West Valley Demonstration Project

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SYSTEM DESCRIPTION
VITRIFICATION FACILITY
POTABLE WATER

SYSTEM 63PW

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WVNS RECORD OF REVISION

DOCUMENT

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WVNS RECORD OF REVISION CONTINUATION FORM

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SUMMARY

The Vitrification Facility Potable Water System (63PW) receives drinkable water from the Main Plant and distributes it to the Vitrification Facility Eye Wash and Shower Stations and Rest Rooms. Maximum water requirements are 65 gpm at pressures between 30 and 65 psig.

Potable water is processed by the Main Plant Facility in accordance with NYS Department of Health Standards. Main Plant Operations is responsible for the operation and maintenance of the Main Plant Potable Water System.

VITRIFICATION FACILITY
POTABLE WATER

Rev. 0

1.0 SYSTEM FUNCTIONS & DESIGN CRITERIA

1.1 Functions

The function of the Vitrification Facility (VF) Potable Water System is to distribute the potable water, received from the Main Plant Service Water Equipment, to Eye Wash and Shower Stations, and Rest Rooms, located in the Vitrification and Cold Chemical Buildings.

1.2 Design Criteria

The Vitrification Facility Potable Water System shall be designed to the requirements stated in DC-022 and the "Operational Safety Design Criteria Manual", ID-12044.

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

1.2.1 Process Requirements

The system shall distribute potable water to rest rooms in the vitrification building, and eye wash and shower stations located in the vitrification building and the cold chemical building.

Eye wash and shower stations shall be supplied with potable water at minimum flow rates of 30 gpm and minimum pressure of 30 psig.

Eye wash stations shall have a water velocity low enough not to be injurious to the user.

1.2.2 Structural Requirements

The piping system shall be constructed in compliance with the Uniform Building Code and ASME B31.3.

1.2.3 Essential Features

Potable water shall be suitable for drinking per NYS Department of Health Standards.

The Potable Water System shall be maintained and tested in accordance with NYS Department of Health Standards and WVNS Standard Operating Procedures.

A backflow preventer valve shall isolate the Vitrification Facility Potable Water System from the Main Plant Potable Water System. The valve shall provide backflow protection, preventing chemical and bacteriological contamination of the Main Plant System.

1.2.4 Maintenance and Inspection

Flushing and testing of piping shall be performed in accordance with CS-139, "Vitrification Mechanical, I&C, and Electrical Installation," Section 15110.

Disinfection of the potable water system shall be performed in accordance with AWWA C651, "Disinfecting Water Mains."

Maintenance and testing of Eye Wash and Shower Stations shall be performed in accordance with ANSI Z358.1, "American National Standard for Emergency Eyewash and Shower Equipment."

Maintenance and testing of the backflow preventer shall be performed annually per NYS DOH Standards, Section 5. The backflow preventor must also be tested and accepted within 45 days prior to being placed into service.

1.2.5 Instrumentation and Control

None.

1.2.6 Interfacing Systems

The VF Potable Water System has direct interfaces with the following systems:

System 15 - Common Facilities

System 32 - Cooling and Service Water Equipment

System 63DV - VF Drain, Waste, Vent

System 63ED - VF Electrical Power Distribution

System 63WW - VF Drains

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 Potable Water System shall be achieved by adherence to the Quality Assurance Program Plan, and WVNS Standard Operating and Maintenance Procedures.

Flushing, hydrostatic testing, and disinfection of the system shall meet all applicable codes and standards.

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 Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment

AWWA C511 - Reduced - Pressure Principle Backflow - Prevention Assembly

AWWA C651 - Disinfecting Water Mains

NYS Department of Health Standards - Section 5

SOP-32-01 - Plant Water System

SOP-32-04 - Potable Water System Operation

SOP-32-09 - Procedure for the Analysis of Utility Room Water Samples

2.0 DESIGN DESCRIPTION

(Background)

Potable water is produced at the Main Plant (System 32) in a 1050 gallon Potable Accumulator Tank (32C-1). Plant utility water is pumped to the tank on demand. A Duotrol Unit controls the volume in the tank and allows the tank to be pressurized to 65 psig. The utility water is chlorinated and disinfected to New York State Health Regulations and distributed, via System 15 piping, to wash rooms, drinking fountains, safety showers and eyewash stations at the WVDP. The maximum potable water flow rate of the current plant system is restricted to 50 gpm. After installation of new accumulator tank in May 1995, the VF flow requirements of 65 gpm will be accommodated. The operation of the Main Plant Potable Water System is described in SOP-32-04, "Potable Water System Operation, and "SOP-32-09, "Procedure for the Analysis of Utility Room Water Samples".

2.1 Functional Description

The VF Potable Water System receives potable water from the main plant system and distributes it to a rest room facility and three eyewash and shower stations located in the vitrification building, and three additional eyewash and shower stations located in the cold chemical building. A Back Flow Preventer provides a physical barrier to prevent back flow to the plant potable water system and possible chemical and bacterial contamination of the main plant potable water system. Expended water from the eyewash and shower stations is discharged to the VF Drains System (System 63WW), while the effluent from the rest rooms is discharged to the VF Drain, Waste and Vent System (System 63DV). The potable water piping system is flushed every week to keep the water fresh. Warning signs 'not to drink the water' are posted at every potable water outlet when the minimum clorine concentration falls below 0.3 ppm.

2.2 Physical Description

The VF Potable Water System consists of a distribution system primarily made up of pipes and valves, six eyewash and shower stations, and a rest room facility.

2.2.1 Distribution System

Potable water from the main plant is delivered to the VF Potable Water System by a two inch pipe (15-PW-375-2). Line 6-PW-1 1/2-001 enters the vitrification building at the south end of the Middle East Operating Aisle (MEOA) and connects with the VF distribution system at interface valve 6-PW-H-001. The water then passes through a backflow preventer valve 6-PW-BP-421 and follows the vitrification distribution line to the utility pipe rack in the Upper East Operating Aisle (UEOA). From here the potable water header traverses the upper east, north and west operating aisles (UEOA, UNOA, and UWOA respectively) supplying its product, via various line drops, to six eyewash and shower stations and a rest room facility.

The first drop (line 6-PW-1 1/2-004) goes to eyewash and shower station 6-PW-ES-416, which is located in the UEOA. The second drop goes to station 6-PW-ES-415, located in the East Truck Lock (ETL); the third drop goes to the rest room facility located south of the West Truck Lock (WTL); and the fourth drop goes to station 6-PW-ES-417, located in the south end of the MWOA. The main distribution line then goes to the cold chemical building via line 6-PW-1 1/2-401, where it provides water to the eyewash and shower stations 6-PW-ES-418, 419, and 420, which are located in the Cold Chemical Equipment Room (CCER), Cold Chemical Scale Room (CCPR) and Cold Chemical Pump Room (CCSR) respectively. Table I summarizes the locations, supply lines and valves for each VF potable water user.

Table I

VF Potable Water Users	Location	Branch Lines	Block Valves
VIT Eyewash & Shower Station 6-PW-ES-415	ETL	6-PW-1 1/2-002	6-PW-GT-003
VIT Eyewash & Shower Station 6-PW-ES-417	MWOA	6-PW-1 1/2-006	6-PW-GT-007
VIT Eyewash & shower Station 6-PW-ES-416	UEOA	6-PW-1 1/2-004	6-PW-GT-005
Rest Room Facilities	South of WTL	6-PW-1-010	6-PW-H-012
CC Eyewash & Shower Station 6-PW-ES-420	CCSR	6-PW-1 1/2-406	6-PW-GT-406
CC Eyewash & Shower Station 6-PW-ES-419	CCPR	6-PW-1 1/2-403	6-PW-GT-403
CC Eyewash & Shower Station 6-PW-ES-418	CCER	6-PW-1 1/2-402	6-PW-GT-402

2.2.2 Eyewash and Shower Stations

The eyewash and shower stations are purchased as commercial equipment that was tested to the requirements of ANSI Z358.1-1990. Each station is provided with potable water at pressures between 30 and 65 psig to meet the flow requirements of the ANSI specification. The stations in the vitrification building are located near chemical storage tanks, ports to add chemicals to the vitrification process, and other chemical handling areas. Expended water from these safety stations is collected via the VF Drains (System 63WW) and disposed of via the interceptor. In the cold chemical building one station is placed in each of the three chemical process areas, which includes the Equipment Room, the Pump Room and the Scale Room. The expended water is collected in

the cold chemical building sump and transferred to the waste hold tank for disposal. Each eyewash and shower station is tested and flushed once every week for proper operation.

2.2.3 Rest Room Facility

The rest room facility includes a Ladies Room and a Mens Room and is located on the west side of the vitrification building with access from the West Truck Lock. Potable water is piped to a water closet and a sink in each rest room, plus a urinal in the mens room. Hot water for the sinks is provided by the Hot Water Tank (6-PW-E-001) which is located in the ladies room. The effluent from the rest rooms is collected by the VF Drain, Waste and Vent System (System 63DV). The waste piping, which includes a floor drain for each rest room, takes the effluent to Lift Station DWV-D-001, which grinds it and pumps it into Manhole No. 2. Although the system is designated as 63DV, the piping and components in the field are tagged as DWV.

2.3 Component Descriptions

Hot Water Tank VF Rest Room (6-PW-E-001) - 15 gallons, glass-lined, with baked enamel finish, temperature range 120 - 170° F, 150 psi, ANSI Standard, UL 174.

Backflow Preventer (6-PW-BP-421) - bronze body construction, replaceable seats, with bronze strainer, for 3/4" to 2", 140° F, 175 psi, ASSE No. 1013, AWWA C506, CSA B64.4, FCCC-HR, IAPMO, and SBCCI (Standard Plumbing Code).

Relief Valve on Rest Room Hot Water Tank (6-PW-RV-036) - bronze body, stainless-steel spring, size 3/4", automatic temperature and pressure relief protection, AGA and ASME rated, ANSI Z21.22 certified, and 100XL.

2.4 Interface Description

This section summarizes the interface parameters between the VF Potable Water System, it's input sources and the user requirements. Maximum potable water requirements for the VF System are 65 gpm at minimum pressure of 30 psig. This estimate is based on the assumption that a maximum of two showers are required at the same time for any emergency situation.

2.4.1 System 215 (Common Facilities)

Distributes potable water from the main plant tank to WVDP users, including the vitrification facility. The VF System receives potable water via line 15-PW-375-2, which is adequate to provide the required flow rate and pressure.

2.4.2 System 32 (Cooling and Service Water Equipment)

Prepares potable water in accumulator tank 32C-1 in accordance with NYS Department of Health Standards and WVNS Standard Operating Procedures. The tank is pressurized between 60 and 65 psig to accommodate water distribution to the WVDP users via system 15. The current system is restricted to a maximum flow rate of 50 gpm. When the new accumulator tank (32C-2) is installed the VF flow requirements of 65 gpm will be accommodated.

2.4.3 System 63ED (VF Electrical Power Distribution)

Hot Water Tank 6-PW-E-001 is connected to power panel PP9. When the heating elements are operating they draw 1.0 KVA of electricity.

2.4.4 System 63DV (VF Drain,Waste,Vent)

The system receives effluent from two water closets, two sinks, one urinal and two floor drains at an estimated average flow rate of 0.5 gpm.

2.4.5 System 63WW (VF Drains)

The Low Level Drains Circuit of this system receives the discharge from eyewash and shower stations located in the vitrification building, and the Cold Chemical Drains Circuit receives the discharge from stations located in the cold chemical building. Eye Wash and Shower Stations are flushed every week with an estimated discharge of 5 gallons per station. Emergency uses of the stations are unpredictable.

2.5 Periodic Test Requirements

Eyewash and shower stations must be flushed by Vit Operations once a week in accordance with ANSI Z-3581.1-1990, "American National Standard for Emergency Eyewash and Shower Equipment".

The pressure relief valve on the hot water tank must be tripped once a year to ensure that water ways are clear.

2.6 Safety Classes and Quality Levels

Table II

COMPONENT	LOCATION	SAFETY CLASS	QUALITY LEVEL
Piping	VIT, Cold Chem Bldg.	N	C
Valves	VIT, Cold Chem Bldg.	N	C
Tank 6-PW-E-001 Hot Water Tank	VIT Bldg, Women Rest Room	N	C
Backflow Preventer Valve 6-PW-BP-421	VIT Bldg, MEOA.	N	C

3.0 OPERATIONAL REQUIREMENTS

There are no vitrification operational requirement to control the VF Potable Water System.

During a site-wide power outage, the main plant potable water system will continue it's operation on backup power provided by a diesel generator.

When the potable water clorine level falls below a minimum concentration of 0.3 ppm Main Plant Operations will post a sign at each potable water outlet 'not to drink the water' until the problem has been corrected.

Operation of the Main Plant Water System is described in SOP-32-01, "Plant Water System."

Operation of the Main Plant Potable Water System is described in SOP-32-04, "Potable Water System Operation."

Procedures for the analysis of utility room water (including Potable Water) are described in SOP-32-09.

4.0 LIMITATIONS, PRECAUTIONS, RANGES/SETPOINTS

4.1 Limitations

The Potable Water System has been designed for water pressures of 150 psig. Water will be supplied at the interface between the Main Plant Potable Water System and the Vitrification Facility Potable Water System at a maximum pressure of 65 psig. Water pressure at the receiving components will vary dependent on their location and the number of simultaneous potable water users.

4.2 Precautions

Adherence to the sequence of operations outlined in SOP-32-04, "Potable Water System Operation," will maintain acceptable limits for chlorination levels, flows, and pressures. When the main plant potable system is shut down for maintenance, provisions must be made for portable eyewash and shower stations to support any chemical operations, or the process must be curtailed during the outage period.

4.3 Setpoints

Pressure Relief Valve, 6-PW-RV-036, on the VF Rest Room Hot Water Tank, is set to 150 psig and 210° F.

5.0 CASUALTY EVENTS AND RECOVERY PROCEDURES

In case of a failure in the main plant potable water system Vit Operations is notified of the failure and chemical operations must be curtailed or portable eyewash and shower systems must be made available at the process site to continue the operation.

During power outages the main plant system will continue to provide potable water using backup power provided by diesel generators.

6.0 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

SOP-32-01 Plant Water System

SOP-32-04 - Potable Water System Operation

SOP-32-09 - Procedure for the Analysis of Utility Room Water Samples

ANSI Z-358.1-1990 - American National Standard for Emergency Eyewash and Shower Equipment, Revision of ANSI Z358.1-1981

Appendix A - Drawings

15AA-63 - Potable Water Distribution P&ID

15R-A-71 - (Bechtel) Utility P&ID Water Systems Utility Building

32R-A-3 - (Bechtel) P&ID Cooling and Potable Water

905-D-021 - P&ID Cold Chemical Water Systems.

905-D-051 - Vitrification Facility Potable Water System & Natural Gas.

905-D-057 - Vitrification Rest Rooms P&ID.

Vitrification Facility (VF) Instrumentation and Control Hardware and Software

System Description
(Systems 200A & 200B)

SD:0003249.01