SERVICE WATER SYSTEM FLOW REQUIREMENTS (gpm)[3]

Component Name	Normal Operation (Nominal)	Shutdown Operation (Nominal)	DBA Operation SW = 85°F
Critical Service Water Header			
Containment Air Coolers	2000-7500	2000-7500	4800[7]
CCW Heat Exchangers[2]	<6000	<6000	4214[8] 4286[12]
Engineered Safeguards Room Coolers	400[4]	400[4]	70[9]
Emergency Diesel Generators	-	-	214[10]
Control Room Air Conditioning	12[5]	12[5]	39[11]
Instrument Air Compressors (C-2A, C-2C)	16	16	16[14]
Alternate to Replenish SFP[13]	-	40	-
Noncritical Service Water Header[6]			
Hydrogen Coolers	2610[1]	-	-
Exciter Air Coolers	370[1]	-	-
Turbine Lube Oil Coolers	2510[1]	-	-
Seal Oil Cooler	125	-	-
EHC Oil Coolers[5]	20	-	-
Isophase Bus Cooler[5]	35	-	-
Instrument Air Compressor C-2B Aftercooler	8	8	-
Main Feedwater Pump Lube Oil Cooler	78	-	-
Main Feedwater Pump Gland Cooler	40	-	-
Heater Drain Pump Cooling	50	-	-
Blowdown Heat Exchanger (E-31)	60-420	-	-
Circ Water and Intake Basin Chlorinator	50	50	-
Hydrogen Dryer	2	-	-
Cooling tower Pump Seal and Bearing Water	95	-	-
Makeup Raw Water Supply (Intermittent)	150-500	150-500	-
Condensor Vacuum Pump	-	10	-
Aux Building Addition Air Conditioning Unit	28.8	28.8	-
Ventilation Equipment Room Air Cooling Unit	28.8	28.8	-
Radwaste Area Compressor	20	20	-
Auxiliary Building Condensing Unit	130	130	-
FWP Air Compressor	65.2	65.2	-
C-42 Panel and Sample Coolers	84	-	-
FWS Sample Cooler SCI-0710-C (to M-97(B))	40	-	-
Condensate Pumps	16	-	-
CD Bldg Boiler Sample (measured) Cooler	1.6	1.6	-
Radiation Monitors	10	-	-

SERVICE WATER SYSTEM FLOW REQUIREMENTS (gpm)[3]

NOTES:

(1)- Flow is temperature controlled.

(2)- DBA Requirement for Post-RAS mode only, flow is temperature controlled prior to RAS.

(3)- The flows listed for DBA operation are required flows at that SW temperature, the actual flow to each component is set periodically by Technical Specification Surveillance Test RO-216, which balances the system flows.

(4)- SW flows continuously to the ESGR Coolers. There is minimum heat load in the rooms during normal operation and slightly more heat load (SDC System) during shutdown operation. The 400 gpm is not a cooling requirement but is the approximate indicated flow.

(5)- Only one unit (or set of coolers) is operated at one time.

(6)- Flows listed here are from original Bechtel figures and have not been verified.

(7)- EA-LOCA-2001-01, Rev 1, Total of 4800 gpm to VHX-1,2,3 in D/G 1-1 failure case.

(8)- EA-LOCA-2001-01, Rev 1, Total of 4214 gpm to both E-54A,B in D/G 1-2 failure case.

(9)- EA-D-PAL-93-272F-01 Rev 1.

(10)- EA-EC28106-03 Rev 0 and EA-EC28106-04 Rev 0.

(11)- EA-D-PAL-93-272E-02 Rev 0.

(12)- EA-LOCA-2001-01, Rev 1, Total of 4286 gpm to E-54A,B in D/G 1-1 failure case.

(13)- Provisions exist to allow the Service Water System to replenish the Spent Fuel Pool (SFP) if SFP inventory is used as makeup to the Primary Coolant System in the event that the Safety Injection Refueling Water (SIRW) Tank is unavailable (see Section 1.8.5).

SERVICE WATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Service Water Pumps

Type	Vertical Turbine With Water Lubrication
Number	3
Capacity (Each)	8,000 gpm*
Head	140 ft*
Pump Accelerating Time	4 Seconds @ 70% Voltage
Material	
Bowls	Cast Iron or Cast Steel or Cast Stainless Steel
Discharge Head	Carbon Steel
Bowl Shaft	416 SS
Line Shaft	1045 CS or 416 SS
Discharge Column	Carbon Steel
Impeller	Bronze or Stainless Steel
Motor	350 hp, 3 Ph, 60 Hz, 2,300 V
Codes	Standards of Hydraulic Institute, NEMA, ASA and ASTM

* The FSAR requirement of 8000 gpm and 140 ft of head is a design characteristic that was supplied to the vendor for individual pump performance.

SERVICE WATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

2. Basket Strainers

Type	Simplex Multi-Basket
Number	3
Design Flow (Each)	9,000 gpm
Design Pressure	150 psig
Design Temperature	70°F
Screen Mesh	3/16 in Perforation
Material	
Body	Cast Steel
Baskets	304 SS

3. Piping, Fittings and Valves

Material	Carbon Steel, Bronze, Stainless Steel, or Cast Iron & Ductile Iron (non-safety related only)
Design Pressure	100 psig
Design Temperature	300°F
Piping and Fittings(a)	2-1/2 in and Larger - Butt- Welded Except at Flanged Equipment(a)
	2 in and Smaller - Socket Welded Except at Flanged Equipment or Threaded
Valves(a)	2-1/2 in and Larger - Butt-Welded 150 lb(a)
	2 in and Smaller - Socket Welded 600 lb or Threaded 200 lb or Flanged 150 lb Class
Code	ASA B31.1-1955 ASA B16.5-1961

(a) These are considered to be classified as flanged equipment.

REACTOR PRIMARY SHIELD COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Shield Cooling Coils

Length (Each Coil)	Approx 24 ft
Spacing of Coils	9 in Center-to-Center
Number of Coil Sections in Each Set	3
Coil Diameter	3/4 in
Material	Seamless Carbon Steel
Design Pressure	75 psig
Design Temperature	220°F
Code	ASA B31.1

2. Shield Cooling Pumps

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	154 gpm
TDH	79 ft
Material	
Case	Cast Iron
Impeller	CD4MCU (Stainless Steel)
Shaft	Stainless Steel (Solid)
Motor	7.5 hp, 3 Ph, 60 Hz, 460 V, 1750 r/min
Codes	Standards of Hydraulic Institute, NEMA, ASA and ASTM

REACTOR PRIMARY SHIELD COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

3. Shield Cooling Heat Exchanger

Type	Horizontal Counterflow, Shell With Straight Tubes Rolled Into Fixed Tube Sheets	
Number	1	
Original Design Duty	200,000 Btu/h	
Original Heat Transfer Area	77 ft^2	
	Shell Side	Tube Side
Design Pressure	150 psig	125 psig
Design Temperature	200°F	200°F
Fluid	Component Cooling Water	Shield Cooling Water
Temperature In	90°F	100°F
Temperature Out	93.2°F	96.8°F
Material		
Shell	Carbon Steel	
Tubes	Admiralty	
Channels	Carbon Steel	
Tube Sheets	Aluminum Bronze	
Codes	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Par UW-2 (a); TEMA Class C	

REACTOR PRIMARY SHIELD COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

4. Shield Cooling Surge Tank

Type	Vertical
Number	1
Design Pressure	50 psig
Design Temperature	200°F
Volume	1,700 Gallons (Based on Total Change in System Water Volume as a Result of Maximum Possible Change in Water Temperature From a Cold Start Condition at 60°F to 212°F)
Material	Carbon Steel
Code	ASME B&PV Code Section III, Class C and ASME B&PV Code, Section VIII, Par UW-2 (a)

REACTOR PRIMARY SHIELD COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

5. Piping, Fittings and Valves

Material	Seamless Carbon Steel
Design Pressure	125 psig
Design Temperature	360°F

Construction	Not Embedded in Concrete	Embedded in Concrete
Pipe, 2-1/2 in and Larger	Butt-Welded Except at Flanged Equipment	None
Pipe, 2 in and Smaller	Screwed Except at Flanged Equipment	Socket Welded
Valves, 2-1/2 in and Larger	Cast Iron, Flanged 125#	None
Valves, 2 in and Smaller	Bronze, Screwed 200# and Carbon Steel, flanged 150#	None
Code	ASA B31.1	

COMPONENT COOLING SYSTEM HEAT LOADS
(x 10^6 Btu/hr)

Component and (Number)	Normal	Shutdown Cooling		DBA	
		Initial	+30 h	SI	Post-RAS*
Shutdown Cooling HXs (2)	-	147.39 (max)	46.13	-	95 (max)
Primary and Auxiliary Systems Sample Cooling Coils (9)	0.3	0.15	Negligible	-	-
Letdown HX (1)	11.8	1.54	Negligible	11.8	-
CRDM Seal Coolers (45)	.07	.07	.07	.07	-
Charging Pumps (3)	0.20	0.12	0.12	0.20	0.20
Primary Coolant Pumps (4)	2.47	1.32****	-	2.47	-
LPSI Pumps (2)	-	0.09	0.09	0.09	***
HPSI Pumps (2)	-	-	-	0.11	0.11
Containment Spray Pumps (3)	-	-	-		0.08
Spent Fuel Pool HX (1)	9.2	9.2	9.2**	-	-
Reactor Shield Cooling HX (1)	0.2	0.2	0.2	0.2	-
Waste Gas Compressors (3)	0.01	0.01	0.01	-	-
Vacuum Degasifier Pump Seal Water Cooler (1)	0.08	0.08	0.08	-	-
Radwaste Evaporators (2)	23.52	11.76	11.76	-	-
Total	47.85	171.93	67.66	14.77	95.39

* With containment high pressure

** Maximum heat load at 7 days after shutdown = 12.5 for 1/3 core off load

*** An additional Post-RAS heat load of up to $0.09X10^6$ Btu/hr could exist if LPSI pumps are used for post accident. However, LPSI pumps are not normally operating Post-RAS.

**** Heat load with P-50D being one of the two operating primary coolant pumps. heat load would be $1.15x10^6$ Btu/hr if P-50D is not one of the two operating pumps.

COMPONENT COOLING WATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Component Cooling Pumps

Type	Horizontal Centrifugal With Mechanical Seals
Number	3
Capacity (Each)	6,000 gpm (Based on Shut-down Cooling Requirements), Including Approximately 10% Wear Margin
Head	164 ft
Material	
Case	Carbon Steel
Impeller	Bronze
Shaft	Alloy Steel
Temperature Transient	Designed To Withstand Increase of 25°F in 1-1/2 Minutes. This May Occur When System Switches to Shutdown Cooling or Post-DBA Cooling From Normal Operation.
Motor	300 hp, 3 Ph, 60 Hz, 2,300 V
Time Required To Accelerate Pump to Full Speed at 70% Voltage	4 s
Codes	Standards of Hydraulic Institute, NEMA, ASA and ASTM

COMPONENT COOLING WATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

2. Component Cooling Heat Exchangers

Type	Horizontal, Counterflow, Shell Straight Tubes, Tubes Rolled Into Tube Sheets	
Number	2	
Original Design Duty (Each)	50.5×10^6 Btu/h (Normal) 94.8×10^6 Btu/h (At Start of Shutdown Cooling) 43.2×10^6 Btu/h (24 Hours After Shutdown Cooling) 85.0×10^6 Btu/h (Post-DBA)	
Original Heat Transfer Area (Each)	7,840 ft^2	
	Shell Side	Tube Side
Design Pressure	150 psig	125 psig
Design Temperature	200°F	200°F
Design Capacity (Each)	4700 gpm (Ref 13 and 14)	
Temperature Transient	Designed To Withstand Increase of 25°F in 1-1/2 Minutes. This May Occur When System Switches to Shutdown Cooling or Post-DBA Cooling From Normal Operation.	
Material		
Shell Side	Carbon Steel, Firebox Quality	
Tube Side	Admiralty	
Tube Sheet	Carbon Steel With Aluminum Bronze Overlay	
Codes	ASME B&PV Code, Section III, Class C, 1965 and ASME B&PV Code, Section VIII, Par UW-2 (a); TEMA Class C	

COMPONENT COOLING WATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

3. Surge Tank

Type	Vertical
Number	1
Design Pressure/Temperature	25 psig @ 140°F
Design Temperature	140°F
Volume	1,230 Gallons (Based on Total Change in System Water Volume as Result of Maximum Possible Change in Water Temperature From Cold Start Conditions at 60°F to 140°F)
Material	Carbon Steel
Code	ASME B&PV Code, Section III, Class C, 1965

4. Piping, Fittings and Valves

Piping Material	Carbon Steel, Seamless and Seam Welded (Seam Weld 100% Radiographed)
Design Pressure	150 psig
Design Temperature	165°F

COMPONENT COOLING WATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

	Outside Containment	Inside Containment
Construction		
Pipe, 2-1/2 in and Larger	Butt-Welded Except at Flanged Equipment, 10% of Circumferential Welds Examined by Radiography	Butt-Welded Except at Flanged Equipment
Pipe, 2 in and Smaller	Socket Welded Except Flanged Equipment	Screwed Except-at Flanged Equipment
Valves (Except Butterfly), 2-1/2 in and Larger	Carbon Steel, Butt Weld Ends, 150#	Cast Iron, Flanged Ends, 125#
Butterfly Valves, 2-1/2 in and Larger	Carbon Steel, Flanged Ends, 150#	Carbon Steel, Flanged Ends, 150#
Valves, 2 in and Smaller	Carbon Steel, Socket Welded Ends, 600#	Bronze, Screwed Ends, 200#
Code	ASA B31.1-1955 ASA B16.5-1961	ASA B31.1-1955 ASA B16.5-1961

COMPONENT COOLING SYSTEM REQUIRED FLOW RATES (GPM)

		Shutdown Cooling		DBA	
Component and (Number)	Normal	Initial	+30 h	SI	Post-RAS*
Shutdown Cooling HXs (2)	-	5,000	5,000	-	4480
Primary and Auxiliary System Sample Cooling Coils (9)	20	20	20	-	-
Letdown HX (1)**	1,000 (max)	70	-	1,000 (max)	-
CRDM Seal Coolers (45)	68	68	68	68	-
Charging Pumps (3) ###	32	22-32	22-32	32	32
Primary Coolant Pumps (4) ###	410	230	230	410	-
LPSI Pumps (2) #	8	8	8	8	8
HPSI Pumps (2) #	29	29	29	29	29
Containment Spray Pumps (3) #	24	24	24	24	24
Spent Fuel Pool HX (1) ***	650	650	650***	-	-
Shield Cooling HX (1)	126	126	126	126[(a)]	-
Waste Gas Compressors (3)	6	6	6	-	-
Vacuum Degasifier Pump Seal Water Cooler (1)	8	8	8	-	-
Radwaste Evaporators (2)	2,136	1,068	1,068	-	-
Total	4,517	##7,329	##7,259	1,697	4573

* With containment high pressure, loss of EDG 1-1/EDG 1-2.

** Flow set by temperature control

*** Increases to 1334 gpm at 7 days after shutdown for 1/3 core off load.

**** These values are for bounding heat loads. (Reference 73, 74)

\# The required flow rates are based on operation of the pumps under the worst case conditions. Actual flow requirements to prevent component degradation will vary upon operating conditions.

Total flow rate assumes 22 gpm for charging pumps.

Charging Pumps P-55B and P-55C can operated up to 72 hours without cooling water flow to the oil coolers. Reference 36.

CCW flowrate for P-50A, B & C is 90 gpm. CCW flowrate for P-50D is 140 gpm.

(a) This component still receives cooling water flow in an SI System alignment. However, there is no minimum flow requirement as the component is not required to function during a DBA.

(Reference 29)

SPENT FUEL POOL COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Fuel Pool Cooling Pumps

Type	Horizontal Centrifugal With Mechanical Seals
Number	2
Capacity (Each)	1,700 gpm
TDH	64 ft
Temperature Transient	Designed To Withstand an Increase from 60°F to 212°F in 5 Seconds
Material	Stainless Steel
Motor	40 hp, 460 V, 60 Hz 3 Ph,
Code	Motor, NEMA; Pump, Standards of Hydraulic Institute

2. Spent Fuel Pool Cooling Heat Exchange Unit

Type	Horizontal Counterflow, With Straight Tubes Rolled Into Tube Sheets
Number	2 Shells in Series
Original Duty (Total)	23×10^6 Btu/h
Original Heat Transfer Area	4,080 ft^2
Component Cooling Water Temperature: In/Out	90/115°F
Spent Fuel Cooling Water Temperature: In/Out	125/110°F
Temperature Transient	Designed To Withstand an Increase From 60°F to 212°F in 5 Seconds

SPENT FUEL POOL COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

Material	
Shells	Carbon Steel
Tubes	Stainless Steel
Tube Sheets	Stainless Steel With SS 308L Weld Overlay
Codes	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Par UW2 (a); TEMA Class C

3. Fuel Pool Recirculation Booster Pump

Type	Horizontal Centrifugal With Mechanical Seals
Number	1
Capacity	160 gpm
TDH	160 ft
Temperature Transient	Designed To Withstand Increase From 60°F to 212°F in 5 Seconds
Material	Type 316 Stainless Steel
Motor	15 hp, 3 Ph, 60 Hz 460 V
Code	Motor, NEMA; Pump, Standards of Hydraulic Institute

SPENT FUEL POOL COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

4. Fuel Pool Filter

Type	Cartridge With Replaceable Filter Element
Number	1
Design Flow	150 gpm
Design Pressure	200 psig
Design Temperature	250°F
Temperature Transient	Designed for Increase From 60°F to 212°F in 5 Seconds
Filter Rating	25 Microns Nominal
Material	Stainless Steel
Codes	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Par UW2 (a)

5. Fuel Pool Demineralizer

Type	Mixed Bed
Number	1
Design Flow	150 gpm
Design Pressure	200 psig
Design Temperature	220°F
Temperature Transient	Design for an Increase From 60°F to 212°F in 5 Seconds
Resin	Equivalent Capacity Mixture of Nuclear Grade Cation and Anion
Material	Type 304 Stainless Steel for Vessel and Integral Parts

SPENT FUEL POOL COOLING SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

Codes	ASME B&PV Code, Section III, Class C and ASME B&PV Code, Section VIII, Par UW2 (a)
6. Piping, Fittings and Valves	
Material	Stainless Steel
Design Pressure	125 psig
Design Temperature	150°F
Joints, 2 in and Larger	ButtWelded Except at Flanged Equipment
1-1/2 in and Smaller	Socket Welded Except at Flanged Equipment
Valves, 2 in and Larger	Stainless Steel, Butt Weld Ends, 150#
11/2 in and Smaller	Stainless Steel, Socket Weld Ends, 150#
Butterflies, All Sizes	Stainless Steel Flanged, 150#
Code	ASA B31.1
Welds	100% Radiographically Checked
7. Spent Fuel Pool	
Volume of Empty SFP Cavity	21,885 ft^3
Volume of Empty North Tilt Pit Cavity	4,095 ft^3

INSTRUMENT AIR SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Instrument Air System

a. Air Compressors

Type	Rotary Screw, Oil Free, Air Cooled
Number	3
Design Capacity (Each)	288 scfm
Design Pressure	125 psig
Main Motor (Compressor)	75 hp, 3 Ph, 60 Hz, 460 V
Fan Motor	5 hp, 3 Ph, 60 Hz, 460 V
Code	Motor, NEMA

b. Aftercoolers

1. Type	Shell and Tube
Number	3 (1 per Compressor)
2. Type	Cooling Coil
Number	3 (1 per Compressor - onboard)

c. Air Receivers

Type	Vertical
Number	3
Design Pressure	125 psig
Capacity	57 ft^3
Code	ASME B&PV Code, Section VIII

INSTRUMENT AIR SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

d. Air Dryer

Type	Silica Gel Absorbent, Electric Heater Reactivated
Number	1
Capacity	205 scfm
Outlet Moisture Content With Saturated Air Inlet	-40°F Dew Point at 100 psig
Code	ASME B&PV Code, Section VIII

e. Piping and Valves

Upstream of Dryer	Carbon Steel Piping and CI, or Bronze Valves
Downstream of Dryer	Copper Piping and Bronze or Stainless Steel Valves Except at Containment Penetration and at Isolation Valves (Carbon Steel)
Code	ASA B31.1

2. High Pressure Air System

a. Air Compressors

Type	Single Acting, Air Cooled
Number	3
Design Capacity (Each)	22.3 scfm
Design Pressure	325 psig
Motor	10 hp, 440 V, 3 Phase
Code	Motor, NEMA

INSTRUMENT AIR SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

b.	Air Dryer	
	Type	Desiccant
	Number	3 (1 per Compressor)
	Capacity (Each)	35 scfm
	Dewpoint	-40 °F at 350 psig
	Code	ASME B&PV Code, Section VIII
c.	Air Receivers	
	Type	Horizontal
	Number	3 (1 per Compressor)
	Design Pressure	350 psig
	Capacity	60 ft^3
	Code	ASME B&PV Code, Section VIII
d.	Aftercoolers	
	Number	3 (1 per Compressor)
	Type	Air Cooled
e.	Piping	
	Material	Carbon Steel
	Code	ASA B31.1 (Seismic Class I Supported From Receivers to Operators on Engineered Safe-guards Systems)

INSTRUMENT AIR SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

3. Feedwater Purity Air System

a. Air Compressors	
Type	Two stage air screw, oil free
Number	2
Design Capacity (Each)	297 scfm
Design Pressure	117 psi
Motor	75 hp, 460 V, 3 Phase
Air Dryer (Integral to Compressor)	
Type	Refrigerant
Power Consumption (at full load)	1.6 kW
Pressure	102 psig
Dew Point	37.4°F @ 68°F/100% RH
c. Aftercooler	
Number	2
Type	Air Cooled
d. Receiver	
Type	Vertical
Number	1
Design Pressure	150 psig
Design Temp	100°F
Capacity	1060 gal
Code	ASME B&PV Code, Section VIII

INSTRUMENT AIR SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

4. Nitrogen Backup Stations

   a. Nitrogen Bottles

Pressure (nominal)	2400 psig

EFFECT OF LOSS OF AIR TO AIR-OPERATED VALVES

No	Valve Description	Safety Position	Position After Loss of Air
Primary Coolant System			
CV-0101	Flange Leak Drain	C	C
CV-0155	Quench Tank Spray	C	C
Chemical and Volume Control System			
CV-2009	Letdown Containment Isolation	C	C
CV-2083	PCP Bleedoff Containment Isolation	C	C
CV-2099	PCP Bleedoff Containment Isolation	C	C
CV-2111	Charging Line Stop	O	O
CV-2113	Loop 1A Charging Line Stop	O/C	O
CV-2115	Loop 2A Charging Line Stop	O/C	O
CV-2117	Pressurizer Auxiliary Spray	O/C	C
CV-2130	Boric Acid Recirculation Control	C	C
CV-2136	Boric Acid Recirculation Control	C	C
CV-2155	Makeup Stop	C	C
CV-2191(g)	PCP Bleedoff Relief Stop	O	C
Safety Injection, Containment Spray and Shutdown Cooling			
CV-3001(b)	Containment Spray Isolation	O/C/T	O
CV-3002(b)	Containment Spray Isolation	O/C/T	O
CV-3003	SI Tank Fill and Drain	C	C
CV-3004	SI Tank Fill and Drain	C	C
CV-3006	Shutdown HX Bypass	O	O
CV-3018(a)(f)	HPSI Pump Dischg (Redundant)	C	C
CV-3025	Shutdown HX Discharge	C	C
CV-3027(a)(b)	Pump Mini-Flow Stop	O/C	As Is
CV-3029(c)	Containment Sump Suction	O/C	As Is
CV-3030(c)	Containment Sump Suction	O/C	As Is

O Open
C Closed
T Throttled
N No Safety Related Function Position

(a) Air supplied by high-pressure air system.
(b) Nitrogen bottle backup.
(c) Air supplied from high-pressure air system with backup from instrument air.
(e) Bulk nitrogen backup.
(f) Manually operated air bottle backup.
(g) Accumulator installed.
(h) Handwheels credited for safety position.

EFFECT OF LOSS OF AIR TO AIR-OPERATED VALVES

No	Valve Description	Safety Position	Position After Loss of Air
CV-3031(c)	SIRW Tank Isolation	O/C	As Is
CV-3036	HPSI Dischg (Redundant)	O	O
CV-3037(a)	HPSI Dischg (Normal)	C	C
CV-3038	SI Line Pressure Control	C	C
CV-3039	SI Tank Fill and Drain	C	C
CV-3040	SI Tank N_2 Supply	C	C
CV-3042	SI Line Pressure Control	C	C
CV-3043	SI Tank Fill and Drain	C	C
CV-3044	SI Tank N_2 Supply	C	C
CV-3046	SI Line Pressure Control	C	C
CV-3047	SI Line Pressure Control	C	C
CV-3048	SI Tank N_2 Supply	C	C
CV-3050	SI Tank N_2 Supply	C	C
CV-3051	SI Tank Purge	C	C
CV-3055(a)	LPSI Pump Dischg Crossover	C	As Is
CV-3056(a)(b)	Pump Mini-Flow Stop	O/C	As Is
CV-3057(c)	SIRW Tank Isolation	O/C	As Is
CV-3059(a)	HPSI Dischg (Normal)	O	O
CV-3063	SI Tank Purge	C	C
CV-3065	SI Tank Purge	C	C
CV-3067	SI Tank Purge	C	C
CV-3069	Check Valve Leakage Drain	C	C
CV-3070(b)	Cooled Suction HPSI Pump	O/C	C
CV-3071(b)	Cooled Suction HPSI Pump	O/C	C
CV-3084	HPSI Hot Leg Drain Isolation	C	C
CV-3085	HPSI Hot Leg Drain Isolation	C	C
CV-3212	Shutdown HX Isolation	O	As Is
CV-3213	Shutdown HX Isolation	O	As Is
CV-3223	Shutdown HX Isolation	O	As Is
CV-3224	Shutdown HX Isolation	O	As Is

O Open
C Closed
T Throttled
N No Safety Related Function Position

(a) Air supplied by high-pressure air system.
(b) Nitrogen bottle backup.
(c) Air supplied from high-pressure air system with backup from instrument air.
(e) Bulk nitrogen backup.
(f) Manually operated air bottle backup.
(g) Accumulator installed.
(h) Handwheels credited for safety position.

EFFECT OF LOSS OF AIR TO AIR-OPERATED VALVES

No	Valve Description	Safety Position	Position After Loss of Air
Feed and Condensate System			
CV-0701	Feedwater Regulating Valve	C	As Is
CV-0703	Feedwater Regulating Valve	C	As Is
CV-0727(b)	Auxiliary Feed Control	O/C	O
CV-0734	Main Feedwater Bypass	C	As Is
CV-0735	Main Feedwater Bypass	C	As Is
CV-0736	Auxiliary Feed Control Bypass	C	C
CV-0736A(h)	Auxiliary Feed Control	O/C	O
CV-0737	Auxiliary Feed Control Bypass	C	C
CV-0737A(h)	Auxiliary Feed Control	O/C	O
CV-0749(b)	Auxiliary Feed Control	O/C	O
CV-2008(h)	Primary Sys Makeup Tank Outlet	O	C
CV-2010(h)	Condensate Storage Tank Inlet	O/C	C
Service Water System			
CV-0821	CCW Heat Exchanger Temp Control	C	C
CV-0822	CCW Heat Exchanger Temp Control	C	C
CV-0823	Component Cool HX Dischg	O	O
CV-0824(b)	Return From Containment Coolers	O/C	O
CV-0825	Eng Safe Room Cooler Supply	O	O
CV-0826	Component Cool HX Dischg	O	O
CV-0844	Critical Service Wtr Header Iso	O	O
CV-0845	Critical Service Wtr Header Iso	O	O
CV-0846	Critical Service Water Header Cross Connect	O	O
CV-0847(b)	Supply to Containment Coolers	O	O
CV-0857	Critical Service Water Header Cross Connect	O	O
CV-0861	8" Return From Cont Coolers	O	O
CV-0862	Containment Cooler Supply	O	O
CV-0864	8" Return From Cont Coolers	O	O

O Open
C Closed
T Throttled
N No Safety Related Function Position

(a) Air supplied by high-pressure air system.
(b) Nitrogen bottle backup.
(c) Air supplied from high-pressure air system with backup from instrument air.
(e) Bulk nitrogen backup.
(f) Manually operated air bottle backup.
(g) Accumulator installed.
(h) Handwheels credited for safety position.

EFFECT OF LOSS OF AIR TO AIR-OPERATED VALVES

No	Valve Description	Safety Position	Position After Loss of Air
CV-0865	Containment Cooler Supply	O	O
CV-0867	8" Return From Cont Coolers	O	O
CV-0869	Containment Cooler Supply	C	C
CV-0870	Containment Cooler Supply	O	O
CV-0873	8" Return From Cont Coolers	O	O
CV-0876	Diesel Generator Cool Supply	O	O
CV-0877	Diesel Generator Cool Supply	O	O
CV-0878	Eng Safe Room Cooler Supply	O	O
CV-0879	Backup Cool Safeguards Pumps	C	C
CV-0880	Backup Cool Safeguards Pumps	C	C
CV-0884	Diesel Generator Cool Supply	O	O
CV-0885	Diesel Generator Cool Supply	O	O
CV-1318	Service Water Pump Header Iso	O	O
CV-1319	Service Water Pump Header Iso	O	O
CV-1359	Noncritical Service Water Header Isolation	C	C
CV-1655	Control Room HVAC Service Water	O	O
CV-1656	Control Room HVAC Service Water	O	O
Component Cooling System			
CV-0910(g)	Component Cool to Cont Isolation	C	O
CV-0911(g)	Component Cool From Cont Isolation	C	O
CV-0913	Supply Safeguards Pumps	O	O
CV-0915	Comp Cool Surge Tank Vent	C	C
CV-0937	Supply to Shutdown HX	O	O
CV-0938	Supply to Shutdown HX	O	O
CV-0940(g)	Component Cool From Cont Isolation	C	O
CV-0944	Supply to Radwaste Evaporator	C	C
CV-0944A	Supply to Spent Fuel HX	C	C
CV-0945	Supply to Comp Cool HX	O	O
CV-0946	Supply to Comp Cool HX	O	O

O Open
C Closed
T Throttled
N No Safety Related Function Position

(a) Air supplied by high-pressure air system.
(b) Nitrogen bottle backup.
(c) Air supplied from high-pressure air system with backup from instrument air.
(e) Bulk nitrogen backup.
(f) Manually operated air bottle backup.
(g) Accumulator installed.
(h) Handwheels credited for safety position.

EFFECT OF LOSS OF AIR TO AIR-OPERATED VALVES

No	Valve Description	Safety Position	Position After Loss of Air
CV-0947	Supply to Safeguards Pumps	O	O
CV-0948	Supply to Safeguards Pumps	O	O
CV-0949	Supply to Safeguards Pumps	O	O
CV-0950	Return From Safeguards Pumps	O	O
CV-0951	Return From Safeguards Pumps	C	C
CV-0977B	Return From Radwaste Evaporator	C	C
Main Steam, Main and Auxiliary Turbine Systems			
CV-0501(g)	Main Steam Isolation Valve	C	C
CV-0510(g)	Main Steam Isolation Valve	C	C
CV-0522B(b)	Steam to Aux Feed Pump Turbine	O/C	C
CV-0738	Steam Generator Recirculation	C	C
CV-0739	Steam Generator Recirculation	C	C
CV-0767	Steam Generator Bottom Blowdown	C	C
CV-0768	Steam Generator Bottom Blowdown	C	C
CV-0770	Steam Generator Bottom Blowdown	N	C
CV-0771	Steam Generator Bottom Blowdown	N	C
CV-0779(e)	Atmospheric Steam Dump	C	C
CV-0780(e)	Atmospheric Steam Dump	C	C
CV-0781(e)	Atmospheric Steam Dump	C	C
CV-0782(e)	Atmospheric Steam Dump	C	C
Instrument Air Systems and Miscellaneous Gas			
CV-1211(b)	Instrument Air to Containment	N	O
CV-1358	Nitrogen to Containment	C	C
Process Sampling System			
CV-1910	PCS Sampling Isolation	C	C

O Open
C Closed
T Throttled
N No Safety Related Function Position

(a) Air supplied by high-pressure air system.
(b) Nitrogen bottle backup.
(c) Air supplied from high-pressure air system with backup from instrument air.
(e) Bulk nitrogen backup.
(f) Manually operated air bottle backup.
(g) Accumulator installed.
(h) Handwheels credited for safety position.

EFFECT OF LOSS OF AIR TO AIR-OPERATED VALVES

No	Valve Description	Safety Position	Position After Loss of Air
CV-1911	PCS Sampling Isolation	C	C
Radioactive Waste Treatment System			
CV-1001	Primary System Drain Tank Recirc	C	C
CV-1002	Primary System Drain Tank Outlet	C	C
CV-1004	Degasifier Pump Discharge	C	C
CV-1007	Primary System Drain Tank Outlet	C	C
CV-1036	Pump P-70 Inlet	C	C
CV-1037	Clean Waste Tank Recirc	C	C
CV-1038	Pump P-70 Inlet	C	C
CV-1044	Pump P-69 A/B Suction	C	C
CV-1045	Pump P-69 A/B Suction	C	C
CV-1064	Clean Waste Tank Vent	C	C
CV-1065	Clean Waste Tank Vent	C	C
CV-1101	Waste Gas Surge Tank Vent	C	C
CV-1102	Waste Gas Surge Tank Vent	C	C
CV-1103	Containment Sump Drain	C	C
CV-1104	Containment Sump Drain	C	C
Shield Cooling System			
CV-0939	Shield Cooling Tank Inlet	C	C

O Open
C Closed
T Throttled
N No Safety Related Function Position

(a) Air supplied by high-pressure air system.
(b) Nitrogen bottle backup.
(c) Air supplied from high-pressure air system with backup from instrument air.
(e) Bulk nitrogen backup.
(f) Manually operated air bottle backup.
(g) Accumulator installed.
(h) Handwheels credited for safety position.

FIRE DETECTION INSTRUMENTATION

	INSTRUMENT LOCATION	DETECTORS	TYPE OF DETECTORS
1.	Cable Spreading Rm, Col M-28	1	Water Flow Sw (WFS-2B)
2.	1-D Switchgear Rm, Col G-28; Col G-22; Col G-22	4	Water Flow Sw (WFS-2B1, WFS-2B2, WFS-2B3, WFS-2D)
3.	1-1 Diesel Generator Rm , Col J-28	1	Water Flow Sw (WFS-2G1)
4.	1-2 Diesel Generator Rm , Col M-28	1	Water Flow Sw (WFS-2G2)
5.	Turbine Bldg 590', Col H-9	1	Water Flow Sw (WFS-2I)
6.	Control Room (Room 325)	8	Smoke
7.	Control Room Adj Offices Rms 324 & 320	2	Smoke
8.	Cable Spreading, Room 224	13	Smoke
9.	Refueling & Spent Fuel Area, Rm 220	4	Smoke
10.	1-D Switchgear Rm, Rm 223	9	Smoke
11.	North Penetration, Rm 332	2	Smoke

FIRE DETECTION INSTRUMENTATION

	INSTRUMENT LOCATION	DETECTORS	TYPE OF DETECTORS
12.	1-C Switchgear Rm, Rm 116A	2	Smoke
13.	Southwest Cable Penetration, Rm 250	2	Smoke
14.	Engineered Safeguards Panel Area, Rm 121	3	Smoke
15.	Stairwell Outside Engineered Safeguards Panel Area, Rm 016	2	Smoke
16.	Component Cooling Pump, Rm 123	2	Smoke
17.	Safeguard Area, Rm 4	3	Smoke
18.	Safeguard Area, Rm 5	2	Smoke
19.	Corridor 106 on 590' Elevation, Rm 106	6	Smoke
20.	Charging Pump, Rm 104	2	Smoke
21.	Containment, Interior North Penetration Area, Rm 332	3	Smoke
22.	Containment, Interior SW Penetration Area, Rm 141, 250	3	Smoke
23.	Containment Instrument Air Room	3	Smoke
24.	Auxiliary Feed Pump Room 570' Level of Turbine Bldg, Rm 007	3	Smoke
25.	Battery Rm 225A	1	Smoke

FIRE DETECTION INSTRUMENTATION

	INSTRUMENT LOCATION	DETECTORS	TYPE OF DETECTORS
26.	Battery Rm 225B	1	Smoke
27.	HVAC Equipment Rooms & Chase:		Smoke
	West Mechanical Equipment Room 300	1	Smoke
	East Mechanical Equipment Room 300A	1	Smoke
	Duct Chase, Rm 300B	1	
28.	Air Handling Unit V-95 & V-96 Inlet Ducts, Rm 300, 300A	2	Smoke
29.	Electrical Equipment Room, Rm 725	6	Smoke
30.	Technical Support Center, Rm 320A	2	Smoke
31.	Intake Structure, Room 136	11	Ultraviolet
32.	Charging Pump Rooms 104, 104A, and 104B	1	Water Flow Sw (WFS-2J)
33.	Diesel - Driven Auxiliary Feedwater Pump Shed	2	Fire & Flame Det.
		1	Water Flow Sw

FIRE PROTECTION SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Fire Pump, Motor Driven

Type	Vertical Turbine
Number	1
Capacity	1,500 gpm
Discharge Pressure	125 psig
Material	
Discharge Head	Cast Iron
Impeller	Bronze
Motor	150 hp, 460 V, 3 Ph, 60 Hz
Codes	Underwriters Lab Label Motor, NEMA; Pump, Standards of Hydraulic Institute

2. Fire Pump, Diesel Engine Driven

Type	Vertical Turbine
Number	2
Capacity	1,500 gpm
Discharge Pressure	125 psig
Material	
Discharge Head	Cast Iron
Impeller	Bronze
Gear Drive	Reduction Ratio 1:1, 200 hp Rating
Diesel Engine	150 hp
Codes	Underwriters Lab Label Diesel Engine, NEMA; Pump, Standards of Hydraulic Institute

FIRE PROTECTION SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

3. Fire System Jockey Pump

Type	Vertical Turbine
Number	1
Capacity	50 gpm
Discharge Pressure	117 psig nominal
Material	
Discharge Head	Fabricated Steel
Impellers	Bronze
Motor	7-1/2 hp, 460 V, 3 PH, 60 Hz
Codes	Motor, NEMA; Pump Standards of Hydraulic Institute

4. Piping, Fittings and Valves

a. To Auxiliary Feedwater Pump Suction Header and Critical Service Waterlines

Material	Seamless Carbon Steel
Design Pressure	125 psig
Design Temperature	100°F
Construction	Butt-Welded Except at Flanged Equipment
Valves	Carbon Steel, Butt-Weld Ends, 150#, or Cast Iron, Flanged End, 175#, Underwriters lab Label

FIRE PROTECTION SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

b. To Spent Fuel Pool Blind Flange and Normal Fire Protection Service

		Underground	Aboveground
Material	Original-	Cast Iron (150# Class)	Carbon Steel
	Replacement-	Ductile Iron (350# Class)	
Design Pressure		150 psig	125 psig
Design Temperature		100°F	100°F
Construction	Original-	Mechanical Joint	Butt-Welded Except at Flanged Equipment
	Replacement-	Push-on Joint	
Valves	Original-	Cast Iron, Mechanical Joint, 175#, Underwriters Lab Label	Cast Iron, Flanged End, 175#, Underwriters Lab Label
	Replacement-	Ductile Iron, Mechanical Joint, 250#, UL Listed, FM Approved	

AUXILIARY FEEDWATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

1. Motor-Driven Auxiliary Feedwater Pump (P-8A)

Type	Horizontal Centrifugal, With Packed Glands
Number	1
Capacity	415 gpm
Head	2,730 ft
Material	
Case	4.6% Chrome Alloy Steel
Impeller	Bronze
Shaft	11%-13% Chrome Alloy Steel
Motor	450 hp, 3 Ph, 60 Hz, 2,300 V
Codes	Motor, NEMA; Pump, Standards of Hydraulic Institute, 11th Edition, 1965

2. Turbine-Driven Auxiliary Feedwater Pump (P-8B)

Type	Horizontal Centrifugal, With Packed Glands
Number	1
Capacity	415 gpm
Head	2,730 ft
Material	
Case	4.6% Chrome Alloy Steel
Impeller	Bronze
Shaft	11%-13% Chrome Alloy Steel

AUXILIARY FEEDWATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

Turbine	Single Stage, Axial Flow, Exhaust to Atmosphere, 450 hp
Codes	Turbine, NEMA; Pump, Standards of Hydraulic Institute, 11th Edition, 1965

3. Motor Driven Auxiliary Feedwater Pump (P-8C)

Type	Horizontal Centrifugal, With Mechanical Seals
Number	1
Capacity	330 gpm
Head	2260 ft
Material	
Case	18 Cr, 8 Ni Stainless Steel
Impeller	12 Cr Stainless Steel
Shaft	12 Cr, 0.6 Mo Stainless Steel
Motor	400 hp, 3 Ph, 60 Hz, 2,300 V
Codes	Motor, NEMA; Pump, Standards of Hydraulic Institute, 11th Edition, 1965

4. Piping and Valves for P-8A, P-8B, and P-8C

a. Pump Suction

	Underground	Aboveground
Material	304 Stainless Steel	Carbon Steel
Design Pressure (Minimum)	50 psig	50 psig
Design Temperature (Minimum)	100°F	100°F
Construction	Welded Except at Flanged Equipment Connections	

AUXILIARY FEEDWATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

Valves 2-1/2 in and Larger	-	Carbon Steel, Butt-Welded, 150#
Valves 2-1/2 in and Smaller	-	Carbon Steel, Socket Welded, 600#
Code	ASA B31.1-1955 ASA B16.5-1961	ASA B31.1-1955 ASA B16.5-1961

b. Pump Discharge

	Underground	Aboveground	
Material	304 Stainless Steel	Carbon Steel	
		Upstream of FW Control Valve	Downstream of FW Control Valve
Design Pressure (Minimum)	1,440 psig	1,337psig	1,100psig
Design Temperature (Minimum)	100°F	100°F	100°F
Construction	Welded Except at Flanged Equipment Only		
Valves 2-1/2 in and Larger	-	Carbon Steel, Butt-Welded, 600#	
Valves 2-1/2 in and Smaller	-	Carbon Steel, Socket Welded, 600#	
Code	ASA B31.1-1955 ASA B16.5-1961	ASA B31.1-1955 ASA B16.5-1961	

AUXILIARY FEEDWATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

c. Auxiliary Turbine Steam Supply

Design Pressure	1,000 psig
Design Temperature	550°F

Piping and Valves Same as for Aboveground Pump Discharge Piping

5. Diesel-Driven Auxiliary Feedwater Pump (P-8D)

Type	Horizontal Centrifugal, with Mechanical Seals
Number	1
Capacity	510 gpm
Head	3148 ft
Diesel Engine (K-17)	800 hp, Starter with Storage Batteries
Codes	NFPA 20, NFPA 37, UL 1247

6. Piping and Valves for P-8D

a. Pump Section

	Underground	Aboveground
Material	304 Stainless Steel	Carbon Steel
Design Pressure	150 psig	150 psig
Design Temperature	130°F	130°F
Construction	Welded Except at Flanged Equipment Connections	
Valves 2-1/2 in and Larger		Carbon Steel, Butt-Welded, 150#
Valves 2-1/2 in and Smaller		Carbon Steel, Butt-Welded, 600#
Code	ASA B31.1 1-2012 for procurement ASA B31.1 1-1973 for qualification	

AUXILIARY FEEDWATER SYSTEM
DESIGN RATINGS AND CONSTRUCTION OF COMPONENTS

b. Pump Discharge

	Underground	Aboveground	
Material	304 Stainless Steel	Carbon Steel	
Design Pressure (Minimum)	1,750 psig	Upstream of Control Valve	Downstream of Control Valve
		1,750 psig	1,200 psig
Design Temperature	34/120°F	34/120°F	34/120°F
Construction	Welded, Except Flanged at Material Transition		
Valves 2-1/2 in and Larger		Carbon Steel, Butt-Welded, 900#	
Valves 2-1/2 in and Smaller		Carbon Steel, Butt-Welded, 1500#	
Code	B31.1 (1973)	B31.1 (1973)	

DESIGN BASIS AMBIENT CONDITIONS

Location	HVAC Original Design				Maximum Bulk Air Temperature (°F) Allowed During Normal Operation (Ref. 70, except as noted)	EEQ Average Arrhenius Temp. (°F) (Ref. 70 except as noted) (Note 6)	
	Winter, °F		Summer, °F				
	Outside	Inside	Outside	Inside		Normal Operation	Cold Shutdown
Turbine Building							
Operating Floor (EEQ Harsh Area)	-10	50	95	104	130	110	80
Auxiliary Feedwater Pump Room (EEQ Harsh Area)	---	---	---	---	104	104	90
Piping Area (EEQ Harsh Area)	-10	50	95	110	130	110	80
Shops and Offices	-10	65	95	104	---	---	---
Auxiliary Building (Non-EEQ Harsh Areas)							
Radwaste Area and Radwaste Area Addition	-10	50	95	110	---	---	---
Fuel Handling Area and Fuel Handling Area Addition	-10	50	95	104	---	---	---
Office Area	-10	75	95	75	---	---	---
Room 116 (1-1 Diesel Generator Room) (Note 8)	---	---	---	---	102 (Ref. 65 & 66)	---	---
Room 116B (1-2 Diesel Generator Room) (Note 8)	---	---	---	---	102 (Ref. 65 & 66)	---	---
Auxiliary Building (EEQ Harsh Areas)							
Room 123 (590’ Component Cooling) (Note 3)	-10	50	95	104	110	100	100
Room 238 (607’-6” Containment Purge Exhaust) (Note 3)	-10	50	95	104	145	115	105
Room 338 (625’ Containment Purge Air Fan) (Note 3)	-10	50	95	104	150	130	110
Room 001 (Dirty Waste Tank T-60)	---	---	---	---	90	90	90
Room 004 (East Engineered Safeguards) (Note 4)	---	---	---	---	90	90	90
Room 005 (West Engineered Safeguards)	---	---	---	---	95 (Ref. 64)	90	90
Room 106 (590’ Corridor)	---	---	---	---	100	90	90
Room 118 (590’ Receiver Tank and Pump Room)	---	---	---	---	100	90	90
Room 120 (Degasifier Vacuum Pumps)	---	---	---	---	100	90	90
Room 121A (South Pipeway Doghouse) (Note 4)	---	---	---	---	125	110	110
Room 121B (Hydrogen Monitor EC-161)	---	---	---	---	100	90	90
Room 150 (602’ Pipeway)	---	---	---	---	110	92	92

DESIGN BASIS AMBIENT CONDITIONS

Location	HVAC Original Design				Maximum Bulk Air Temperature (°F) Allowed During Normal Operation (Ref. 70 except as noted)	EEQ Average Arrhenius Temp. (°F) (Ref. 70 except as noted) (Note 6)	
	Winter, °F		Summer, °F				
	Outside	Inside	Outside	Inside		Normal Operation	Cold Shutdown
Containment Building (EEQ Harsh Area) (Note 1)	-10	50	95	104	140 (Note 5)	(Note 2)	(Note 2)
Control Room (Non-EEQ Harsh Area) (Note 7)	-10	75	95	75	---	---	---
Condensate and Makeup Demineralizer Building – Non-EEQ Harsh Areas							
Process and Equipment Area	-10	50	90	104	---	---	---
Covered Receiving and Loading Area	-10	50	90	104	---	---	---
Boiler Room	-10	50	90	104	---	---	---
Pipe Gallery	-10	50	90	104	---	---	---
Instrument Room	-10	75	90	90	---	---	---

Note 1: Original equipment design was based on these conditions. To allow for elevated service water temperatures a higher building design temperature was specified for the containment air coolers. Chapter 14 contains containment temperature assumptions for analyzed accident situations.
Note 2: Temperatures are dependent on elevation and location (References 71 and 72).
Note 3: Rooms 123, 238 and 338 have a design temperature of 120°F per M-391, Specification for Installation of Ventilation Equipment and Ductwork Penetration and Fans Rooms.
Note 4: The combined East Engineered Safeguards and South Pipeway Doghouse room can be maintained less than or equal to 135°F post-accident with the initial temperatures in room 004 and room 121A at 95°F (Reference 70).
Note 5: Reference FSAR Section 14.18. The Technical Specifications restrict bulk air temperature to 140°F (LCO 3.6.5).
Note 6: Maximum allowed post-accident temperature profiles in EEQ harsh areas outside containment are maintained by the EEQ program.
Note 7: The relative humidity in the control room is 50%.
Note 8: Actual rooms can be maintained less than or equal to 120°F with a diesel generator operating with the initial room temperature and outside air temperature of 102°F (Ref. 65).

CONTROL ROOM HVAC SYSTEM
MAJOR COMPONENT DESIGN DATA

Makeup/Recirculation Air Filter Units

Quantity	Two - 100% Capacity Each
Capacity	3,200 ft^3/min
Filters (per Filtering Unit)	
Prefilter	
Quantity	3
Media	Glass Fiber or Knitted Pad
HEPA Filter	
Quantity	3 Upstream Filters 3 Downstream Filters
Media	Glass Fiber
Charcoal Filter Trays	
Quantity	18 [2 Banks of 9]
Media	Activated Carbon, 4 in. Bed Depth (Two-2 inch deep Trays in Series)
Fan Type	Vaneaxial
Fan Static Pressure at Rating, in wg	10 in
Motor	20 hp, 460 V, 3 Ph
Filter Test Efficiency	
HEPA	99.97% of Particulate
Carbon Adsorber	99.9% of Elemental Iodine
Electric Heating Coil	
Type	Nickel/Chromium
Capacity	15 kW, 480 V, 3 Ph
Air Filter Unit Assembly	
ΔP of wg	8.00 in (Maximum)

NOTE: All electrical equipment is Class 1E unless otherwise noted.

CONTROL ROOM HVAC SYSTEM
MAJOR COMPONENT DESIGN DATA

Air Handling Unit V-95 or V-96

Type	Package (Filter, Cooling Coil, Fan)
Capacity	12,500 ft^3/min
Cooling Coil	
Type	Direct Expansion Refrigerant
Capacity (Total)	603,500 Btu/h
Heating Coil (Nonclass 1E)	
Type	80% Nickel and 20% Chromium
Capacity	177 kW, 480 V, 3 Ph
Fan	
Type	Centrifugal
Total Pressure, wg	3.85 in
Motor	25 hp, 460 V, 3 Ph
Filter Type, Media	6 in Thick Moderate Efficiency Prefilter
ΔP of wg (Clean)	0.25 in

Refrigerant Condensing Unit

Type	Water-Cooled Reciprocating
Refrigerant	R-22
Compressor	
Type	Reciprocating, 4 Cylinder
Motor	60 hp, 460 V, 3 Ph
Capacity	554,400 Btu/h @ 85 °F, 39 gpm Service Water
Condenser Water Flow	Set per RO-216

NOTE: All electrical equipment is Class 1E unless otherwise noted.

CONTROL ROOM HVAC SYSTEM
MAJOR COMPONENT DESIGN DATA

Smoke Purge Exhaust Fan V-94 (Nonclass 1E)	
Type	Vaneaxial
Capacity	7,800 ft^3/min
Motor	7-1/2 hp, 460 V, 3 Ph
Exhaust Fan V-16 (Existing) (Nonclass 1E)	
Type	Centrifugal
Capacity	160 ft^3 /min
Motor	1/12 hp, 120 V, 1 Ph
Humidifiers VH-12 and VH-13 (Nonclass 1E)	
Type	Steam Generator
Capacity	50 lb/h (17 kW, 480 V, 3 Ph)

NOTE: All electrical equipment is Class 1E unless otherwise noted.

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
Control Room (see Figure 7-24)					
D-1	Normal Outside Air - Train A	Open - Train A Close - Train B	Open - Train A Close - Train B	Close on CHP or CHR	Close
D-2	Normal Outside Air - Train A	Modulate - Train A Close - Train B	Modulate - Train A Close - Train B	Close on CHP or CHR	Close
D-3	Normal Recirc Air - Train A	Open	Open	Open on CHP or CHR	Open
D-4	Supply Air Back Draft Dampers - Train A	Open - Train A Close - Train B	Open - Train A Close - Train B	Open - Train A Close - Train B on CHP or CHR	NA (Back Draft)
D-5	Charcoal Filter Unit Supply Air - Train A	Close	Close	Open - Train A Close - Train B on CHP or CHR	NA (Back Draft)
D-6	Charcoal Filter Unit Return Air - Train A	Close	Close	Open - Train A Close - Train B on CHP or CHR	Open

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
D-7	Charcoal Filter Unit Outside Air - Train A	Close	Close	Open - Train A, (Manual Close Avail) Close - Train B on CHP or CHR	NA (Elect Op FAI)
D-8	Normal Outside Air - Train B	Open - Train B Close - Train A	Open - Train B Close - Train A	Close on CHP or CHR	Close
D-9	Normal Outside Air - Train B	Modulate - Train B Close - Train A	Modulate - Train B Close - Train A	Close on CHP or CHR	Close
D-10	Normal Recirc Air - Train B	Open	Open	Open on CHP or CHR	Open
D-11	Supply Air Back Draft Damper - Train B	Open - Train B Close - Train A	Open - Train B Close - Train A	Open - Train B Close - Train A on CHP or CHR	NA (Back Draft)
D-12	Charcoal Filter Unit Supply Air - Train B	Close	Close	Open - Train B Close - Train A on CHP or CHR	NA (Back Draft)

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
D-13	Charcoal Filter Unit Return Air - Train B	Close	Close	Open - Train B Close - Train A on CHP or CHR	Close
D-14	Charcoal Filter Unit Outside Air - Train B	Close	Close	Open - Train B, (Manual Close Avail) Close - Train A on CHP or CHR	NA (Elect Op FAI)
D-15	Purge Fan Isolation	Close	Close	Close on CHP or CHR	Close
D-16	Purge Fan Isolation	Close	Close	Close on CHP or CHR	Close
D-17	Exhaust Fan V-16 Isolation	Open	Open	Close on CHP or CHR	Close
D-18	Exhaust Fan Isolation	Open	Open	Close on CHP or CHR	Close
D-19	Number Not Used	-	-	-	-

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
D-20	Charcoal Filter Flow Control - Train A	Open	Open	Modulate - Train A Open - Train B on CHP or CHR	Open
D-21	Charcoal Filter Flow Control - Train B	Open	Open	Modulate - Train B Open - Train A on CHP or CHR	Open
Radioactive Waste Area and Engineered Safeguards Rooms					
PO-3010	Fresh Air Supply	Open	Open	Close on Trip of Fan V-10	Close
PO-1809	Radwaste Area Supply	Open	Open	Close (RE-1809)	Close
PO-1839	Radwaste Area Exhaust	Open	Open	Close on Trip of Fan V-14A	Close
PO-1840	Radwaste Area Exhaust	Open	Open	Close on Trip of Fan V-14B	Close
PO-1817	East Safeguards Room Supply	Open	Open	Close (RE-1810)	Close
PO-1810	East Safeguards Room Exhaust	Open	Open	Close (RE-1810)	Close

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
PO-1812	West Safeguards Room Supply	Open	Open	Close (RE-1811)	Close
PO-1811	West Safeguards Room Exhaust	Open	Open	Close (RE-1811)	Close
Auxiliary Building Addition Radwaste Area Ventilation System					
PO-8006	Fresh Air Supply	Open	Open	Close on Trip of Fan V-67	Close
PO-8016A	Radwaste Add Exhaust	Open	Open	Close on Trip of Fan V-68A	Close
PO-8016B	Radwaste Add Exhaust	Open	Open	Close on Trip of Fan V-68B	Close

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
Fuel Handling Area					
Damper PO-3007 is normally open during reactor operation or reactor shutdown and fails closed on loss of instrument air.					
Auxiliary Building Addition Fuel Handling Area Ventilation System					
PO-8001	Fresh Air Supply	Open	Open	Close on Trip of Fan V-69	Close
PO-8013A	Fuel Handling Add Exhaust	Open	Open	Close on Trip of Fan V-70A	Close
PO-8013B	Fuel Handling Add Exhaust	Open	Open	Close on Trip of Fan V-70B	Close
Penetration and Fan Rooms Heating and Ventilation System					
PO-8035	Outside Air Supply	Open	Open	Close (RIA-5710)	Close
PO-8036	Exhaust	Open	Open	Close (RIA-5710)	Close

VENTILATION DAMPERS: FUNCTIONS AND POSITIONS FOR VARIOUS MODES OF PLANT OPERATION

Damper	Description	Normal Position	Shutdown Position	Position After Auto Actuation	Position After Loss of Air
Containment					
CV-1813	Air Space Purge Supply	Close	Open	Close on CHP or CHR	Close
CV-1814	Air Space Purge Supply	Close	Open	Close on CHP or CHR	Close
CV-1806	Cont Purge Exhaust	Close	Open	Close on CHP or CHR	Close
CV-1805	Cont Purge Exhaust	Close	Open	Close on CHP or CHR	Close
CV-1808	Cont Purge Exhaust	Close	Open	Close on CHP or CHR	Close
CV-1807	Cont Purge Exhaust	Close	Open	Close on CHP or CHR	Close

SAMPLING STATIONS

NSSS Sampling Station

Containment Hydrogen Monitoring System

Turbine Analyzer Panel

Radwaste Sampling Station

Waste Gas Sample Panel

Radwaste Addition Sampling System

SAMPLE POINT SUMMARY

1. NSSS Sample Station

Pressurizer Vapor Phase	Grab Sample, Bomb
Pressurizer Liquid Phase	Grab Sample, Bomb
Primary Coolant Hot Leg	Grab Sample, Bomb
Quench Tank Liquid Phase	Grab Sample, Bomb
Quench Tank Vapor Phase	Grab Sample, Bomb
Purification Ion Exchange Inlet	Grab Sample
Purification Filters Outlet	Grab Sample
LPSI Pumps Discharge	Grab Sample
Purification Ion Exchange Outlet	Grab Sample
SI Drain Tank	Grab Sample
Containment Spray Pumps Discharge	Grab Sample
SIRW Tank Recirculation	Grab Sample
HPSI Pumps Discharge	Grab Sample

2. Radwaste Sampling Station

Primary System Drain Tank Recirc	Grab Sample
Equipment Drain Tank Recirc	Grab Sample
Vacuum Degasifier Pump Discharge	Grab Sample
Receiver Tank Pumps Discharge	Grab Sample
Receiver Tank Circ Pumps Discharge	Grab Sample
Radwaste Demin Tanks Outlet (3)	Grab Sample
Treated Waste Mon Tanks Recirc (2)	Grab Sample
Controlled Chem Lab Drain Tank	Grab Sample
Filtered Waste Monitor Tank Recirc	Grab Sample
Dirty Waste Drain Tank Recirc	Grab Sample
Component Cooling Pumps Discharge	Grab Sample

3. Turbine Analyzer Panel

Steam Generator Blowdown (2)	Grab Sample, Conductivity, pH, Sodium, Hydrazine
Feedwater Heater Train (2)	Grab Sample, Conductivity, pH, Oxygen, Sodium, Hydrazine
Condensate Pumps Discharge (2)	Grab Sample, Conductivity, pH, Oxygen, Sodium, Hydrazine
Heater Drains Discharge (2)	Grab Sample, pH
Primary Storage Tank	Grab Sample, Conductivity, pH, Sodium
Condensate Pump P-11 Discharge	Grab Sample, Conductivity, pH, Sodium
Blowdown Demineralizer (3)	Grab Sample

SAMPLE POINT SUMMARY

4. Waste Gas Sample Panel

Volume Control Tank	Bomb
Waste Gas Surge Tank	Bomb
Waste Gas Decay Tanks (6)	Bomb
Spurt Resin Storage Tank	Bomb

5. Radwaste Addition Sampling System

Radwaste Polishing Demineralizer Discharge	Grab Sample, Conductivity
Clean Waste Transfer Pump Discharge	Grab Sample
Clean Waste Distillate Pump Discharge	Grab Sample
Misc Waste Distillate Pumps Discharge (2)	Grab Sample
Misc Waste Demineralizer Tank Discharge (2)	Grab Sample, Conductivity (1)
Misc Waste Transfer Pumps Discharge (2)	Grab Sample
Misc Waste Filter Inlet	Grab Sample
Misc Waste Filter Discharge (2)	Grab Sample
Primary System Makeup Water Pump Discharge	Grab Sample
Utility Water Transfer Pump Discharge	Grab Sample
Spurt Resin Storage Tank Gas	Bomb
Waste Gas Decay Tanks (3)	Bomb
Radwaste Evaporator Distillate (2)	Grab Sample

6. Containment Hydrogen Monitor

Containment Atmosphere (2)	% Hydrogen

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

1.1 General

Normal Letdown Flow	40 gpm
Normal Purification Flow Rate	40 gpm
Normal Charging Flow	44 gpm
Primary Coolant Pump Controlled Bleedoff (4 Pumps)	4 gpm
Normal Letdown Temperature at Loop	547.8°F
Normal Charging Temperature at Loop	425°F
Ion Exchanger Operating Temperature	120°F

1.2 Regenerative Heat Exchanger - E-56

Quantity	1
Type	Shell and Tube, Vertical
Normal Heat Transfer	6.6×10^6 Btu/h
Code	ASME B&PV Code, Section III, Class C, 1965
Shell Side (Charging)	
Fluid	Primary Coolant, 1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)
Design Pressure	2,735 psig
Design Temperature	650°F
Material	Stainless Steel

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

Tube Side (Letdown)

Fluid	Primary Coolant, 1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)
Design Pressure	2,485 psig
Design Temperature	650°F
Material	Stainless Steel

Operating Parameters - Regenerative Heat Exchanger

	Unbalanced Normal	Maximum Unbalanced Charging With Heat Transfer	Maximum Purification	Maximum Letdown
Tube Side (Letdown)				
Flow - gpm	53	53	160	160
Inlet Temp - °F	547.8	547.8	547.8	547.8
Outlet Temp - °F	251	160	319	449
Shell Side (Charging)				
Flow - gpm	43	133	123	33
Inlet Temp - °F	120	120	120	120
Outlet Temp - °F	416	246	367	523
Heat Transfer - Btu/h	6.3×10^6	7.9×10^6	14.9×10^6	6.9×10^6

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

1.3 Letdown Orifice - RO-2003, RO-2004 and RO-2005

Quantity	3
Capacity (Each)	40 gpm
Design Pressure	2,485 psia
Design Temperature	650°F
Normal Temperature of Fluid	250°F
Maximum Temperature of Fluid	450°F
Normal Downstream Pressure	425 psia
Normal Upstream Pressure	1,970 psia
Material	Stainless Steel
Fluid	Primary Coolant, 1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)

1.4 Letdown Heat Exchanger - E-58

Quantity	1
Type	Shell and Tube, Horizontal
Design Heat Transfer	19.1×10^6 Btu/h
Code	ASME B&PV Code, Section III, Class C
Tube Side (Letdown)	
Fluid	Primary Coolant, 1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

Design Pressure	650 psig
Design Temperature	550°F
Material	Stainless Steel
Shell Side (Cooling Water)	
Fluid	Component Cooling Water
Design Pressure	150 psig
Design Temperature	250°F
Material	Carbon Steel

Operating Parameters - Letdown Heat Exchanger

	Unbalanced Normal	Maximum Unbalanced Charging With Letdown	Maximum Purification	Maximum Letdown
Tube Side (Letdown)				
Flow - gpm	42	40	130	143
Inlet Temp - °F	251	160	319	449
Outlet Temp - °F	120	120	120	139
Heat Transfer - Btu/h	2.6×10^6	$.79 \times 10^6$	11.9×10^6	19.1×10^6
Shell Sides (Cooling Water)				
Flow - gpm	66 - 111	23 - 40	500 - 1,000	591 - 960
Inlet Temp - °F	65 - 90	65 - 90	65 - 90	65 - 90

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

Outlet Temp - °F	144-137	133-130	113 - 114	130-130

1.5 Process Radiation Monitor - Element RE-0202

Quantity	1
Design Pressure	200 psig
Design Temperature	250°F
Normal Operating Pressure	20 psig
Normal Operating Temperature	120°F
Normal Flow Rate	0.5 gpm
Code	ASA B31.1

1.6 Ion Exchangers - T-51A, T-51B and T-52

Quantity	3
Type	Flushable
Design Pressure	200 psig
Design Temperature	250°F
Normal Operating Pressure	20 psig
Normal Operating Temperature	120°F
Resin Volume	32 ft^3
Normal Flow Rate	40 gpm
Maximum Flow Rate	120 gpm
Decontamination Factor, Minimum	10
Retention Screen	80 US Mesh

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

Code for Vessel	ASME B&PV Code, Section III, Class C
Material	Stainless Steel
Fluid	1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)

1.7 Purification Filters - F-54A and F-54B

Quantity	2
Type of Elements	Synthetic Fiber
Retention	0.05 to 6.0 Micron Absolute; 1.0 Micron Nominal (or finer)
Design Pressure	200 psig
Design Temperature	250°F
Design Flow	120 gpm
Normal Flow	40 gpm
Maximum Flow	160 gpm
Code for Vessel	ASME B&PV Code, Section III, Class C, 1965
Material	Stainless Steel
Fluid	1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)

1.8 Volume Control Tank - T-54

Quantity	1

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

	Type	Vertical, Cylindrical
	Design Pressure, Internal	75 psig
	Design Pressure, External	15 psig
	Design Temperature	250°F
	Internal Volume, Minimum	4,170 gal
	Operating Pressure Range	0 to 75 psig
	Normal Operating Pressure	10 psig
	Normal Operating Temperature	120°F
	Normal Spray Flow	40 gpm
	Blanket Gas	Hydrogen or Nitrogen
	Code	ASME B&PV Code, Section III, Class C, 1965
	Fluid	1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)
	Material	Stainless Steel
1.9	Spray Nozzle (Volume Control Tank)	
	Quantity	1
	Type	Medium Angle, Full Cone
	Design Pressure	200 psig
	Design Temperature	250°F
	Normal Spray Flow	40 gpm

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

	Maximum Spray Flow	120 gpm
	Fluid	1 Wt % Boric Acid, Nominal; 15,000 ppm Boric Acid, Maximum (Design)
	Material	Stainless Steel
1.10	Variable Speed Charging Pump - P-55A	
	Quantity	1
	Type	Positive Displacement
	Design Pressure	2,735 psig
	Design Temperature	250°F
	Flow Rate Range	33 to 53 gpm
	Normal Flow Rate	44 gpm
	Normal Discharge Pressure	2,200 psig
	Normal Temperature of Pumped Fluid	120°F
	Maximum Discharge Pressure (Short Term)	2,900 psig
	NPSH Required	7.65 ft (Ref. 25)
	NPSH Available (Normal Suction From VCT)	30.39 ft (Ref. 25)
	Maximum Pressure Pump Starts Against	2,485 psig
	Driver Rating	100 hp
	Type Variable Capacity Device	Fluid Drive

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

Fluid Drive and Pump Cooling Water Requirements	22 gpm, 15°F Rise
Materials in Contact With Pumped Fluid	Stainless Steel or Equivalent Corrosion Resistance
Fluid	1 Wt % Boric Acid, Nominal; 12 Wt% Boric Acid, Maximum (Design)

1.11 Constant Speed Charging Pumps - P-55B and P-55C

Quantity	2
Type	Positive Displacement
Design Pressure	2,735 psig
Design Temperature	250°F
Flow Rate	40 gpm
Normal Discharge Pressure	2,200 psig
Normal Temperature of Pumped Fluid	120°F
Maximum Discharge Pressure (Short Term)	3,010 psig
NPSH Required	7.41 ft (Ref. 25)
NPSH Available P-55B/C (Normal Suction From VCT)	28.22/28.18 ft (Ref. 25)
Maximum Pressure Pump Starts Against	2,500psig
Driver Rating	75 hp
Pump Cooling Water Requirements	5 gpm, 15°F Rise

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

	Materials in Contact With Pumped Fluid	Stainless Steel or Equivalent Corrosion Resistance
	Fluid	1 Wt % Boric Acid, Nominal; 12 Wt % Boric Acid, Maximum (Design)
1.12	Boric Acid Batching Tank - T-77	
	Quantity	1
	Internal Volume	580 gal
	Useful Volume	457.4 gal
	Design Pressure	Atmospheric
	Design Temperature	200°F
	Normal Operating Temperature	150°F
	Type Heater	Electric Immersion
	Heater Capacity	31.5 kw Minimum
	Code	ASME B&PV Code, Section VIII
	Fluid	6-1/4 Wt % Boric Acid, Normal; 12 Wt % Boric Acid, Maximum (Design)
	Material	Stainless Steel
1.13	Boric Acid Strainer - F-10 (YS-0224)	
	Quantity	1
	Type	Basket
	Design Pressure	125 psig

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

Design Temperature	250°F
Screen Size	100 x 100 US Mesh
Design Flow	50 gpm
Material	Stainless Steel
Fluid	6-1/4 Wt % Boric Acid, Normal; 12 Wt % Boric Acid, Maximum (Design)

1.14 Concentrated Boric Acid Storage Tanks - T-53A and T-53B

Quantity	2
Internal Volume	6,550 gal
Design Pressure	Atmospheric
Design Temperature	200°F
Normal Operating Temperature	140°F to 170°F
Type Heater	Electrical, Dry Well Installation
Heater Capacity	Two Independent 4 kW Banks per Tank
Fluid	6-1/4 Wt % Boric Acid, Normal; 12 Wt % Boric Acid, Maximum (Design)
Material	Stainless Steel
Code	ASME B&PV Code, Section III, Class C, 1965

1.15 Boric Acid Pumps - P-56A and P-56B

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

Quantity	2
Type	Centrifugal
Design Pressure	150 psig
Design Temperature	250°F
Design Head	225 ft
Design Flow	143 gpm
Minimum Flow	10 gpm
Normal Operating Temperature	160°F
NPSH Required	7.50 ft (Ref. 25)
NPSH Available P-56A/B	25.06/25.23 (Ref. 25)
Horsepower	30
Fluid	6-1/4 Wt % Boric Acid, Normal; 12 Wt % Boric Acid, Maximum (Design)
Material in Contact With Liquid	Stainless Steel

1.16 Boric Acid Filter - F-9

Quantity	1
Type Elements	Synthetic Fiber
Retention of 5 Micron Particles	98%
Design Pressure	150 psig
Design Temperature	250°F

CHEMICAL AND VOLUME CONTROL SYSTEM
DESIGN PARAMETERS

Design Flow	140 gpm
Material	Stainless Steel
Liquid	6-1/4 Wt % Boric Acid, Normal; 12 Wt % Boric Acid, Maximum (Design)
Code	ASME B&PV Code, Section III, Class C, 1965

1.17 Chemical Addition Tank - T-56

Quantity	1
Capacity	10.5 gal
Design Pressure	Atmospheric
Design Temperature	200°F
Normal Operating Temperature	Ambient
Material	Stainless Steel
Fluid	Hydrazine (N_2H_4), LiOH, KOH, NH_4OH
Code	ASME B&PV Code, Section VIII

1.18 Chemical Addition Strainer - F-58

Quantity	1
Type	Basket
Design Pressure	100 psig
Design Temperature	250°F
Screen Size	60 US Mesh

CHEMICAL AND VOLUME CONTROL SYSTEM DESIGN PARAMETERS

Design Flow	30 gph
Material	Stainless Steel
Fluid	Hydrazine (N_2H_4), LiOH, KOH, NH_4OH

1.19 Metering Pump - P-57

Quantity	1
Type	Air Operated Double Diaphragm
Design Pressure	120 psig
Design Temperature	190°F
Design Flow Rate	0 to 35 gpm
Design Air Consumption	0 to 50 scfm
Normal Fluid Temperature	75°F
Material	Stainless Steel
Fluid	Hydrazine (N_2H_4), LiOH, KOH, NH_4OH

FUEL HANDLING DATA

1. New Fuel Storage Rack	
Core Storage Capacity	1/6
Equivalent Fuel Assemblies	36
Center-to-Center Spacing of Assemblies	11 in
2. Spent Fuel Storage Pool	
Core Storage Capacity	4.3
Equivalent Fuel Assemblies	892
Number of Space Accommodations for Spent Fuel Shipping Casks	1
Center-to-Center Spacing of Assemblies	
Region 1	10-1/4 in
Region 2	9.17 in
Maximum k_{eff} With Unborated Water	Less Than 1.0
3. Miscellaneous Details	
Wall Thickness for Spent Fuel Storage Pool	4 ft to 6-1/2 ft
Weight of Fuel Assembly	1,500 lb
Capacity of Refueling Water Storage Tank	285,000 gal
Quantity of Water Required for Refueling	250,000 gal

FUEL BUILDING CRANE

Main Hoist	3 ft/min at Full Load (3 Steps), 25 hp at 900 r/min
Main Hoist Brake Capacity	179 ft-lb
Auxiliary Hoist	25 ft/min at Full Load (Stepless), 25 hp at 900 r/min
Trolley	25 ft/min at Full Load (3 Steps), 3 hp at 1,800 r/min *
Bridge	25 ft/min at Full Load (3 Steps), 5 hp at 1,800 r/min *
Service Class	Class A, Electric Overhead Crane Institute Specification 70
Lift Main Hoist	54 ft 0 in
Lift Auxiliary Hoist	108 ft 5 in
Span	44 ft 10 in Center-to-Center Rails
Bridge Travel	Approximately 100 ft
Lifting Tackle	Main Hoist - Rope 16 Parts 1¾-Inch SS, Drum 52½-Inch Pitch Diameter, Sheaves 28-Inch Pitch Diameter
	Auxiliary Hoist - Rope 4 Parts ¾-Inch SS, Drum 15-Inch Pitch Diameter, Sheaves 13-Inch Pitch Diameter
Girders	Welded Box Section
Runway Rail	100 lbs ASCE
Trolley Rail	175 lbs USS
Bridge Drive	Direct Drive Arrangement With Oiltight Center Gear Case
Trolley Drive	Direct Drive Arrangement With Oiltight Center Gear Case

* Single failure proof mode of operation only

FUEL BUILDING CRANE

Capacity in Net Tons	Bridge 110 Tons, Main Hoist 110 Tons, Auxiliary Hoist 15 Tons
Wheels	Bridge Has Eight 21-Inch Steel Hardened Treads
	Trolley Has Four 21-Inch Diameter Steel Hardened Treads
Bridge End Assembly	Rotating Axle
Bumpers	Rubber
Bearings	Antifriction Throughout
Gearing	Helical Gearing Heat-Treated Steel Throughout Except Trolley Traverse. All Gearing in Oiltight Casing

POWER BLOCK STRUCTURE

Building	Fire Area	Description
Auxiliary	1	Control Room Complex
Auxiliary	2	Cable Spreading Room
Auxiliary	3	1D Switchgear Room & North Cableway
Auxiliary	4	1C Switchgear Room
Auxiliary	5	1-1 Diesel Generator Room
Auxiliary	6	1-2 Diesel Generator Room
Auxiliary	7	Diesel Generator 1-1 Fuel Oil Day Tank
Auxiliary	8	Diesel Generator 1-2 Fuel Oil Day Tank
Auxiliary	10	East Engineered Safeguards Room
Auxiliary	11	Battery Room #2
Auxiliary	12	Battery Room #1
Auxiliary	13	Auxiliary Building - Miscellaneous
Auxiliary	15	Engineered Safeguards Panel Room & Stairway
Auxiliary	16	Component Cooling Pump Room
Auxiliary	17	Refueling & Spent Fuel Pool Room
Auxiliary	18	Demineralizer Rooms
Auxiliary	19	Track Alley
Auxiliary	21	Electrical Equipment Room
Auxiliary	27	Radwaste Addition - VRS
Auxiliary	28	West Engineered Safeguards Room
Auxiliary	29	Center Mechanical Equipment Room
Auxiliary	30	East Mechanical Equipment Room
Auxiliary	31	West Mechanical Equipment Room
Auxiliary	32	SIRW Tank & CCW Roof Area
Auxiliary	33	Technical Support Center
Auxiliary	34	Man Hole #1
Auxiliary	35	Man Hole #2
Auxiliary	36	Man Hole #3
Auxiliary	26	Southwest Cable Penetration Room
Reactor	14	Reactor Containment Building
Turbine	9	Intake Structure
Turbine	22	Turbine Lube Oil Room
Turbine	23	Turbine Building
Turbine	24	Auxiliary Feedwater Pump Room
Turbine	25	Heating Boiler Rooms
Turbine	56	Diesel Fire Pump Fuel Oil Day Tank Room
Feedwater Purity	39	Feedwater Purity Building
Yard	41	Outside Area within Protected Area & Transformer Area
Switchyard	40	Switchyard
Enclosure	59	Diesel - Driven AFW Pump P-8D Enclosure