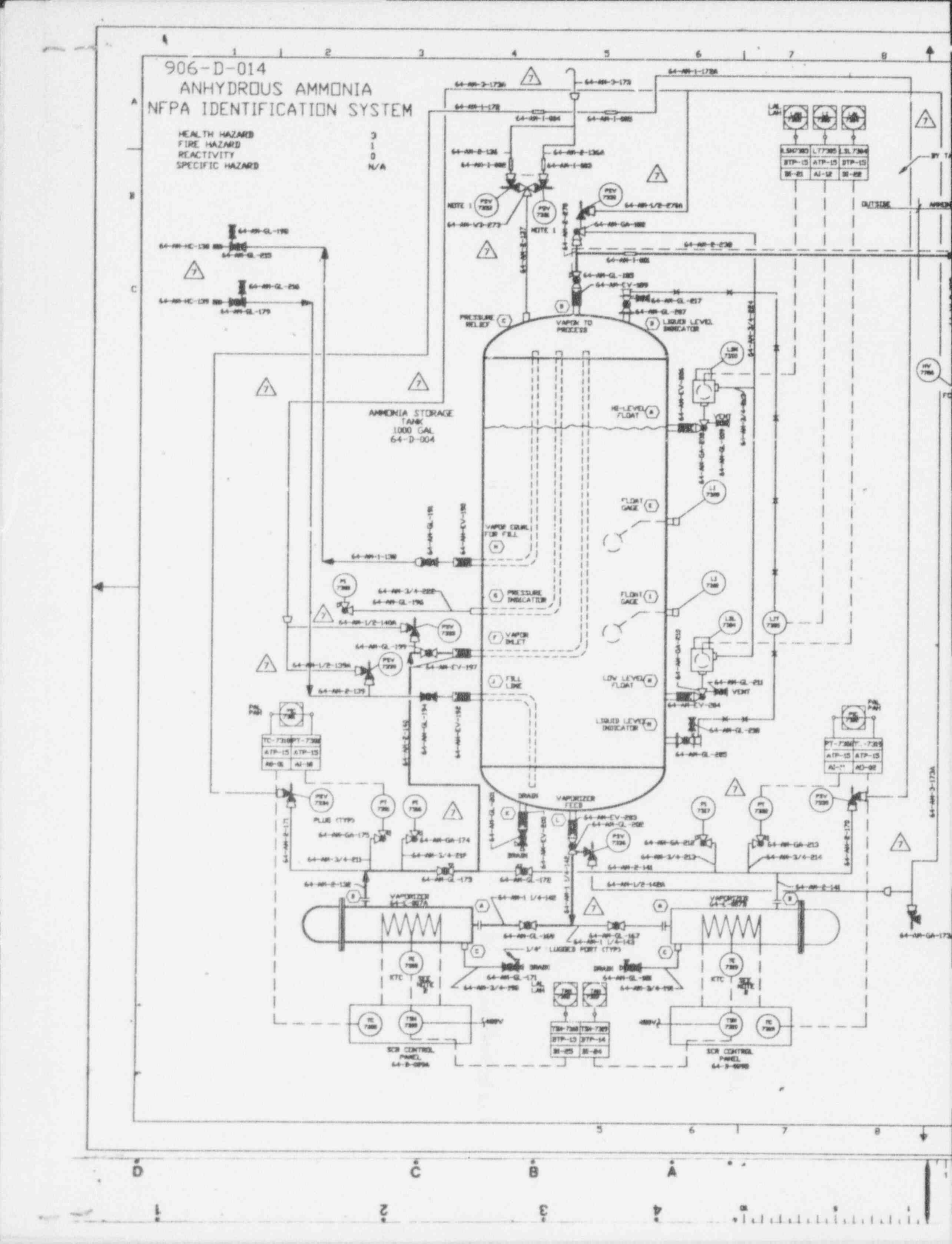
FOR WEST VALLEY NUCLEAR SERVICES CO.,INC. WEST VALLEY, NEW YORK

VF EX-CELL OFF-GAS P&ID MISCELLANEOUS UTILITIES

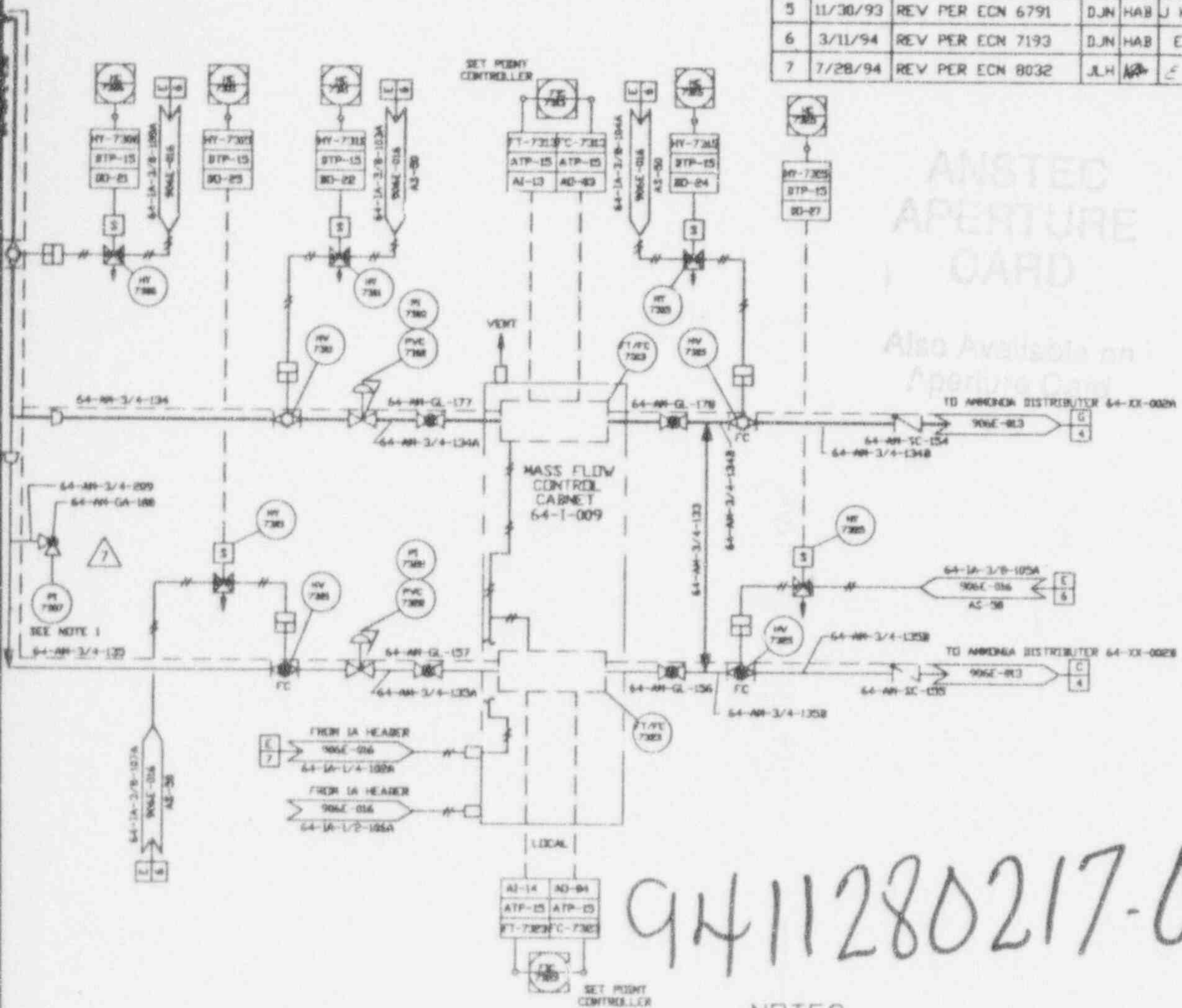
DWG SIZE D | SCALE NONE | WEIGHT | DWG NO. 906B-009 | REV 3

SHEET 1 OF 1

CAD DRAWING-DO NOT REVISE THIS ORIGINAL


906-D-014
ANHYDROUS AMMONIA
NFPA IDENTIFICATION SYSTEM
HEALTH HAZARD 3
FIRE HAZARD 1
REACTIVITY 0
SPECIFIC HAZARD N/A
AMMONIA STORAGE TANK 1000 GAL 64-D-004
VAPOR TO PROCESS
LIQUID LEVEL INDICATOR
PRESSURE RELIEF
HI-LEVEL FLOAT
FLOAT GAGE
VAPOR EQUAL FOR FILL
PRESSURE INDICATOR
VAPOR INLET
FILL LINE
LOW LEVEL FLOAT
LIQUID LEVEL INDICATOR
DRAIN
VAPORIZER FEED
PLUG (TYP)
VAPORIZER 64-E-007A
VAPORIZER 64-E-007B
1/4" LUGGED PORT (TYP)
KTC
SCR CONTROL PANEL 64-D-0056
SCR CONTROL PANEL 64-D-0057
OUTSIDE

NO.	DATE	REVISION	DR	CH	APPROVED
B	~~[illegible]~~	~~GENERAL REVISION~~	YP	JK	~~R.A. / RM / FJES~~
C	~~[illegible]~~	GENERAL REVISION	YP	JK	R.A. / JK / FJES
0	9/24/91	ER 2193			JRH
1	10/2/91	GEN REV PER ECN 4553	LRK	HAB	B L GERMOND
2	02/19/93	GEN REV PER ECN 5908	SRC	HAB	J H KRUZICKI
3	02/19/93	GEN REV PER ECN 6137	SRC	KMQ	P A NESTER
4	04/05/93	REV PER ECN 6136	SRC	KMQ	P A NESTER
5	11/30/93	REV PER ECN 6791	DJN	HAB	J H KRUZICKI
6	3/11/94	REV PER ECN 7193	DJN	HAB	E BIANCHI
7	7/28/94	REV PER ECN 8032	JLH	[illegible]	[illegible]



9411280217-08

ANSTEC APERTURE CARD

Also Available on Aperture Card

NOTES:

1. PSV 7331 AND PSV 7332 ARE INCLUDED IN 64-AM-W3-273. (7)
2. THERMOCOUPLE MOUNTED ON VAPORIZER.
3. ═══ HEAT TRACED PIPES.
4. ALL INSTRUMENT NUMBERS PREFIXED BY SYSTEM NO '64'

REFERENCE DRAWINGS:

V.F. P&ID MELTER OFF-GAS SYSTEM	906E-012
V.F. P&ID MELTER OFF-GAS SYSTEM	906E-013
V.F. P&ID MELTER OFF-GAS SYSTEM	906D-015
INSTRUMENT AIR SYSTEM P&ID	906E-016
SYMBOLS NOTES & LEGEND	900D-1306
SYMBOLS NOTES & LEGEND	900D-1307
SYMBOLS NOTES & LEGEND	900D-1308
AMMONIA STORAGE TANK	906D-020

FOR DRAWING INDEX SEE DRAWING NO. ______

APPRV'D WVNS CO	
PROJECT MGR F J E STOREY	02-16-91
ENGINEER SUPV F TULIPANO	02-16-91
LEAD DISC ENGR F TULIPANO	02-16-91
DESIGN R J LEVKO	02-16-91
CHECKED P PANASCI	02-16-91
DRAWN Y.PATEL	DATE 02-16-91

EBASCO SERVICES INCORPORATED
A/E D.F.S. NO.2388 TASK ORDER 023
FOR
WEST VALLEY NUCLEAR SERVICES COMPANY, INC
WEST VALLEY, NEW YORK

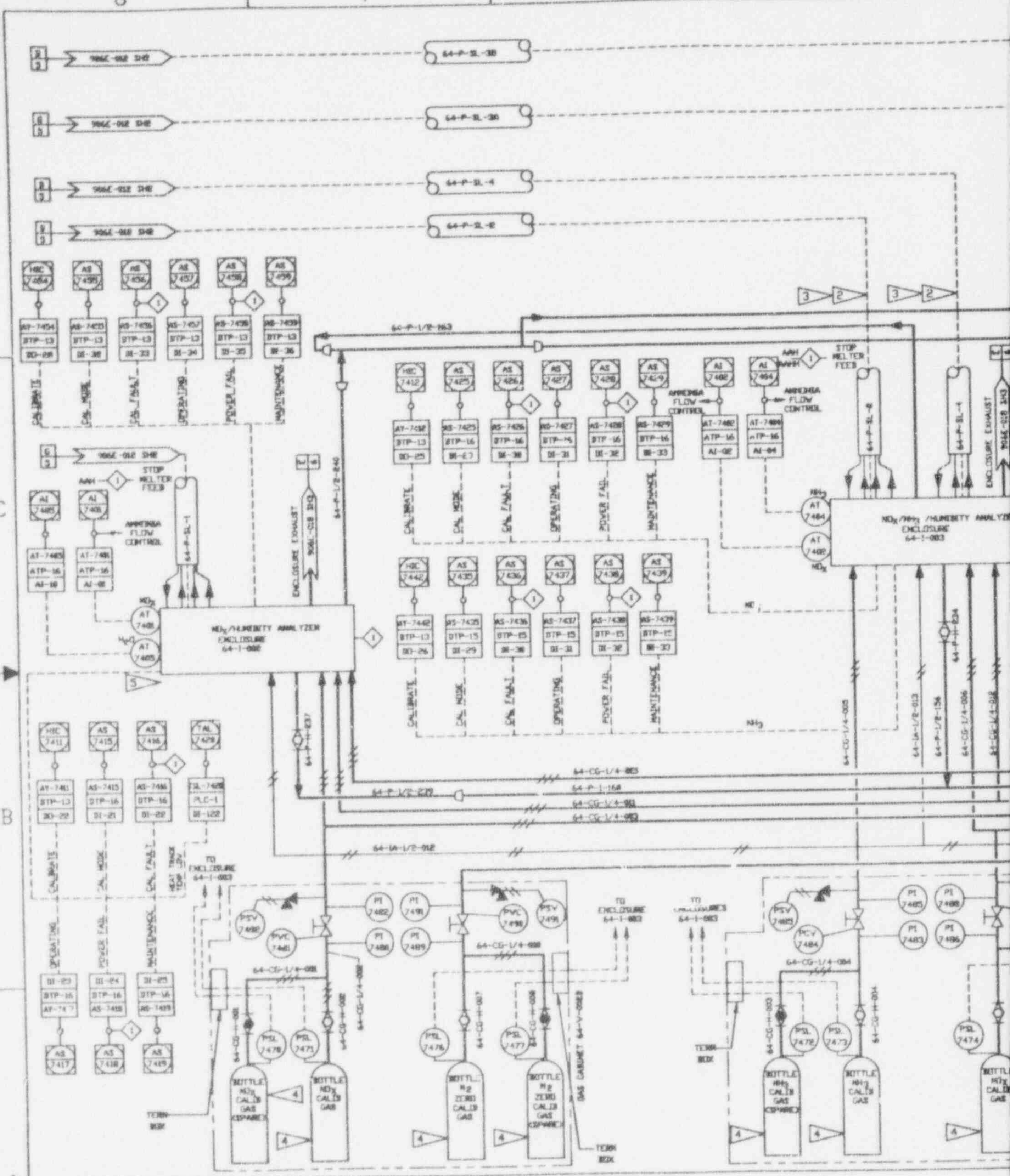
WEST VALLEY DEMONSTRATION PROJECT

VITRIFICATION FACILITY
P&ID MELTER EX-CELL
OFF-GAS SYSTEM

DE-AC07-81NE44139 PROJECT NO.
19-CVV-02275 SUBCONTRACT NO.
ISSUED FOR CONSTRUCTION

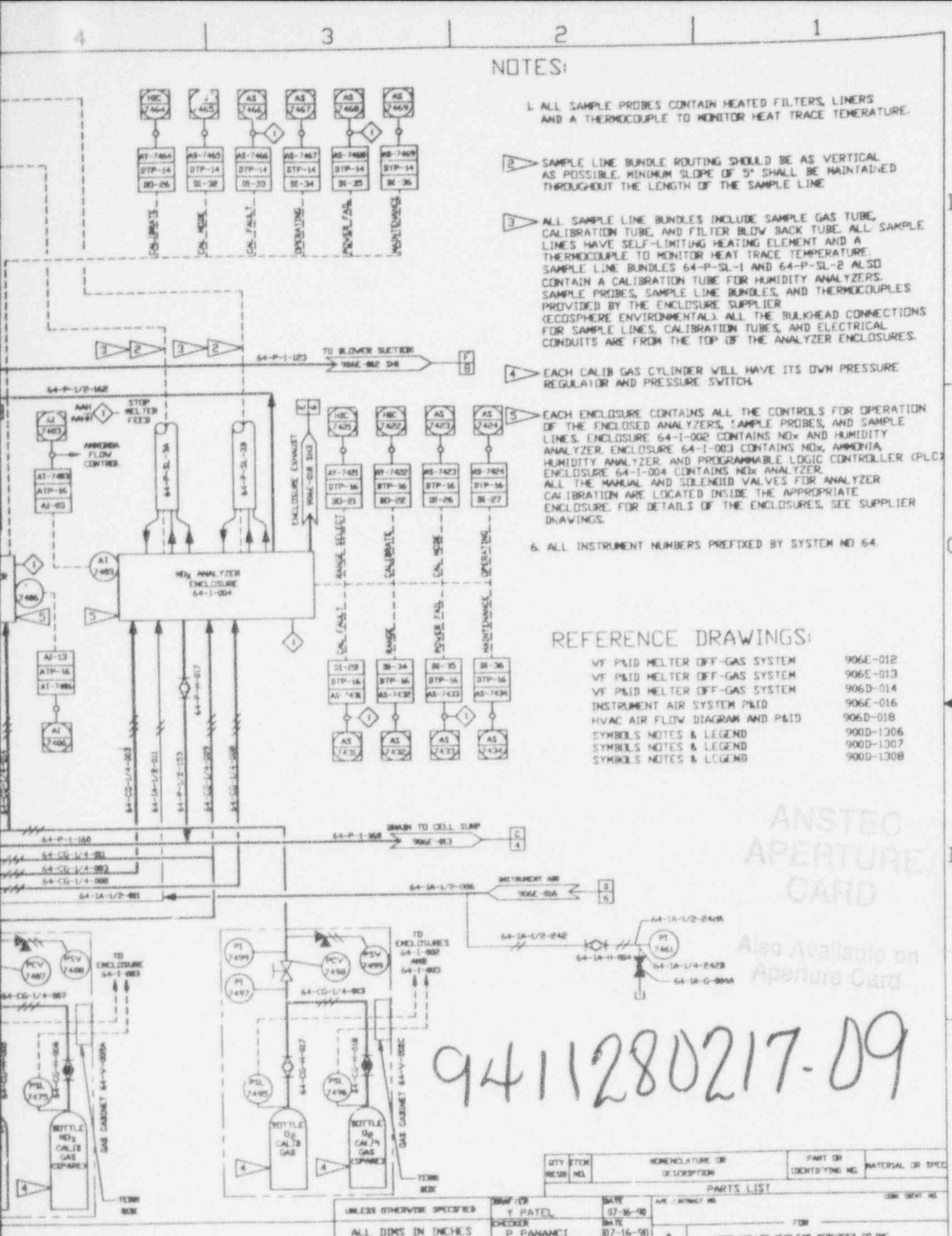
SIZE	INDEX CODE NUMBER (AREA / DR.TYP / CL / ORIG)	DRAWING NO.	REV.
D		906D-014	7
SCALE NONE	SPEC CODES	A/E SHEET NO. 906-D-014	C

CAD DRAWING - DO NOT REVISE THIS ORIGINAL

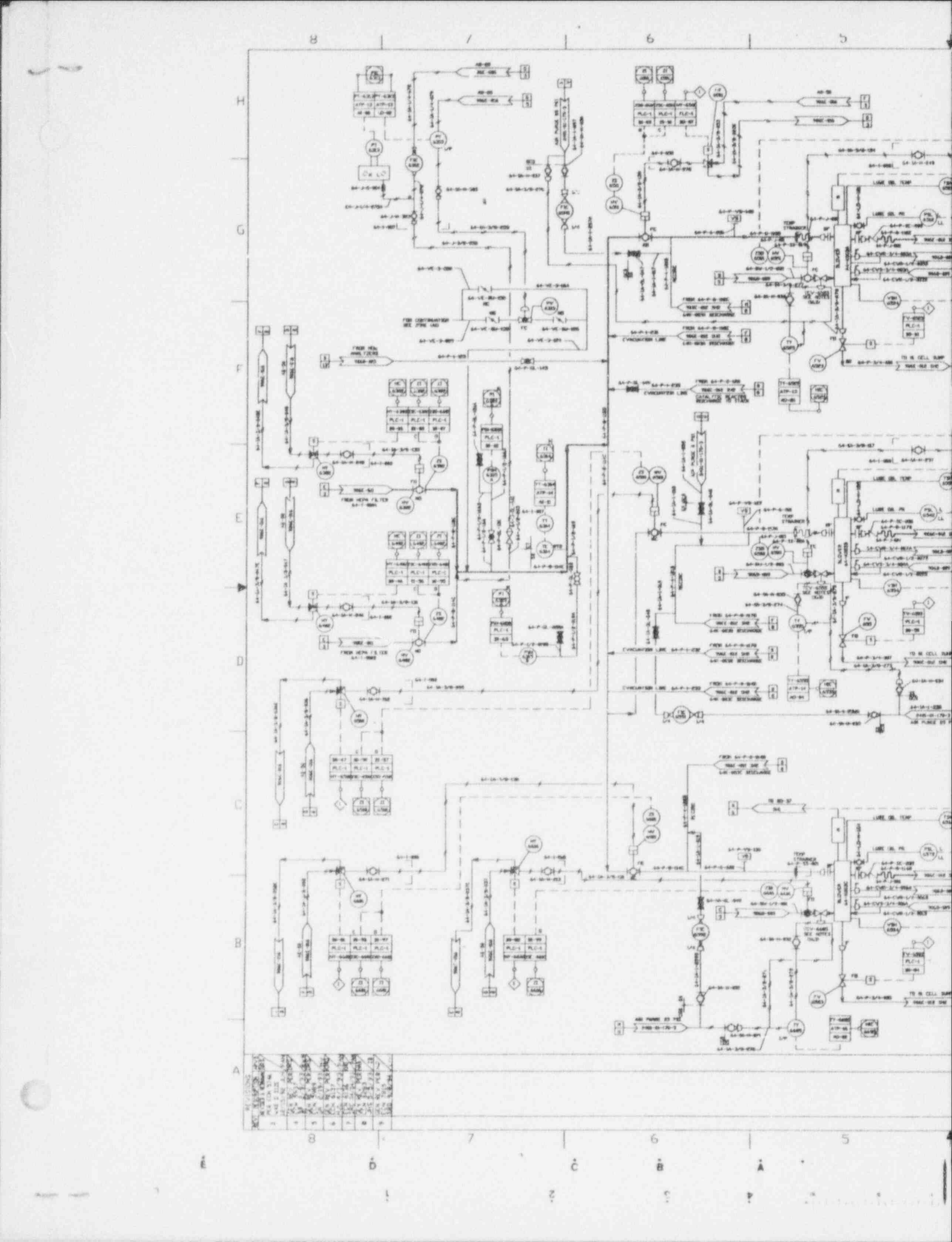


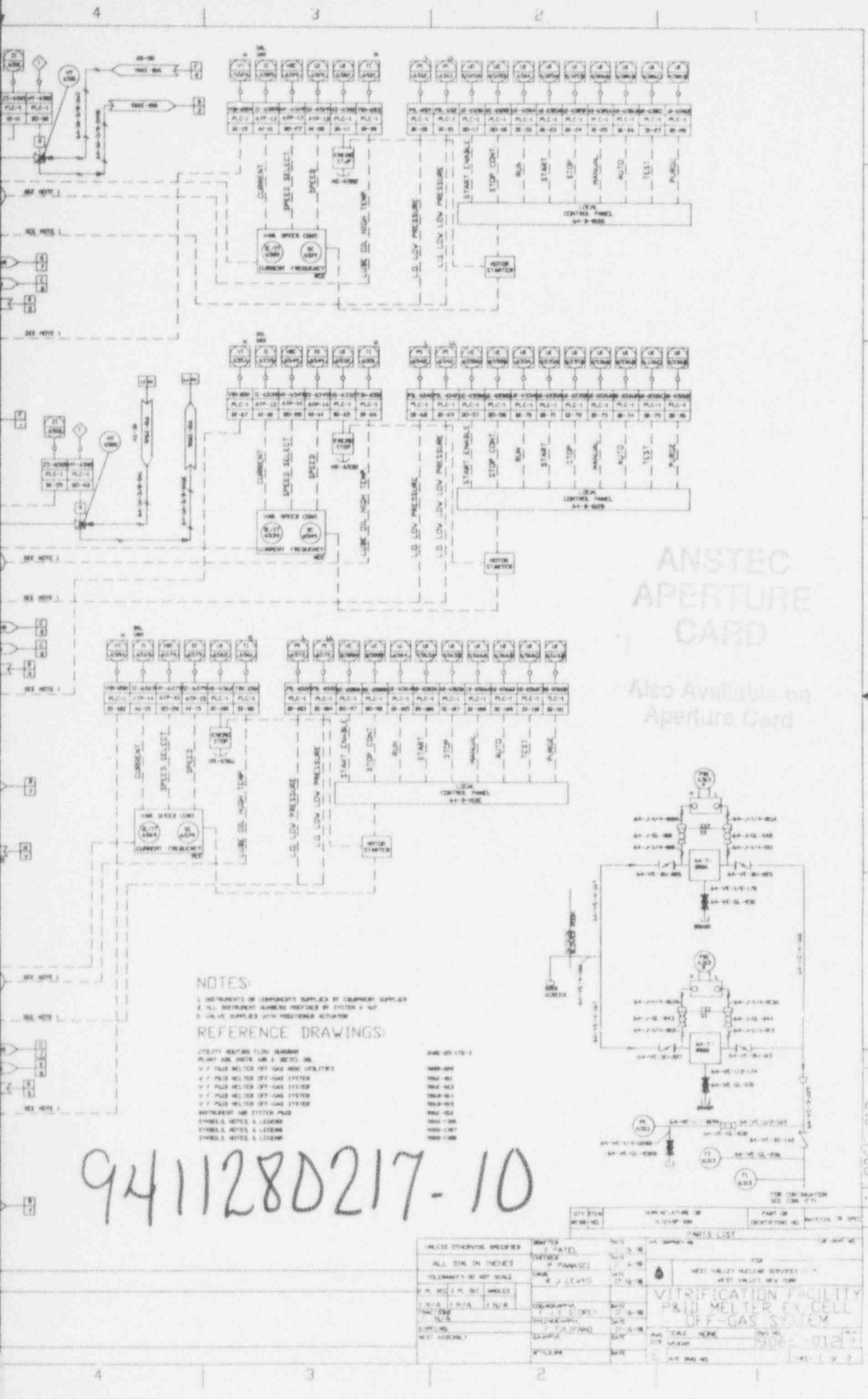
REVISIONS

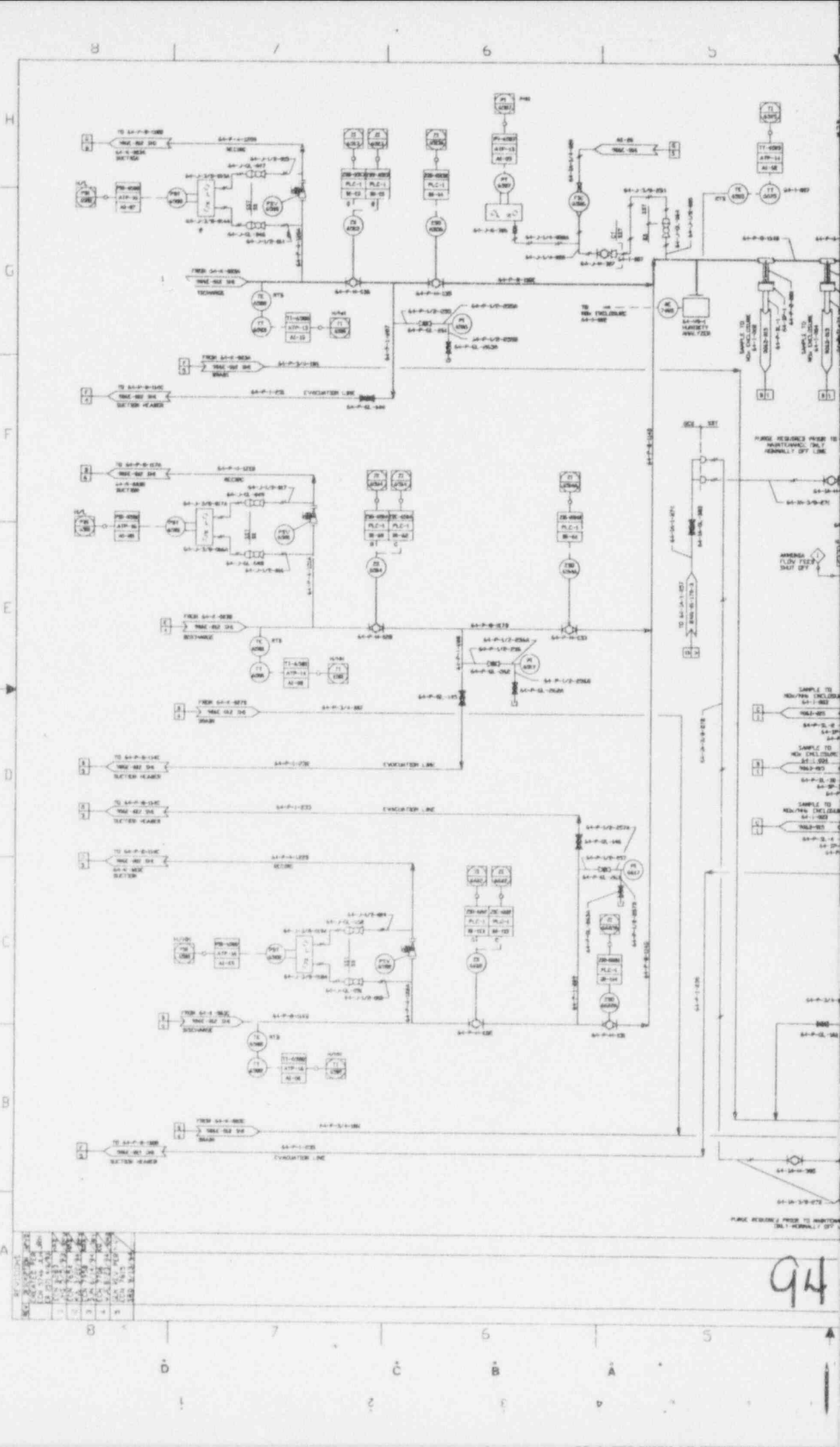
REV.	DESCRIPTION
2	REVISED & REDRAWN PER ECN#35929 SRC 02/19/93
3	GEN REV PER ECN#46137 SRC 04/01/93
4	ECN 6136 SRC 04/04/93
5	ECN 5283 JHS 05/05/93
6	GEN REV/ECN 7207 MJC 3/18/94
7	ECN 7933 SRD 8/25/94



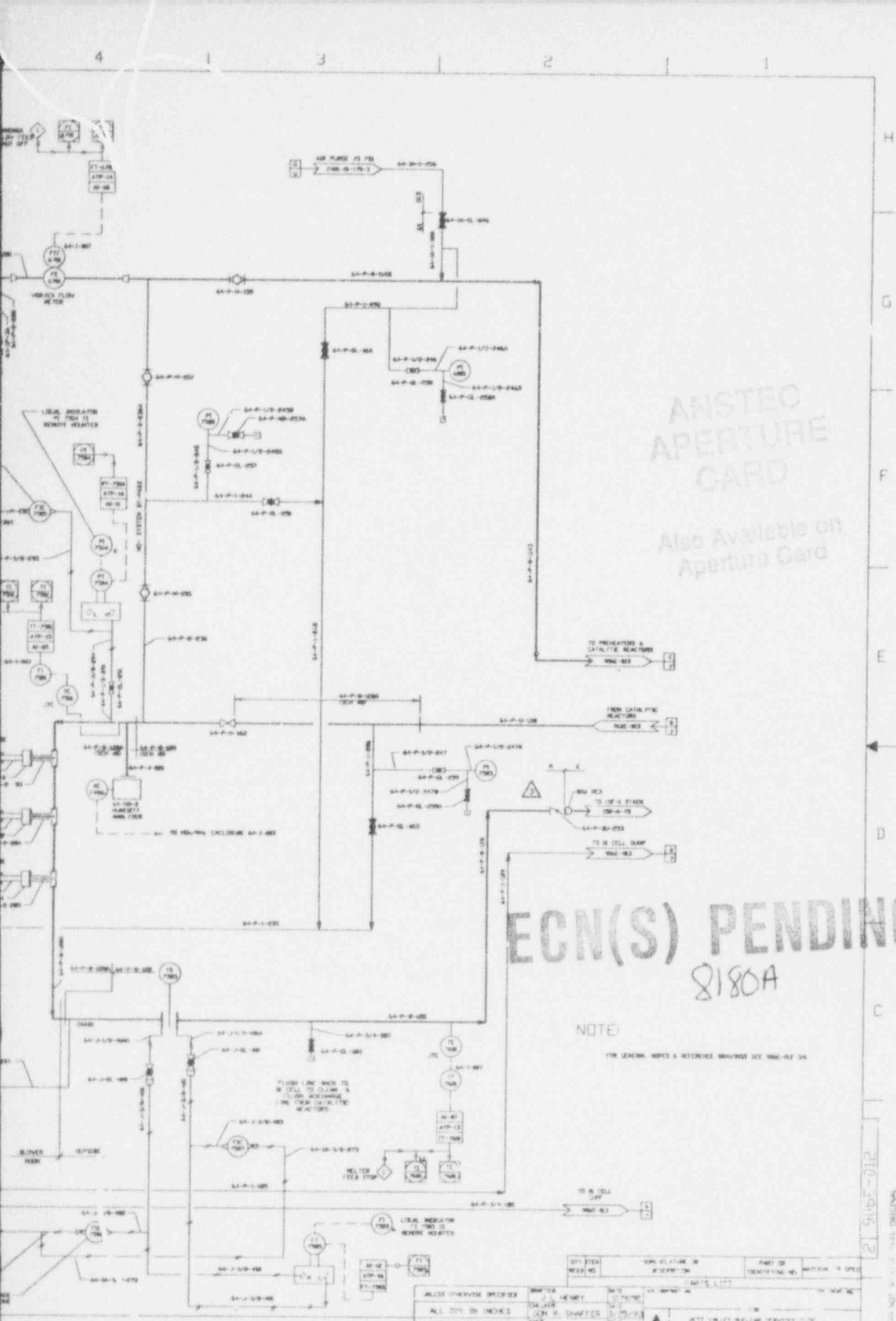
9411280217-09




NOTES:
REFERENCE DRAWINGS:
CURRENT
SPEED SELECT
SPEED
LUBE OIL HIGH TEMP
L.O. LOW PRESSURE
L.O. LOW LOW PRESSURE
START ENABLE
STOP CONT.
RUN
START
STOP
MANUAL
AUTO
TEST
PURGE
LOCAL CONTROL PANEL
MOTOR STARTER
CURRENT FREQUENCY
ANSTEC APERTURE CARD
Also Available on Aperture Card
9411280217-10
PARTS LIST
UNLESS OTHERWISE SPECIFIED
ALL DIM. IN INCHES
P. PANASCI
WEST VALLEY NUCLEAR SERVICES
WEST VALLEY, NEW YORK
VITRIFICATION FACILITY
P&ID MELTER EX-CELL
OFF-GAS SYSTEM
SCALE NONE
NEXT ASSEMBLY



94

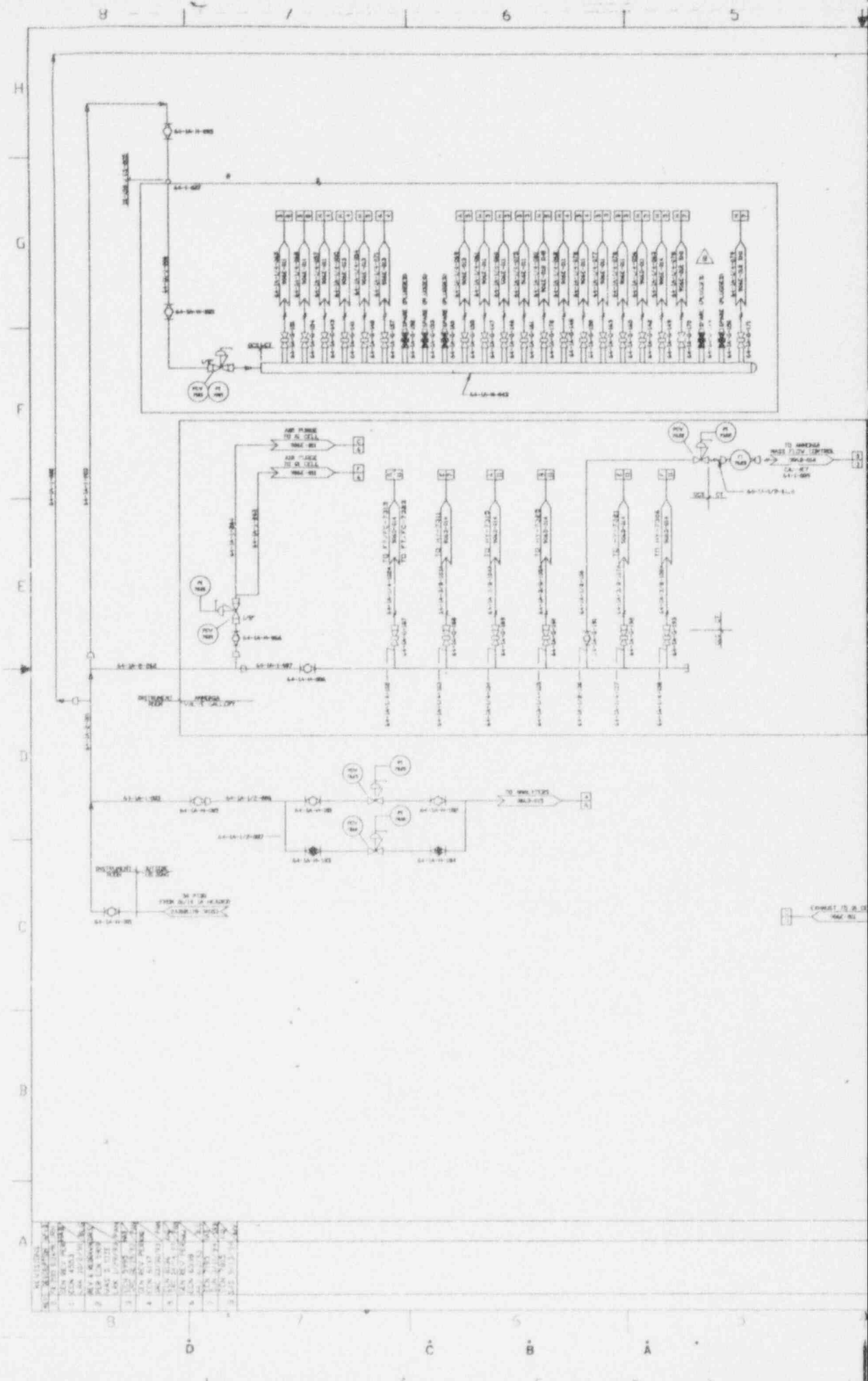


ECN(S) PENDING
8180A

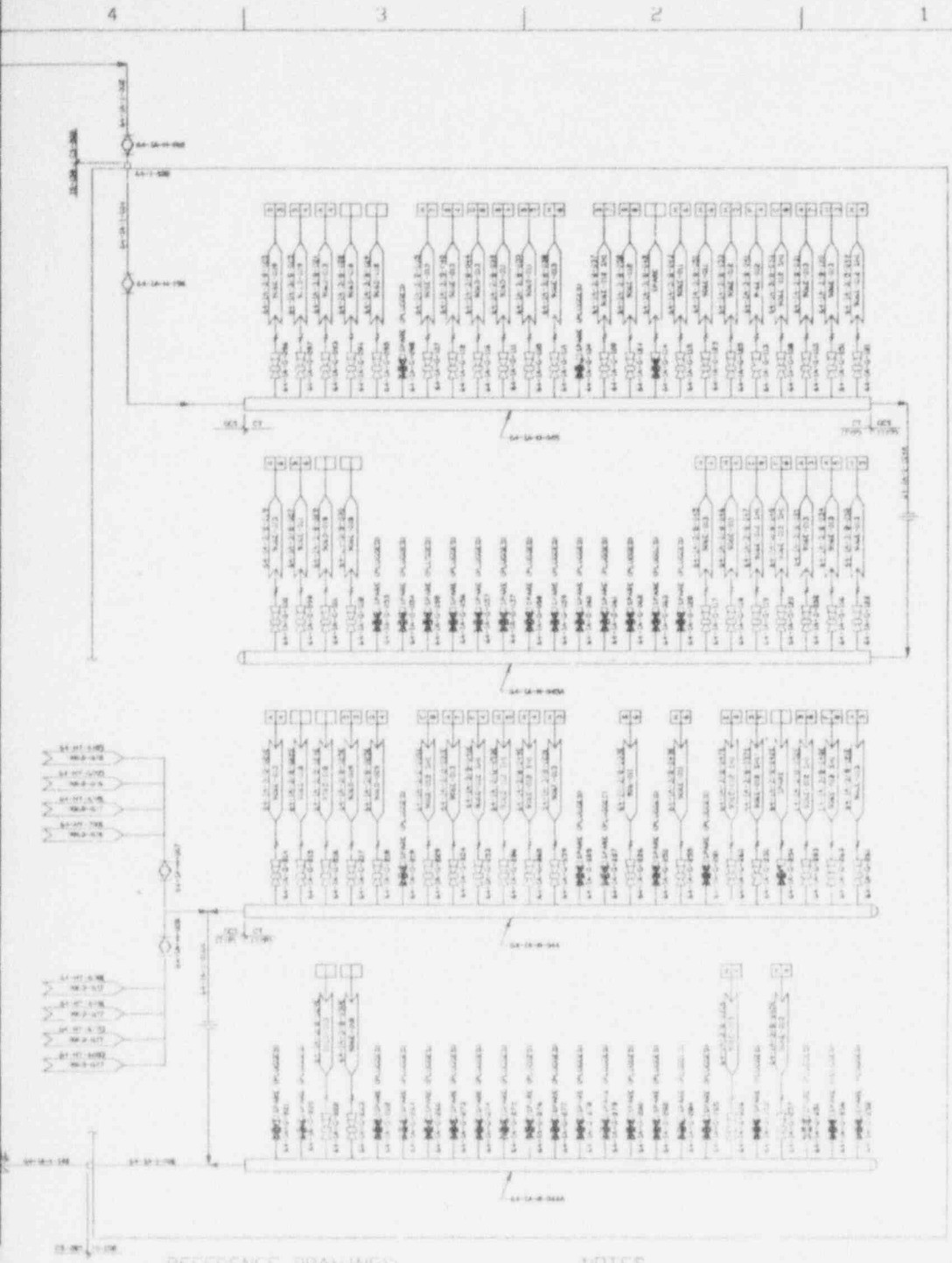
NOTE:

VITRIFICATION FACILITY
P&ID MELTER EX-CELL OFF-GAS SYSTEM

1280217-11



016



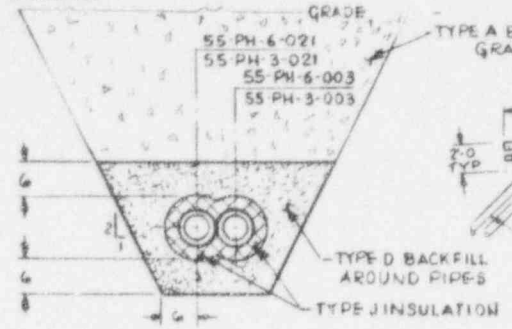
REFERENCE DRAWINGS

NOTES

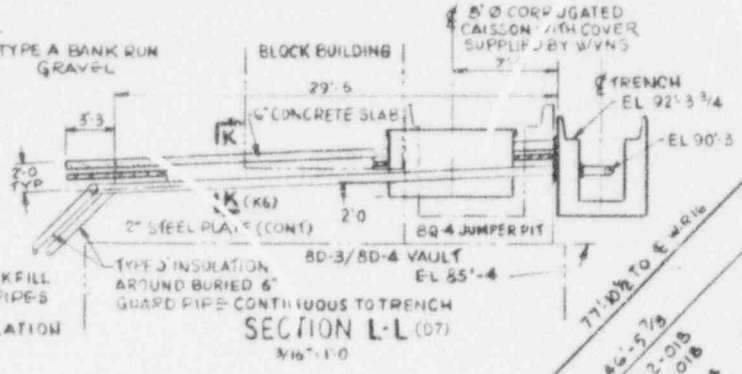
1) ALL INSTRUMENTS ASHERS FURNISHED BY SYSTEM NO. 04

9411280217-12

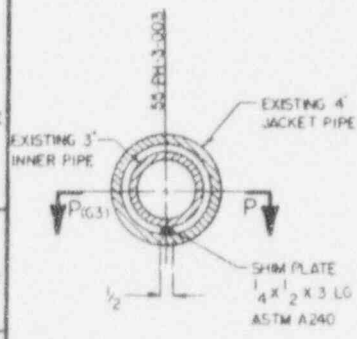
904-D-060 SH. 5



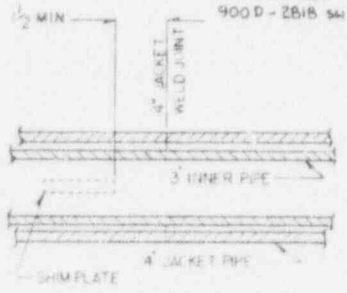
SECTION J-J (HH)



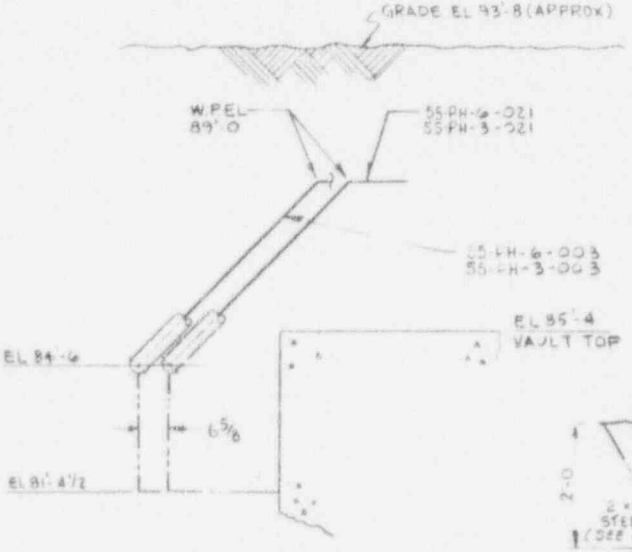
SECTION L-L (D7)
3/16"=1'-0



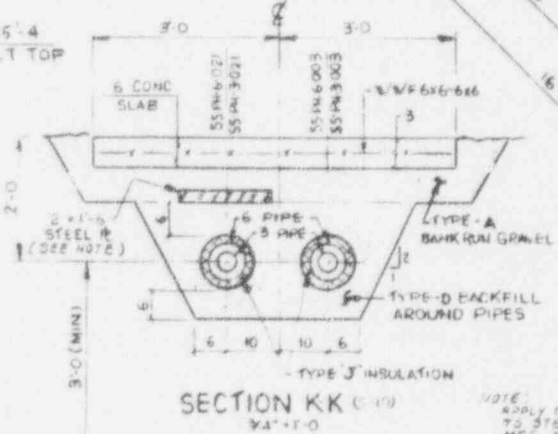
SECTION N-N (E6)
SCALE: NONE



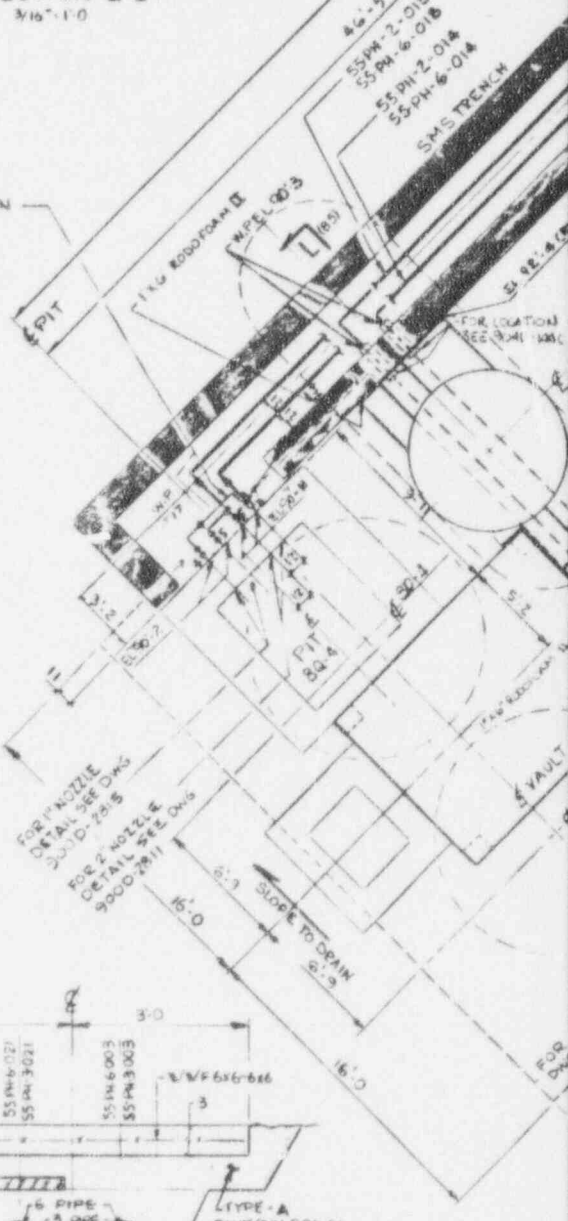
SECTION P-P (E6)
SCALE: NONE



SECTION H-H (H12)
1/2"=1'-0

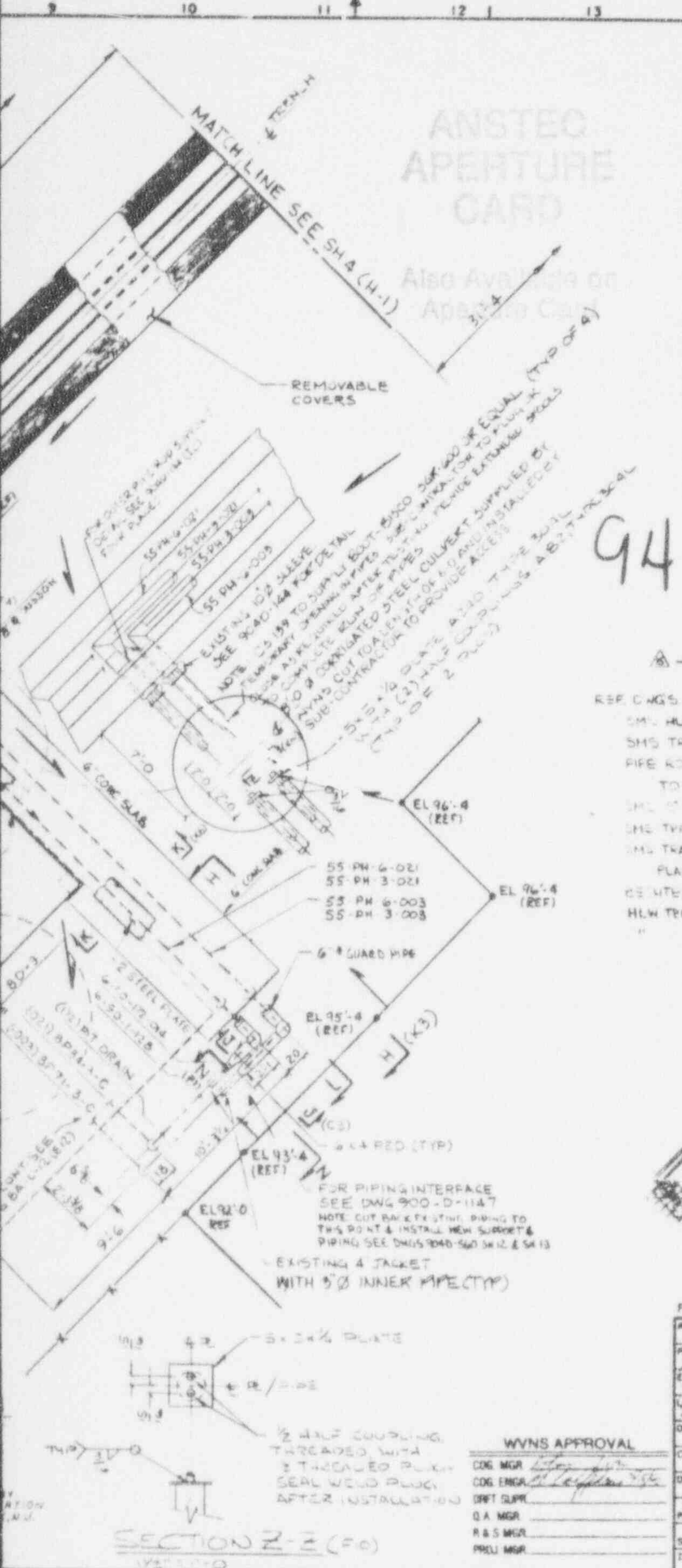


SECTION KK (C7)
3/4"=1'-0



PLAN
1/4"=1'-0

NOTE:
APPLY ONE COAT OF COLD TAR EPOXY TO STEEL PLATE BEFORE INSTALL MFG BY ANTI-HYDRO CO. NEWARK OR APPROVED EQUAL



REV NO	DATE	REVISION	DR	CH	APPROVED		
B			PLP				
GENERAL REVISION							
C	4-1-90						
GENERAL REVISION							
0	6/8/90	ER1874					
1		REV PER ECN 3742	CGK	HAB	J.M.		
2	10-15-90	REV PER ECN 3930	GW	HAB			
3	11/5/90	REV PER ECN 4022	KKG	HAB			
4	5-4-92	GEN REV PER ECN 4831	PD	LPB			
5	6-1-92	REV PER ECN 5155	PAK	DRS			
6	8-10-92	REV/FCN VF 2E-0563	PD	LPB			
7	4-27-93	GEN REV PER ECN 6059	PD	LPB			
8	6-18-93	REV/FCN VF-2B-0981	PD	DRS			
9	9-8-93	REV/FCN VF-2B-0980	RMS	LPB			
10	9-27-93	REV/ECN 6647A	PD	DRS			
11	1-12-94	REV/FCN VF-2B-1594	AAJ	LPB	PB		
12	5-24-94	REV/FCN VF-2B-1942	DJM	LPB			
13	6-21-94	REV/FCN VF-2B-2321	MJL	LPB			
14	7-9-94	REV/FCN VF-2B-2401	PD				
15	9-14-94	REV PER FCN 2402	GW		PB		

9411280217-13

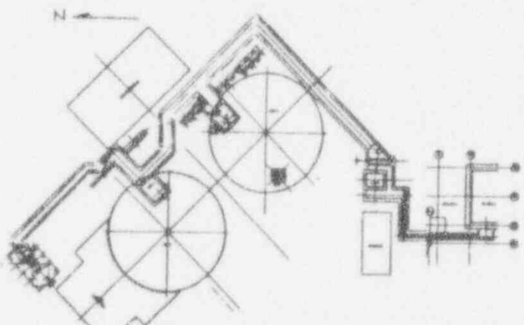
NOTES:

FOR GENERAL NOTES & REFERENCE DRAWINGS SEE 904-D-060 SH-1

(B) ——> DENOTES DIRECTION OF SLOPE AT FINISHED GRADE. ELEV'S DENOTES TOP OF SLOPE AT FINISHED GRADE.

REF. DWGS.

SMS HLW TRANSFER PIPING	904D-060 SH 4
SMS TRENCH PLAN & DETAILS SH 1	904D-144
PIPE ROUTING LINE H LIST FROM VALVE AISLE TO 8D-3	900D-1147 SH 1
SMS HORIZ. 2 NOZZLE WALL EMBEDMENT	900D-2811
SMS TRANSFER PIT ... NOZZLE EMBED.	900D-2815
SMS TRANSFER LINES LEAK DETECTION PIPING PLAN & SECTIONS	900D-2818
BECHTEL ... WASTE STORAGE TANKS	BA-L-12
HLW TRANSFER PROCESS PIPING SUPPORT LOCATIONS	904D-560 SH 12
" " " " " "	904D-560 SH 13



KEY PLAN

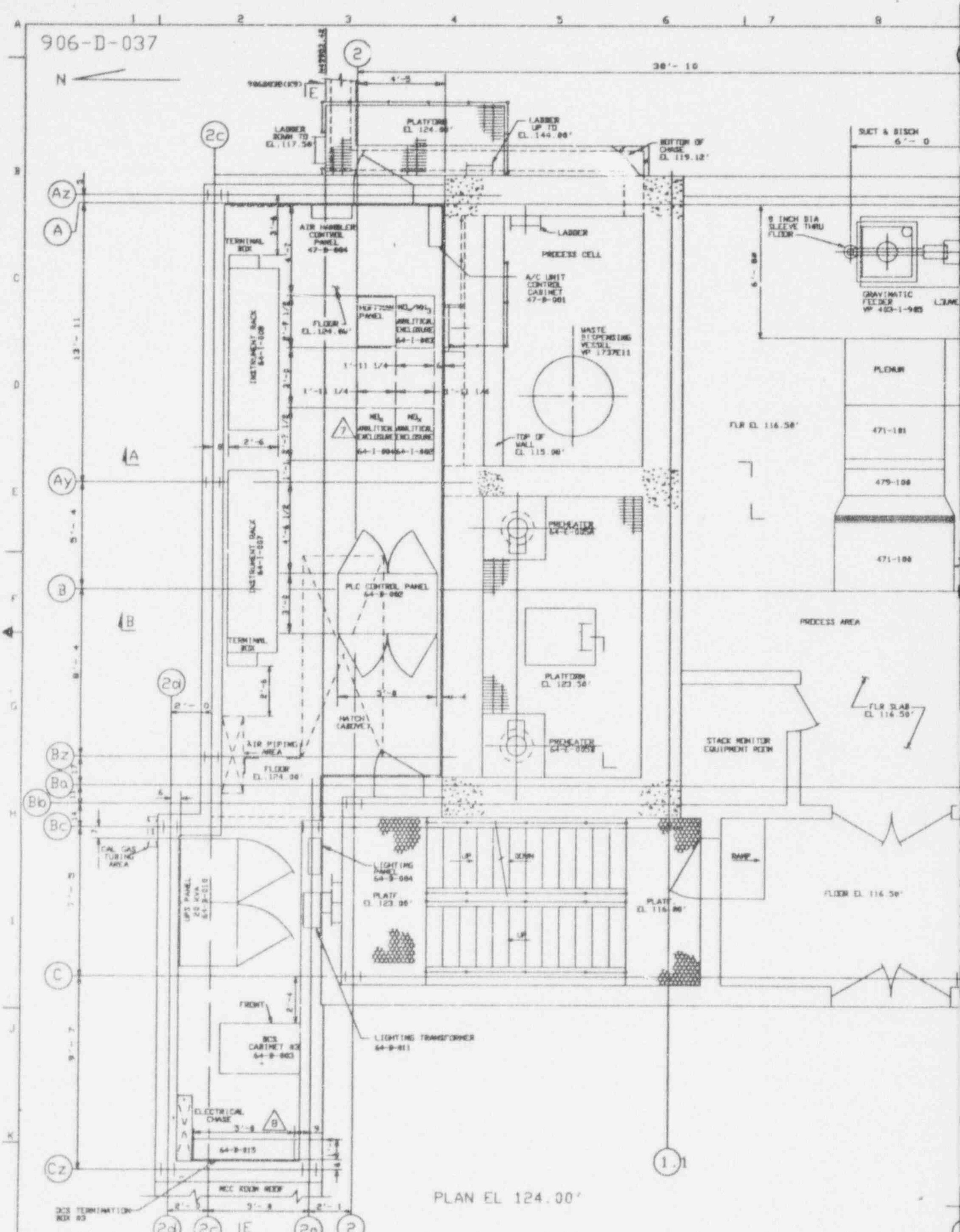
FOR DRAWING INDEX SEE DRAWING NO.

WVNS APPROVAL
COG MGR
COG ENGR
DRFT SUPR
Q.A. MGR
R & S MGR
PROJ MGR

EBASCO SERVICES INCORPORATED
A/E O.T.S. NO. 2388 TASK ORDER 015
FOR
WEST VALLEY NUCLEAR SERVICES COMPANY, INC
WEST VALLEY, NEW YORK
WEST VALLEY DEMONSTRATION PROJECT
SLUDGE MOBILIZATION SYSTEM
HLW TRANSFER PIPING

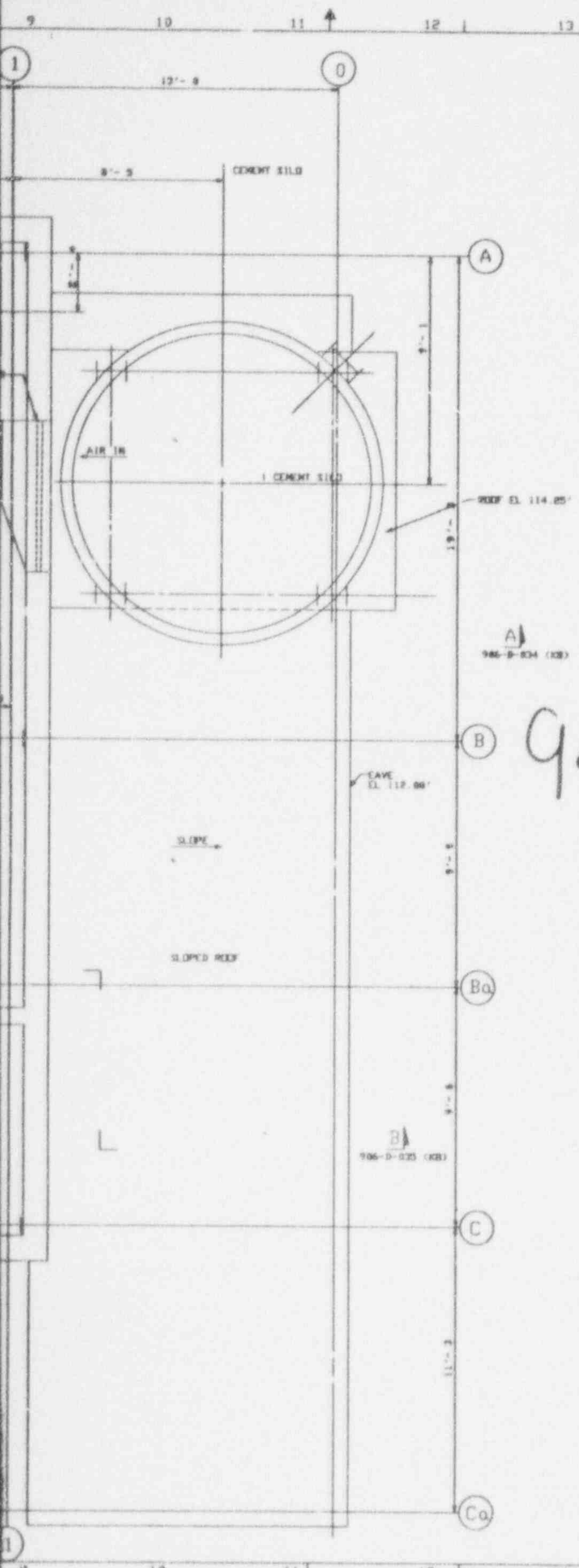
APPR'D WVNS CO.
PROJECT MGR
ENGINEER SUPV
LEAD DISC ENGR
DESIGN
CHECKED A VIRGO
DRAWN S. ELIA
DE-AC07-81NE44139 PROJECT NO.
10-CWF-02275 SUBCONTRACT NO.
ISSUED FOR CONSTRUCTION

SIZE D
INDEX CODE NUMBER: AREA, GR. TYP, Q., ORIG
DRAWING NO. 904D-060
REV. 15
SCALE AS NOTED
SPEC. CODES
A/E SHEET NO. 904-D-060 SH 5 C



906-D-037
N
PLATFORM EL 124.00'
LADDER DOWN TO EL 117.50'
LADDER UP TO EL 144.00'
BOTTOM OF CHASE EL 119.12'
AIR HANDLER CONTROL PANEL 47-B-004
TERMINAL BOX
INSTRUMENT RACK 64-I-008
INSTRUMENT RACK 64-I-007
LADDER
PROCESS CELL
A/C UNIT CONTROL CABINET 47-B-001
WASTE DISPENSING VESSEL
TOP OF WALL EL 115.00'
FLOOR EL 124.00'
PLC CONTROL PANEL 64-B-002
PREHEATER
PLATFORM EL 123.50'
HATCH (ABOVE)
AIR PIPING AREA
CAL GAS TUBING AREA
LIGHTING PANEL 64-B-004
PLATF EL 123.00'
PLATF EL 116.00'
UPS PANEL
DCS CABINET #3 64-B-003
ELECTRICAL CHASE
64-B-015
MCC ROOM ROOF
DCS TERMINATION BOX #3
LIGHTING TRANSFORMER 64-B-011
FRONT
RAMP
STACK MONITOR EQUIPMENT ROOM
PROCESS AREA
FLR SLAB EL 116.50'
FLR EL 116.50'
FLOOR EL 116.50'
PLENUM
GRAVIMATIC FEEDER
8 INCH DIA SLEEVE THRU FLOOR
SUCT & DISCH
PLAN EL 124.00'

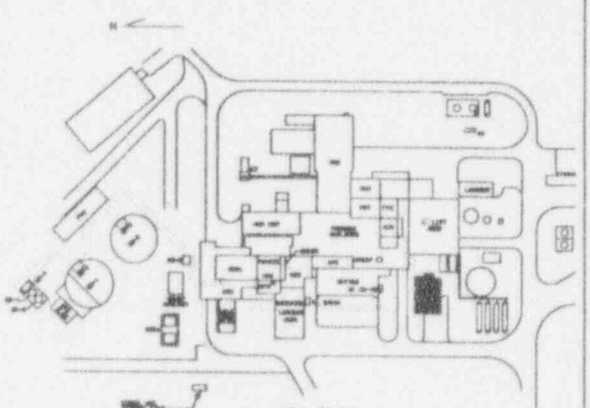
NO.	DATE	REVISION	DR	CH	APPROVED	
0	9-24-91	ER 2193			JRH	
1	12-2-91	ECN 4696	DAK	HAB	RPV	
2	03-07-92	ECN 4996	SRC	HAB	RPV	
3	03-04-93	ECN 5996	SRC	KMQ	JHK	
4	05-10-93	GEN REV/ECN 6323	JLH	DRS	JHK	
5	05-14-93	ECN 6290	HJL	HAB	DJR	
6	08-26-93	ECN 6575	JLH	KMQ	GGT	
7	08-24-94	ECN 7938	AAJ	ARA	JHK	
8	10-6-94	ECN 8267	HJL	[illegible]	JHK	



NOTES

FOR NOTES AND REFERENCE DRAWINGS SEE DWG 906-D-030.

9411280217-14



KEY PLAN

1 0 3 6 9FT 3/8"=1'-0

FOR DRAWING INDEX SEE DRAWING NO.

EBASCO SERVICES INCORPORATED
A/E D.F.S. NO 2308 TASK ORDER 025
FOR
WEST VALLEY NUCLEAR SERVICES COMPANY, INC
WEST VALLEY, NEW YORK

WEST VALLEY DEMONSTRATION PROJECT
VITRIFICATION FACILITY
GENERAL ARRANGEMENT
01/14 BUILDING PLAN EL 124.00'

PROJECT MGR F J C STOREY
ENGINEER SUPV F S KOWALCZYK
LEAD DISC ENGR F S KOWALCZYK
DESIGN R J LEVAD
CHECKED J SICK
DRAWN Y PATEL

DE-AC07-81NE44139 PROJECT NO.
19-CWV-02275 SUBCONTRACT NO.
ISSUED FOR CONSTRUCTION
SIZE D
SCALE 3/8"=1'-0
DRAWING NO. 906-D-037 REV 8
A/E SHEET NO. 906-D-037 A

West Valley Demonstration Project

Doc. Number WVNS-SD-63M

Revision Number 0

Revision Date 10/24/94
Engineering Release #3105

SYSTEM DESCRIPTION

VITRIFICATION LOAD-IN FACILITY
SYSTEM 63M

PREPARED BY _____ L. E. Donovan
Cognizant Engineer

APPROVED BY _____ L. E. Donovan
Cognizant System Engineer

APPROVED BY _____ T. E. Cottrell
Cognizant System Design Manager

APPROVED BY _____ for D. L. Dempster
10/24/94
Quality Assurance Representative

West Valley Nuclear Services Co., Inc.
P.O. Box 191
West Valley, NY 14171-0191

WVNS RECORD OF REVISION

DOCUMENT

If there are changes to the controlled document, the revision number increases by one. Indicate changes by one of the following:

- Placing an arrow at the beginning of the sentence or paragraph that was revised
- Placing a vertical black line in the margin adjacent to sentence or paragraph that was revised
- Placing the words GENERAL REVISION at the beginning of the text
- Placing either FC#> or PC#> at the beginning of a field/page change

Example:

The arrow in the margin indicates a change. >
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WVNS RECORD OF REVISION CONTINUATION FORM

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SUMMARY

The Vitrification Load-In Facility (VLIF) consists of a building adjacent to the west wall of the Equipment Decontamination Room (EDR). The building is an engineered steel structure with a concrete floor and insulated sheet metal siding. The facility

contains truck receiving and unloading capabilities, over head bridge crane coverage, empty canister handling provisions, a shielded canister port into the EDR for inserting canisters, heating and ventilation for comfort, and air control between the new building and the EDR for contamination control. The VLIF design is such that with minimal modifications, the facility can be converted to a canister load-out facility. The design of a load-out facility was not included in the VLIF design scope, but due consideration was given so that conversion of the facility to a load-out configuration can be accommodated, not as redesign, but as a continuation of design effort.

VITRIFICATION LOAD-IN FACILITY
SYSTEM 63M

REV. 0

1.0 SYSTEM FUNCTIONS & FUNCTIONAL DESIGN CRITERIA

1.1 Functions

The primary function of the VLIF is to provide for the receipt, inspection, storage, and movement of empty canisters into the EDR on a scheduled basis to support the vitrification glass production schedule. As a secondary function the VLIF provides for the receipt and movement of canister storage racks into the EDR for installation in the Chemical Process Cell, of the old plant, prior to vitrification "hot" operations. Throughout the vitrification campaign the VLIF provides a means of moving expendable items and new pieces of equipment into the EDR for replacement of failed or nonfunctional items in the Vitrification Cell.

1.1.1 Load-In Facility Functional Design Criteria

Truck unloading capabilities to off-load ISO 20 foot shipping containers filled with empty canisters from a tractor trailer rig.

Truck unloading activities shall occur within a work area protected from the effects of adverse outdoor weather conditions.

Work area space shall be sufficient to allow for the removal and lay down of two ISO 20 foot shipping containers. Space around the containers shall be sufficient for the removal of canisters within, receipt inspections, and to prepare the canisters for movement into the EDR.

Material handling equipment shall provide for the movement of canisters from shipping containers to the EDR west wall. An access port for canisters shall allow for insertion of canisters horizontally through the EDR wall and an upending device such that the remotely operated EDR crane can lift them onto the transfer cart.

The truck unloading area shall accommodate the off-loading of canister storage racks, inspection, and preparation of the racks for movement into the EDR.

The canister port through the EDR wall shall include a shield plug for radiation protection plus contamination and air flow control.

Design of the concrete floor in front of the canister port shall be capable of supporting a shielded structure for canister decontamination and cask loading. Shielding requirements for this structure shall be as defined in Section 1.4.1 of this document. Steel embeds shall be included now to facilitate the erection of this shielding when the building is converted to load-out.

The building structure shall be designed to provide for necessary head room and crane capacity to load a HLW and glass filled canister into a vertical loading shipping cask. Provisions shall be provided to allow for the installation of this crane when the building is converted to load-out.

Floor area in front of the existing shield doors in the EDR wall shall be kept clear for the installation of contamination control enclosures (tents). Prior to opening these 12' X 14' doors for moving equipment into the EDR, a contamination control enclosure must be erected.

The existing man access door in the EDR wall shall be maintained. The concrete labyrinth in front of this door shall be removed and replaced with a steel labyrinth and air lock structure.

An airlock structure shall be provided in front of the secondary filter room shield doors. This will provide access to the secondary filter room for maintenance while controlling air flow.

Shielding for radiation protection as required by Section 1.4.1 of this document.

Heating and ventilation shall be provided for occupancy comfort. The building shall be maintained at a positive pressure with respect to the EDR for contamination control.

Provide design features to maintain radiation exposures to operating and maintenance personnel ALARA, and in no case exceed allowable exposure guidelines.

Provide viewing capability to monitor operations inside the EDR.

1.2 Process Requirements

All work within the VLIF shall be hands on with occupancy on an intermittent basis as required for the vitrification process schedule and truck receiving.

Operating personnel when loading in canisters shall maintain visibility of the handling operations within EDR utilizing closed circuit TV equipment.

All material handling during load-in within the EDR shall be done remotely.

The maximum radiation dose in the new areas for a full-time occupancy area shall be 0.10 mRem/hour. A full-time occupancy area is one in which an individual(s) may be expected to spend all or most of his or her work day.

The maximum radiation dose in the new areas for a full-time access area shall be 1.0/t mRem/hour in which "t" is the maximum average time in hours per day that the area is expected to be occupied by any one individual. A full-time access area is one in which no physical or administrative control or entry exists. If compliance with full-time access area requirements would be economically not feasible, impractical or prohibitive, higher dose rates may be allowed. However, access to such fields shall be strictly controlled.

Truck unloading shall be accomplished with a radio controlled over head bridge crane rated at 15 tons.

Using the over head crane, empty canisters will be loaded one at a time onto a roller conveyor in front of a transfer port in the EDR wall. A shield plug will be manually rolled aside and a canister inserted through the port into an upending device inside the EDR. The empty canisters will then be loaded onto the transfer cart with the EDR bridge crane.

Radiation air monitors shall be used in the immediate work area whenever an opening into the EDR is to be made active.

1.3 Structural Requirements

Structural design shall be in accordance with normal standard practices for industrial structures. The major structural features of the building shall meet the Performance Category 2 requirements as specified in DOE Order 5480.28.

Concrete mat design to the west of the EDR and to the Nox Off-Gas trench shall be based on loading that will be incurred later under load-out provisions. This will include heavy shielding loads and embeds installed now to allow for the erection of shielding plates.

Column loads shall include a 50 ton bridge crane capacity and the extra loading introduced by attaching two of the plant stack guy wires to the southeast corner of the new construction.

1.3.1 Seismic Design

A seismic design load is applicable to the structure and components located within the Load-In Building and shall be based on UBC Zone 1, 1991 edition.

Structural interface design between the EDR and this new construction shall include seismic interaction analyses to assure integrity of the EDR west wall.

1.3.2 Design Wind Forces

The design of the exposed structures and components shall be based on a wind speed of 80 miles per hour. Design wind pressures for the major structures, and components shall be established using the procedure in ASCE 7-88 for Exposure C and Importance Factor (I) of 1.07.

1.3.3 Design Snow Loading

Roof structure shall be designed for a snow load of 1,915 Pa (40 lb/ft^2) as per ASCE 7-88.

1.3.4 Reference Design Flood

A flood is not considered to be a hazard to the facility.

1.4 Essential Features

1.4.1 Shielding

The EDR wall and the canister port shield plug shall provide sufficient shielding to meet the following radiation criteria with a transfer cart loaded with four vitrified HLW storage canisters (each having a maximum dose rate of 9500 rads/hr at contact). [2][5] A listing of the quantities of radioactive isotopes contained in the HLW canisters is given in Reference [2][4].

Shielding requirements for the new man door labyrinth and the south wall of the EDR shall be based on one HLW canister in a vertical position at the extreme south and west travel of the EDR crane.

Future shielding requirements for canister load-out capabilities shall be based on one HLW canister within the shielded enclosure, in a horizontal position, and on a center line with the canister port.

The maximum radiation dose for a full time occupancy area shall be 0.10 mRem/hour. A full time occupancy area is one in which an individual(s) may be expected to spend all or most of his or her work day.

The maximum radiation dose for a full time access area shall be 1.0/t mRem/hour in which "t" is the maximum average time in hours per day that the area is expected to be occupied by any one individual. A full time access area is one in which no physical or administrative control or entry exists. If compliance with full time access area requirements would be economically not feasible, impractical or prohibitive, higher dose rates may be allowed. However, access to such fields shall be strictly controlled.

Designs shall include ALARA concepts for the protection of construction, operating and maintenance personnel. The EDR, CPC, and the Vit Hot Cell are all unmanned areas. Operations in these areas will be accomplished using remote techniques.

1.4.2 Space Heating and Ventilation

Comfort heating shall be provided in the VLIF using the plant steam system and electric heaters in those areas occupied only on a limited basis.

For contamination control the VLIF shall be maintained at a positive pressure with respect to the EDR. A negative pressure environment is maintained inside the EDR by the existing plant Head End Ventilation system. Once an opening through the EDR wall is activated, air will flow from the VLIF into the EDR.

1.4.3 Lighting and Electrical

Lighting shall be of the high pressure sodium bulb, commercial high bay fixture type. Lighting levels shall be 50 foot-candles at work height throughout and 150 foot-candles at the canister roller conveyor for inspection purposes. This additional lighting requirement shall be provided by spot type commercial fixtures on a separate and switchable electrical circuit.

Convenience outlets (120 volts) with individual ground fault protection shall be provided around the perimeter of the building and a minimum of two standard welding machine outlets (480 V, 60 A, fused disconnect) shall also be included.

1.4.4 Material Handling

A 15 ton bridge crane shall be used for material handling within the VLIF. Plant fork lifts may also be used within the facility for special load in applications as required. Structurally, the design shall include steel supports and run way for a 50 ton bridge crane to be installed when the building is converted to a load-out configuration. All material handling within EDR shall be with the remote operated 20 ton bridge crane and transfer cart.

1.4.5 Viewing

Empty canisters and material handling in the VLIF shall be with conventional overhead crane and the use of a fork lift on some items. Sufficient visibility, by remote TV, shall be provided the VLIF operator of movement of canisters and equipment once these items are inside the EDR. Remote operation of the EDR crane and transfer cart will be controlled from the operating aisle on the east side of the EDR.

1.4.6 Piping

Piping in the VLIF shall include provisions for utility water to be used to wash down the floor area in the truck unloading bay. Utility air and demineralized water shall be piped into the southeast area and terminated now for future use. Steam and condensate lines shall be provided for space heating purposes. Drains shall include those from the truck unloading bay to the site storm drain system. A double wall stainless steel floor drain shall be provided from the area directly in front of the canister port to outside the floor slab on the north side of the VLIF. This drain will not be used or made operational at this time. When the facility is converted to load-out, the need for such a drain will be assessed and if required, made operational at that time. Piping used in the VLIF shall meet the requirements of ANSI B31.3.

1.4.7 Fire Detection and Protection

The complete Load-In Building shall be protected by an automatic wet-pipe sprinkler system.

The fire protection system and components shall be designed in accordance with National Fire Codes and the Operational Safety Design Criteria Manual, DOE-ID-12044.

1.5 Maintenance and Inspection

Section 2.5, Periodic Test Requirements, describes planned verifications and inspections of the Load-In Facility.

1.6 Instrumentation and Control

Administrative control of the EDR doors and the Secondary Filter Room doors is located in System 63K, In-Cell Remote Handling, Maintenance, and Viewing.

1.7 Interfacing Systems

Physically, the VLIF interfaces at ground level with the west wall of the EDR and the west wall of the SFR. At the upper levels interfaces include the west roof area of the EDR and the west entrance to the crane maintenance operating aisle.

The VLIF interfaces with the Nox Off-Gas concrete trench that runs north and south, to the west of the EDR, and in the area of the VLIF floor slab.

One of the existing plant stack guy wire supports will be replaced by attaching the guy wires to one of the new building columns.

The VLIF shall interface with tractor trailer trucks loaded with VF equipment and ISO 20 foot shipping containers containing empty canisters.

The VLIF may make use of an individual canister lift fixture of a design that will allow hoisting and placing a canister in a horizontal position.

The VLIF shall interface with the EDR through an existing 12'x 14' shield door, an existing 3'x 7' man door with new labyrinth access shielding, and a new shielded canister port.

Empty canisters shall be transferred horizontally into the EDR through the canister port and into an upending device.

Air flow across openings between the VLIF and the EDR or the Secondary Filter Room shall be controlled by the main plant Head End Ventilation system.

Piping for the VLIF shall interface with the Chemical Process Cell operating aisle.

Electrical power shall interface with the Vitrification Facility switch gear through the Secondary Filter Room.

1.8 Quality Assurance

All design, fabrication, and testing shall be in accordance with ASME NQA-1-1989, "Quality Assurance Program Requirements for Nuclear Facilities".

1.9 Reliability Assurance

The Load-In Building was designed in accordance with NQA-1, the Quality Assurance Program Plan and WVNS Standard Operating Procedures.

Design activities were in accordance with DOE Order 6430.1A, "General Design Criteria" and DOE Order 5480.28, "Natural Phenomena Hazards Mitigation".

Quality control inspections were performed at regular intervals during installation of structural steel and concrete.

1.10 Safety Classes and Quality Levels

Safety Classes and Quality Levels are in accordance with Quality Management Manuals section 2, "Quality Assurance Program" and section 3, "Design Control" (See paragraph 2.6 for component levels).

1.11 Codes and Standards

AISC Manual	American Institute of Steel Construction, Manual of Steel Construction
ACI 318	American Concrete Institute, Building Code Requirements for Reinforced Concrete
ASCE 7	American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
ASME NQA-1	American Society of Mechanical Engineers, Quality Assurance Program Requirements for Nuclear Facilities
ANSI B30.2	American National Standards Institute, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley)
ANSI B31.3	Chemical Plant and Petroleum Refinery Piping
AWS D1.1	American Welding Society, Structural Welding Code
CMAA 70	Crane Manufacturers Association of America, Specifications for Electric Overhead Traveling Cranes
NFPA	National Fire Protection Association
NYS Code	Official Compilation of Codes, Rules, and Regulations of the State of New York, including supplement 8, dated 8/31/93
UBC 1991	Uniform Building Code, International Conference of Building Officials

DOE ORDERS

DOE 5480.1	Environmental Protection, Safety and Health Protection Program for DOE Operations
DOE 5480.28	Natural Phenomena Hazards Mitigation
DOE 6430.1A	General Design Criteria
DOE ID 12044	Operational Safety Design Criteria Manual

2.0 DESIGN DESCRIPTION

2.1 Functional Description

The Load-In Facility's function is to provide a method of receiving equipment and materials required throughout the vitrification campaign, moving those items into the EDR for transfer to the Vitrification Hot Cell, and accomplishing these functions under weather protection.

Special emphasis in the design of this facility has been directed toward the loading in of empty canisters for the vitrification process. Canisters constitute the single most repetitive item requiring a method of entering the Vitrification Facility. Process considerations require a minimum of 244 up to a maximum of 352 canisters during the two plus years of "hot" operation.

2.2 Physical Description

The Load-In Building consists of a steel building erected on a concrete mat/spread footing type foundations. This building is directly west of the EDR and the Secondary Filter Room and these existing structures form the east wall of the building.

The foot print of the building represents 4,539 sq ft with an additional 400 sq ft as an entry change room for the EDR and weather protection over valve pit 35104. The building proper extends 70.5 feet west of the Secondary Filter Room west wall and 58.25 feet north of the EDR south wall. Roof elevation is 54 feet above the finished floor.

2.2.1 Load-In Structural

The following loads shall be used for the structural analysis and design:

Dead Load -- Dead load shall include the weight of the structure and its structural components, equipment and subsystems. Water or other fluid contained in the equipment or piping shall be considered as dead load. Unit weights to be used in establishing dead loads are as follows:

* Reinforced Concrete	150 lb/ft^3
* Structural Steel	489 lb/ft^3
* Water	62.4 lb/ft^3

Equipment weights:

* Shipping Container	5 tons
* Canister	.25 tons empty 3 tons full
* Storage Rack	5 tons
* Replacement Equip. (Max)	9 tons
* Shipping Cask	40 tons

Live Load: Weights to be used in establishing live loads are as follows:

* Access Platform	100 lb/ft^2
* Ground Floor	300 lb/ft^2 (or equip. wt.)
* Stack Loads	Per Reference Drawing 15A-M-174

Thermal Load: Structural components shall be designed to withstand the applicable thermal loads due to expansion, contraction and thermal gradients. Coefficients of expansion/contraction to be used are:

* Concrete	5.5 x 10^6 per °F
* Steel	6.5 x 10^6 per °F
* Outdoor Design Conditions Summer Winter	 88°FDB, 74°FWB 02°FDB
* Indoor Maximum Temperatures Summer Winter	 104°FDB (max) 60°FDB (min)
* "As Built" temperature for both steel and concrete shall be assumed to be 70 degrees F.	

Allowable soil bearing for slabs/mats:

* Normal Operating Loads	6 kips/ft^2
* Transient + Normal Operating Loads	8 kips/ft^2

A. Foundation Mat

From the EDR west wall, west to the Nox Off-Gas trench, concrete floor and column foundations were placed as one continuous concrete mat. Thickness of the reinforced concrete in this area is 3.5 feet. Thickness of the reinforced concrete floor west of the Nox Off-Gas trench is 1.5 feet.

B. Steel

In addition to the usual loads associated with building design the structural steel for the Load-In Building has been designed for a 15-ton bridge crane now with the addition of a 50-ton bridge crane later. Also included in the design loads for the building is the anchorage of one set of guy cables for the plant exhaust stack. This requirement was brought about because the existing concrete anchor for the guy cables interfered with the building foot print.

C. Shielding

Shielding within the Load-In Building consists of the existing 12' x 14' door into the EDR, the existing reinforced concrete west wall of the EDR, the new canister port steel shield plug, the new steel plate labyrinth for the EDR personnel door, and additional solid core concrete block added to that portion of the EDR south wall inside the new change room.

2.2.2 Load-In Architectural

The Load-In Building is enclosed by structural steel framing with metal siding and roof. The roof is insulated with rigid board insulation and the exterior walls consist of factory insulated metal panels.

Interior walls that make up the Secondary Filter Room entrance air lock are metal studs covered with 5/8" thick sheets of gypsum board.

A. Doors

The Load-In Building personnel access doors are all industrial commercially-available hollow metal doors with standard hardware and panic bars.

Hollow metal doors are 1-3/4" thick, fabricated of cold-rolled patent leveled 16-gauge furniture steel with 18-gauge internal reinforcing. Doors are filled with honeycomb, inert, sound-deadening material epoxy bonded to the sheet metal. Frames are pressed steel, not less than 16-gauge of cold-rolled steel sheet with integral stop. All steel doors and frames are galvanized.

There are two commercial motor-operated full lift doors for truck access. These are both 12' x 14' doors located in the north and south ends of the truck unloading bay.

Door locations and type are identified on door schedule, 907D-153.

B. Fire Protection

The Load-In Building is protected with a wet pipe sprinkler system. Inside the building are two fire hose stations and a siamese fire hose connection is located on the outside north wall.

C. Material Handling

A 15-ton overhead bridge crane operates full length of the building east and west in the bay directly in front of the EDR west wall. The truck bay is 20 feet wide and traverses the full width of the building on the extreme west end. This area is serviced by the bridge crane for truck unloading. Fork trucks can be used to move items on pallets within the building.

2.2.3 Lighting/Lighting Levels

Lighting standards are in accordance with the Federal Property Management Regulations. Emergency lighting is provided for all locations where lighting is necessary for the safety of personnel.

Adequate lighting is necessary for performing various operations and inspections, and to provide for safe egress of personnel. Design lighting levels throughout the building are 50 foot candles with the canister load-in port area at 150 foot candles to facilitate visual inspection activities. Interior lighting complies with the Illumination Society Lighting Handbook. Exit and emergency lighting systems comply with NFPA 101 and NFPA 110.

2.2.4 Paintings and Coatings

Concrete surfaces in the facility are coated with NU-Klad 114, primed with Amerlock 400, and topcoated with Amerlock 400 Deep Gray or White. Drywall surfaces are primed with Latex filler or with Alkyd sealer and topcoated with Alkyd Gloss Enamel White. Structural steel, floor plates, and the plate steel labyrinth are primed with Amerlock 400 and topcoated with Amerlock 400 Deep Gray or White.

2.2.5 Platforms/Ladders/Handrails

Handrails fabricated of welded pipe are provided for all stairs, platforms, and floors. Handrails, toe boards, and fixed steel ladders conform to OSHA Federal Regulations and are topcoated safety yellow.

All stairs/platforms have a design live load of 100 lb/ft^2. Exterior platforms are galvanized steel grating approximately 1-1/4" thick.

2.2.6 Heating and Ventilation

The Load-In Building heating and ventilation system consists of a unit to supply 100%, filtered, outdoor air through associated duct work to the building. An exhaust fan discharges a less volume of air to the outside than is supplied by the supply fan. This is to assure the building space is pressurized in relation to the outdoor atmosphere. The supply and exhaust units operating simultaneously comprise a once-through system. Supply air is tempered in the winter months with a steam coil and the ventilation rate provides for 2 air changes per hour.

Comfort space heating is provided with seven steam unit heaters and two electric unit heaters.

2.3 Component Descriptions

The Load-In Facility is essentially a receiving, truck unloading, and warehousing facility. Items received here will have final inspections performed prior to passing them through into the EDR.

Components within the facility are by definition, material handling components. The 15-ton overhead bridge crane and fork lifts will be used for unloading and moving items within the facility. The roller conveyor in front of the canister port is for manually moving a canister through the port into the EDR. The canister upender inside the EDR completes the canister load-in components.

2.4 Interface Descriptions/Requirements

The Load-In Building provides weather protection for the receiving, inspection, and loading-in operations that are required in support of the vitrification campaign. Additionally, the building ventilation system is designed to maintain a positive pressure in relation to the outside atmosphere and the EDR for contamination control.

The building is designed to carry all loads associated the loading in of canisters and equipment throughout the vitrification process. In addition, the reinforced concrete foundation/floor slab mat is designed to carry the loads associated with added shielding structures associated with load-out requirements.

Structural steel is designed for an added 50-ton bridge crane for load-out. Steel framing and metal siding for the west wall is designed to be removed in the area required to allow for the 50-ton crane installation.

2.5 Periodic Test Requirements

A continual level of safety and maintenance should be maintained in the facility. The following areas or items should be addressed prior to and during facility operation for the duration of the vitrification campaign.

2.5.1 Lighting Verifications

Periodic lighting checks should be performed to verify lights are functioning properly. Any improperly operating or burned-out lights should be replaced immediately.

The frequency of these lighting checks is to be determined.

2.5.2 RadCon Program

Placement and requirements of air monitors should be verified against the Radiation West Valley Demonstration Project Radiological Controls Manual.

2.5.3 Heat Tracing

Periodic checks of heat tracing should be performed to ensure that heat tracing is working properly and the pipes are free from ice buildup. The area to be checked is the pipe chase overhead in the Change Room. Utility piping through this area is heat traced since this room is only heated when scheduled for use.

The frequency of these heat tracing checks is to be determined. During severe weather (sequential days of below freezing temperatures) heat tracing checks should be increased.

2.5.4 Door Operation/Hardware

Periodic checks of facility doors should be performed to ensure that doors and motor operators operate as specified.

The frequency of these door operation checks is to be determined.

2.5.5 Fire Protection System

Periodic fire protection tests should be performed in accordance with the National Fire Protection Codes.

The frequency of these tests should be as defined in the National Fire Protection Codes.

2.6 Safety Classes and Quality Levels

COMPONENT OR SYSTEM	SAFETY CLASS	QUALITY LEVEL
Concrete Foundations and Mat (EDR Wall West to Nox Off-Gas Trench)	C	C
Concrete (All Remaining)	N	N
Structural Steel	C	C
Steel Labyrinth Shielding	C	C
Steel Shield Plug for Canister Port	C	C
Utility Piping	C	C
Fire Sprinkler Piping	C	C
Bridge Crane (15 Ton)	C	C
Building and Remainder of Services	N	N

3.0 OPERATIONAL REQUIREMENTS

Canisters will arrive by truck in ISO 20 foot shipping containers. Using the overhead bridge crane, shipping containers will be off loaded and stored on the floor of the Load-In building.

Canisters will be removed from the shipping containers and visually inspected for shipping damage. Each Canister Data Package will be verified and completed as to:

3.1 Material Certifications complete

3.2 As Built Dimensions checked

3.3 Canister Numbers (readable)

3.4 Cleanliness Report

3.5 Damage Report (if any)

3.6 Any other items included in package

Canisters will be deposited one at a time on the roller conveyor in front of the access port. While on the conveyor, final inspection will take place to include a visual examination of the inside of the canister to assure that no foreign material is there.

For the loading in of empty canisters, the shield plug over the port opening will be manually rolled aside and one canister inserted into the upender. Once one canister is inside, an air control cover will be placed over the opening while another canister is loaded onto the conveyor and concurrently the EDR crane will place the other canister on the transfer cart. This process will be repeated until four canisters are on the transfer cart.

Vitrification process controls and melter throughput rates establish the time to fill one canister as 55 to 63 hours. Time to fill four canisters becomes 220 to 252 hours or approximately 10 days. On a ten day schedule four empty canisters will be loaded into the EDR from the VLIF.

During the course of the vitrification campaign, the process will require the filling of a minimum of 244 to a maximum of 352 canisters. Reference [1][3][4].

Other items of equipment to be loaded into the EDR will require opening one or both leafs of the 12 x 14 shielded door. Prior to opening this door a temporary contamination control enclosure must be installed in front of the opening.

For those items that can best be hand carried into the EDR, (canister lids, supplies too large to insert through the Vit transfer drawers, and any miscellaneous items small enough to not warrant operation of the 12 x 14 door) the man door can be used. The man door can be accessed through the Change Room/labyrinth and will require a Radiation Work Permit (RWP).

4.0 LIMITATIONS, PRECAUTIONS, RANGES/SETPOINTS

4.1 Limitations

4.1.1 Canister Port Shield Plug

The canister port shield plug is to protect facility operators from radiation exposure and to control air flow into the EDR for contamination control. This shield plug will only be moved back from the opening when transferring canisters into the EDR. Even then, the air shield shall be used after a canister is inserted and left in place while another canister is being made ready. The differential pressure monitor will alarm if the pressure drops to 1/4" WG. If this occurs during canister load-in operations, the air shield must be put in place and operations ceased until the pressure differential is recovered.

4.1.2 EDR Shield Doors

Prior to opening the EDR shield doors a temporary tented enclosure is required for air and contamination control. The size of this enclosure will not always be the same, being dictated in some respect by the dimensions of the item being loaded in. Personnel access will require a RWP.

4.1.3 EDR Man Door

The EDR personnel door can be accessed through the change room and labyrinth air lock. Entrance here also requires a RWP.

4.2 Precautions

4.2.1 Ventilation Considerations

The building ventilation system is designed to maintain quantities of air consistent with air change requirements recommended by ASHRAE. Positive pressure with respect to the outside atmosphere and the EDR will be maintained by exhausting less air than that being supplied.

A pressure differential switch, independent from system controls, is installed to activate an alarm should the pressure differential between Load-In and the EDR drop below 1/4" WG. Simultaneously, the exhaust fan is de-energized. The exhaust fan will restart automatically when the differential pressure is restored and the signal reset manually.

4.3 Ranges/Setpoints

Temperature ranges for occupied areas shall be maintained at comfort levels during the heating season.

5.0 REFERENCE DOCUMENTS

5.1 Letter OG:88:0400, S.M. Barnes to J.M. Pope, "Chronological Review of HLW Glass Production and Processing Time Requirements", dated November 28, 1988

5.2 "Operational Safety Design Criteria Manual," ID 12044, dated April, 1985. W.L. Williams, Operational Safety Division, Department of Energy

5.3 TA No. 1327 to ESI, dated January 19, 1994, "EDR Radiation Shielding Input" - radionuclide source term information

5.4 "Waste Compliance Plan for the West Valley Demonstration Project High-Level Waste Form", WVNS-WCD-001

5.5 "Description of the West Valley Demonstration Project Reference High-Level Waste Form and Canister", R.L. Eisenstatt, July 28, 1986, DOE/NE/44139-26

5.6 WVNS Quality Assurance Program Plan, WVDP-002

5.7 West Valley Demonstration Project, Vitrification Load-in Facility Conceptual Design, Ebasco Services Inc., dated October 1993

APPENDIX A
REFERENCE DRAWINGS

900-D-4398	Vit. Fac. Underground Piping, Drainage and Electrical Conduits
905-D-031	GA Vitrification Facility EDR, CPC Plan EL. 100.00'
905-D-033	GA Vitrification Facility EDR, CPC Plan EL. 117.00'
905-D-035	GA Vitrification Facility EDR, CPC Plan EL. 131.00'
905-D-037	GA Vitrification Facility Sections
900-D-4862 900-D-4869	Canister Transfer Cart System
900-D-5743	HLW Production Canister
900-D-5744	HLW Production Canister Lids
E-2034-1000	Canister Lift Fixture
15A-M-174	Stack Guy Anchors Details, Rev.1, 4/25/66
15R-A-74 15R-A-75	Main Plant Ventilation System
15A-M-26 15A-M-27 VP-4413-15-V-77-1-1	EDR Crane 15V-21
WVNS-DC-022	Design Criteria, Vitrification of High-Level Wastes
WVNS-DC-048	Design Criteria, High-Level Waste Interim Storage System
WVNS-CS-139	Construction Specification, Vitrification Facility Mechanical, I&C, and Electrical Installation
WVNS-CS-205	Construction Specification, Vitrification Ex-Cell Off-Gas Construction

CONSTRUCTION DRAWINGS

907-D-030	GA, Plan at EL. 100'
907-D-031	GA, Plan at EL. 112'
907-D-032	GA, Plan at EL. 125'
907-D-033	GA, Bldg. Sections
907-D-020	P&ID, Utility Air, Utility & Demin. Water
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SYSTEM DESCRIPTION
VITRIFICATION FACILITY
COOLING TOWER WATER

SYSTEM 63CW

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SUMMARY

The Vitrification Facility (VF) Cooling Tower Water (CTW) System receives cooling water from the Main Plant Utility Room and distributes it to the chiller units of the VF HVAC System, the cooling jackets of the cold chemical process tanks, and the heat exchanger for the VF Closed Loop Cooling Water System. A booster pump maintains a constant pressure differential across the system distribution manifolds. After cooling the vitrification equipment the warmed water is returned to the utility room for reprocessing.

Main Plant Operations is responsible for operation and maintenance of the main plant cooling water utilities, including the chemical treatment of the cooling water.

VITRIFICATION FACILITY
COOLING TOWER WATER

REV. 0

1.0 SYSTEM FUNCTIONS & DESIGN CRITERIA

1.1 Functions

The Vitrification Facility (VF) Cooling Tower Water (CTW) System receives cooling water from the Main Plant Utility Room and distributes it to the chiller units of the VF HVAC System, the cooling jackets of the cold chemical process tanks, and the heat exchanger for the VF Closed Loop Cooling Water System. A booster pump maintains a constant pressure differential across the system distribution manifolds. After cooling the vitrification equipment the warmed water is returned to the utility room for reprocessing. Cooling water regulation to individual components or systems is controlled by the component or system being supplied.

1.2 Design Criteria

The system shall be designed to the requirements stated in DC-022 and to the Operational Safety Design Criteria Manual," ID-12044.

The design life of the VF Cooling Tower Water System shall be seven years.

1.2.1 Process Requirements

The Vitrification Cooling Tower Water System shall receive 1180 gpm of cooling water from the Main Plant Utility Room at 70 to 80° F. The distribution requirements are:

HVAC Chillers	480 gpm
CLCW Heat Exchanger	600 gpm
Cold Chemical Tank Cooling Jackets	80 gpm
	1160 gpm

A Booster Pump Subsystem shall be capable of providing 15 psi differential pressure across the cooling tower water supply and return header in the Vitrification Facility.

The system shall be required to operate continuously, 24 hours a day, seven days a week.

1.2.2 Structural Requirements

Piping in the Vitrification Facility Cooling Tower Water System shall be constructed from carbon steel pipes and comply with ASME B31.3.

The system shall comply with the Uniform Building Code.

1.2.3 Essential Features

None.

1.2.4 Maintenance and Inspection

Provisions shall be made for the yearly calibration of pressure gauges.

The system shall be capable of contact maintenance.

1.2.5 Instrumentation and Control

Adequate instrumentation and control shall be provided to verify and maintain necessary flow and pressure to the Vitrification Facility systems.

1.2.6 Interfacing Systems

The VF Cooling Tower Water System has direct interfaces to the following systems:

System 15 (Common Facilities)

System 32 (Cooling & Service Water Equipment)

System 63CC (VF Chilled Water), a part of system 67 (VF HVAC)

System 65 (VF Cold Chemical)

System 66 (VF Closed Loop Cooling Water)

System 200A (VF Instrumentation and Control, Hardware)

1.2.7 Quality Assurance

The Quality Assurance requirements for this system shall be in accordance with NQA-1 and the West Valley Nuclear Services Quality Assurance Program Plan (WVDP-111).

1.2.8 Reliability Assurance

Operational reliability of the Booster Pumps shall be achieved by adherence to WVNS Standard Operating Procedures and WVNS Periodic Maintenance Procedures. The distribution system is passive and inherently reliable.

1.2.9 Safety Classes and Quality Levels

Safety Classes and Quality Levels shall be in accordance with Quality Management Manuals WVDP 002, QM-2, "Quality Assurance Program", and QM-3, "Design Control". (see paragraph 2.6 for component levels)

1.2.10 Codes and Standards

ANSI/ASME B31.3 - Chemical Plant and Petroleum Refinery Piping

ANSI/ASME NQA-1 - Quality Assurance Program Requirements

MIL-STD-45662A - Calibration, Systems Requirements

2.0 DESIGN DESCRIPTION

(Background)

The Vitrification Facility Cooling Water System receives it's cooling water from the Main Plant Cooling Water System (System 32), just like many other facilities at the WVDP. The plant system uses an evaporative cooling tower and an electric motor driven recirculating pump to deliver 2250 gpm of cooled water at 80° F with influent water temperatures of 120° F. The main pump is backed up with a steam turbine driven pump that comes on line automatically when the main pump fails, and during a power outage. The system is also equipped to filter the water, add corrosion and algae control substances, maintain an 8.2 to 8.4 pH level, and monitor the radiation level of the return water. For operating details of the Main Plant Cooling Water System see SOP 32-06.

In the near future, prior to Hot Vit Operation, the Main Plant Cooling System will receive a new cooling tower and three 875 gpm recirculating pumps. With two pumps operating together and the third pump on standby, the system delivers 1750 gpm of cooling water at 80° F with influent water temperatures of 95° F. The third pump automatically replaces a failed pump, while a standby diesel generator, located in the utility room expansion, provides backup power during power failures. The P&ID of the replacement cooling equipment is shown in drawing 900-D-5294, sheet 1.

2.1 Functional Description

The VF Cooling Tower Water System receives cooled water from the Main Plant Utility Room and distributes it to user components in the Vitrification Building and the Cold Chemical Building. The user components consist of two chiller packages for the HVAC System (System 63CC), seven process tank cooling jackets and one and the vessel ventilation system heat exchanger for the Cold Chemical System (System 65), and the heat exchanger for the Closed Loop Cooling Water System (System 66). For adequate cooling for these components the system requires a continuous cooling water flow capacity of 1160 gpm, 480 gpm for to HVAC System, 80 gpm for the Cold Chemical System and 600 gpm for the Closed Loop Cooling Water System. To maintain this flow rate a booster pump is added to the VF Cooling Tower System that maintains a constant differential pressure across the vitrification cooling tower water supply and return headers. After passing through the user components the warmer water is returned to the Plant Utility Room for reprocessing.

2.2 Physical Description

The Vitrification Facility Cooling Tower Water System is comprised of a water distribution system, located in the Vitrification Building, and a booster pump subsystem, located in the Process Building.

2.2.1 Vit Cooling Water Distribution System

The Vit distribution system consists mainly of piping, valves and instrumentation. Cooling water from the Utility Room enters the system via a six inch pipe (6-CW-6-023) at the south end of the Middle East Operating Aisle (MEOA). The line is directed to the Upper East Operating Aisle (UEOA) where it enters valve 6-CW-H-094, which is the interface point to the VF Cooling Tower System. From here the six inch supply header enters the utility pipe rack and traverses the Upper East, North, and West Operating Aisles (UEOA, UNOA, and UWOA), and then goes down to the Closed Loop Cooling Water (CLCW) system heat exchanger, which is located in the Lower West Operating Aisle (LWOA). The cooling water leaves the heat exchanger via the six inch return header (6-CW-6-002), which directs the used water, via the utility pipe rack, back to the system interface return valve 6-CW-H-095, located in the UEOA, and exits the Vitrification Building from the MEOA via pipe 6-CW-6-025. The cooling water headers also service two HVAC Chiller Units (CC-V-015A and CC-V-015B) located in the vitrification building Chiller Room, seven chemical process tank cooling jackets and the scrub solution tank heat exchanger located in Cold Chemical Building. The Cold Chem distribution pipes, isolation valves 6-CW-BU-124 and 6-CW-BU-129, and pressure relief valve 6-CW-RV-410, are part of the cooling tower water system. Table I identifies the user systems, component names, component locations, interface

points, and cooling water requirements for each user component.

TABLE I

User Location	Interface Pts Input/Output	Component Identification	Required Flow Rates	Usage
System 63CC Chiller Room	6-CW-BU-124 6-CW-GL-128	Condenser, Chiller Package CC-V015A	240 gpm	Continuous
System 63CC Chiller Room	6-CW-BU-129 6-CW-GL-135	Condenser, Chiller Package CC-V015B	240 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-GT-418 6-CW-GT-402	Cooling Jacket for Drain Tank 65-D-01	10 gpm	Continuous 40 to 100%
System 65 Cold Chem	6-CW-GT-41[illegible] 6-CW-GT-403	Cooling Jacket for Process Tank 65-D-02	40 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-GT-414 6-CW-GT-404	Cooling Jacket for Process Tank 65-D-03	40 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-GT-422 6-CW-GT-405	Cooling Jacket for Process Tank 65-D-04	34 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-GT-451 6-CW-GT-406	Cooling Jacket for Process Tank 65-D-07	17 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-GT-458 6-CW-GT-407	Cooling Jacket for Process Tank 65-D-08	10 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-GT-465 6-CW-GT-408	Cooling Jacket for Process Tank 65-D-09	10 gpm	Intermittent 0 or 100%
System 65 Cold Chem	6-CW-H-829 6-CW-GT-409	Heat Exchanger 65-E-01 for Scrub Solution Tank 65-D-10	30 gpm	Continuous
System 66 LWOA	6-CW-GT-004 6-CW-GL-009	Heat Exchanger 66-E-10	600 gpm	Continuous

2.2.2 Booster Pump Subsystem

The booster pump subsystem is added, in series, with the eight inch cooling water supply line (15-CW-483-8). It is located in the Chemical Operating Aisle (COA) of the Process Building and consists of two centrifugal pumps, associated piping, valving and instrumentation. The main line (15-CW-483-8) is blocked and bypassed via check valve 63-CWS-VC-6463 and shutoff valve 63-CWS-BU-6464. This bypass allows the main plant system to supply cooling water when the booster pumps are off, and at the same time permits the booster pumps to increase the downstream pressure even with the bypass valve open. The speed, and hence the flow rate, of the primary booster pump is controlled with an adjustable frequency drive (AF-044). The control signal for this drive is provided by the DCS and is set to maintain a constant pre-set pressure differential across the Vit CTW headers. If the differential pressure drops below a preset minimum level a low level alarm (PDAL) is set in the DCS and at the Vitrification Process Control Room (VPCR) console. The primary booster pump must be manually started and includes a timer (TB1) in the starting circuit that delays the actions of a low flow switch (FSL-5107) in the pump output line, and a low pressure switch in the pump input line. The input/output lines are also equipped with a check valve (63-CWS-NC-6468), two isolation valves (63-CWS-BU-6461 and 6462), and two pressure indicators (63-PI-5103 and 5104). The booster system also includes a standby pump (63-G-107B), to be used when the primary pump is taken off-line for maintenance. This pump is similarly equipped, except that a fixed drive replaces the adjustable drive of the primary pump, and the output isolation valve is replaced with a globe valve to manually throttle the flow rate. The standby circuit includes check valve 63-CWS-NC-667, input isolation valve 63-CWS-BU-6451, output isolation and throttling valve 63-CWS-GL-6456, low flow switch 63-FSL-5105, low inlet pressure switch 63-PSL-5106, and pressure indicators 63-PI-5101 and 5102. Except for the primary pump speed control, all booster pump functions are manually controlled from and displayed at the local control panel.

2.2.3 Instrumentation

The Cooling Tower Water System includes two instrumentation sensors in the Vit distribution system and eight sensors in the booster pump subsystem. Flow sensor element FE-050 and indicator/transmitter FIT-050 are installed in Instrument Rack 3W5, and provide the DCS and the user with the combined water flow rates through the CLCW heat exchanger and the tanks in the Cold Chemical Building. Differential pressure transmitter PDT-044 measures the differential pressure across the cooling water supply and return lines at a location just past the Cold Chem branch lines, and provides this signal to the DCS. The

DCS uses this input to control the adjustable frequency drive AF-044 to the primary booster pump. Pressure indicators 63-PT-5101 and 63-PT-5102 provide a local reading of the respective output and input pressure for the standby booster pump. Pressure indicator 63-PT-5103 and 63-PT-510 do the same for the primary booster pump. Low flow switch 63-FSL-5105 and low pressure switch 63-PSL-5106 protect the standby booster pump from abnormal water conditions. Low flow switch 63-FSL-5107 and low pressure switch 63-PSL-5108 do the same for the primary booster pump. Flow-switch and pressure-switch status in indicated via lights at the local control panel. Ranges and setpoints for these instruments are provided in section 4.3.

2.3 Component Descriptions

Booster Pump 63-G-107A & B - Bell & Gossett Centrifugal Pump, Model 5G, Series 1510, 1750 rpm, 1300 gpm @ 62 psi.

Electrical Data: 60 HP, 480 volts, 60 Hz, 3 phase.

Pump 107A includes variable frequency drive AF-044.

2.4 Interface Descriptions

2.4.1 System 15 (Common Facilities)

Cooling water supply and return piping system. Passes cooling water between the Utility Room and the Vitrification Facility. The Booster Pump Subsystem is directly inserted into supply line 15-CW-483-8 in the Process Building. The system delivers 1180 gpm of cooling water to the Vitrification Facility.

Interface Points to Vit Facility:
Valve 6-CW-H-094, Cooling Water Input.
Valve 6-CW-H-095, Cooling Water Return.

Interface Points to Boost Pump Subsystem:
Line 63-CWS-103-8, Input to Booster Pumps.
Line 63-CWS-108-8, Output from Booster Pumps.

2.4.2 System 32 (Cooling and Service Water Equipment)

Cools and processes water for use in all West Valley facilities, and pressurizes the distribution piping system. The physical interface is with System 15. The current system provides 2200 gpm of cooling water. The replacement system provides 1750 gpm of cooling water.

2.4.3 System 63CC (VF Chiller Water)

When in use the two HVAC Chillers require 240 gpm of cooling water each. For most of the vitrification process one chiller can provide sufficient cooling for the VF HVAC requirements.

Interface points to Chiller CC-V-015A:
Valve 6-CW-BU-124, Cooling Water Input.
Valve 6-CW-GL-128, Cooling Water Return.

Interface points to Chiller CC-V-015B:
Valve 6-CW-BU-129, Cooling Water Input.
Valve 6-CW-GL-135, Cooling Water Return.

2.4.4 System 65 (Cold Chemical System)

The cold chemical system uses cooling tower water to keep the process tanks and the scrub tank from overheating. Cooling tower water is provided from the VF CTW header via line 6-CW-4-401 and isolation valve 6-CW-BU-401, and returns via line 6-CW-4-414 and isolation valve 6-CW-BU-411. Isolation and interface valves are located in the Cold Chemical Building. Nominal cooling water requirements to the Cold Chemical Building are 80 gpm.

Interface points to Cold Chemical Process:

Tank 65-D-01:	Input valve 6-CW-GT-418
	Output valve 6-CW-GT-402
Tank 65-D-02:	Input valve 6-CW-GT-412
	Output valve 6-CW-GT-403
Tank 65-D-03:	Input valve 6-CW-GT-412
	Output valve 6-CW-GT-404
Tank 65-D-04:	Input valve 6-CW-GT-422
	Output valve 6-CW-GT-405
Tank 65-D-07:	Input valve 6-CW-GT-451
	Output valve 6-CW-GT-406
Tank 65-D-08:	Input valve 6-CW-GT-458
	Output valve 6-CW-GT-407
Tank 65-D-09:	Input valve 6-CW-GT-465
	Output valve 6-CW-GT-408
Heat Exchanger:	Input valve 6-CW-H-829
	Output valve 6-CW-GT-409

2.4.5 System 66 (Closed Loop Cooling Water)

The Closed Loop Cooling Water System uses Heat Exchanger 66-E-10 as a physical barrier between the Vitrification cooling loop and the cooling tower water system. The Heat Exchanger is connected to the end of the VF CTW supply header and requires 600 gpm of cooling tower water.

Interface points to the Heat Exchanger:
Valve 6-CW-GT-004, Cooling Water Input.
Valve 6-CW-GL-009, Cooling Water Return.

2.4.6 System 200A (VF Instrumentation & Control)

DCS interfaces are provided with the following instruments:

PDT-044 - Differential Pressure Transmitter
FIT-050 - Flow Transmitter
AF -044 - Primary Booster Pump Frequency Controller

2.5 Periodic Test Requirements

Verify daily that flow rates at FI-050 are nominal.

Verify weekly that booster pumps operate properly.

2.6 Safety Classes and Quality Levels

Component	Location	Safety Class	Quality Level
Piping	VIT, Cold Chem, Proc Bldg	N	C
Valves	VIT, Proc Bldg	N	C
Instrumentation	VIT, Cold Chem, Proc Bldg	N	C

3.0 OPERATIONAL REQUIREMENTS

The Vitrification Facility Cooling Tower Water System is primarily a passive distribution system and should perform all its required functions without operator intervention, except for the booster pump subsystem. The booster pumps must be manually started and stopped. Although the output of the primary pump is automatically adjusted by the frequency controller, the flow rate of the standby pump must be manually adjusted with valve 63-CWS-GL-6456. When switching between pumps, all isolation valves must be manually opened or closed. The instrumentation provided at the pumps is sufficient to make the required adjustments. Control of the cooling water for other components is determined by the user system.

For information purposes, operation of the Main Plant Cooling Tower Water System is described in SOP-32-06, "Cooling Water System."

3.1 Electrical Outage

During an electrical outage, the Cooling Tower Water System will continue to perform all of its normal functions. The Main Plant electric recirculating pump is backed up by a turbine-driven pump of equal capacity which automatically starts when the main pump fails. During power failures the booster pumps will not operate, leaving only plant pump pressure across the VF CTW distribution lines.

3.2 Pump Maintenance

All cooling water pumps are provided with back-up pumps, so that normal cooling can be maintained during pump maintenance.

4.0 LIMITATIONS, PRECAUTIONS, RANGES/SETPOINTS

4.1 Limitations

Pressure relief valve, 6-CW-RV-410, on the Cold Chemical cooling water return header is set to vent at 60 psig.

4.2 Precautions

The DCS alarm PDAL-044 comes on when the differential pressure across the cooling tower water headers falls below 10 psi. If either booster pump was turned on, then this condition may indicate that the booster pump has failed, and the operating condition of pumps must be investigated.

4.3 Ranges/Setpoints

Instrument	Type	Range	Setpoint
PI-5101 thru 5104	Pressure Indicator, Booster Pumps	0-100 psig	N/A
FSL-5105 & 5107	Low Flow Switch, Boost Pump Output	0.025-0.800 ft/sec	TBD
PLS-5106 & 5108	Low Pressure Switch, Boost Pump Input	20-100 psig	TBD
PDT-044	Differential Pressure Transmitter	50-750 inch H_2O	N/A

Instrument	Type	Range	Setpoint
AF-044	Primary Booster Pump Controller	TBD	415 inch H_2O (~15 psi)
PDAL-044	Low Differential Pressure Alarm	N/A	280 inch H_2O (~10 psi)
RV-410	Pressure Relief Valve	N/A	25 psig
FE-050/FT-050	Flow Meter/ Transmitter	0-750 gpm	N/A

5.0 CASUALTY EVENTS AND RECOVERY PROCEDURES

TBD

6.0 MAINTENANCE

TBD

7.0 REFERENCE DOCUMENTS

WVNS-DC-022 - Design Criteria Vitrification of High-Level Wastes

CS-134 - Vitrification Facility Civil/Structural Installation

CS-139 - Vitrification Mechanical, I&C, and Electrical Installation

CS-205 - Vitrification Ex-Cell Off-Gas Construction

SOP-32-06 - Cooling Water System

APPENDIX A
REFERENCE DRAWINGS

15-A-A-68 - Utility Piping & Instrument Diagram Process Area Cooling Water Supply Distribution

15-A-A-69 - Utility Piping & Instrument Diagram Cooling Water Return Distribution

32R-A-3 - P&ID Cooling & Potable Water

900-D-5297, sheet 1 - Process Building CW Booster Pumps Plan and P&ID

905-D-015 - P&ID Cold Chemical Preparation and Feed System

905-D-016 - P&ID Cold Chemical Preparation and Feed System

905-D-017 - P&ID Cold Chemical Preparation and Feed System

905-D-018 - P&ID Cold Chemical Preparation and Feed System

905-D-021 - P&ID Cold Chemical Water System

905-D-054 - P&ID Vitrification Facility Cooling Tower Water System

West Valley Demonstration Project

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SYSTEM DESCRIPTION

VITRIFICATION FACILITY
CELL WALLS AND EX-CELL ARRANGEMENT

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SUMMARY

The Vitrification Facility Cell Walls and Ex-Cell Arrangement as a system is comprised of three distinct areas: the seismically designed Vitrification Cell or confinement barrier, the Ex-Cell aisleways, and the shielding structures. The Vitrification Cell is comprised of wall modules, cast-in-place concrete columns, floor pad, mat, roof structure, access hatches, shield doors, and various penetrations. The Ex-Cell areas are comprised of the Vitrification Facility structural steel, exterior metal siding, floor slabs, the Control Room, restrooms, access hatches, wall partitions, aisleways, stairways, doors, and platforms. Shielding structures of the facility included the Crane Maintenance Room and Operating Aisle, Secondary Filter Room, HVAC/Diesel Generator Room, Equipment Decontamination Room, Transfer Tunnel, and Chemical Process Cell.

The Off-Gas Trench has been included in the description of the shielding structures.

VITRIFICATION FACILITY
CELL WALLS AND EX-CELL ARRANGEMENT

REV. 0

1.0 SYSTEM FUNCTIONS & FUNCTIONAL DESIGN CRITERIA

1.1 Functions

The function of the Cell Walls and Floor is confining radioactive contamination and maintaining shielding of the radioactive Vitrification process during and after a seismic event, thus serving to protect site personnel and the general public.

The function of the Ex-Cell Arrangement System is to control environment and provide weather protection for Vitrification process related activities, to minimize the spread of contamination, and to control ventilation.

The function of the shielding structures is basically the same as the Cell Walls and Floor to provide confinement of radioactivity, shield site personnel, and to protect safety related systems.

1.1.1 Cell Walls and Floor Functional Design Criteria

The Cell Walls and Floor shall be seismically qualified and continue to provide confinement of radioactivity after a seismic event.

The Cell Walls and Floor shall provide adequate shielding for the Vitrification process.

Floor and roof slabs shall be designed for a concentrated load of 10,000 pounds located at any position on a 2' by 2' area.

The Cell Wall System doors and hatches shall provide access capabilities for remote equipment installation and removal in all areas where maintenance is required.

Openings through cell walls shall be sealed to allow for HVAC control.

Piping penetrations through the cell walls shall have backflow preventers.

Piping penetrations for gravity flow of fluids shall be valved with valves located ex-cell.

The Cell Wall System shall maintain clearances for master-slave manipulator operation as well as insertion and removal of manipulators.

The Cell Floor shall be able to withstand loads associated with in-cell components and equipment changeout or removal.

The Cell Wall System shall be designed to the requirements stated in WVNS-DC-022 and to the Operational Safety Design Criteria Manual, DOE-ID-12044.

The design life of the Vitrification Facility Cell Walls and Floor shall be adequate to support Vitrification operations.

1.1.2 Ex-Cell Arrangement Functional Design Criteria

The Ex-Cell Arrangement System shall provide design features to maintain internal and external radiation exposures to operating and maintenance personnel ALARA, and in no case exceed allowable Federal guidelines.

The Ex-Cell Arrangement System shall provide the capability to control contamination during routine and emergency operating conditions and during all hands-on and remote maintenance activities.

Adequate clearance shall be maintained in the ex-cell aisleways for monorail/manipulator operations.

The Ex-Cell Arrangement System shall avoid inadvertent radioactivity transfer possibility by minimizing multiple manifolded transfer routes, using physical barriers, and or permissively controlling nonroutine transfer routes.

Pad eyes of 5,000 lbs. capacity each shall be provided in the roof of the Crane Maintenance Room (CMR) and Secondary Filter Room. Pad eyes shall be spread approximately 6' apart and inserted no closer than 2' from outside walls. Maximum lifting loads shall be 10,000 pounds over adjacent eyes.

The Ex-Cell Arrangement System shall be designed with the minimum number of external access points, as dictated by safe and efficient access and egress.

The Ex-Cell Arrangement System shall provide fire detection and protection capabilities.

Design of the Ex-Cell Arrangement System shall optimize operability, maintainability, and human factors engineering.

The Ex-Cell Arrangement System shall be able to withstand loads associated with equipment changeout or removal (exception: shield windows) and general operation activities.

Lighting of the Ex-Cell areas shall be sufficient to perform operations and maintenance activities.

Adequate clearances shall be maintained for maintenance of windows.

Any moving mechanical parts associated with the shielding doors shall be maintainable from outside the cell.

1.1.3 Shielding Structures Functional Design Criteria

The shielding structures shall be seismically qualified and continue to provide confinement of radioactivity after a seismic event.

The Diesel Generator Room and Secondary Filter Room shall be tornado resistant to the characteristics outlined in WVNS-DC-022, Design Criteria Vitrification of High-Level Wastes.

The shielding structures shall provide adequate shielding for the Vitrification process.

Floor and roof slabs of the shielding structures shall be designed for a concentrated load of 10,000 pounds located at any position on a 2' by 2' area.

The shielding structures doors and hatches shall provide access capabilities for equipment installation and removal in all areas where maintenance is required.

Openings through shielding structures shall be sealed to allow for HVAC control.

The shielding structures shall maintain clearances for master-slave manipulator operation as well as insertion and removal of manipulators.

The shielding structures floors shall be able to withstand loads associated with in-cell components and equipment changeout or removal.

The shielding structures shall be designed to the requirements stated in WVNS-DC-022 and to the Operational Safety Design Criteria Manual, DOE-ID-12044.

Access for manned entry shall be provided in the shielding structures.

The design life of the shielding structures shall be adequate to support Vitrification operations.

1.2 Process Requirements

The Cell Walls and Ex-Cell Arrangement is a static system serving to support and house the vitrification components, structures, and process. There are no process requirements for this system.

1.3 Structural Requirements

Structures that are not required to confine radioactive material shall be designed to the New York State "Code Manual for the State Building Construction Code."

Structures and components, that are required to confine radioactive material that could be hazardous to the public or site personnel, shall be able to withstand the effects of natural hazards without loss of capability to perform safety functions or prevent the release of radioactivity and shall be designed to the Operational Safety Design Criteria Manual, DOE-ID-12044.

1.3.1 Design Basis Earthquake

The Design Basis Earthquake (DBE) was established by the "Seismic Hazard Analysis for the West Valley Demonstration Project" and approved by "Seismic Hazard Analysis." The confinement structures shall be designed to an acceleration of 0.1g at ground level (horizontal loads), with a vertical component equal to 2/3 of the horizontal acceleration. The design shall include a validated dynamic analysis of the structures or components. The components may be validated by testing in lieu of analysis.

1.3.2 Design Basis Tornado

The Design Basis Tornado (DBT) has been specified for the West Valley Demonstration Project by Nicholas and Egan, 1983. The DBT definition was based on detailed analyses of all tornado occurrences in Western New York State. The characteristics of the DBT were derived from the "Natural Phenomenon Hazard Studies and Recommended Design Criteria for the West Valley Site, West Valley, New York," date October 1, 1981 by the Lawrence Livermore Laboratory. Characteristics of the DBT are outlined in WVNS-DC-022, Design Criteria Vitrification of High-Level Wastes.

1.3.3 Design Pressure Differential

Concrete building structures shall be designed for negative pressures with respect to the outside atmosphere. The interior design pressure shall be a negative 745 Pa (-3 inches H_2O).

1.3.4 Design Wind Forces

Building structures, and equipment on the exterior of buildings, shall be designed to a 100-year wind of 35.8 m/s (80 mph) with peak gusts of 43.4 m/s (97 mph). Wind pressure shall be analyzed using the methods specified in ANSI A58.1, Exposure Condition C.

1.3.5 Design Snow Loading

Buildings and outside structures shall be designed for a snow load of 1,915 Pa (40 lb/ft^2).

1.3.6 Reference Design Flood

A flood is not considered to be a hazard to the facility.

1.4 Essential Features

1.4.1 Shielding

Shielding thickness shall be based on the waste containing the greatest radionuclide inventory and emitting the highest energy radiation. Penetrations through shielding walls for windows, piping, ventilation ducts, etc., shall be designed to provide shielding equivalent to the walls.

Shielding shall be adequate to protect plant personnel from excessive radiation during normal operations and during decontamination operations. Concrete shielding shall be designed in accordance with ANSI N101.6 to provide primary protection from radiation.

The facility shall be designed to the following, as taken from WVNS-DC-022, Design Criteria - Vitrification of High-Level Wastes:

A. The maximum radiation dose rate for a full-time occupancy area shall be 0.25 mRem/hour. A full-time occupancy area is one in which an individual(s) may be expected to spend all or most of his/her work day.

B. The maximum radiation dose rate for a full-time access area shall be 2.5/t mRem/hour in which "t" is the maximum average time in hours per day that the area is expected to be occupied by any one individual. A full-time access area is one in which no physical or administrative control of entry exits.

If compliance with full-time access area requirements would not be economically feasible, impractical, or prohibitive, higher dose rates may be allowed. However, access to such fields shall be strictly controlled.

1.4.2 Ventilation

All structures which form the Zone I confinement boundary and the associated Ventilation and Filtration System shall be designed to continue to perform their contamination confinement function during and after the occurrence of a design basis event, accident, credible fire or explosion.

Each HVAC zone shall be bounded by barriers, such as pipes, and vessels, different pressure zones, and building walls.

Pressure differentials shall be maintained between each confinement zone and between the outermost zone and the outside atmosphere. Air flows shall travel from zones of lesser contamination potential to zones of greater contamination potential under normal and off-normal conditions.

1.4.3 Fire Detection and Protection

Fire protection systems and components shall be designed in accordance with National Fire Codes and the Operational Safety Design Criteria Manual, DOE-ID-12044.

All egress corridors and door openings shall meet NFPA 101. The size and arrangement of interior corridors shall accommodate personnel traffic flow patterns, safety of building occupants, movement of equipment, and ultimate decontamination and decommissioning of the facility.

Ex-Cell areas shall be constructed of fire-resistant and noncombustible material.

Equipment recessed in corridors, such as fire hose racks, cabinets, or drinking fountains shall be grouped together to the maximum extent possible.

Storage areas for combustible material shall be physically isolated from equipment areas by fire-resistant walls or storage cabinets manufactured for housing combustibles.

Occupied areas shall be protected by an automatic wet-pipe system. The VF Process Control Room and HVAC Control Room shall have additional protection by a system compatible with electronic equipment.

1.5 Maintenance and Inspection

Section 2.5, Periodic Test Requirements, describes planned verifications and inspections of the Vitrification Facility structures, surfaces, lighting, freeze protection, etc.

1.6 Instrumentation and Control

Administrative control of the Vitrification Facility shield doors #1, #2, and #8 is located in System 63K, In-Cell Remote Handling, Maintenance, and Viewing.

1.7 Interfacing Systems

Although this system serves to support, anchor, or enclose all other vitrification systems and components, it has few direct interfaces. Direct interfaces are as follows:

63K - In-Cell Remote Handling, Maintenance, and Viewing

63ED - VF Electrical Power Distribution

63FP - Fire Detection and Protection

63WW - VF Drains

67 - VF Heating, Ventilating, and Air Conditioning

63IA - VF Instrument Air

1.8 Quality Assurance

The Quality Assurance requirements for this system are in accordance with NQA-1 and the West Valley Nuclear Services Quality Assurance Program Plan.

1.9 Reliability Assurance

The Cell Walls and Ex-Cell Arrangement Systems were designed in accordance with NQA-1, the Quality Assurance Program Plan and WVNS Standard Operating Procedures.

The Cell Walls and Ex-Cell Arrangement Systems have been seismically qualified through engineering calculations.

Quality control inspections were performed at regular intervals during installations of structural steel and concrete fo the Vitrification Cell Walls and Ex-Cell Arrangement.

1.10 Safety Classes and Quality Levels

Safety Classes and Quality Levels are in accordance with the Quality Management Manual, Section 2, "Quality Assurance Program," and 3, "Design Control."

1.11 Codes and Standards

ANSI/ASME B31.3 - Chemical Plant and Petroleum Refinery Piping.

ANSI/ASME NQA-1 - Quality Assurance Program Requirements.

ACI 318 - American Concrete Institute

AISC - American Institute of Steel Construction

NFPA 10, 101, 110 - National Fire Protection Association

New York State "Code Manual for the State Building Construction Code."

2.0 DESIGN DESCRIPTION

2.1 Functional Description

The cell walls function is to provide a confinement barrier for the radioactive vitrification process. The walls are seismically qualified to perform their confinement function during and after a seismic event.

The Ex-Cell arrangement function is to provide contamination/ventilation control and weather protection. Walls and facility doors function as physical barriers to separate different HVAC zones and separate areas of possible contamination. The facility metal building is a weather enclosure to provide a controlled atmosphere for vitrification related activities.

The shielding structures function is to confine potential radioactive operations and shield or protect the occupied ex-cell areas from radioactivity.

2.2 Physical Description

Since each area, cell, ex-cell, and shielding structures can be considered as having individual physical qualities and purpose, they will be described separately below.

Concrete throughout the Vitrification Facility is a minimum design strength of 4000 psi compression.

2.2.1 Cell Structural

A. Cell Foundation Mat

The cell's 4'-6" thick foundation mat is constructed at two elevations. The lower section of the foundation has a top of mat elevation of 86.00' and extends between column lines 2 through 3 and A through D. This mat section supports the cell walls between column lines 2 through 3 and A through D and the primary equipment needed for Vitrification.

The upper section of the foundation has a nominal top mat elevation of 100.00' and extends between column lines 3 through 5 and B through D. The foundation mat at el. 100.00' also extends between column lines 4 through 6 and B through E. This section of mat supports the cell walls, CMR walls, HVAC area walls, transfer cart rails, and related equipment loads.

Floor loadings for cell - TBD.

B. Cell Walls

The wall structure of the Vitrification Cell consists of prefabricated wall modules placed between previously cast-in-place concrete columns. The modules consist of a structural framework to support internal piping and various penetrations for windows and utilities. A 3/8" thick stainless steel plate faces the radioactive or "hot" cell interior. The nonradioactive or "cold" side of the 1.22m (4 ft.) thick module was formed after the modules were installed by filling each module with concrete. A total of seven modules were installed and welded together. Specifications for wall modules are in WVNS-EQ-265, Vitrification Cell Wall Modules.

The cell is a reinforced concrete structure with outside dimensions of 42' by 70' and approximately 46'above grade. There are no intermediate floors between the top of the mat and the bottom of the roof within the cell. The North, East, and West walls are 4' thick between el. 100.00' and el. 120'-10", 2'-10" thick between el. 120'-10" and el. 127.00', and 2'-2" thick above el. 127.00'. The South wall at column line 5, including East and West shear wall extensions, vary in thickness over the wall as a function of shielding and structural considerations.

The roof of the cell is 2'-9" thick with the top being at el. 146.25'. Stay-in-place forms consisting of steel beams and metal Q-decking are used for roof construction. Drilled in dowels/rebar connectors are provided for extending the walls and roof of the VF cell. The walls and roof thicknesses are governed by WVNS shielding requirements.

The East and West (B & D) walls support a bridge crane at el. 132.00'.

In the Vitrification Cell, the liner, in areas other than the wall modules, is stainless-steel nominal 10-gauge plating on the cell floor and up the walls to elevation 123-0'. Door faces are also stainless-steel plate. The Vitrification Transfer Tunnel has a stainless-steel nominal 10-gauge liner plating on the floor with covering and extensions up the walls to the ceiling.

Roof Hatches in the Vitrification Cell are constructed of precast, reinforced concrete with steel frame. They are designed to be welded to the steel hatch enclosure embed structure.

C. Shield Doors

Shield doors are made of carbon steel. The doors provide personnel shielding from the Vitrification process and act as barriers between the same and different HVAC zones and atmospheres.

In the Vitrification Facility, there are two types of doors: radiation shielding doors and containment doors. All of the doors listed below are containment doors. However, only doors #1, #2, #3, #6, and #7 are radiation shielding doors.

The sequence of opening and closing doors #1, #2, and #8 is described in System 63K, In-Cell Remote Handling, Maintenance, and Viewing.

Special door locations and sizes are as follows:

Door #1 - Transfer Tunnel Shield Door, motorized worm-gear mechanism. 16' by 14'-8", 13" thick, 62.5 tons.

Door #2 - Crane Maintenance Room Shield Door, interlocks, hoist housings for motors. 14'-7 1/2" by 39'-4 1/2", 9" thick, 104 tons.

Door #3 - Equipment Decontamination Room Tornado Shield Door. 14'-3 1/2" by 12'-3 1/2", 13" thick, 50 tons.

Door #4 - Secondary Filter Room Door. 8'-2 1/2" by 8'-3 1/2", 3" thick, 4.2 tons.

Door #5 - HVAC Control Room Door. 7'-2 1/2" by 5'-3 1/2", 3" thick, 2.4 tons.

Door #6 - Equipment Decontamination Room Personnel Access & Shield Door. 6'-11" by 3'-7", 13" thick, 6.6 tons.

Door #7 - Crane Maintenance Room Personnel Access & Shield Door. 7'-3" by 3'-5", 8" thick, 4.1 tons.

Door #8 - Transfer Tunnel to Equipment Decontamination Room Door. 14'-1" by 12'-1 1/2", 2" thick, 7.0 tons.

Door #9 - Emergency Diesel Generator Room Door. 7'-2" by 5', 2" thick, 0.5 tons.

Door specifications are outlined in WVNS-EQ-264, Special Doors for Vitrification Facility.

D. Cell Penetrations

Penetrations for gravity flow of fluids into the Vitrification Cell have valved piping with valves located on the Ex-Cell wall to isolate the cell.

Unused utility sleeves have a shield plug inserted from the Ex-Cell side that is bolted in place to prevent it from sliding out during a design basis event. Seismic calculations for shield plugs can be found in WVNS-CAL-004, Seismic Calculations for Vitrification Blank Penetration Plugs. Fabrication information is in WVNS-FA-122, Vitrification Facility Penetration Shield Plugs.

A list of cell penetrations and their respective drawings are in WVNS-WPI-001, Wall Penetration Index.

1. Windows

Shield window penetrations are large plate weldments that allow for cold side installation of oil-filled radiation-shielding windows. The penetrations are stepped similar to utility penetrations to provide adequate shielding. On the hot side of the window penetration, a bolt area and a recessed mounting area were provided for a hot side cover glass which provides a seal. This seal allows maintenance of the oil-filled window without breaching the cell seal. The window penetrations also include seismic mounting.

Specifications for shield windows are in WVNS-EQ-308, Vitrification Facility Equipment Specification for Oil-Filled Shielded Viewing Windows.

2. Cell Hatch

A 13' by 13' roof hatch is located above the Vitrification Cell. The hatch is comprised of three separate partitions, each made of reinforced concrete with steel casing around the perimeter. The partitions are 13' long by 4' wide by 2'-9" thick and weigh approximately 15,000 lbs. each. The partitions are designed to be welded onto the hatch by 4" metal clips.

3. Utility Sleeves

Utility penetrations or sleeves are cylindrical, straight-through penetrations machined from pipe and cast into the cell concrete walls. The inside diameter of the penetration is machined with a concentric step such that a stepped plug may be installed to provide adequate shielding. Utility penetrations sizes are 7", 9", and 16". They allow future installation of new services such as air, steam, or electrical power without having to core drill through a concrete wall. The penetrations include mounting provisions to seismically support the shield plug.

4. Manipulator Ports

Manipulator penetrations are 10" ID tubes which are used to mount master-slave manipulators. Shielding is provided by close-fit lead assemblies provided with the manipulator. They also include a seismic mount for the manipulator or plugs.

Seismic Calculations for shield plugs are in WVNS-CAL-017, Seismic Calculations for Vitrification Transfer Drawer and Manipulator Penetration Plugs. Specifications for the manipulators are in WVNS-EQ-307, Vitrification Facility Master-Slave Manipulators.

5. Pipe/Conduit

3" mechanical penetrations are welded pipe fabrications with two elbows to provide a shielding offset. The back sides of both elbows are shielded with an extra piece of round steel bar stock. These penetrations are used for remote fluid connections in the Vitrification Cell.

2" mechanical penetrations are bent pipe fabrications with two bends to provide a shielding offset. The back sides of both bends are shielded with an extra piece of steel bar stock. These penetrations are used for remote fluid connections in the Vitrification Cell.

2" electrical connections are bent pipe fabrications with two bends to provide a shielding offset. The back sides of both bends are shielded with an extra piece of steel bar stock. These penetrations are used for remote electrical connections in the Vitrification Cell.

2"-3 way mechanical penetrations are bent pipe penetrations with two bends to provide a shielding offset. The back sides of the bottom bend is shielded with an extra piece of round steel bar stock. These penetrations include three 1/2" nominal pipes and are used for remote fluid connections in the Vitrification Cell.

6. Others

Frit Addition:

The frit addition penetration is located at el. 120' in the North Wall adjacent to the melter viewing window. Its a straight-through penetration at a 45° angle to the cell wall. The penetration is 3" in diameter and made of Schedule 40 stainless steel pipe. Currently, the penetration has a steel screw cap with a shield plug insert. During frit addition, this will be changed to a quick-release plug with a ball valve.

Melter Viewing:

The melter viewing penetration is at el. 111.3' in the North Wall. It is a 15" stepped penetration with a stainless steel sleeve. The penetration has a lead shielding labyrinth wall plug.

Glass Pour Viewing:

The glass pour viewing penetration is located at el. 111.6' in the East Wall of the Vitrification Cell. Dimensions and material are the same as the melter viewing penetration above.

Glove Box (Transfer Drawer):

Transfer Drawer penetrations are straight-through penetrations which are used with transfer drawer assemblies to provide small parts transfer capability into the Vitrification Cell. The transfer drawer itself provides two shield blocks, one on the hot side of the drawer and one on the cold side to assure adequate shielding at all times. The transfer drawer penetration also provides seismic mounting for the transfer drawer assembly.

Two transfer drawers are located on the East side of the cell. One transfer drawer is located on the North side of the cell. All three are at el. 113'.

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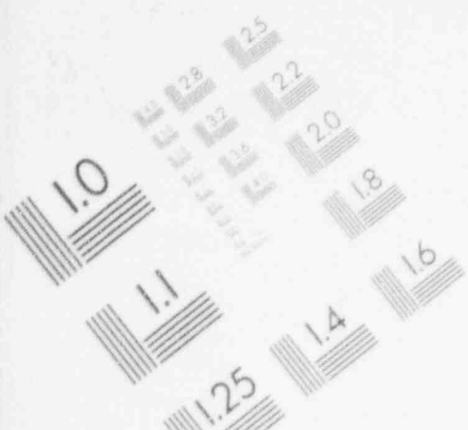

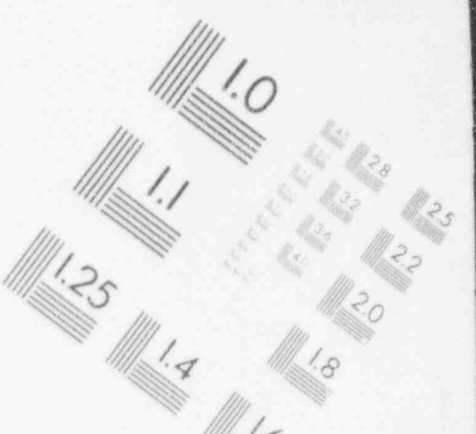

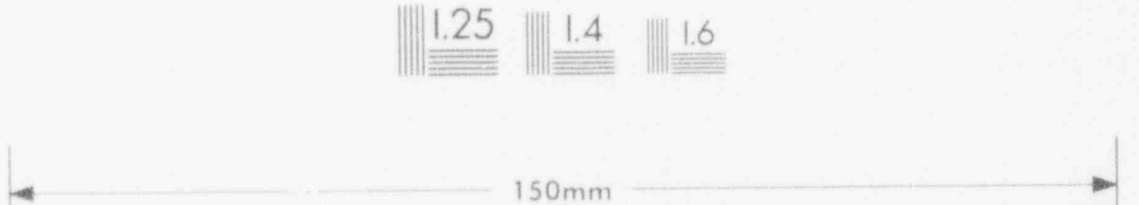

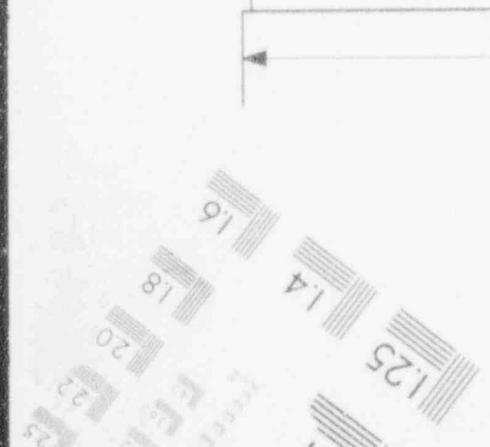

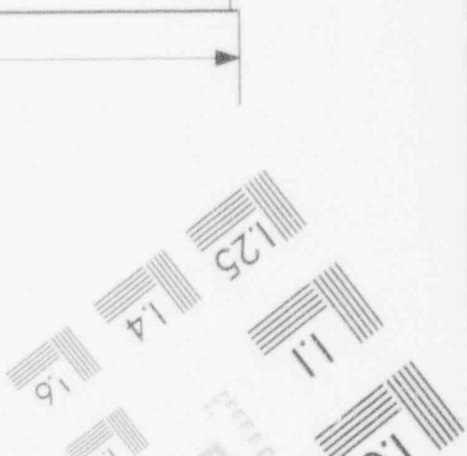

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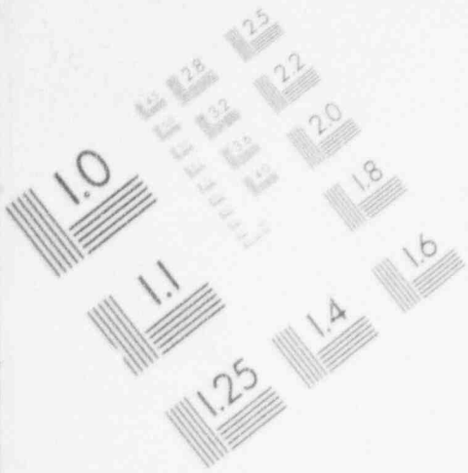

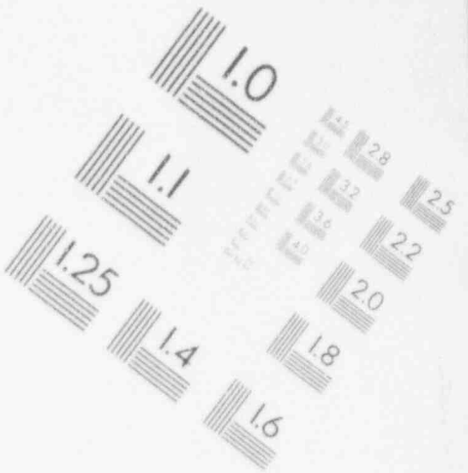

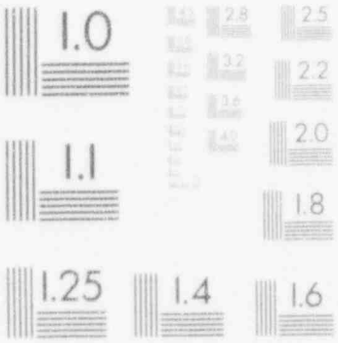

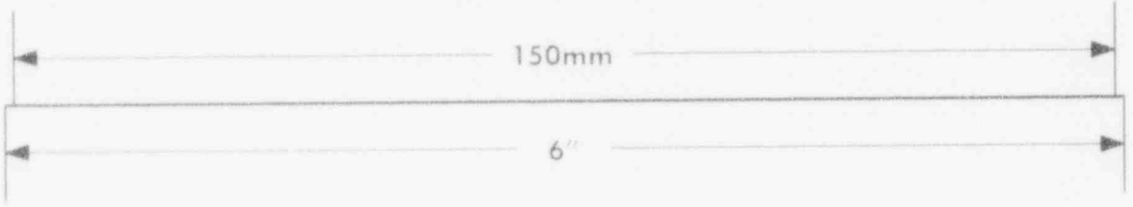

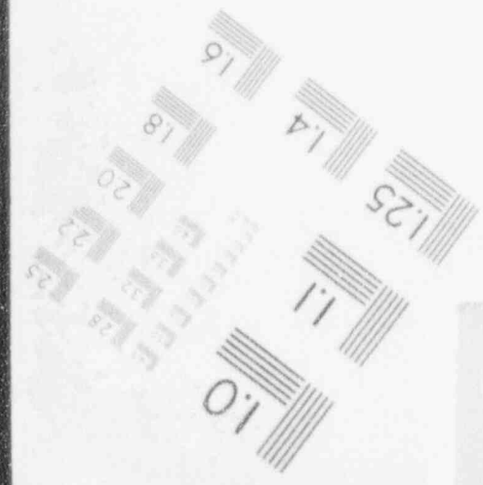

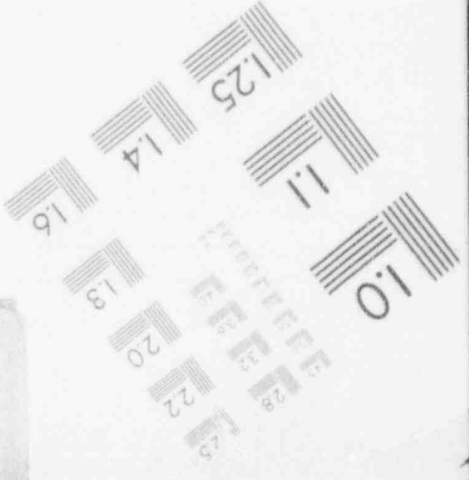

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IMAGE EVALUATION
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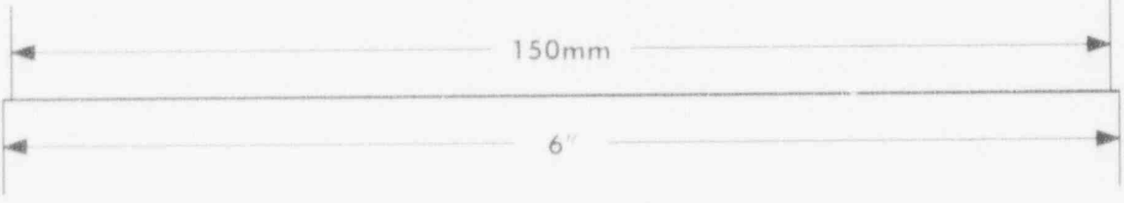

Sample Transfer:

The Sample Transfer Cell is located on the NW corner of the Vitrification Cell. It will be used to transfer samples from the Vitrification Cell to the Analytical Lab for analyses.

The Sample Transfer Cell has three penetrations into the Vitrification Cell; a 1" penetration for a stainless steel drain pipe, a 2" penetration at a 30° angle for a sample transfer port, and a 3" penetration for ventilation. The penetrations for the drain pipe and ventilation are offset. The drain pipe penetration is shielded by 3" steel plates.

Refer to drawing 905-D-058, Pneumatic Sample Transfer Drawer P&ID.

Cell Cooler:

Cooler penetrations are straight-through holes in the cell roof with steel bar shields. The cooler is structurally designed to be supported at the penetration points. If removal is required, the cooler can be lowered by winch using the penetrations as hoisting points.

HVAC Embedment:

A steel embedment in the South cell wall is used to buildup shielding where concrete thickness has been reduced to accommodate HVAC exhaust ductwork.

Thermocouples:

Thermocouple penetrations are 1" nominal pipes bent into a spiral shape which allows insertion of sheathed thermocouples. Shielding is provided by virtue of the spiral shape which eliminates radiation streaming.

E. Shielding

Shielding thicknesses are based on the waste containing the greatest radionuclide inventory and emitting the highest energy radiation. Penetrations through shielding walls for windows, manipulators, instrumentation, piping, ventilation ducts, etc. have been designed to provide shielding equivalent to the walls.

The use of concrete, steel embeds, and shield plugs adequately shield site personnel and the general public from excessive radiation exposure. Shielding calculations were used to determine shielding requirements per facility area.

Shielding calculations were produced by Ebasco and transmitted to WVNS as Approval Requests in EBAR 462, "Dose Rates," and EBAR 535, "Dose Rate Calculations Due to a Canister Lift to El. 127'2". WVNS review of these calculations are documented in HG:86:0035, "Shielding Analysis: CTS Conversion," HG:86:0047, "Shielding Analysis: CTS Conversion," FB:86:0083, "Vitrification Facility Shielding Review/Analysis: CIEF Phase II Shielding Requirements," and HC:86:0040, "Queries Regarding CIEF Phase II Construction."

2.2.2 Ex-Cell Architectural

Ex-Cell areas of the Vitrification Facility are enclosed by structural steel framing with a metal siding and roof. The metal building is supported by spread footings and grade beams. The building's ceiling and exterior walls are insulated with blanket fiberglass.

The building siding and girt system is designed for a wind load and loading distribution of 97 mph wind speed at 30 feet above ground and Exposure C in accordance with ANSI Standard A58.1 and Importance Factor (I).

The building roof and purlin systems are designed for a live load of 40 psf and the above wind load. Structural steel is designed to handle piping, supports, conduit, equipment, and HVAC loads in addition to dead loads and environmental loads.

Ex-Cell partitions are comprised of steel studs covered with 5/8" thick type "X" sheets of drywall. Ex-Cell stairway walls are steel studs covered with two 5/8" thick type "X" sheets of drywall.

The floor slab at elevation 100' is 12" thick reinforced concrete. The elevated floor slabs listed below are 4" thick reinforced concrete placed on Q-decking and supported by structural steel.

el. 110' -	Column line 2 to 5 between E and D and A and B Column line 1 to 2 between A and E
el.125' -	Column line 2 to 5 between E and D and A and B

el. 130' - Column line 1 and 2 between A and E

el. 110',125' East of column A and between 2 and 4

Floor loadings at the 100' and 125' elevations are 250 lbs./sq. ft. live loads and 10,000 lbs. for concentrated loads.

Ex-Cell areas were designed to the Human Factors Engineering Requirements outlined in WVNS-DC-022, Design Criteria Vitrification of High-Level Wastes.

A. Facility Doors

The Vitrification Facility main access and utility doors are all industrial commercially-available hollow metal doors with standard hardware and panic bars.

Hollow metal doors are 1 3/4" thick, fabricated of cold-rolled patent leveled 16-gauge furniture steel with 18-gauge internal reinforcing. Doors are filled with inert sound-deadening material. Frames are pressed steel, not less than 16-gauge of cold-rolled steel sheet with integral stop. All facility steel doors and frames are galvanized.

Personnel doors and double doors are provided with locks and panic bar hardware. Exit devices consist of panic bars with keyed outside operation. Panic bars have vertical rods for top and bottom strikes to securely seal doors. Exterior doors have card readers for entry and can be manually locked.

There are two commercial motor-operated roll-up doors for large equipment or truck access to the Vitrification Facility metal enclosure. One door is located in the NW corner of the facility. The other door is located at the NE corner. Both are at el. 100'. The doors consist of interlocking roll-formed flat style slats of 20 gauge hot-dipped galvanized steel with end locks. The doors can safely withstand 52 pounds per square foot wind loads. Door operation is electric with standard wall mounted push button control. The electric motor operates on 120/1/60 electric service with a 120 VAC Control Circuit.

Some interior doors have added seals for ventilation purposes. Additionally, some doors are fire-rated dependent upon their location and type of service. Fire-rated doors and frames (1 1/2 hours) are UL Listed and include stairwells, the Main Control Room, and the Diesel Generator Room.

Doors accommodating the monorail system are swinging, barn-door type to facilitate monorail operation.

The entrance to the Vitrification Facility is at el. 100' at the NW corner by a standard personnel access door equipped with a card reader.

Door locations and type of service are identified on door schedule, 905-D-738.

B. Vitrification Facility Control Room

The Main Control Room floor is at el. 114.59'. The computer area floor is raised to el. 117.5' for cable access and routing. Both floors have checkered plating. The Control Room is sealed for fire protection purposes. A 1/4" steel plate is buried in the North wall for added radiation shielding. Another 1/4" steel plate is buried in the partial East wall of the Control Room. The ceiling is suspended acoustical tile. Lighting is recessed to avoid shadows and glare. Control Room walls are 5/8" thick type "X" drywall over steel studs with insulation for sound control. Windows are constructed of glass and frame. Normal access and egress to the control room is through a fire door with frame (1 hour minimum fire rated, UL Listed) controlled by a card reader on the NW corner of the room. A double door on the west side of the room provides access to a platform at el. 117.50'. An additional single fire door exit is located at the SE end of the Main Control Room.

The Control Room has been designed in accordance with human factors outlined in Ebasco Approval Request, 1679, "Vitrification Facility Control Room Architectural Design," and Ebasco Approval Request, 1675A, "Conceptual Design Criteria and Recommendations related to the Human Factors Aspects of the Vitrification Facility Control Room, Rev. B."

The initial plan of the control room design is outlined in Ebasco Approval Request, 1673, "Vitrification Facility Control Room Human Factors Engineering Evaluation Program Plan."

The Control Room layout is on General Arrangement, 905-D-032, sheet 2, VF Control Room Arrangement.

C. Facility Restrooms

The floor elevation of the restrooms is 101.88'. Floor construction is a suspended concrete floor placed on structural steel. Restroom walls are one layer of 5/8" thick drywall over steel studs.

D. Ex-Cell Aisleway Hatch

An aisleway carbon steel floor hatch provides access to equipment. The hatch is located at el. 125' on the Northeast side of North Aisle. Access is from the 125' el. to the 110' elevation.

E. Fire Protection

Ex-Cell areas are protected by an automatic wet-pipe system.

The VF Control Room is protected by both a Pre-Action sprinkler system and a Halon-1301 fixed fire extinguishing system. The pre-action system serves as a backup to the Halon System. Halon fire suppression capabilities also exist under the floor in the Main Control Room. The computer floor of the control room is constructed of noncombustible material. The VF Control Room is one-hour fire rated.

The HVAC Control Room is also protected by a Halon-1301 fire-extinguishing system.

All Ex-Cell stairwells are constructed of a structural support system covered by two layers of 5/8" type "X" drywall. Stairwells afford a two-hour fire enclosure. The stairwells are also considered smoke enclosures and constructed for smoke-free egress.

Fire detection, protection, and ratings are explained further in System Description, WVNS-SD-63FP, Fire Detection and Protection.

F. Monorail

The monorail runs on carbon steel "I" beams. There are two rail systems; one at the North aisle and one at East aisle. The I-Beams run parallel to the Vitrification Cell walls. Manipulators are positioned on either side of the cell's windows. Both trolley and hoists for the system are motorized and operated by motorized pendant.

Provisions for removal of manipulators on the monorails is described in System 63K, In-Cell Remote Handling, Maintenance, and Viewing.

G. Cerium IV Containment

A pit or containment for the Cerium IV decon tank is on the Southeast side of the Vitrification Facility at el. 124', between column lines 3 and B, exterior to the Vitrification Cell. The containment is approximately 13' by 5' and surrounds the Decon Mix Tank, 63-D-048. It is lined with stainless steel.

The cerium IV containment is shown on general arrangement drawing 905-D-034.

H. Condensate Pit (Tank)

A circular condensate pit for steam condensate is located on the Southwest side of the Vitrification Facility. The top of pit is at el. 100'.

The condensate pit is shown on general arrangement drawing, 905-D-030. More descriptive information can be found in the Steam Condensate System Description, 63SC.

I. Door #2 Hoist Enclosures

TBD.

2.2.3 Shielding Structures/Rooms

Between column lines 5 and 6 and B and E, there are floor slabs at elevations 111' and 124'. In this area are the Diesel Generator Room, Secondary Filter Room, Crane Maintenance Room, Crane Maintenance Room Operating Aisle, HVAC Control Station, and Transfer Tunnel. The concrete walls vary in thickness from 2' to 4'. The roof is at elevation 144'. These rooms will be described separately below.

There are Built-Up rubber-based exterior roofs at elevations 124' and 144' to provide additional weather protection and rain water control.

A. Crane Maintenance Room

The Crane Maintenance Room (CMR) is a reinforced concrete structure with 2' thick walls, floor, and roof. One hatch is provided in the floor (17' by 13') and one hatch is provided in the roof (13' by 13'). The roof is designed to accommodate (2) hoists capable of lifting 28,000 lbs. each which will be used to leap-frog the main process bridge crane with the backup bridge crane.

The CMR has a 10-gauge stainless-steel liner over the floor and coverage up the walls to 18" above the floor. The floor is at el. 124'. The CMR floor has a removable stainless-steel cover over the top of concrete floor plugs at el 124'.

Hatches between the Transfer Tunnel and the Crane Maintenance Room are constructed of precast, reinforced concrete with steel frame. General Arrangement drawing 905-D-034, Vitrification Facility Plan El. 124' and Above, details the lay down area for the hatch panels. Another roof hatch, a 13' by 13' opening, has a carbon steel cover.

Steel platforms, which support the crane rail, and access stairways are provided at el. 131.33' in the area outside the crane rails.

B. Crane Maintenance Room Operating Aisle

The CMR Operating Aisle is structurally separated from the Vitrification Facility. The enclosure has a 1' thick reinforced concrete floor slab (el. 131.33') and a steel superstructure with insulated siding. The enclosure is supported on the 2' thick Equipment Decontamination Room (EDR) building roof. The floor and interior walls are finished to facilitate decontamination. A 6" high concrete curb is provided on the perimeter of the enclosure. A viewing window, centered on the CMR south wall, and a minimum 6' by 8' opening in the roof are provided. The floor is designed for a 27,000 lbs. load distribution uniformly over a 4' by 4' area. Manipulators can be installed above the windows, although there is currently no plan for their installation. A 2,000 lbs. capacity monorail can be used to install the manipulator. The removable I-beam will clear the top of the manipulator by 2'.

Beneath the Crane Maintenance Room Operating Aisle floor and the top of the Equipment Decontamination Room roof is a crawl space. This crawl space will be heated to protect the pipes from freezing.

C. HVAC Room

The HVAC Room/Diesel Room is at el. 111.50'. It is a reinforced concrete structure with 2' minimum thick walls, floor, and roof. The West portion of the roof is penetrated by the HVAC stack. The HVAC Equipment Station above the Diesel Generator Room has a 1' thick concrete floor at el. 111.50' and access from the outside is provided.

D. Secondary Filter Room

The Secondary Filter Room is a reinforced concrete structure with approximate dimensions of 22' wide by 32' long. The floor is at el. 100, and the height runs to el. 122'. An additional area of 16' by 14' provides room for equipment and maintenance. The walls vary in thickness from 2' to 4'. A window at approximately el. 115' provides an emergency egress from the HVAC room into the Secondary Filter Room.

Structural steel platforms at el. 109.17' and 112.25' provide access for removal of secondary filters from the duct bank. The platforms are rated for live loads of 200 lbs. per square ft.

A 4' high concrete tornado wall is located on the West side of the Secondary Filter Room at el. 124'. The wall protects the HVAC duct running from the ex-cell area to the Crane Maintenance Room.

E. Transfer Tunnel

The Transfer Tunnel is a reinforced concrete structure approximately 16' wide by 32' in length. The tunnel runs between elevations 100' and 122'. Tunnel walls are 4' thick. The floor and walls of the tunnel are lined with stainless steel for decontamination purposes.

A 13' by 17' hatch in the ceiling of the tunnel is comprised of five panels. There is a lay down area in the Crane Maintenance Room for these panel when they are removed.

F. Off-Gas Trench

The Off-Gas Trench is a 1' thick concrete trench running from the Vitrification Facility to the 01-14 Building. The trench exits the Vitrification Facility at el. 95.25' between column lines 4 and 5 and travels approximately 290' to the 01-14 Building. Portions of the trench are cast-in-place. The trench also has removable concrete covers. Trench piping carries off-gases primarily from the ceramic melter to the 01-14 Building for processing.

Utility services for the Vitrification Facility and the Supernatant Treatment System use the trench. These pipes and components belong to the individual utility systems and are not part of the Cell Walls and Ex-Cell Arrangement System.

G. High-Level Waste Trench

Refer to System Description 55, Sludge Mobilization and Transfer, for trench specifications.

H. Rooms of the Original Plant

1. Equipment Decontamination Room (EDR)

The EDR's interior dimensions are approximately 32' wide by 43.7' long by 25' high. The walls are reinforced concrete approximately 3' thick. The floor is 14" thick concrete and the roof is 2' thick concrete.

A shield door on the West side of the room is the prime equipment entrance and exit. On the South end, a 4' thick concrete and steel sliding shield door allows the transfer cart to pass into the former Chemical Process Cell. An entrance for personnel is described in the Load-In Facility System Description, System 63M.

The Vitrification Facility structure is isolated from the adjacent Equipment Decontamination Room structure by a minimum distance of 3" to prevent impact of structures during a design basis earthquake. The separation is sealed at the roof level with flashing and a continuous 9" waterstop. This separation joint is filled with Rodofoam construction filler material.

Embedded steel shield plates are installed on the East and West sides of the separation joint.

2. Chemical Process Cell (CPC)

The Chemical Process Cell is a reinforced concrete structure approximately 93' long by 22' wide by 43' high. The walls are approximately 5'-9" thick. The ceiling is approximately 5' thick. An epoxy coating has been painted on the interior walls to permit washdown and decontamination.

This cell was originally part of the main fuel reprocessing plant and will be used as the Vitrification campaign's High-Level Waste Interim Storage. The facility can accommodate 396 canisters of high-level radioactive waste stored in an 11 rack canister storage system.

2.2.4 Paint and Coatings

The Vitrification Facility concrete surfaces are coated with NU-Klad 114, primed with Amerlock 400 and topcoated with Amerlock 400 Deep Grey or White. The Vitrification Facility aisleway walls are drywall primed with Latex filler or with Alkyd sealer and topcoated with Alkyd Gloss Enamel White. The Cold Chemical Building concrete berm from el. 98.5' to 100' including equipment pads, curbs, and trenches are filled with 9028 M2 and topcoated with Plasite 4030 Charcoal Grey. Remaining carbon steel floors and walls are primed with Amerlock 400 and topcoated with Amerlock 400 Deep Grey or White.

2.2.5 Ex-Cell Shielding

A. Ex-Cell Aisleways

Shielding may be added later to the cell "cold" face at locations determined by the actual dose rates. Embedded plates and swivel anchors can be utilized as anchor points for adding shielding above elevation 125'.

B. Control Room

A 1/4" steel plate has been installed from elevations 117' to 125' in the North wall of the Vitrification Control Room. The plate extends six feet beyond the North wall within the East wall. A 3/8" checkered plate which supports the computer floor also provides additional shielding.

C. Waste Tank Farm Trench

The Waste Tank Farm trench enters the Vitrification Facility at the Northwest corner. Shielding from the high-level waste is provided. Shielding consists of 12" stair-stepped steel plate at elevation 100'.

2.2.6 Platforms/Ladders/Handrails

Handrails are provided for all stairs, platforms, and floors and are fabricated of welded pipe unless otherwise noted on drawings. Handrails and fixed ladders conform to OSHA Federal Regulations and are topcoated yellow.

All stairwell/platforms have a 100 lb./ft^2 live load.

A. Exterior Platforms

Exterior platforms are metal grating approximately 1 1/4" thick.

Some platforms are galvanized steel.

2.2.7 Lighting/Lighting Levels

Lighting standards shall be in accordance with the Federal Property Management Regulations. Emergency lighting shall be provided for all locations where lighting is necessary for the safety of personnel and/or equipment.

Adequate lighting is necessary for performing various operations and inspections associated with the vitrification process, and to allow for safe egress of personnel. Lighting systems are designed to provide illumination throughout the Vitrification Facility during normal and off-normal plant operations. The lighting systems are designed to provide sufficient illumination to enable the plant operators to perform all manual operations and to move safely through essential areas of the VF. Interior lighting, exit lighting, and emergency lighting systems comply with the Vitrification Facility Electrical Power Distribution system description (System 63ED) and WVNS-DC-022, Design Criteria Vitrification of High-Level Wastes.

2.2.8 HVAC Zones

HVAC zones of the Vitrification Facility are maintained through the use of barriers, such as walls, aisleways, and doors. The walls, aisleways, and doors prevent the spread of contamination between rooms. There are differential pressure ranges maintained with reference to atmosphere or adjacent zones throughout the facility.

HVAC zones are described below:

Zone I - designates areas that may contain radioactive materials during normal operations.

Zone II - designates the operating area and other potentially contaminated areas surrounding Zone I.

Zone III - designates areas inside of buildings that are expected to be free of contamination.

The Vitrification Cell, Tunnel, and Crane Maintenance Room are Zone I and are kept under negative pressure. The shielding structures of the facility are Zone II and are kept under a lesser negative pressure than the cell area to assure air flow into the cell. Ex-Cell aisleways and the Control Room are Zone III and are kept under a lesser negative pressure than shielding areas to assure air flow into Zone II areas.

Refer to WVNS-SD-67, VF HVAC System Volume I (Air Side) for specific ventilation requirements.

2.3 Component Descriptions

The cell walls, ex-cell aisleways, and shielding structures are integral to the Vitrification Facility. There are no individual components in this system.

2.4 Interface Descriptions/Requirements

The Vitrification Facility Cell Walls, mat, and floor are a confinement barrier for the primary systems used in vitrification operations. The walls, mat, and floor interface indirectly with components, structures, and utilities used in the vitrification process.

The building is designed to carry all loads associated with components, systems, equipment changeouts (exception: shield windows), and operation activities.

The Facility metal enclosure surrounds the Vitrification Cell, other shielding areas, ex-cell areas, and exterior rooms. The structural steel of the metal enclosure, floor slabs, platforms, and stairwells, interface indirectly with vitrification support activities and components.

Mechanical and electrical supports and hangers for other systems are not interfaces to the Cell Walls and Ex-Cell Arrangement. They are addressed in the system requiring the supports or hangers.

Although the cell walls, metal building, aisleways, rooms, and shielding structures serve to anchor, support, or enclose other structures and systems, there are very few direct interfaces and no direct interface requirements.

The following systems have direct interfaces to the Cell Walls and Ex-Cell Arrangement system; however, they are not dependent upon this system for process or control requirements.

63K - In-Cell Remote Handling, Maintenance, and Viewing:

The In-Cell Remote Handling, Maintenance, and Viewing System interfaces with the cell walls and ex-cell arrangement by penetrations through cell walls for windows, doors, and mechanical attachments to this system. Operation and administrative control for these are detailed in System 63K, In-Cell Remote Handling, Maintenance, and Viewing.

63ED - VF Electrical Power Distribution:

The Electrical Power Distribution system interfaces to the VF Cell Walls and General Arrangement for lighting of ex-cell aisleways, power to VF rollup door motors (2), card readers at designated shield and access doors, and closed circuit television(s). Power requirements to these components or systems are defined in system descriptions for Systems 63K and 63ED.

63IA - VF Instrument Air:

The Instrument Air System supplies air for inflatable seals on Doors #1 and #2. Operation of the Door #2 seals and air requirements will be outlined in System 63K, In-Cell Remote Handling, Maintenance, and Viewing. Air pressure and flow rate is detailed in System 63IA, Vitrification Facility Instrument Air.

63FP - Fire Detection and Protection:

Fire Detection and Protection interfaces to ex-cell aisleway sprinkler heads and the VF Process Control Room and the HVAC Control Room Halon fire extinguishing systems. Requirements for these interfaces are outlined in 63FP, Fire Detection and Protection.

63WW - VF Drains:

The VF Drain System interfaces to the Cell Walls and General Arrangement by floor drains in the Vitrification Cell, Transfer Tunnel, Diesel Generator Room, the Secondary Filter Room, Crane Maintenance Room, HVAC Control Room, Truck Lock Area, and ex-cell operating aisleways. Locations of the drains are described in System 63WW, VF Drains.

67 - VF Heating, Ventilating, and Air Conditioning:

The Heating, Ventilating, and Air Conditioning System interfaces to the Cell Walls and Ex-Cell Arrangement through various piping and ductwork through the cell walls and ex-cell areas. Requirements for HVAC are outlined in System 67, VF Heating, Ventilating, and Air Conditioning.

2.5 Periodic Test Requirements

The Cell Walls and Ex-Cell Arrangement is a passive system. However, a continual level of safety and maintenance should be maintained. The following areas or items should be addressed prior to and during facility operation for the duration of the Vitrification campaign.

2.5.1 Shielding Verifications

Periodic dose rates should be taken at predetermined locations during facility walkdowns.

2.5.2 RadCon Program

The West Valley Demonstration Project Radiological Controls Manual should be used to verify the placement and requirements of air monitors in the Vitrification Facility.

2.5.3 Freeze Protection

The establishment of the freeze protection preventative maintenance program should be designed in accordance with WV-108, Preventative Maintenance Recall Tracking System.

A. Door Seals

Freeze protection checks should be performed on exterior surfaces and door seals of the Vitrification Facility to verify that seals are working properly and that weather conditions have not compromised door closures.

Normal rounds should be arranged to ensure that all exterior doors are operated once per shift.

B. Weather Enclosure

The Vitrification Facility metal enclosure should be checked to ensure that the facility interior, exterior, and ex-cell areas remain free from rain water, snow, and ice accumulation.

Normal rounds should be arranged to ensure that the facility remain free from rain water, snow, and ice accumulation once per shift.

C. Heat Tracing

Heat tracing should be checked to ensure that it is working properly and the pipes are free from ice buildup. Areas to be checked include piping in the crawl space under the Crane Maintenance Room Operating Aisle, sanitary sewer lines, and the pipe chase from the Process Building to the East side of the Vitrification Facility.

Shift Round-Sheets should address heat tracing operation on a shift by shift basis from October through April.

2.5.4 Wall Surfaces and Berm Areas

Painted wall surfaces and berms should be checked to ensure that surfaces are smooth without cracks, chips, peeling, or rusting.

Defects in painted wall surfaces and berms should be reported to the Shift Supervisor.

2.5.5 Door Operation/Hardware

During routine operation of facility doors, door hardware, and card readers, any equipment found to be defective should be reported to the Shift Supervisor.

2.5.6 Fire Stops

Fire penetration sealing material around cabletrays and conduit and between rooms of the Vitrification Facility should be checked to maintain standards in accordance with National Fire Protection Codes.

Normal rounds should address the integrity of fire stops (TBD).

2.5.7 Structural Defects

Any apparent structural defects or cracks in the foundation or concrete walls of the Vitrification Facility should be immediately brought to the attention of the Shift Supervisor.

2.5.8 Facility Walkdown

A facility walkdown should be performed to ensure the general safety of the ex-cell aisleways, operation areas, and that pull spaces/equipment operating envelopes have been maintained.

General housekeeping should be performed in accordance with procedure WV-110, Conduct of Operations.

2.6 Safety Classes and Quality Levels

Component	Location	Safety Class	Quality Level
Concrete Cell, Shielding Structures	VF Cell	B	B
Shield Wall Penetrations (for manipulators, periscopes, access plugs, utility plugs)	VF	B	B
Sheet Metal Bldg., Aisleways, CMROA, Door #2 Hoist Enclosure	VF	N	N
Off-Gas Trench	VF to 01-14	C	C

3.0 OPERATIONAL REQUIREMENTS

The Cell Walls and Ex-Cell Arrangement does not operate or control any activities or operations; therefore, there are no operational requirements for this system.

4.0 LIMITATIONS, PRECAUTIONS, RANGES/SETPOINTS

4.1 Limitations

4.1.1 Shield Plugs

Shield plugs have been inserted in unused cell penetrations to protect facility operators from radioactivity and from airborne contamination exiting the Vitrification Cell. Shield plugs should not be removed without safety precautions to control these hazards.

4.1.2 Shield Window Changeout

Due to the limited floor load capacity of the ex-cell aisleways (250 lb/ft^2 North Aisle, 150 lb/ft^2 East and West Aisles), distribution of shield window loads should be considered prior to window changeout.

4.1.3 Tunnel Hatch Storage

Crane Maintenance Room/Tunnel hatch panels when removed must not be laid more than one high. Panels should be placed in the hatch laydown area as shown on General Arrangement drawing, 905-D-034, Vitrification Facility Plan El. 124' and Above.

Floor loading limitations for the Crane Maintenance Room are TBD.

4.1.4 Pull Spaces/Head Spaces

Pull spaces for filters, the CLCW Heat Exchanger, and Chiller heat exchangers should be maintained as indicated on general arrangement drawings.

Minimum head spaces are to be maintained per the Life Safety Code.

4.2 Precautions

4.2.1 Ventilation Considerations

Propping open any facility mandoors will be by special procedure or Shift Supervisor instruction only.

4.2.2 Supporting and Anchoring of Equipment

The support of pipes, conduit, equipment, etc. from the metal building purlins or rafters is prohibited unless reviewed and accepted by Engineering. Purlins and rafters will not support any additional loads.

The installation of concrete anchors into the ex-cell floors at elevations 110' and 125' should be reviewed by Engineering prior to any issue of work orders.

4.3 Ranges/Setpoints

Temperature ranges for occupied areas and aisleways shall be maintained per System 67, VF Heating, Ventilating, and Air Conditioning.

5.0 REFERENCE DOCUMENTS

WVNS-DC-022 - Design Criteria Vitrification of High-Level Wastes

WVNS-CS-134 - Vitrification Facility Civil/Structural Installation

WVNS-CS-139 - Vitrification Mechanical, I&C, and Electrical Installation

WVNS-WPI-001 - Wall Penetration Index

WVNS-SD-55 - Sludge Mobilization and Transfer

WVNS-SD-63M - Load In Facility

WVNS-SD-63IA - VF Instrument Air

WVNS-SD-63FP - Fire Detection and Protection

WVNS-SD-63SC - VF Steam and Condensate

WVNS-SD-63WW - Vitrification Facility Drains

WVNS-SD-63ED - VF Electrical Power Distribution

WVNS-SD-67 - Vitrification Facility HVAC System Volume I (Air Side)

DOE ID-12044 - Operational Safety Design Criteria Manual

WVNS-EQ-265 - Vitrification Cell Wall Modules

WVNS-EQ-264 - Special Doors for Vitrification Facility

WVNS-CAL-004 Seismic Calculations for Vitrification Blank Penetration Plugs

WVNS-FA-122 - Vitrification Facility Penetration Shield Plugs

WVNS-EQ-308 - Vitrification Facility Equipment Specification for Oil-Filled Viewing Windows

WVNS-CAL-017 - Seismic Calculations for Vitrification Transfer Drawer and Manipulator Penetration Plugs

WVNS-EQ-307 - Vitrification Facility Master-Slave Manipulators

WV-110 - Conduct of Operations

WV-108 - Preventative Maintenance Recall Tracking System

EBAR 1679 - Vitrification Facility Control Room Architectural Design Criteria, September 16, 1992

EBAR 1675 - Human Factors Engineering Compliance Report, December 31, 1992.

EBAR 1673 - Vitrification Facility Control Room Human Factors Engineering Evaluation Program Plan, August 30, 1992.

EBAR 1675A - Conceptual Design Criteria and Recommendations Related to the Human Factors Aspects of the Vitrification Facility Control Room, August 11, 1992 and November 3, 1992.

WVDP-010 - Radiological Controls Manual

APPENDIX A
REFERENCE DRAWINGS

General Arrangements

905-D-030 - General Arrangement Vitrification Facility Plan El. 100.00'

905-D-031 - General Arrangement Vitrification Facility EDR, CPC, Plan El. 100.00'

905-D-032, sh.1 - General Arrangement Vitrification Facility Plan El. 110.25'

905-D-032, sh.2 - VF Control Room General Arrangement

905-D-033 - General Arrangement Vitrification Facility EDR, CPC Plan El. 117.00'

905-D-034 - General Arrangement Vitrification Facility Plan El. 124.00' and Above

905-D-035 - General Arrangement Vitrification Facility EDR, CPC Plan El. 131.00'

905-D-036 - General Arrangement Vitrification Facility Sections

905-D-037 - General Arrangement Vitrification Facility Sections

905-D-038 - General Arrangement Vitrification Facility Sections

905-D-039 - General Arrangement Vitrification Facility Sections

905-D-040 - General Arrangement Vitrification Facility Plan El. 146.25' and Roof

905-D-058 - Pneumatic Sample Transfer Drawer P&ID

905-D-738 - Vitrification Facility Door Schedule