West Valley Demonstration Project

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SYSTEM DESCRIPTION

VITRIFICATION LOAD-IN FACILITY
SYSTEM 63M

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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
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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. 1

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
907-D-021	P&ID, Fire Protection
907-D-022	P&ID, Steam & Condensate

907-D-023	P&ID, Drainage
907-D-060	Piping Plan at EL. 100'
907-D-061	Piping Plan at EL. 100'
907-D-062	Piping Plan at EL. 112'
907-D-063	Piping Plan at EL. 112'
907-D-064	Piping Sections
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907-D-066	Embedded Piping Sections
907-D-067	Hot Cell Drain Details
907-D-501	Pipe Support Details
907-D-560	Pipe Supports at EL. 100'
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907-D-562	Pipe Supports at EL. 112'
907-D-563	Pipe Supports at EL. 112'
907-D-564	Pipe Support Sections
907-D-100	Civil General Notes
907-D-101	Foundation Plan & Details
907-D-102	Foundation Plan & Details
907-D-103	Foundation Plan & Details
907-D-104	Foundation Embed Details
907-D-105	Roof Framing Plan
907-D-106	Vertical Bracing & Column Base Plates
907-D-107	Vertical Bracing
907-D-108	Crane Girder Details
907-D-109	Girt Framing Sections
907-D-110	Girt Framing Sections & Details
907-D-111	Change Rm. Concrete & Steel Details
907-D-112	Trench Plan & Details
907-D-113	Stairs and Platforms
907-D-114	Stairs and Platforms
907-D-115	Stairs and Platforms
907-D-116	Stairs and Platforms
907-D-117	EDR West Wall Penetration
907-D-118	Shielded Labyrinth
907-D-150	Architect. Plans & Details
907-D-151	Architect. Elev. & Details
907-D-152	Architect. Elev. & Details
907-D-153	Door Sch. Plan & Misc. Details
907-D-154	Architect., Sections & Misc. Details
907-D-401	H & V Air Flow Diag. & P&ID
907-D-402	H & V Plans
907-D-403	H & V Sections & Details
907-B-300	I & C Drawing Index
907-B-302	Logic Diagrams (Sht. 004 through 012)
907-B-304	Control Wiring Diagrams (Sht. 001, 2, 7, 8, 11, 12, & 15 through 30)

907-D-200	Grounding Plan
907-D-201	Conduit and Grounding Plan
907-D-202	Conduit Sections and Details
907-D-203	Lighting Plan
907-D-204	Lighting & Power Panel Schedule
907-D-205	Security System Location
907-D-206	Communication System Location
907-A-210	Cable & Conduit List

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APPENDIX B
OPERATIONAL TESTING

At the time the Load-in Facility is released and turned over by construction, the following systems or components will have been checked out and made operational:

1. Building lighting, including emergency lighting.

2. Automatic wet pipe fire sprinkler system.

3. Steam and electric unit heaters.

4. Make up air heating and ventilation system.

5. Two 12 ft. x 14 ft. electric operated vertical lift doors.

6. A 15-ton, radio controlled bridge crane.

7. The electric operated 12 ft. x 14 ft. EDR shield doors.

Periodic operational testing of the above listed systems and components are addressed under 2.5 Periodic Test Requirements and will be included under operational SOPs to be developed for the facility.

Tests

I. Differential Pressure Override and Alarm Functions:

1. Calibrate EDR/Load-in differential pressure monitor and readout.

2. Verify alarm functions (flashing red light over canister port and acknowledgement at the V019 Vit HVAC control panel) at 1/4" WG differential pressure.

3. Verify exhaust fan EF-1 stops and the exhaust damper LV-2 closes at the 1/4" WG reading.

4. Reset alarm signal and verify that EF-1 restarts and LV-2 opens as differential pressure recovers above 1/4" WG.

Reference the following drawings for location, P&ID, and CWDs:

907-D-401	Vitrification Facility Load-in Building H&V Air Flow Diagram and P&ID
907-D-402	Vitrification Facility Load-in Building HVAC Plans
907-D-403	Vitrification Facility Load-in Building HVAC Sections and Details

907-D-302 Sht 4 Load-in Facility Logic Diagram Units EF-1 & HV-1

907-D-302 Sht 5 Load-in Facility Logic Diagram Dampers LV-1 & LV-2

907-D-304 Sht 7 Load-in Facility CWD-Differential Pressure Switch

907-D-304 Sht 8 Load-in Facility Installation Diagram DPS

II. Canister Load-in Port:

The testing of the canister load-in port can only be accomplished as a part of loading in canisters for hot operations.

1. Using the 15-ton bridge crane, place a canister on the roller conveyor in front of the canister port.

2. QC to perform final canister visual inspection and document.

3. Move shield plug away from the port opening.

4. Slide air shield aside from port opening.

5. Insert canister through the port opening and into the canister tipping device.

6. Slide air shield over port opening.

7. Verify operation of canister tipping device by TV monitor.

Removal of canister and the placement of canister in the transfer cart is controlled from the EDR crane operating aisle. Repeat the above steps 1, 2, 4, 5, 6, & 7 until four canisters are loaded into the EDR. After the fourth canister has been loaded in then:

1. Slide air shield over port opening.

2. Move shield plug over the port opening.

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