Introduction

This procedure identifies the pump and valve tests performed to meet the requirements of 10 CFR 50.55a, Section XI of the ASME Boiler and Pressure Vessel Code, and Technical Specification 5.5.8.

This program is applicable to PVNGS Units 1, 2, and 3. The pumps and valves within the scope of this program are identified in the component tables.

The second 10-year IST interval for all three units begins on January 15, 1998, and ends on January 15, 2008. During this interval, inservice testing is performed in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition; and ASME/ANSI OM-1987, "Operation and Maintenance of Nuclear Power Plants", Part 1, Part 6 (with OMa-1988 Addenda), and Part 10 (with OMa-1988 Addenda). Deviations from the requirements of these codes are documented by relief requests.

Component Tables

The Pump Table, Valve Table, and supporting documentation are provided on the following pages:

References

Implementing References

- 73DP-9XI02, "Pump and Valve Inservice Testing Program – Administrative Requirements"
- Surveillance test procedures as listed in the Pump Table and Valve Table

Developmental References

Developmental references for the Pump and Valve IST Program are listed in 73DP-9XI02.

In addition, recent IST Program changes are documented by the following:

- CRDR 980161 (Deletion of non-ASME EDG valves)
- CRDR 981343 (Deletion of CHNPSV0865 from the IST Program)
- RCTS 040634 (Pressurizer safety valve and main steam safety valve testing on a refueling schedule)
- RCTS 038788 (Main steam safety valve testing on a refueling schedule)
- CRDR 980862 (AFAV015 closure test moved from 73ST-9AF03 to 73ST-9XI38)
- CRDR 280198.03 / RCTS 042728.02 / LER 2-98-004-00 (Revised testing frequencies for Class 1 PSVs)
- CRDR 980888.05 (Deferral of SIAVA10, SIBVA15, SIAV997, and SIBV998 exercise testing to RFO)
- CRDR 981540 (Addition of AFBPSV0106, AFBPSV0107, AFCPSV0108, AFAPSV0109, and NCEPSV0617 to the IST Program)

Pump Table

Pump ID / Description	Code Class	Drawing Coord.	Speed	Press.	Flow Rate	Vibration	Test Procedure	Remarks
AFA-P01 Essential Auxiliary Feedwater Pump (Turbine-Driven)	3	AFP-001 D06	QTR	QTR	NA PRR-01	QTR	73ST-9AF02	Minimum flow recirc test
			CSD	CSD	CSD	CSD	73ST-9AF02	Full-flow test per PRR-01
AFB-P01 Essential Auxiliary Feedwater Pump (Motor-Driven)	3	AFP-001 B06	NA	QTR	NA PRR-01	QTR	73ST-9AF03	Minimum flow recirc test
			NA	CSD	CSD	CSD	73ST-9AF03	Full-flow test per PRR-01
AFN-P01 Non-Class Auxiliary Feedwater Pump (Motor-Driven)	N	AFP-001 H06	NA	QTR	NA PRR-02	QTR	73ST-9AF01	Augmented component, tested pursuant to SR 3.7.5.2
CHA-P01 Charging Pump	2	CHP-002 B03	NA	QTR	QTR PRR-03	QTR PRR-07	73ST-9CH06	
CHB-P01 Charging Pump	2	CHP-002 D03	NA	QTR	QTR PRR-03	QTR PRR-07	73ST-9CH06	
CHE-P01 Charging Pump	2	CHP-002 G03	NA	QTR	QTR PRR-03	QTR PRR-07	73ST-9CH06	
CTA-P01 Condensate Transfer Pump	3	CTP-001 C05	NA	QTR	QTR	QTR	73ST-9CT01	Augmented component
CTB-P01 Condensate Transfer Pump	3	CTP-001 B05	NA	QTR	QTR	QTR	73ST-9CT01	Augmented component
DFA-P01 Diesel Generator Fuel Oil Transfer Pump	3	DFP-001 B06	NA	QTR	QTR	NA*	73ST-9DF01	*Submerged pump - no accessible bearings.
DFB-P01 Diesel Generator Fuel Oil Transfer Pump	3	DFP-001 B02	NA	QTR	QTR	NA*	73ST-9DF01	*Submerged pump - no accessible bearings.
ECA-P01 Essential Chilled Water Circulation Pump	3	ECP-001 B08	NA	QTR	QTR	QTR	73ST-9EC01	
ECB-P01 Essential Chilled Water Circulation Pump	3	ECP-001 B04	NA	QTR	QTR	QTR	73ST-9EC01	
EWA-P01 Essential Cooling Water Pump	3	EWP-001 E06	NA	QTR	QTR	QTR	73ST-9EW01	

Pump ID / Description	Code Class	Drawing Coord.	Speed	Press.	Flow Rate	Vibration	Test Procedure	Remarks
EWB-P01 Essential Cooling Water Pump	3	EWP-001 E02	NA	QTR	QTR	QTR	73ST-9EW01	
PCA-P01 Spent Fuel Pool Cooling Pump	3	PCP-001 D15	NA	QTR	QTR PRR-04	QTR	73ST-9PC01	Augmented component
PCB-P01 Spent Fuel Pool Cooling Pump	3	PCP-001 B15	NA	QTR	QTR PRR-04	QTR	73ST-9PC01	Augmented component
SIA-P01 Low Pressure Safety Injection (LPSI) Pump	2	SIP-001 F11	NA	QTR	NA PRR-05	QTR	73ST-9SI11	Minimum flow recirc test
			NA	CSD	CSD	CSD	73ST-9SI14	Full-flow test per PRR-05
SIB-P01 Low Pressure Safety Injection (LPSI) Pump	2	SIP-001 B11	NA	QTR	NA PRR-05	QTR	73ST-9SI11	Minimum flow recirc test
			NA	CSD	CSD	CSD	73ST-9SI14	Full-flow test per PRR-05
SIA-P02 High Pressure Safety Injection (HPSI) Pump	2	SIP-001 E11	NA	QTR	NA PRR-06	QTR	73ST-9SI10	Minimum flow recirc test
			NA	RFO	RFO	RFO	73ST-9XI33	Full-flow test per PRR-06
SIB-P02 High Pressure Safety Injection (HPSI) Pump	2	SIP-001 A11	NA	QTR	NA PRR-06	QTR	73ST-9SI10	Minimum flow recirc test
			NA	RFO	RFO	RFO	73ST-9XI33	Full-flow test per PRR-06
SIA-P03 Containment Spray Pump	2	SIP-001 H11	NA	QTR	NA PRR-11	QTR	73ST-9SI06	Minimum flow recirc test
			NA	CSD	CSD	CSD	73ST-9SI15	Full-flow test per PRR-11
SIB-P03 Containment Spray Pump	2	SIP-001 C11	NA	QTR	NA PRR-11	QTR	73ST-9SI06	Minimum flow recirc test
			NA	CSD	CSD	CSD	73ST-9SI15	Full-flow test per PRR-11
SPA-P01 Essential Spray Pond Pump	3	SPP-001 Sh. 1 C04	NA	QTR	QTR	QTR	73ST-9SP01	Vertical line shaft pump
SPB-P01 Essential Spray Pond Pump	3	SPP-001 Sh. 1 C07	NA	QTR	QTR	QTR	73ST-9SP01	Vertical line shaft pump

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (In) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
AFAV007	AFP-001	8	C	FSO	CSD	73ST-9AF02	CSJ-01	
TURBINE-DRIVEN AFW PUMP SUCTION CHECK VALVE FROM CONDENSATE STORAGE TANK	D07	CK	A	PSO	QTR	73ST-9AF02	CSJ-01	
	3	SA	O					
AFAV015	AFP-001	6	C	FSO	CSD	73ST-9AF02	CSJ-03	
TURBINE-DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE CHECK VALVE	E05	CK	A	FSC	CSD	73ST-9XI38	CSJ-03	
	3	SA	OC					
AFBV022	AFP-001	8	C	FSO	CSD	73ST-9AF03	CSJ-01	
MOTOR-DRIVEN AFW PUMP SUCTION CHECK VALVE FROM CONDENSATE STORAGE TANK	C07	CK	A	PSO	QTR	73ST-9AF03	CSJ-01	
	3	SA	O					
AFBV024	AFP-001	6	C	FSO	CSD	73ST-9AF03	CSJ-03	
MOTOR-DRIVEN AUXILIARY FEEDWATER PUMP DISCHARGE CHECK VALVE	C05	CK	A	FSC	CSD	73ST-9AF02	CSJ-03	
	3	SA	OC					
AFBHV0030	AFP-001	6	B	FSO	QTR	73ST-9XI05		
MOTOR-DRIVEN AFW PUMP TO SG #1 FLOW CONTROL VALVE	B04	GL	A	FSC	QTR	73ST-9XI05		
	3	MO	OC	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		
AFBHV0031	AFP-001	6	B	FSO	QTR	73ST-9XI05		
MOTOR-DRIVEN AFW PUMP TO SG #2 FLOW CONTROL VALVE	B04	GL	A	FSC	QTR	73ST-9XI05		
	3	MO	OC	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		
AFAHV0032	AFP-001	6	B	FSO	QTR	73ST-9XI05		
TURBINE-DRIVEN AFW PUMP TO SG #1 FLOW CONTROL VALVE	D04	GL	A	FSC	QTR	73ST-9XI05		
	3	MO	OC	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		
AFCHV0033	AFP-001	6	B	FSO	QTR	73ST-9XI05		
TURBINE-DRIVEN AFW PUMP TO SG #2 FLOW CONTROL VALVE	C04	GL	A	FSC	QTR	73ST-9XI05		
	3	MO	OC	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		
AFBUV0034	AFP-001	6	B	FSO	QTR	73ST-9XI05		
MOTOR-DRIVEN AFW PUMP TO SG #1 ISOLATION VALVE	B03	GA	A	FSC	QTR	73ST-9XI05		
	2	MO	OC	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		
AFBUV0035	AFP-001	6	B	FSO	QTR	73ST-9XI05		
MOTOR-DRIVEN AFW PUMP TO SG #2 ISOLATION VALVE	C03	GA	A	FSC	QTR	73ST-9XI05		
	2	MO	OC	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
AFCUV0036 TURBINE-DRIVEN AFW PUMP TO SG #1 ISOLATION VALVE	AFP-001 D03 2	6 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI05 73ST-9XI05 73ST-9XI05 73ST-9XI05 73ST-9XI05		
AFAUV0037 TURBINE-DRIVEN AFW PUMP TO SG #2 ISOLATION VALVE	AFP-001 D03 2	6 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI05 73ST-9XI05 73ST-9XI05 73ST-9XI05 73ST-9XI05		
AFAHV0054 TURBINE-DRIVEN AFW PUMP TRIP/THROTTLE VALVE	AFP-001 G04 3	4 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-9XI05 73ST-9XI05 73ST-9XI05		
AFAV079 AFW TO SG #1 CHECK VALVE	AFP-001 E02 2	6 CK SA	C A O	FSO	CSD	73ST-9AF02	CSJ-04	Also exercised open in 73ST-9AF03
AFBV080 AFW TO SG #2 CHECK VALVE	AFP-001 C02 2	6 CK SA	C A O	FSO	CSD	73ST-9AF02	CSJ-04	Also exercised open in 73ST-9AF03
FAV096 AUX STEAM SUPPLY CHECK VALVE TO AFW TURBINE	AFP-001 G02 3	4 CK SA	C A C	FSC	RFO	73ST-9ZZ25		Disassembled per OM-10, para. 4.3.2.4.c
AFBPSV0106 PRESSURE LOCKING RELIEF VALVE FOR AFBUV0034 BONNET	AFP-001 B03 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Being added per DMWO 741855. May not be installed in all units yet.
AFBPSV0107 PRESSURE LOCKING RELIEF VALVE FOR AFBUV0035 BONNET	AFP-001 C03 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Being added per DMWO 741855. May not be installed in all units yet.
AFCPSV0108 PRESSURE LOCKING RELIEF VALVE FOR AFCUV0036 BONNET	AFP-001 D03 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Being added per DMWO 741855. May not be installed in all units yet.
AFAPSV0109 PRESSURE LOCKING RELIEF VALVE FOR AFAUV0037 BONNET	AFP-001 D03 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Being added per DMWO 741855. May not be installed in all units yet.
AFAV137 TURBINE DRIVEN AFW PUMP DISCHARGE CHECK VALVE	AFP-001 D06 3	6 CK SA	C A O	FSO PSO	CSD QTR	73ST-9AF02 73ST-9AF02	CSJ-02	
AFBV138 MOTOR DRIVEN AFW DISCHARGE CHECK VALVE	AFP-001 C06 3	6 CK SA	C A O	FSO PSO	CSD QTR	73ST-9AF03 73ST-9AF03	CSJ-02	
CHEVM70 HARGING TO REGENERATIVE HEAT CHANGER INLET INBOARD CIV (PEN. 1)	CHP-001 F15 2	3 CK SA	AC A OC	FSO FSC AJ	QTR RFO CLR	73ST-9CH06 73ST-9XI28 73ST-9CL01	 ROJ-09	

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CHNPSV0115	CHP-002	3	C	SV	10Y	73ST-9ZZ20		
VOLUME CONTROL TANK OUTLET PRESSURE RELIEF VALVE	C06	SV	A					
	2	SA	OC					
CHNV118	CHP-002	4	C	FSO	QTR	73ST-9CH06		
VOLUME CONTROL TANK OUTLET CHECK VALVE	B07	CK	A					
	2	SA	O					
CHNV144	CHP-002	3	B	FSO	QTR	73ST-9XI31		
MANUAL ISOLATION VALVE FROM RWT TO SPENT FUEL POOL CLEANUP PUMPS	B14	DI	A	FSC	QTR	73ST-9XI31		
	3	MA	OC					
CHNV154	CHP-002	3	C	FSO	RFO	4xST-xCH04	ROJ-03	
BORIC ACID MAKEUP PUMP DISCHARGE CHECK VALVE	B13	CK	A	PSO	QTR	73ST-9XI06	ROJ-03	
	3	SA	O					
CHNV155	CHP-002	3	C	FSO	RFO	4xST-xCH04	ROJ-03	
BORIC ACID MAKEUP PUMP DISCHARGE CHECK VALVE	B13	CK	A	PSO	QTR	73ST-9XI06	ROJ-03	
	3	SA	O					
CHNV164	CHP-002	3	B	FSO	QTR	73ST-9XI31		
BORIC ACID MAKEUP FILTER BYPASS LINE ISOLATION VALVE	D11	DI	A	FSC	QTR	73ST-9XI31		
	3	MA	O					
CHAV177	CHP-002	3	C	FSO	RFO	4xST-xCH04	ROJ-01	
BORIC ACID MAKEUP CHECK VALVE TO VCT OUTLET	B07	CK	A	PSO	CSD	4xST-xCH04	ROJ-01	
	2	SA	O					
CHAV190	CHP-002	3	C	FSO	RFO	4xST-xCH04	ROJ-01	
RWT TO CHARGING PUMP SUCTION CHECK VALVE	A07	CK	A	PSO	CSD	4xST-xCH04	ROJ-01	
	2	SA	O					
CHNPSV0199	CHP-002	2	C	SV	10Y	73ST-9ZZ20		
RCP SEAL BLEEDOFF RELIEF VALVE	H15	SV	A					
	2	SA	OC					
CHBHV0203	CHP-001	2	B	FSO	CSD	73ST-9XI22	CSJ-06	Cycled every 18 months per TRM TSR 3.4.100.3
AUXILIARY PRESSURIZER SPRAY VALVE	H10	GL	A	FSC	CSD	73ST-9XI22	CSJ-06	
	1	SO	OC	STO	CSD	73ST-9XI22	CSJ-06	
				STC	CSD	73ST-9XI22	CSJ-06	
				FTC	CSD	73ST-9XI22	CSJ-06	
				VP	2YR	73ST-9XI27		
CHAHV0205	CHP-001	2	B	FSO	CSD	73ST-9XI22	CSJ-06	Cycled every 18 months per TRM TSR 3.4.100.3
AUXILIARY PRESSURIZER SPRAY VALVE	H11	GL	A	FSC	CSD	73ST-9XI22	CSJ-06	
	1	SO	OC	STO	CSD	73ST-9XI22	CSJ-06	
				STC	CSD	73ST-9XI22	CSJ-06	
				FTC	CSD	73ST-9XI22	CSJ-06	
				VP	2YR	73ST-9XI27		
CHEHV0239	CHP-001	2	B	FSC	QTR	73ST-9XI06		
NORMAL CHARGING FLOWPATH ISOLATION VALVE	G11	GL	A	STC	QTR	73ST-9XI06		
	2	AO	C	FTC	QTR	73ST-9XI06		
				VP	2YR	73ST-9XI06		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CHEPDV0240	CHP-001	2	B	FSC	QTR	73ST-9XI06		
NORMAL CHARGING FLOWPATH ISOLATION VALVE	G11	GL	A	STC	QTR	73ST-9XI06		
	1	AO	C	FTC	QTR	73ST-9XI06		
				VP	2YR	73ST-9XI06		
CHBHV0255	CHP-001	1.5	A	FSC	CSD	73ST-9XI22	CSJ-11	
RCP SEAL INJECTION OUTBOARD CIV (PEN. 72)	G04	GL	A	STC	CSD	73ST-9XI22	CSJ-11	
	2	MO	C	AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI22		
CHBV305	CHP-002	20	C	FSO	RFO	73ST-9XI29	ROJ-02	
REFUELING WATER TANK OUTLET CHECK VALVE TO SI SUCTION HEADER	B15	CK	A	FSC	RFO	40ST-9SI09	ROJ-10	
	2	SA	OC	PSO	QTR	73ST-9SI11	ROJ-02	
CHAV306	CHP-002	20	C	FSO	RFO	73ST-9XI29	ROJ-02	
REFUELING WATER TANK OUTLET CHECK VALVE TO SI SUCTION HEADER	C13	CK	A	FSC	RFO	40ST-9SI09	ROJ-10	
	2	SA	OC	PSO	QTR	73ST-9SI11	ROJ-02	
CHAPSV0315	CHP-002	0.75	C	SV	10Y	73ST-9ZZ20		
CHARGING PUMP SUCTION PRESSURE RELIEF VALVE	C05	SV	A					
	2	SA	OC					
CHAV316	CHP-002	4	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP CHA-P01 NORMAL SUCTION FROM VCT MANUAL ISOLATION VALVE	B05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHBPSV0318	CHP-002	0.75	C	SV	10Y	73ST-9ZZ20		
CHARGING PUMP SUCTION PRESSURE RELIEF VALVE	F05	SV	A					
	2	SA	OC					
CHBV319	CHP-002	4	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP CHB-P01 NORMAL SUCTION FROM VCT MANUAL ISOLATION VALVE	D05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHEPSV0321	CHP-002	0.75	C	SV	10Y	73ST-9ZZ20		
CHARGING PUMP SUCTION PRESSURE RELIEF VALVE	H05	SV	A					
	2	SA	OC					
CHEV322	CHP-002	4	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP CHE-P01 NORMAL SUCTION FROM VCT MANUAL ISOLATION VALVE	G05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHEPSV0324	CHP-002	0.75	C	SV	10Y	73ST-9ZZ20		
CHARGING PUMP DISCHARGE PRESSURE RELIEF VALVE	G02	SV	A					
	2	SA	OC					
CHBPSV0325	CHP-002	0.75	C	SV	10Y	73ST-9ZZ20		
CHARGING PUMP DISCHARGE PRESSURE RELIEF VALVE	E02	SV	A					
	2	SA	OC					
CHAPSV0326	CHP-002	0.75	C	SV	10Y	73ST-9ZZ20		
CHARGING PUMP DISCHARGE PRESSURE RELIEF VALVE	C02	SV	A					
	2	SA	OC					

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CHBV327	CHP-002	3	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP ALTERNATE SUCTION COMMON ISOLATION VALVE	E05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHAV328	CHP-002	2	C	FSO	QTR	73ST-9CH06		
CHARGING PUMP CHA-P01 DISCHARGE CHECK VALVE	B02	CK	A					
	2	SA	O					
CHBV331	CHP-002	2	C	FSO	QTR	73ST-9CH06		
CHARGING PUMP CHB-P01 DISCHARGE CHECK VALVE	E02	CK	A					
	2	SA	O					
CHEV334	CHP-002	2	C	FSO	QTR	73ST-9CH06		
CHARGING PUMP CHE-P01 DISCHARGE CHECK VALVE	G02	CK	A					
	2	SA	O					
CHNPSV0345	CHP-001	2	C	SV	10Y	73ST-9ZZ20		
INTERMEDIATE PRESSURE LETDOWN RELIEF VALVE AT OUTLET OF REGENERATIVE HEAT EXCHANGER	E12	SV	A					
	2	SA	OC					
CHNPSV0354	CHP-001	2	C	SV	10Y	73ST-9ZZ20		
INTERMEDIATE PRESSURE LETDOWN RELIEF VALVE AT OUTLET OF LETDOWN HEAT EXCHANGER	F9	SV	A					
	2	SA	OC					
CHEV429	CHP-001	2	C	FSO	QTR	73ST-9CH06		
COMMON CHARGING LINE TO REGENERATIVE HEAT EXCHANGER CHECK VALVE	D16	CK	A					
	2	SA	O					
CHEV431	CHP-001	2	C	FSO	CSD	73ST-9XI27	CSJ-06	
PRESSURIZER AUXILIARY SPRAY CHECK VALVE	G09	CK	A					
	1	SA	O					
CHEV433	CHP-001	2	C	FSO	QTR	73ST-9CH06		
CHARGING LINE CHECK VALVE TO RCS	G09	CK	A					
	1	SA	O					
CHEV435	CHP-001	2	C	FSO	QTR	73ST-9CH06		
REGENERATIVE HEAT EXCHANGER OUTLET CHECK VALVE	F11	CK	A					
	1	SA	O					
CHNV494	CHP-003	1.5	AC	FSC	CSD	73ST-9XI28	CSJ-29	
REACTOR MAKEUP WATER SUPPLY CHECK VALVE TO RDT INBOARD CIV (PEN. 45)	E15	CK	A	AJ	CLR	73ST-9CL01		
	2	SA	C					
CHNUV0501	CHP-002	4	B	FSC	CSD	73ST-9XI22	CSJ-08	
VOLUME CONTROL TANK OUTLET ISOLATION VALVE	C07	GA	A	STC	CSD	73ST-9XI22	CSJ-08	
	2	MO	C	VP	2YR	73ST-9XI22		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CHBUV0505	CHP-002	1	A	FSO	CSD	73ST-9XI22	CSJ-32	
REACTOR COOLANT SEAL BLEED-OFF OUTBOARD CIV (PEN. 43)	H13	GL	A	FSC	CSD	73ST-9XI22	CSJ-32	
	2	AO	C	STO	CSD	73ST-9XI22	CSJ-32	
				STC	CSD	73ST-9XI22	CSJ-32	
				FTC	CSD	73ST-9XI22	CSJ-32	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI22		
CHAUV0506	CHP-002	1	A	FSO	CSD	73ST-9XI22	CSJ-32	
REACTOR COOLANT SEAL BLEED-OFF INBOARD CIV (PEN. 43)	H14	GL	A	FSC	CSD	73ST-9XI22	CSJ-32	
	2	AO	C	STO	CSD	73ST-9XI22	CSJ-32	
				STC	CSD	73ST-9XI22	CSJ-32	
				FTC	CSD	73ST-9XI22	CSJ-32	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI22		
CHNUV0514	CHP-002	3	B	FSO	QTR	73ST-9XI06		
BORIC ACID MAKEUP TO CHARGING PUMP SUCTION ISOLATION VALVE	B10	GL	A	STO	QTR	73ST-9XI06		
	3	MO	O	VP	2YR	73ST-9XI06		
CHBUV0515	CHP-001	2	B	FSC	CSD	73ST-9XI22	CSJ-09	
LETDOWN ISOLATION VALVE	H15	GL	A	STC	CSD	73ST-9XI22	CSJ-09	
	1	AO	C	FTC	CSD	73ST-9XI22	CSJ-09	
				VP	2YR	73ST-9XI22		
CHAUV0516	CHP-001	2	A	FSC	CSD	73ST-9XI22	CSJ-09	
LETDOWN INBOARD CIV (PEN. 40)	G15	GL	A	STC	CSD	73ST-9XI22	CSJ-09	
	1	AO	C	FTC	CSD	73ST-9XI22	CSJ-09	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI22		
CHBUV0523	CHP-001	2	A	FSC	CSD	73ST-9XI22	CSJ-09	
LETDOWN FROM REGENERATIVE HEAT EXCHANGER OUTBOARD CIV (PEN. 40)	F13	GL	A	STC	CSD	73ST-9XI22	CSJ-09	
	2	AO	C	FTC	CSD	73ST-9XI22	CSJ-09	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI22		
CHAHV0524	CHP-001	2	B	AJ	CLR	73ST-9CL01		
CHARGING LINE OUTBOARD CIV (PEN. 41)	D16	GL	P	VP	2YR	73ST-9XI22		
	2	MO	O					
CHNUV0527	CHP-002	3	B	FSC	QTR	73ST-9XI06		
MAKEUP TO CHARGING VCT BYPASS ISOLATION VALVE	B08	GA	A	STC	QTR	73ST-9XI06		
	3	AO	C	FTC	QTR	73ST-9XI06		
				VP	2YR	73ST-9XI06		
CHBHV0530	CHP-002	20	B	FSO	QTR	73ST-9XI06		
REFUELING WATER TANK OUTLET ISOLATION VALVE	C15	GA	A	FSC	QTR	73ST-9XI06		
	2	MO	OC	STO	QTR	73ST-9XI06		
				STC	QTR	73ST-9XI06		
				VP	2YR	73ST-9XI06		
CHAHV0531	CHP-002	20	B	FSO	QTR	73ST-9XI06		
REFUELING WATER TANK OUTLET ISOLATION VALVE	C14	GA	A	FSC	QTR	73ST-9XI06		
	2	MO	OC	STO	QTR	73ST-9XI06		
				STC	QTR	73ST-9XI06		
				VP	2YR	73ST-9XI06		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CHEHV0532	CHP-002	3	B	FSO	CSD	73ST-9XI22	CSJ-07	
ISOLATION FOR REFUELING WATER TANK TO BORIC ACID MAKEUP PUMPS	E16	GL	A	FSC	CSD	73ST-9XI22	CSJ-07	
	2	AO	OC	STO	CSD	73ST-9XI22	CSJ-07	
				STC	CSD	73ST-9XI22	CSJ-07	
				FTO	CSD	73ST-9XI22	CSJ-07	
				VP	2YR	73ST-9XI22		
CHEHV0536	CHP-002	3	B	FSO	CSD	73ST-9XI22	CSJ-07	
REFUELING WATER TANK TO CHARGING PUMP SUCTION ISOLATION VALVE	A14	GL	A	STO	CSD	73ST-9XI22	CSJ-07	
	3	MO	O	VP	2YR	73ST-9XI22		
CHAUV0560	CHP-003	3	A	FSC	QTR	73ST-9XI06		
REACTOR DRAIN TANK OUTLET INBOARD CIV (PEN. 44)	B15	GL	A	STC	QTR	73ST-9XI06		
	2	AO	C	FTC	QTR	73ST-9XI06		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI06		
CHBUV0561	CHP-003	3	A	FSC	QTR	73ST-9XI06		
REACTOR DRAIN TANK INBOARD CIV (PEN. 44)	A15	GL	A	STC	QTR	73ST-9XI06		
	2	AO	C	FTC	QTR	73ST-9XI06		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI06		
CHAUV0580	CHP-003	1.5	A	FSC	QTR	73ST-9XI06		
REACTOR MAKEUP WATER TO RDT OUTBOARD CIV (PEN. 45)	F14	GA	A	STC	QTR	73ST-9XI06		
	2	AO	C	FTC	QTR	73ST-9XI06		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI06		
CHAUV0715	CHP-003	0.5	A	FSC	QTR	73ST-9XI06		
PASS TO RDT CIV (PEN. 45)	E13	GL	A	STC	QTR	73ST-9XI06		
	2	SO	C	FTC	QTR	73ST-9XI06		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI06		
CHAV755	CHP-002	3	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP CHA-P01 ALTERNATE SUCTION MANUAL ISOLATION VALVE	C05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHBV756	CHP-002	3	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP CHB-P01 ALTERNATE SUCTION MANUAL ISOLATION VALVE	D05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHEV757	CHP-002	3	B	FSO	QTR	73ST-9XI31		
CHARGING PUMP CHE-P01 ALTERNATE SUCTION MANUAL ISOLATION VALVE	F05	DI	A	FSC	QTR	73ST-9XI31		
	2	MA	OC					
CHNV835	CHP-001	1.5	AC	FSC	CSD	73ST-9XI26	CSJ-11	
RCP SEAL INJECTION SUPPLY LINE CHECK VALVE	G03	CK	A	AJ	CLR	73ST-9CL01		
	2	SA	C					
CHEV854	CHP-001	0.75	A	AJ	CLR	73ST-9CL01		
CHARGING LINE CHEMICAL ADDITION ISOLATION VALVE (PEN. 41)	E15	GL	P					
	2	MA	C					

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CHBUV0924	CHP-001	0.5	A	FSC	QTR	73ST-9XI06		
LETDOWN TO PASS CIV (PEN. 40)	E14	GA	A	STC	QTR	73ST-9XI06		
	2	SO	C	FTC	QTR	73ST-9XI06		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI06		
CPAUV0002A	CPP-001	42	A	FSC	CSD	73ST-9XI23	CSJ-10	
CONTAINMENT REFUELING PURGE SUPPLY OUTBOARD CIV (PEN. 56)	D06	BF	A	STC	CSD	73ST-9XI23	CSJ-10	
	2	MO	C	AJ	CLR	73ST-9CL06		
				VP	2YR	73ST-9XI23		
CPAUV0002B	CPP-001	42	A	FSC	CSD	73ST-9XI23	CSJ-10	
CONTAINMENT REFUELING PURGE EXHAUST INBOARD CIV (PEN. 57)	E03	BF	A	STC	CSD	73ST-9XI23	CSJ-10	
	2	MO	C	AJ	CLR	73ST-9CL10		
				VP	2YR	73ST-9XI23		
CPBUV0003A	CPP-001	42	A	FSC	CSD	73ST-9XI23	CSJ-10	
CONTAINMENT REFUELING PURGE SUPPLY INBOARD CIV (PEN. 56)	D05	BF	A	STC	CSD	73ST-9XI23	CSJ-10	
	2	MO	C	AJ	CLR	73ST-9CL06		
				VP	2YR	73ST-9XI23		
CPBUV0003B	CPP-001	42	A	FSC	CSD	73ST-9XI23	CSJ-10	
CONTAINMENT REFUELING PURGE EXHAUST OUTBOARD CIV (PEN. 57)	E02	BF	A	STC	CSD	73ST-9XI23	CSJ-10	
	2	MO	C	AJ	CLR	73ST-9CL10		
				VP	2YR	73ST-9XI23		
CPAUV0004A	CPP-001	8	A	FSC	QTR	73ST-9XI15		
CONTAINMENT POWER ACCESS PURGE SUPPLY OUTBOARD CIV (PEN. 78)	D06	BF	A	STC	QTR	73ST-9XI15		
	2	AO	C	FTC	QTR	73ST-9XI15		
				AJ	CLR	73ST-9CL07		
				VP	2YR	73ST-9XI15		
CPAUV0004B	CPP-001	8	A	FSC	QTR	73ST-9XI15		
CONTAINMENT POWER ACCESS PURGE EXHAUST INBOARD CIV (PEN. 79)	D03	BF	A	STC	QTR	73ST-9XI15		
	2	AO	C	FTC	QTR	73ST-9XI15		
				AJ	CLR	73ST-9CL07		
				VP	2YR	73ST-9XI15		
CPBUV0005A	CPP-001	8	A	FSC	QTR	73ST-9XI15		
CONTAINMENT POWER ACCESS PURGE SUPPLY INBOARD CIV (PEN. 78)	D05	BF	A	STC	QTR	73ST-9XI15		
	2	AO	C	FTC	QTR	73ST-9XI15		
				AJ	CLR	73ST-9CL07		
				VP	2YR	73ST-9XI15		
CPBUV0005B	CPP-001	8	A	FSC	QTR	73ST-9XI15		
CONTAINMENT POWER ACCESS PURGE EXHAUST OUTBOARD CIV (PEN. 79)	C02	BF	A	STC	QTR	73ST-9XI15		
	2	AO	C	FTC	QTR	73ST-9XI15		
				AJ	CLR	73ST-9CL07		
				VP	2YR	73ST-9XI15		
CTAHV0001	CTP-001	10	B	FSO	QTR	73ST-9XI05		The tests in the open direction are for an augmented function
AFN-P01 SUCTION ISOLATION VALVE FROM CONDENSATE STORAGE TANK	E02	BF	A	FSC	QTR	73ST-9XI05		
	3	MO	C	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
CTAHV0004	CTP-001	10	B	FSO	QTR	73ST-9XI05		The tests in the open direction are for an augmented function
AFN-P01 SUCTION ISOLATION VALVE FROM CONDENSATE STORAGE TANK	E03	BF	A	FSC	QTR	73ST-9XI05		
	3	MO	C	STO	QTR	73ST-9XI05		
				STC	QTR	73ST-9XI05		
				VP	2YR	73ST-9XI05		
CTNPSV0008	CTP-001	10	C	SV	10Y	73ST-9ZZ20		Press/Vacuum Relief
	H05	SV	A					
COMBINED VACUUM AND PRESSURE RELIEF FOR THE CONDENSATE STORAGE TANK	3	SA	OC					
CTAV016	CTP-001	3	C	FSO	QTR	73ST-9CT01		Augmented test requirement
CONDENSATE TRANSFER PUMP DISCHARGE CHECK VALVE	C04	CK	A					
	3	SA	O					
CTAV018	CTP-001	3	B	FSO	QTR	73ST-9CT01		The test in the open direction is an augmented function
CONDENSATE TRANSFER TO SPENT FUEL POOL ISOLATION	C03	GA	A	FSC	QTR	73ST-9CT01		
	3	MA	OC					
CTBV019	CTP-001	3	B	FSO	QTR	73ST-9CT01		The test in the open direction is an augmented function
CONDENSATE TRANSFER TO SPENT FUEL POOL ISOLATION	B03	GA	A	FSC	QTR	73ST-9CT01		
	3	MA	OC					
CTBV020	CTP-001	3	C	FSO	QTR	73ST-9CT01		Augmented test requirement
CONDENSATE TRANSFER PUMP DISCHARGE CHECK VALVE	B04	CK	A					
	3	SA	O					
CTNPSV0023	CTP-001	10	C	SV	10Y	73ST-9ZZ20		Press/Vacuum Relief
	H05	SV	A					
COMBINED VACUUM AND PRESSURE RELIEF FOR THE CONDENSATE STORAGE TANK	3	SA	OC					
CTAV037	CTP-001	3	C	FSO	QTR	73ST-9CT01		Augmented test requirement
CONDENSATE TRANSFER TO SPENT FUEL POOL CHECK VALVE	C04	CK	A					
	3	SA	O					
CTBV038	CTP-001	3	C	FSO	QTR	73ST-9CT01		Augmented test requirement
CONDENSATE TRANSFER TO SPENT FUEL POOL CHECK VALVE	B04	CK	A					
	3	SA	O					
DFAV012	DFP-001	2	C	FSO	QTR	73ST-9DF01		
FUEL OIL TRANSFER PUMP DISCHARGE CHECK VALVE	D06	CK	A					
	3	SA	O					
DFBV019	DFP-001	2	C	FSO	QTR	73ST-9DF01		
FUEL OIL TRANSFER PUMP DISCHARGE CHECK VALVE	D02	CK	A					
	3	SA	O					
DGAPSV0005	DGP-001	1	C	SV	10Y	73ST-9ZZ20		
EDG START AIR RECEIVER SAFETY RELIEF VALVE	H06 SH9	SV	A					
	3	SA	OC					

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
DGBPSV0006 EDG START AIR RECEIVER SAFETY RELIEF VALVE	DGP-001 D06 SH9 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
DGAPSV0007 EDG START AIR RECEIVER SAFETY RELIEF VALVE	DGP-001 F06 SH9 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
DGBPSV0008 EDG START AIR RECEIVER SAFETY RELIEF VALVE	DGP-001 C03 SH9 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
DGAV066 EDG STARTING AIR DRYER OUTLET CHECK VALVE	DGP-001 F06 SH9 3	1 CK SA	C A C	FSC	QTR	73ST-9XI17		Required in all modes including shutdown
DGAV067 EDG STARTING AIR DRYER OUTLET CHECK VALVE	DGP-001 G06 SH9 3	1 CK SA	C A C	FSC	QTR	73ST-9XI17		Required in all modes including shutdown
DGBV068 EDG STARTING AIR DRYER OUTLET CHECK VALVE	DGP-001 D06 SH9 3	1 CK SA	C A C	FSC	QTR	73ST-9XI18		Required in all modes including shutdown
DGBV069 EDG STARTING AIR DRYER OUTLET CHECK VALVE	DGP-001 C06 SH9 3	1 CK SA	C A C	FSC	QTR	73ST-9XI18		Required in all modes including shutdown
DGAV317 EDG ENGINE-DRIVEN JACKET WATER CIRC PUMP DISCHARGE CHECK VALVE	DGP-001 F06 SH4 3	6 CK SA	C A OC	FSO	QTR	40ST-9DG01	VRR-01	
DGAV318 EDG MOTOR-DRIVEN JACKET WATER CIRC PUMP DISCHARGE CHECK VALVE	DGP-001 D06 SH4 3	3 CK SA	C A OC	FSO	QTR	40ST-9DG01	VRR-01	
DGAV364 EDG PRE-LUBE PUMP AND HEATER CHECK VALVE	DGP-001 C06 SH3 3	3 CK SA	C A OC	FSO	QTR	40ST-9DG01	VRR-01	
DGBV417 EDG ENGINE-DRIVEN JACKET WATER CIRC PUMP DISCHARGE CHECK VALVE	DGP-001 F02 SH4 3	6 CK SA	C A OC	FSO	QTR	40ST-9DG02	VRR-01	
DGBV418 EDG MOTOR-DRIVEN JACKET WATER CIRC PUMP DISCHARGE CHECK VALVE	DGP-001 D02 SH4 3	3 CK SA	C A OC	FSO	QTR	40ST-9DG02	VRR-01	
DGBV464 EDG PRE-LUBE PUMP AND HEATER CHECK VALVE	DGP-001 C02 SH3 3	3 CK SA	C A OC	FSO	QTR	40ST-9DG02	VRR-01	
DWEV061 [illegible]V SUPPLY HEADER OUTSIDE CONTAINMENT ISOLATION VALVE (PEN. 6)	DWP-002 C03 2	2 GL MA	A P C	AJ	CLR	73ST-9CL01		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
DWEV062 DW SUPPLY HEADER INSIDE CONTAINMENT ISOLATION VALVE (PEN. 6)	DWP-002 C02 2	2 GL MA	A P C	AJ	CLR	73ST-9CL01		
ECAV038 MAKEUP LINE CHECK VALVE FROM DW	ECP-001 D07 3	1.5 CK SA	C A C	FSC	RFO	73ST-9ZZ25		Disassembled per OM-10, para. 4.3.2.4.c
ECAV041 MAKEUP LINE CHECK VALVE FROM CT	ECP-001 C07 3	1.5 CK SA	C A C	FSC	RFO	73ST-9ZZ25		Disassembled per OM-10, para. 4.3.2.4.c
ECAV043 NITROGEN SUPPLY CHECK VALVE TO EC EXPANSION TANK	ECP-001 C07 3	1 CK SA	C A C	FSC	STF	73ST-9ZZ25	VRR-03	Disassembled on a sampling basis
ECBV060 MAKEUP LINE CHECK VALVE FROM DW	ECP-001 D03 3	1.5 CK SA	C A C	FSC	RFO	73ST-9ZZ25		Disassembled per OM-10, para. 4.3.2.4.c
ECBV064 NITROGEN SUPPLY CHECK VALVE TO EC EXPANSION TANK	ECP-001 C03 3	1 CK SA	C A C	FSC	STF	73ST-9ZZ25	VRR-03	Disassembled on a sampling basis
CBV072 MAKEUP LINE CHECK VALVE FROM CT	ECP-001 D03 3	1.5 CK SA	C A C	FSC	RFO	73ST-9ZZ25		Disassembled per OM-10, para. 4.3.2.4.c
ECAPSV0075 EC EXPANSION TANK RELIEF VALVE	ECP-001 D06 3	1.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0076 EC EXPANSION TANK RELIEF VALVE	ECP-001 D03 3	1.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECAPSV0095 ESF SWITCHGEAR ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 E05 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0096 ESF SWITCHGEAR ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 E02 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECAPSV0097 CONTROL ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 E07 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0098 NTROL ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 E04 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
ECAPSV0099 WEST ELECTRICAL PENETRATION ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 F07 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0100 EAST ELECTRICAL PENETRATION ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 F03 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECAPSV0101 EW PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 F06 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0102 EW PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 F02 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECAPSV0103 CS PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 H07 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0104 CS PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 H04 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECAPSV0105 HPSI PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 H06 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0106 HPSI PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 H03 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECAPSV0107 LPSI PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 H05 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0108 LPSI PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 H02 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
ECBPSV0109 EW PUMP ROOM ESSENTIAL ACU RELIEF VALVE	ECP-001 F04 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
ECAPSV0117	ECP-001	1	C	SV	10Y	73ST-9ZZ20		
	F05	SV	A					
AFW PUMP ROOM ESSENTIAL ACU RELIEF VALVE	3	SA	OC					
ECAPSV0121	ECP-001	1	C	SV	10Y	73ST-9ZZ20		
	E06	SV	A					
DC EQUIPMENT ROOM ESSENTIAL ACU RELIEF VALVE	3	SA	OC					
ECBPSV0120	ECP-001	1	C	SV	10Y	73ST-9ZZ20		
	E03	SV	A					
DC EQUIPMENT ROOM ESSENTIAL ACU RELIEF VALVE	3	SA	OC					
EWAPSV0047	EWP-001	1	C	SV	10Y	73ST-9ZZ20		
SHUTDOWN HEAT EXCHANGER RELIEF VALVE	B07	SV	A					
	3	SA	OC					
EWBPSV0048	EWP-001	1	C	SV	10Y	73ST-9ZZ20		
SHUTDOWN HEAT EXCHANGER PRESSURE RELIEF VALVE	B03	SV	A					
	3	SA	OC					
EWAPSV0061	EWP-001	1	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL CHILLER OUTLET LINE RELIEF VALVE	D07	SV	A					
	3	SA	OC					
EWBPSV0062	EWP-001	1	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL CHILLER OUTLET LINE RELIEF VALVE	E03	SV	A					
	3	SA	OC					
EWAUV0065	EWP-001	12	B	FSC	CSD	73ST-9XI23	CSJ-12	
EW TO NUCLEAR COOLING WATER RETURN ISOLATION VALVE	C08	BF	A	STC	CSD	73ST-9XI23	CSJ-12	
	3	MO	C	VP	2YR	73ST-9XI23		
EWAHCV0067	EWP-001	10	B	FSO	QTR	73ST-9XI31		Passive closed valve, exercising is augmented testing because of important (but non-safety) function to open
FUEL POOL HEAT EXCHANGER RETURN ISOLATION VALVE	E08	BF	P	FSC	QTR	73ST-9XI31		
	3	MA	OC					
EWBHCV0068	EWP-001	10	B	FSO	QTR	73ST-9XI31		Passive closed valve, exercising is augmented testing because of important (but non-safety) function to open
FUEL POOL HEAT EXCHANGER RETURN ISOLATION VALVE	E04	BF	P	FSC	QTR	73ST-9XI31		
	3	MA	OC					
EWAPSV0079	EWP-001	1	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL CHILLED WATER HEAT EXCHANGER A PRESSURE RELIEF VALVE	F07	SV	A					
	3	SA	OC					
EWBPSV0080	EWP-001	1	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL CHILLED WATER HEAT EXCHANGER B PRESSURE RELIEF VALVE	F03	SV	A					
	3	SA	OC					
EWAPSV0103	EWP-001	2	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL COOLING WATER SURGE TANK A PRESSURE RELIEF VALVE	H06	SV	A					
	3	SA	OC					

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
EWBPSV0104 ESSENTIAL COOLING WATER SURGE TANK B PRESSURE RELIEF VALVE	EWP-001 H02 3	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
EWAPSV0105 EW SURGE TANK VACUUM RELIEF VALVE	EWP-001 H06 3	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
EWBPSV0106 EW SURGE TANK VACUUM RELIEF VALVE	EWP-001 H02 3	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
EWAHCV0133 FUEL POOL HEAT EXCHANGER SUPPLY ISOLATION VALVE	EWP-001 D06 3	10 BF MA	B P OC	FSO FSC	QTR QTR	73ST-9XI31 73ST-9XI31		Passive closed valve, exercising is augmented testing because of important (but non-safety) function to open
EWBHCV0134 FUEL POOL HEAT EXCHANGER SUPPLY ISOLATION VALVE	EWP-001 D02 3	10 BF MA	B P OC	FSO FSC	QTR QTR	73ST-9XI31 73ST-9XI31		Passive closed valve, exercising is augmented testing because of important (but non-safety) function to open
EWAUV0145 W TO NUCLEAR COOLING WATER UPPLY ISOLATION VALVE	EWP-001 C04 3	12 BF MO	B A C	FSC STC VP	CSD CSD 2YR	73ST-9XI23 73ST-9XI23 73ST-9XI23	CSJ-12 CSJ-12	
FPEV089 FIRE WATER OUTSIDE CONTAINMENT ISOLATION VALVE (PEN. 7)	FPP-006 E08 2	6 GL MA	A P C	AJ	CLR	73ST-9CL01		
FPEV090 FIRE WATER INSIDE CONTAINMENT ISOLATION VALVE (PEN. 7)	FPP-006 F09 2	6 CK SA	AC P C	AJ	CLR	73ST-9CL01		
GAAUV0001 HIGH PRESSURE NITROGEN SUPPLY HEADER OUTSIDE CIV (PEN. 30)	GAP-001 E07 2	1 GA SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
GAAUV0002 LOW PRESSURE NITROGEN SUPPLY HEADER OUTSIDE CIV (PEN. 29)	GAP-001 F03 2	1 GA SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
GAEV011 HIGH PRESSURE NITROGEN SUPPLY INSIDE CONTAINMENT ISOLATION CHECK VALVE (PEN. 30)	GAP-001 D06 2	1 CK SA	AC P C	FSC AJ	CSD CLR	73ST-9XI28 73ST-9CL01		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
AEV015 W PRESSURE NITROGEN SUPPLY INSIDE CONTAINMENT ISOLATION CHECK VALVE (PEN. 29)	GAP-001 E02 2	1 CK SA	AC A C	FSC AJ	CSD CLR	73ST-9XI28 73ST-9CL01	CSJ-23	

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
GRAUV0001	GRP-001	1	A	FSC	QTR	73ST-9XI07		
CONTAINMENT ISOLATION BETWEEN RDT AND GAS SURGE HEADER (PEN 52)	H07	GL	A	STC	QTR	73ST-9XI07		
	2	MO	C	AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI07		
GRBUV0002	GRP-001	1	A	FSC	QTR	73ST-9XI07		
CONTAINMENT ISOLATION (SOV) BETWEEN RDT AND GAS SURGE HEADER (PEN 52)	H07	GL	A	STC	QTR	73ST-9XI07		
	2	SO	C	FTC	QTR	73ST-9XI07		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI07		
HCBUV0044	HCP-001	1	A	FSC	QTR	73ST-9XI08		
CONTAINMENT ATMOSPHERE RADIATION MONITOR INLET CIV (PEN 25A)	E03	GA	A	STC	QTR	73ST-9XI08		
	2	SO	C	FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HCAUV0045	HCP-001	1	A	FSC	QTR	73ST-9XI08		
CONTAINMENT ATMOSPHERE RADIATION MONITOR INLET CIV (PEN. 25A)	E02	GA	A	STC	QTR	73ST-9XI08		
	2	SO	C	FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HCAUV0046	HCP-001	1	A	FSC	QTR	73ST-9XI08		
CONTAINMENT ATMOSPHERE RADIATION MONITOR OUTLET CIV (PEN. 25B)	D02	GA	A	STC	QTR	73ST-9XI08		
	2	SO	C	FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HCBUV0047	HCP-001	1	A	FSC	QTR	73ST-9XI08		
CONTAINMENT ATMOSPHERE RADIATION MONITOR OUTLET CIV (PEN. 25B)	D03	GA	A	STC	QTR	73ST-9XI08		
	2	SO	C	FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HCAHV0074	HCP-001	0.75	B	VP	2YR	36ST-9SB28		
CONTAINMENT PRESSURE TRANSMITTER CIV (PEN. 54A)	D08	GL	P					
	2	SO	O					
HCBHV0075	HCP-001	0.75	B	VP	2YR	36ST-9SB28		
CONTAINMENT PRESSURE TRANSMITTER CIV (PEN. 55A)	C02	GL	P					
	2	SO	O					
HCCHV0076	HCP-001	0.75	B	VP	2YR	36ST-9SB28		
CONTAINMENT PRESSURE TRANSMITTER CIV (PEN. 32A)	C08	GL	P					
	2	SO	O					
HCDHV0077	HCP-001	0.75	B	VP	2YR	36ST-9SB28		
CONTAINMENT PRESSURE TRANSMITTER CIV (PEN. 62A)	C02	GL	P					
	2	SO	O					
HPAUV0001	HPP-001	2	A	FSO	QTR	73ST-9XI08		
H2 CONTROL SYSTEM SUPPLY FROM CONTAINMENT INBOARD CIV (PEN. 35)	E15	GL	A	FSC	QTR	73ST-9XI08		
	2	MO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		

Valve ID / Description	Drawing / Coord/Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
HPAV002	HPP-001	2	AC	FSO	QTR	73ST-9XI09		
H2 CONTROL SYSTEM RETURN LINE TO	F15	CK	A	FSC	CSD	73ST-9XI28	CSJ-24	
CONTAINMENT INBOARD CIV (PEN. 38)	2	SA	OC	AJ	CLR	73ST-9CL01		
HPBUV0002	HPP-001	2	A	FSO	QTR	73ST-9XI08		
H2 CONTROL SYSTEM SUPPLY FROM	C15	GL	A	FSC	QTR	73ST-9XI08		
CONTAINMENT INBOARD CIV (PEN. 36)	2	MO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPAUV0003	HPP-001	2	A	FSO	QTR	73ST-9XI08		
H2 CONTROL SYSTEM RETURN TO	E14	GL	A	FSC	QTR	73ST-9XI08		
CONTAINMENT OUTBOARD CIV (PEN. 35)	2	MO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPBV004	HPP-001	2	AC	FSO	QTR	73ST-9XI10		
H2 CONTROL SYSTEM RETURN LINE TO	C15	CK	A	FSC	CSD	73ST-9XI28	CSJ-24	
CONTAINMENT INBOARD CIV (PEN. 39)	2	SA	OC	AJ	CLR	73ST-9CL01		
HPBUV0004	HPP-001	2	A	FSO	QTR	73ST-9XI08		
[illegible] CONTROL SYSTEM RETURN TO	C14	GL	A	FSC	QTR	73ST-9XI08		
[illegible]ONTAINMENT OUTBOARD CIV (PEN. 36)	2	MO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPAUV0005	HPP-001	2	A	FSO	QTR	73ST-9XI08		
H2 CONTROL SYSTEM RETURN TO	E14	GL	A	FSC	QTR	73ST-9XI08		
CONTAINMENT OUTBOARD CIV (PEN 33)	2	MO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPBUV0006	HPP-001	2	A	FSO	QTR	73ST-9XI08		
H2 CONTROL SYSTEM RETURN TO	C14	GL	A	FSC	QTR	73ST-9XI08		
CONTAINMENT OUTBOARD CIV (PEN. 39)	2	MO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPAHV0007B	HPP-001	1	A	FSO	QTR	73ST-9XI08		
POST-LOCA H2 MONITOR OUTLET CIV	G14	GL	A	FSC	QTR	73ST-9XI08		
(PEN. 38)	2	SO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
HPAHV0007A	HPP-001	1	A	FSO	QTR	73ST-9XI08		
POST-LOCA H2 MONITOR INLET CIV (PEN. 35)	F14	GL	A	FSC	QTR	73ST-9XI08		
	2	SO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPBHV0008A	HPP-001	1	A	FSO	QTR	73ST-9XI08		
POST-LOCA H2 MONITOR INLET CIV (PEN. 36)	C13	GL	A	FSC	QTR	73ST-9XI08		
	2	SO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPBHV0008B	HPP-001	1	A	FSO	QTR	73ST-9XI08		
POST-LOCA H2 MONITOR OUTLET CIV (PEN. 39)	B14	GL	A	FSC	QTR	73ST-9XI08		
	2	SO	OC	STO	QTR	73ST-9XI08		
				STC	QTR	73ST-9XI08		
				FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPAUV0023	HPP-001	0.5	A	FSC	QTR	73ST-9XI08		
CONTAINMENT H2 MONITORING SYSTEM RETURN FROM PASS OUTBOARD CIV (PEN. 38)	G14	GL	A	STC	QTR	73ST-9XI08		
	2	SO	C	FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
HPAUV0024	HPP-001	0.5	A	FSC	QTR	73ST-9XI08		
CONTAINMENT H2 MONITORING SYSTEM TO PASS ISOLATION VALVE	F12	GL	A	STC	QTR	73ST-9XI08		
	2	SO	C	FTC	QTR	73ST-9XI08		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI08		
IAAUV0002	IAP-003	2	A	FSC	CSD	73ST-9XI23	CSJ-13	
INSTRUMENT AIR SUPPLY OUTSIDE CONTAINMENT ISOLATION VALVE (PEN. 31)	G07	GA	A	STC	CSD	73ST-9XI23	CSJ-13	
	2	SO	C	FTC	CSD	73ST-9XI23	CSJ-13	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI23		
IAEV021	IAP-003	2	AC	FSC	CSD	73ST-9XI28	CSJ-13	
INSTRUMENT AIR SUPPLY INSIDE CONTAINMENT ISOLATION VALVE (PEN. 31)	G05	CK	A	AJ	CLR	73ST-9CL01		
	2	SA	C					
IAEV072	IAP-002	3	A	AJ	CLR	73ST-9CL01		
BREATHING AIR CONTAINMENT ISOLATION VALVE (PEN. 59)	G09	GL	P					
	2	MA	C					
IAEV073	IAP-002	3	AC	AJ	CLR	73ST-9CL01		
BREATHING AIR SUPPLY INSIDE CONTAINMENT ISOLATION VALVE (PEN. [illegible])	H07	CK	P					
	2	SA	C					

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
NCEV118 NUCLEAR COOLING WATER SUPPLY TO RCP COOLER INBOARD CIV (PEN. 33)	NCP-003 E06 2	10 CK SA	AC A C	FSC AJ	CSD CLR	73ST-9XI26 73ST-9CL01	CSJ-30	
NCAHCV0244 NUCLEAR COOLING WATER TO SPENT FUEL POOL HEAT EXCHANGER ISOLATION VALVE	NCP-002 B04 3	10 BF MA	B A C	FSC	QTR	73ST-9XI31		Augmented
NCBHCV0245 NUCLEAR COOLING WATER TO SPENT FUEL POOL HEAT EXCHANGER ISOLATION VALVE	NCP-002 B04 3	10 BF MA	B A C	FSC	QTR	73ST-9XI31		Augmented
NCAPSV0250 FUEL POOL COOLING HEAT EXCHANGER RELIEF VALVE	NCP-002 E02 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Augmented
NCBPSV0251 FUEL POOL COOLING HEAT EXCHANGER RELIEF VALVE	NCP-002 D02 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Augmented
NCAHCV0258 NUCLEAR COOLING WATER TO SPENT FUEL POOL HEAT EXCHANGER ISOLATION VALVE	NCP-002 C04 3	10 BF MA	B A C	FSC	QTR	73ST-9XI31		Augmented
NCBHCV0259 NUCLEAR COOLING WATER TO SPENT FUEL POOL HEAT EXCHANGER ISOLATION VALVE	NCP-002 B04 3	10 BF MA	B A C	FSC	QTR	73ST-9XI31		Augmented
NCBUV0401 NUCLEAR COOLING WATER SUPPLY TO RCP COOLER OUTBOARD CIV (PEN. 33)	NCP-003 E07 2	10 BF MO	A A C	FSC STC AJ VP	CSD CSD CLR 2YR	73ST-9XI23 73ST-9XI23 73ST-9CL01 73ST-9XI23	CSJ-14 CSJ-14	
NCAUV0402 NUCLEAR COOLING WATER SUPPLY TO RCP COOLER OUTBOARD CIV (PEN. 34)	NCP-003 F07 2	10 BF MO	A A C	FSC STC AJ VP	CSD CSD CLR 2YR	73ST-9XI23 73ST-9XI23 73ST-9CL01 73ST-9XI23	CSJ-14 CSJ-14	
NCBUV0403 NUCLEAR COOLING WATER SUPPLY TO RCP COOLER INBOARD CIV (PEN. 34)	NCP-003 F06 2	10 BF MO	A A C	FSC STC AJ VP	CSD CSD CLR 2YR	73ST-9XI23 73ST-9XI23 73ST-9CL01 73ST-9XI23	CSJ-14 CSJ-14	
NCEPSV0614 NC CONTAINMENT ISOLATION VALVE RELIEF VALVE	NCP-003 E05 2	6 SV SA	C A O	SV	10Y	73ST-9ZZ20		Augmented
NCEPSV0615 NC CONTAINMENT ISOLATION VALVE RELIEF VALVE	NCP-003 E05 2	6 SV SA	C A O	SV	10Y	73ST-9ZZ20		Augmented

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
NCEPSV0617 NC CONTAINMENT PENETRATION RELIEF VALVE (PEN 34)	NCP-003 E07 2	0 SV SA	AC A OC	AJ SV	CLR 10Y	73ST-9CL01 73ST-9ZZ20		Being added per DMWO 830780. May not be installed in all units yet.
PCAV013 SPENT FUEL POOL COOLING PUMP DISCHARGE CHECK VALVE	PCP-001 D15 3	8 CK SA	C A OC	FSO FSC	QTR QTR	73ST-9PC01 73ST-9PC01		Augmented
PCBV017 SPENT FUEL POOL COOLING PUMP DISCHARGE CHECK VALVE	PCP-001 B15 3	8 CK SA	C A OC	FSO FSC	QTR QTR	73ST-9PC01 73ST-9PC01		Augmented
PCAPSV0035 SPENT FUEL POOL COOLING HEAT EXCHANGER PRESSURE RELIEF VALVE	PCP-001 E13 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Augmented
PCBPSV0036 SPENT FUEL POOL COOLING HEAT EXCHANGER PRESSURE RELIEF VALVE	PCP-001 B13 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		Augmented
PCEV070 REFUELING POOL PURIFICATION RETURN CONTAINMENT ISOLATION VALVE (PEN 51)	PCP-001 E10 2	4 GA MA	A P C	AJ	CLR	73ST-9CL01		
PCEV071 REFUELING POOL PURIFICATION RETURN CONTAINMENT ISOLATION VALVE (PEN 51)	PCP-001 E09 2	4 GA MA	A P C	AJ	CLR	73ST-9CL01		
PCEV075 REFUELING POOL PURIFICATION SUPPLY CONTAINMENT ISOLATION VALVE (PEN 50)	PCP-001 G06 2	4 GA MA	A P C	AJ	CLR	73ST-9CL01		
PCEV076 REFUELING POOL PURIFICATION SUPPLY CONTAINMENT ISOLATION VALVE (PEN 50)	PCP-001 G05 2	4 GA MA	A P C	AJ	CLR	73ST-9CL01		
PCNV215 RWT TO SPENT FUEL POOL MANUAL ISOLATION VALVE	CHP-002 A11 3	3 DI MA	B A OC	FSO FSC	QTR QTR	73ST-9XI31 73ST-9XI31		
RCAHV0101 REACTOR VESSEL HEAD VENT VALVE	RCP-001 G15 2	1 GL SO	B A OC	FSO FSC STO STC FTC VP	CSD CSD CSD CSD CSD 2YR	73ST-9XI24 73ST-9XI24 73ST-9XI24 73ST-9XI24 73ST-9XI24 73ST-9XI24	CSJ-15 CSJ-15 CSJ-15 CSJ-15 CSJ-15	

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
RCBHV0102	RCP-001	1	B	FSO	CSD	73ST-9XI24	CSJ-15	
REACTOR VESSEL HEAD VENT VALVE	G15	GL	A	FSC	CSD	73ST-9XI24	CSJ-15	
	2	SO	OC	STO	CSD	73ST-9XI24	CSJ-15	
				STC	CSD	73ST-9XI24	CSJ-15	
				FTC	CSD	73ST-9XI24	CSJ-15	
				VP	2YR	73ST-9XI24		
RCAHV0103	RCP-001	1	B	FSO	CSD	73ST-9XI24	CSJ-15	
PRESSURIZER VENT VALVE	G14	GL	A	FSC	CSD	73ST-9XI24	CSJ-15	
	2	SO	OC	STO	CSD	73ST-9XI24	CSJ-15	
				STC	CSD	73ST-9XI24	CSJ-15	
				FTC	CSD	73ST-9XI24	CSJ-15	
				VP	2YR	73ST-9XI24		
RCBHV0105	RCP-001	1	B	FSO	CSD	73ST-9XI24	CSJ-15	
PRESSURIZER/REACTOR VESSEL HEAD VENT VALVE TO REACTOR DRAIN TANK	G13	GL	A	FSC	CSD	73ST-9XI24	CSJ-15	
	2	SO	OC	STO	CSD	73ST-9XI24	CSJ-15	
				STC	CSD	73ST-9XI24	CSJ-15	
				FTC	CSD	73ST-9XI24	CSJ-15	
				VP	2YR	73ST-9XI24		
RCAHV0106	RCP-001	1	B	FSO	CSD	73ST-9XI24	CSJ-15	
PRESSURIZER/REACTOR VESSEL HEAD VENT VALVE TO CONTAINMENT	G13	GL	A	FSC	CSD	73ST-9XI24	CSJ-15	
	2	SO	OC	STO	CSD	73ST-9XI24	CSJ-15	
				STC	CSD	73ST-9XI24	CSJ-15	
				FTC	CSD	73ST-9XI24	CSJ-15	
				VP	2YR	73ST-9XI24		
RCBHV0108	RCP-001	1	B	FSO	CSD	73ST-9XI24	CSJ-15	
PRESSURIZER VENT VALVE	G13	GL	A	FSC	CSD	73ST-9XI24	CSJ-15	
	1	SO	OC	STO	CSD	73ST-9XI24	CSJ-15	
				STC	CSD	73ST-9XI24	CSJ-15	
				FTC	CSD	73ST-9XI24	CSJ-15	
				VP	2YR	73ST-9XI24		
RCBHV0109	RCP-001	1	B	FSO	CSD	73ST-9XI24	CSJ-15	
PRESSURIZER VENT VALVE	G13	GL	A	FSC	CSD	73ST-9XI24	CSJ-15	
	1	SO	OC	STO	CSD	73ST-9XI24	CSJ-15	
				STC	CSD	73ST-9XI24	CSJ-15	
				FTC	CSD	73ST-9XI24	CSJ-15	
				VP	2YR	73ST-9XI24		
RCEPSV0200	RCP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 040634)
PRESSURIZER SAFETY VALVE	F12	SV	A					
	1	SA	OC					
RCEPSV0201	RCP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 040634)
PRESSURIZER SAFETY VALVE	F12	SV	A					
	1	SA	OC					
RCEPSV0202	RCP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 040634)
PRESSURIZER SAFETY VALVE	F12	SV	A					
	1	SA	OC					
RCEPSV0203	RCP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 040634)
PRESSURIZER SAFETY VALVE	F12	SV	A					
	1	SA	OC					

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
RDAV020 CONTAINMENT SPRAY PUMP ROOM FLOOR DRAIN CHECK VALVE TO ESF SUMP	RDP-002 B14 SH2 3	4 CK SA	C A OC	FSO FSC	STF STF	73ST-9ZZ25 73ST-9ZZ25	VRR-04 VRR-04	Disassembled on a sampling basis
RDAV021 HPSI PUMP ROOM FLOOR DRAIN CHECK VALVE TO ESF SUMP	RDP-002 B05 SH2 3	4 CK SA	C A OC	FSO FSC	STF STF	73ST-9ZZ25 73ST-9ZZ25	VRR-04 VRR-04	Disassembled on a sampling basis
RDAV022 LPSI PUMP ROOM FLOOR DRAIN CHECK VALVE TO ESF SUMP	RDP-002 B14 SH2 3	4 CK SA	C A OC	FSO FSC	STF STF	73ST-9ZZ25 73ST-9ZZ25	VRR-04 VRR-04	Disassembled on a sampling basis
RDAUV0023 CONTAINMENT RADWASTE SUMP OUTLET INBOARD CIV (PEN. 9)	RDP-001 G04 2	3 GA MO	A A C	FSC STC AJ VP	QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
RDBUV0024 CONTAINMENT RADWASTE SUMP OUTLET OUTBOARD CIV (PEN. 9)	RDP-001 G04 2	3 GA AO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
DBV040 CONTAINMENT SPRAY PUMP ROOM FLOOR DRAIN CHECK VALVE TO ESF SUMP	RDP-002 B05 SH3 3	4 CK SA	C A OC	FSO FSC	STF STF	73ST-9ZZ25 73ST-9ZZ25	VRR-04 VRR-04	Disassembled on a sampling basis
RDBV041 HPSI PUMP ROOM FLOOR DRAIN CHECK VALVE TO ESF SUMP	RDP-002 B05 SH3 3	4 CK SA	C A OC	FSO FSC	STF STF	73ST-9ZZ25 73ST-9ZZ25	VRR-04 VRR-04	Disassembled on a sampling basis
RDBV042 LPSI PUMP ROOM FLOOR DRAIN CHECK VALVE TO ESF SUMP	RDP-002 B05 SH3 3	4 CK SA	C A OC	FSO FSC	STF STF	73ST-9ZZ25 73ST-9ZZ25	VRR-04 VRR-04	Disassembled on a sampling basis
RDBUV0407 CONTAINMENT RADWASTE SUMP OUTLET TO POST ACCIDENT SAMPLING CIV (PEN. 9)	RDP-001 G04 2	0.5 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
SGEV003 ECONOMIZER FEEDWATER LINE CHECK VALVE	SGP-002 E10 2	24 CK SA	C A C	FSC	CSD	73ST-9XI32	CSJ-16	
SGEV005 ECONOMIZER FEEDWATER LINE CHECK VALVE	SGP-002 A10 2	24 CK SA	C A C	FSC	CSD	73ST-9XI32	CSJ-16	
SGEV006 ECONOMIZER FEEDWATER LINE CHECK LVE	SGP-002 A10 2	24 CK SA	C A C	FSC	CSD	73ST-9XI32	CSJ-16	

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SGEV007 ECONOMIZER FEEDWATER LINE CHECK VALVE	SGP-002 E10 2	24 CK SA	C A C	FSC	CSD	73ST-9XI32	CSJ-16	
SGEVA19 MSIV 170 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA20 MSIV 170 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA21 MSIV 180 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA22 MSIV 180 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA23 MSIV 171 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA24 MSIV 171 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA25 MSIV 181 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGEVA26 MSIV 181 INSTRUMENT AIR CHECK VALVE	VM M234A-14 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG01 73ST-9SG01		
SGAVA27 ECONOMIZER FWIV 174 INSTRUMENT AIR CHECK VALVE	VM M234A-55 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9XI16 73ST-9XI16		
SGAVA28 ECONOMIZER FWIV 177 INSTRUMENT AIR CHECK VALVE	VM M234A-55 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9XI16 73ST-9XI16		
SGBVA29 ECONOMIZER FWIV 132 INSTRUMENT AIR CHECK VALVE	VM M234A-55 NA 2	0.5 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9XI16 73ST-9XI16		

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SGBVA30	VM M234A-55	0.5	AC	FSC	QTR	73ST-9XI16		
ECONOMIZER FWIV 137 INSTRUMENT AIR CHECK VALVE	NA	CK	A	LT	2YR	73ST-9XI16		
		SA	C					
SGAV043	SGP-001	6	C	FSO	CSD	73ST-9AF02	CSJ-17	
STEAM SUPPLY CHECK VALVE TO TURBINE-DRIVEN AFW PUMP	E12 SH1	CK	A	FSC	QTR	73ST-9AF02		
	3	SA	OC	PSO	QTR	73ST-9AF02	CSJ-17	
SGAV044	SGP-001	6	C	FSO	CSD	73ST-9AF02	CSJ-17	
STEAM SUPPLY CHECK VALVE TO TURBINE-DRIVEN AFW PUMP	C12 SH1	CK	A	FSC	QTR	73ST-9AF02		
	3	SA	OC	PSO	QTR	73ST-9AF02	CSJ-17	
SGBUV0130	SGP-002	8	B	FSC	CSD	73ST-9XI19	CSJ-18	Fails closed on loss of air only
SG 1 DOWNCOMER FEEDWATER DOWNSTREAM ISOLATION VALVE	G11	GA	A	STC	CSD	73ST-9XI19	CSJ-18	
	2	AO	C	FTC	CSD	73ST-9XI19	CSJ-18	
				VP	2YR	73ST-9XI19		
SGBUV0132	SGP-002	24	B	FSC	CSD	73ST-9XI16	CSJ-18	
SG 1 ECONOMIZER FEEDWATER DOWNSTREAM ISOLATION VALVE	E12	GA	A	PSC	QTR	73ST-9XI16		
	2	HY	C	STC	CSD	73ST-9XI16	CSJ-18	
				FTC	CSD	73ST-9XI16	CSJ-18	
				VP	2YR	73ST-9XI16		
SGAUV0134	SGP-001	6	B	FSO	QTR	73ST-9XI01		
SG 1 STEAM SUPPLY TO AUX FEED PUMP TURBINE ISOLATION VALVE	E14 SH1	GA	A	FSC	QTR	73ST-9XI01		
	2	MO	OC	STO	QTR	73ST-9XI01		
				STC	QTR	73ST-9XI01		
				LT	RFO	73ST-9XI34		
				VP	2YR	73ST-9XI01		
SGAUV0134A	SGP-001	1	B	FSO	QTR	73ST-9XI01		
TDAFW PUMP STEAM SUPPLY WARM-UP LINE ISOLATION VALVE	E13 SH1	GL	A	FSC	QTR	73ST-9XI01		
	2	SO	OC	STO	QTR	73ST-9XI01		
				STC	QTR	73ST-9XI01		
				FTC	QTR	73ST-9XI01		
				LT	RFO	73ST-9XI34		
				VP	2YR	73ST-9AF02		
SGBUV0135	SGP-002	8	B	FSC	CSD	73ST-9XI19	CSJ-18	Fails closed on loss of air only
SG 2 DOWNCOMER FEEDWATER DOWNSTREAM ISOLATION VALVE	C11	GA	A	STC	CSD	73ST-9XI19	CSJ-18	
	2	AO	C	FTC	CSD	73ST-9XI19	CSJ-18	
				VP	2YR	73ST-9XI19		
SGBUV0137	SGP-002	24	B	FSC	CSD	73ST-9XI16	CSJ-18	
SG 2 ECONOMIZER FEEDWATER DOWNSTREAM ISOLATION VALVE	A12	GA	A	PSC	QTR	73ST-9XI16		
	2	HY	C	STC	CSD	73ST-9XI16	CSJ-18	
				FTC	CSD	73ST-9XI16	CSJ-18	
				VP	2YR	73ST-9XI16		
SGAUV0138	SGP-001	6	B	FSO	QTR	73ST-9XI02		
SG 2 STEAM SUPPLY TO AUX FEED PUMP TURBINE ISOLATION VALVE	C13 SH1	GA	A	FSC	QTR	73ST-9XI02		
	2	MO	OC	STO	QTR	73ST-9XI02		
				STC	QTR	73ST-9XI02		
				LT	RFO	73ST-9XI34		
				VP	2YR	73ST-9XI02		

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SGAUV0138A	SGP-001	1	B	FSO	QTR	73ST-9XI02		
TDAFW PUMP STEAM SUPPLY WARM-UP LINE ISOLATION VALVE	C14 SH1	GL	A	FSC	QTR	73ST-9XI02		
	2	SO	OC	STO	QTR	73ST-9XI02		
				STC	QTR	73ST-9XI02		
				FTC	QTR	73ST-9XI02		
				LT	RFO	73ST-9XI34		
				VP	2YR	73ST-9AF02		
SGEUV0169	SGP-001	4	B	FSC	QTR	73ST-9XI01		
MSIV BYPASS VALVE	D11 SH1	GA	A	STC	QTR	73ST-9XI01		
	2	AO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI01		
SGEUV0170	SGP-001	28	B	FSC	CSD	73ST-9SG01	CSJ-19	
MAIN STEAM ISOLATION VALVE	G10 SH1	GA	A	PSC	QTR	73ST-9SG01		
	2	HY	C	STC	CSD	73ST-9SG01	CSJ-19	
				FTC	CSD	73ST-9SG01	CSJ-19	
				VP	2YR	73ST-9SG01		
SGEUV0171	SGP-001	28	B	FSC	CSD	73ST-9SG01	CSJ-19	
MAIN STEAM ISOLATION VALVE	D10 SH1	GA	A	PSC	QTR	73ST-9SG01		
	2	HY	C	STC	CSD	73ST-9SG01	CSJ-19	
				FTC	CSD	73ST-9SG01	CSJ-19	
				VP	2YR	73ST-9SG01		
SGAUV0172	SGP-002	8	B	FSC	CSD	73ST-9XI19	CSJ-18	Fails closed on loss of air only
SG 1 DOWNCOMER FEEDWATER UPSTREAM ISOLATION VALVE	G12	GA	A	STC	CSD	73ST-9XI19	CSJ-18	
	2	AO	C	FTC	CSD	73ST-9XI19	CSJ-18	
				VP	2YR	73ST-9XI19		
SGAUV0174	SGP-002	24	B	FSC	CSD	73ST-9XI16	CSJ-18	
SG 1 ECONOMIZER FEEDWATER UPSTREAM ISOLATION VALVE	E12	GA	A	PSC	QTR	73ST-9XI16		
	2	HY	C	STC	CSD	73ST-9XI16	CSJ-18	
				FTC	CSD	73ST-9XI16	CSJ-18	
				VP	2YR	73ST-9XI16		
SGAUV0175	SGP-002	8	B	FSC	CSD	73ST-9XI19	CSJ-18	Fails closed on loss of air only
SG 2 DOWNCOMER FEEDWATER UPSTREAM ISOLATION VALVE	C12	GA	A	STC	CSD	73ST-9XI19	CSJ-18	
	2	AO	C	FTC	CSD	73ST-9XI19	CSJ-18	
				VP	2YR	73ST-9XI19		
SGAUV0177	SGP-002	24	B	FSC	CSD	73ST-9XI16	CSJ-18	
SG 2 ECONOMIZER FEEDWATER UPSTREAM ISOLATION VALVE	A12	GA	A	PSC	QTR	73ST-9XI16		
	2	HY	C	STC	CSD	73ST-9XI16	CSJ-18	
				FTC	CSD	73ST-9XI16	CSJ-18	
				VP	2YR	73ST-9XI16		
SGBHV0178	SGP-001	12	B	FSO	QTR	73ST-9XI20		
STEAM GENERATOR ATMOSPHERIC DUMP VALVE (ADV)	E02 SH2	GL	A	FSC	QTR	73ST-9XI20		
	2	AO	OC	STO	QTR	73ST-9XI20		
				STC	QTR	73ST-9XI20		
				FTC	QTR	73ST-9XI20		
				VP	2YR	73ST-9XI20		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (In) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SGAHV0179	SGP-001	12	B	FSO	QTR	73ST-9XI20		
STEAM GENERATOR ATMOSPHERIC	B02 SH2	GL	A	FSC	QTR	73ST-9XI20		
DUMP VALVE (ADV)	2	AO	OC	STO	QTR	73ST-9XI20		
				STC	QTR	73ST-9XI20		
				FTC	QTR	73ST-9XI20		
				VP	2YR	73ST-9XI20		
SGEUV0180	SGP-001	28	B	FSC	CSD	73ST-9SG01	CSJ-19	
MAIN STEAM ISOLATION VALVE	F10 SH1	GA	A	PSC	QTR	73ST-9SG01		
	2	HY	C	STC	CSD	73ST-9SG01	CSJ-19	
				FTC	CSD	73ST-9SG01	CSJ-19	
				VP	2YR	73ST-9SG01		
SGEUV0181	SGP-001	28	B	FSC	CSD	73ST-9SG01	CSJ-19	
MAIN STEAM ISOLATION VALVE	B10 SH1	GA	A	PSC	QTR	73ST-9SG01		
	2	HY	C	STC	CSD	73ST-9SG01	CSJ-19	
				FTC	CSD	73ST-9SG01	CSJ-19	
				VP	2YR	73ST-9SG01		
SGEUV0183	SGP-001	4	B	FSC	QTR	73ST-9XI02		
MSIV BYPASS VALVE	C11 SH1	GA	A	STC	QTR	73ST-9XI02		
	2	AO	C	FTC	QTR	73ST-9XI02		
				VP	2YR	73ST-9XI02		
SGAHV0184	SGP-001	12	B	FSO	QTR	73ST-9XI20		
STEAM GENERATOR ATMOSPHERIC	G02 SH2	GL	A	FSC	QTR	73ST-9XI20		
DUMP VALVE (ADV)	2	AO	OC	STO	QTR	73ST-9XI20		
				STC	QTR	73ST-9XI20		
				FTC	QTR	73ST-9XI20		
				VP	2YR	73ST-9XI20		
SGBHV0185	SGP-001	12	B	FSO	QTR	73ST-9XI20		
STEAM GENERATOR ATMOSPHERIC	D02 SH2	GL	A	FSC	QTR	73ST-9XI20		
DUMP VALVE (ADV)	2	AO	OC	STO	QTR	73ST-9XI20		
				STC	QTR	73ST-9XI20		
				FTC	QTR	73ST-9XI20		
				VP	2YR	73ST-9XI20		
SGBHV0200	SGP-002	0.375	B	FSC	QTR	73ST-9XI01		
CHEMICAL INJECTION ISOLATION VALVE	F11	GA	A	STC	QTR	73ST-9XI01		
(PEN. 11)	2	SO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI01		
SGBHV0201	SGP-002	0.375	B	FSC	QTR	73ST-9XI02		
CHEMICAL INJECTION ISOLATION VALVE	B11	GA	A	STC	QTR	73ST-9XI02		
(PEN. 12)	2	SO	C	FTC	QTR	73ST-9XI02		
				VP	2YR	73ST-9XI02		
SGAUV0204	SGP-002	0.5	B	FSC	QTR	73ST-9XI01		
SG 1 HOT LEG BLOWDOWN SAMPLE LINE	F03	GL	A	STC	QTR	73ST-9XI01		
ISOLATION VALVE (PEN. 37B)	2	SO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI01		
SGAUV0211	SGP-002	0.5	B	FSC	QTR	73ST-9XI01		
[illegible] 1 COLD LEG BLOWDOWN SAMPLE	G03	GL	A	STC	QTR	73ST-9XI01		
[illegible]E ISOLATION VALVE (PEN. 37A)	2	SO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI01		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SGBUV0219 SG 1 HOT LEG BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 37B)	SGP-002 G03 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI01 73ST-9XI01 73ST-9XI01 73ST-9XI01		
SGAUV0220 SG 1 DOWNCOMER BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 49)	SGP-002 G06 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI01 73ST-9XI01 73ST-9XI01 73ST-9XI01		
SGBUV0221 SG 1 DOWNCOMER BLOWDOWN SAMPLE LINE ISOLATION VALVE PEN. 49)	SGP-002 G05 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI01 73ST-9XI01 73ST-9XI01 73ST-9XI01		
SGBUV0222 SG 2 COLD LEG BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 63B)	SGP-002 C04 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGAUV0223 SG 2 COLD LEG BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 63B)	SGP-002 C03 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
GBUV0224 SG 2 HOT LEG BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 63A)	SGP-002 D04 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGAUV0225 SG 2 HOT LEG BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 63A)	SGP-002 D02 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGBUV0226 SG 2 DOWNCOMER BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 48)	SGP-002 C05 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGAUV0227 SG 2 DOWNCOMER BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 48)	SGP-002 C05 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGBUV0228 SG 1 COLD LEG BLOWDOWN SAMPLE LINE ISOLATION VALVE (PEN. 37A)	SGP-002 G03 2	0.5 GL SO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI01 73ST-9XI01 73ST-9XI01 73ST-9XI01		
SGBPSV0302 ADV SGBHV178 NITROGEN ACCUMULATOR PRESSURE RELIEF VALVE	SGP-001 F06 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
BPSV0305 V SGBHV178 NITROGEN SUPPLY PRESSURE RELIEF VALVE	SGP-001 F05 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		

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SGBPV0306A ADV NITROGEN SOLENOID VALVE	SGP-001 F05 SH2 3	1 GA SO	B A O	FSO	QTR	73ST-9XI20	VRR-02	
SGBPV0306B ADV NITROGEN SOLENOID VALVE	SGP-001 E05 SH2 3	1 GA SO	B A O	FSO	QTR	73ST-9XI20	VRR-02	
SGAPSV0309 ADV SGAHV179 NITROGEN ACCUMULATOR PRESSURE RELIEF VALVE	SGP-001 C06 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
SGAPSV0312 ADV SGAHV179 NITROGEN SUPPLY PRESSURE RELIEF VALVE	SGP-001 C05 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
SGAPV0313B ADV NITROGEN SOLENOID VALVE	SGP-001 H05 SH2 3	1 GA SO	B A O	FSO	QTR	73ST-9XI20	VRR-02	
SGAPV0313A ADV NITROGEN SOLENOID VALVE	SGP-001 C05 SH2 3	1 GA SO	B A O	FSO	QTR	73ST-9XI20	VRR-02	
SGAPSV0316 ADV SGAHV184 NITROGEN ACCUMULATOR PRESSURE RELIEF VALVE	SGP-001 H06 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
SGAPSV0319 ADV SGAHV184 NITROGEN SUPPLY PRESSURE RELIEF VALVE	SGP-001 H05 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
SGBPSV0322 ADV SGBHV185 NITROGEN ACCUMULATOR PRESSURE RELIEF VALVE	SGP-001 E06 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
SGBPSV0325 ADV SGBHV185 NITROGEN SUPPLY PRESSURE RELIEF VALVE	SGP-001 E05 SH2 3	1 SV SA	AC A OC	LT SV	2YR 10Y	73ST-9SG05 73ST-9ZZ20		
SGEV334 NITROGEN CHECK VALVE TO ADV 179	SGP-001 C04 SH2 3	1 CK SA	C A O	FSO	QTR	73ST-9XI20		
SGEV339 NITROGEN CHECK VALVE TO ADV 184	SGP-001 H05 SH2 3	1 CK SA	C A O	FSO	QTR	73ST-9XI20		
SGEV346 INSTRUMENT AIR CHECK VALVE TO ADV 184	SGP-001 B04 SH2 3	1 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG05 73ST-9SG05		

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SGEV348 INSTRUMENT AIR CHECK VALVE TO ADV 179	SGP-001 G04 SH2 3	1 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG05 73ST-9SG05		
SGEV350 NITROGEN CHECK VALVE TO ADV 178	SGP-001 F04 SH2 3	1 CK SA	C A O	FSO	QTR	73ST-9XI20		
SGEV357 INSTRUMENT AIR CHECK VALVE TO ADV 178	SGP-001 F04 SH2 3	1 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG05 73ST-9SG05		
SGEV358 INSTRUMENT AIR CHECK VALVE TO ADV 185	SGP-001 D04 SH2 3	1 CK SA	AC A C	FSC LT	QTR 2YR	73ST-9SG05 73ST-9SG05		
SGEV360 NITROGEN CHECK VALVE TO ADV 185	SGP-001 E05 SH2 3	1 CK SA	C A O	FSO	QTR	73ST-9XI20		
SGBUV0500Q STEAM GENERATOR BLOWDOWN SAMPLE CIV (PEN. 46)	SGP-002 E02 2	6 GA AO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI01 73ST-9XI01 73ST-9XI01 73ST-9XI01		
SGAUV0500S STEAM GENERATOR BLOWDOWN SAMPLE CIV (PEN. 47)	SGP-002 A02 2	6 GA AO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGAUV0500P STEAM GENERATOR BLOWDOWN SAMPLE CIV (PEN. 46)	SGP-002 E03 2	6 GA AO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI01 73ST-9XI01 73ST-9XI01 73ST-9XI01		
SGBUV0500R STEAM GENERATOR BLOWDOWN SAMPLE CIV (PEN. 47)	SGP-002 A03 2	6 GA AO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI02 73ST-9XI02 73ST-9XI02 73ST-9XI02		
SGEPSV0554 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 1	SGP-001 D12 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0555 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 1	SGP-001 D13 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0556 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 1	SGP-001 D14 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0557 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 1	SGP-001 D15 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SGEPSV0558 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 2	SGP-001 A15 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0559 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 2	SGP-001 A14 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0560 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 2	SGP-001 A13 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0561 MAIN STEAM SAFETY VALVE SG2 STEAM LINE 2	SGP-001 A12 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0572 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 1	SGP-001 H12 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0573 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 1	SGP-001 H13 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0574 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 1	SGP-001 H14 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0575 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 1	SGP-001 H14 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0576 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 2	SGP-001 F15 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0577 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 2	SGP-001 F14 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0578 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 2	SGP-001 F13 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEPSV0579 MAIN STEAM SAFETY VALVE SG1 STEAM LINE 2	SGP-001 F12 SH1 2	6 SV SA	C A OC	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
SGEV642 DOWNCOMER FEEDWATER LINE CHECK VALVE	SGP-002 G11 2	8 CK SA	C A C	FSC	CSD	73ST-9XI32	VRR-05	
SGEV652 DOWNCOMER FEEDWATER LINE CHECK VALVE	SGP-002 G10 2	8 CK SA	C A C	FSC	CSD	73ST-9XI32	VRR-05	

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SGEV653	SGP-002	8	C	FSC	CSD	73ST-9XI32	VRR-05	
DOWNCOMER FEEDWATER LINE CHECK VALVE	C10	CK	A					
	2	SA	C					
SGEPSV0691	SGP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
MAIN STEAM SAFETY VALVE SG1 STEAM LINE 2	F15 SH1	SV	A					
	2	SA	OC					
SGEPSV0692	SGP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
MAIN STEAM SAFETY VALVE SG1 STEAM LINE 1	H15 SH1	SV	A					
	2	SA	OC					
SGEV693	SGP-002	8	C	FSC	CSD	73ST-9XI32	VRR-05	
DOWNCOMER FEEDWATER LINE CHECK VALVE	C11	CK	A					
	2	SA	C					
SGEPSV0694	SGP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
MAIN STEAM SAFETY VALVE SG2 STEAM LINE 2	A15 SH1	SV	A					
	2	SA	OC					
SGEPSV0695	SGP-001	6	C	SV	RFO	73ST-9ZZ18		Tested each refueling (ref. RCTS 038788)
MAIN STEAM SAFETY VALVE SG2 STEAM LINE 1	D15 SH1	SV	A					
	2	SA	OC					
SGEV887	SGP-001	2	C	FSO	QTR	73ST-9AF02		
WARM-UP LINE CHECK VALVE TO TURBINE-DRIVEN AFW PUMP	D12 SH1	CK	A	FSC	CSD	73ST-9XI36	CSJ-22	
	3	SA	OC					
SGEV888	SGP-001	2	C	FSO	QTR	73ST-9AF02		
WARM-UP LINE CHECK VALVE TO TURBINE-DRIVEN AFW PUMP	C13 SH1	CK	A	FSC	CSD	73ST-9XI36	CSJ-22	
	3	SA	OC					
SGEV982	SGP-001	1	AC	FSC	QTR	73ST-9SG05		
ADV NITROGEN SUPPLY CHECK VALVE	B06 SH2	CK	A	LT	2YR	73ST-9SG05		
	3	SA	C					
SGEV985	SGP-001	1	AC	FSC	QTR	73ST-9SG05		
ADV NITROGEN SUPPLY CHECK VALVE	G06 SH2	CK	A	LT	2YR	73ST-9SG05		
	3	SA	C					
SGEV988	SGP-001	1	AC	FSC	QTR	73ST-9SG05		
ADV NITROGEN SUPPLY CHECK VALVE	D06 SH2	CK	A	LT	2YR	73ST-9SG05		
	3	SA	C					
SGEV991	SGP-001	1	AC	FSC	QTR	73ST-9SG05		
ADV NITROGEN SUPPLY CHECK VALVE	F06 SH2	CK	A	LT	2YR	73ST-9SG05		
	3	SA	C					
SGAUV1133	SGP-001	1	B	FSC	QTR	73ST-9XI01		
STEAM TRAP SGN-M23 ISOLATION VALVE	E15 SH1	GL	A	STC	QTR	73ST-9XI01		
	2	SO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI32		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SGAUV1134	SGP-001	1	B	FSC	QTR	73ST-9XI02		
STEAM TRAP SGN-M24 ISOLATION VALVE	C14 SH1	GL	A	STC	QTR	73ST-9XI02		
	2	SO	C	FTC	QTR	73ST-9XI02		
				VP	2YR	73ST-9XI32		
SGBUV1135B	SGP-001	1	B	FSC	QTR	73ST-9XI01		
STEAM TRAP SGN-M02 ISOLATION VALVE	F11 SH1	GL	A	STC	QTR	73ST-9XI01		
	2	SO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI32		
SGBUV1135A	SGP-001	1	B	FSC	QTR	73ST-9XI01		
STEAM TRAP SGN-M01 ISOLATION VALVE	H11 SH1	GL	A	STC	QTR	73ST-9XI01		
	2	SO	C	FTC	QTR	73ST-9XI01		
				VP	2YR	73ST-9XI32		
SGBUV1136B	SGP-001	1	B	FSC	QTR	73ST-9XI02		
STEAM TRAP SGN-M04 ISOLATION VALVE	A11 SH1	GL	A	STC	QTR	73ST-9XI02		
	2	SO	C	FTC	QTR	73ST-9XI02		
				VP	2YR	73ST-9XI32		
SGBUV1136A	SGP-001	1	B	FSC	QTR	73ST-9XI02		
STEAM TRAP SGN-M03 ISOLATION VALVE	D11	GL	A	STC	QTR	73ST-9XI02		
	2	SO	C	FTC	QTR	73ST-9XI02		
				VP	2YR	73ST-9XI32		
SIAVA10	SIP-002	1	AC	FSO	RFO	73ST-9XI21	ROJ-12	Being installed per DMWO 746122. May not be in all units.
PRESSURE LOCKING CHECK VALVE FOR SIAUV0655 BONNET	G03	CK	A	FSC	RFO	73ST-9XI21	ROJ-12	
	2	SA	OC	AJ	CLR	73ST-9CL01		
SIBVA15	SIP-002	1	AC	FSO	RFO	73ST-9XI21	ROJ-12	Being installed per DMWO 746122. May not be in all units.
PRESSURE LOCKING CHECK VALVE FOR SIBUV0656 BONNET	G10	CK	A	FSC	RFO	73ST-9XI21	ROJ-12	
	2	SA	OC	AJ	CLR	73ST-9CL01		
SIEV113	SIP-002	3	C	FSO	RFO	73ST-9XI33	ROJ-04	
HPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	F14	CK	A	FSC	CSD	73ST-9SI05	CSJ-20	
	2	SA	OC					
SIEV114	SIP-002	12	C	FSO	CSD	73ST-9XI27	CSJ-21	
LPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	F13	CK	A	FSC	CSD	73ST-9SI05	CSJ-21	
	2	SA	OC					
SIEV123	SIP-002	3	C	FSO	RFO	73ST-9XI33	ROJ-04	
HPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	F12	CK	A	FSC	CSD	73ST-9SI05	CSJ-20	
	2	SA	OC					
SIEV124	SIP-002	12	C	FSO	CSD	73ST-9XI27	CSJ-21	
LPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	F11	CK	A	FSC	CSD	73ST-9SI05	CSJ-21	
	2	SA	OC					
SIEV133	SIP-002	3	C	FSO	RFO	73ST-9XI33	ROJ-04	
HPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	F07	CK	A	FSC	CSD	73ST-9SI05	CSJ-20	
	2	SA	OC					
SIEV134	SIP-002	12	C	FSO	CSD	73ST-9XI26	CSJ-21	
LPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	F06	CK	A	FSC	CSD	73ST-9SI05	CSJ-21	
	2	SA	OC					

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIBPSV0140 SI PUMP SUCTION LINE FROM CONTAINMENT SUMP PRESSURE RELIEF VALVE (PEN. 24)	SIP-001 B15 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBPSV0141 PRESSURE RELIEF VALVE BETWEEN ISOLATION VALVES TO FUEL POOL COOLING	SIP-001 B15 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIEV143 HPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	SIP-002 F04 2	3 CK SA	C A OC	FSO FSC	RFO CSD	73ST-9XI33 73ST-9SI05	ROJ-04 CSJ-20	
SIEV144 LPSI CHECK VALVE TO RCS COLD LEG INJECTION HEADER	SIP-002 F04 2	12 CK SA	C A OC	FSO FSC	CSD CSD	73ST-9XI26 73ST-9SI05	CSJ-21 CSJ-21	
SIAPSV0150 PRESSURE RELIEF VALVE BETWEEN ISOLATION VALVES TO FUEL POOL COOLING	SIP-001 H15 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAPSV0151 SI PUMP SUCTION LINE FROM CONTMT SUMP PRESSURE RELIEF VALVE (PEN. 23)	SIP-001 G15 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAV157 CONTAINMENT SPRAY PUMP SUCTION LINE CHECK VALVE	SIP-001 G13 2	18 CK SA	C N O	FSO PSO	RFO QTR	73ST-9XI29 73ST-9SI06	ROJ-11 ROJ-11	
SIBV158 CONTAINMENT SPRAY PUMP SUCTION LINE CHECK VALVE	SIP-001 B13 2	18 CK SA	C N O	FSO PSO	RFO QTR	73ST-9XI29 73ST-9SI06	ROJ-11 ROJ-11	
SIAPSV0161 LPSI/SDC LINE PRESSURE RELIEF VALVE	SIP-001 H06 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAPSV0162 PRESSURE RELIEF VALVE BETWEEN ISOLATION VALVES TO FUEL POOL COOLING	SIP-001 G05 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAV164 CONTAINMENT SPRAY HEADER CHECK VALVE AND INBOARD CIV (PEN. 21)	SIP-002 F08 2	10 CK SA	AC A OC	FSO FSC AJ	STF STF CLR	73ST-9ZZ25 73ST-9ZZ25 73ST-9CL01	VRR-06 VRR-06	Disassembled on a sampling basis
SIBV165 CONTAINMENT SPRAY HEADER CHECK VALVE AND INBOARD CIV (PEN. 22)	SIP-002 F06 2	10 CK SA	AC A OC	FSO FSC AJ	STF STF CLR	73ST-9ZZ25 73ST-9ZZ25 73ST-9CL01	VRR-06 VRR-06	Disassembled on a sampling basis
SIBPSV0166 [illegible]SI LONG TERM RECIRC PRESSURE [illegible]LIEF VALVE	SIP-002 G09 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIBPSV0169 SHUTDOWN COOLING LINE PRESSURE RELIEF VALVE	SIP-002 D10 1	0.75 SV SA	C A OC	SV	5YR	73ST-9ZZ20		
SIAPSV0179 SHUTDOWN COOLING RETURN LINE LTOP RELIEF VALVE	SIP-002 G03 2	6 SV SA	AC A OC	AJ SV	CLR 18M	73ST-9CL01 73ST-9ZZ19		Tested every 18 months per TRM 5.0.500.8.d.
SIBPSV0189 SHUTDOWN COOLING RETURN LINE LTOP RELIEF VALVE	SIP-002 F11 2	6 SV SA	AC A OC	AJ SV	CLR 18M	73ST-9CL01 73ST-9ZZ19		Tested every 18 months per TRM 5.0.500.8.d.
SIBPSV0191 SHUTDOWN COOLING HEAT EXCHANGER OUTLET PRESSURE RELIEF VALVE	SIP-001 D07 2	1.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBPSV0192 PRESSURE RELIEF VALVE BETWEEN ISOLATION VALVES TO FUEL POOL COOLING	SIP-001 C05 3	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBPSV0193 SI/SDC LINE PRESSURE RELIEF VALVE	SIP-001 D06 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAPSV0194 SHUTDOWN COOLING HEAT EXCHANGER OUTLET PRESSURE RELIEF VALVE	SIP-001 H07 2	1.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBV200 LPSI PUMP SUCTION LINE CHECK VALVE	SIP-001 B12 2	20 CK SA	C A OC	FSO FSC PSO	RFO RFO QTR	73ST-9XI29 40ST-9SI09 73ST-9XI10	ROJ-11 ROJ-10 ROJ-11	
SIAV201 LPSI PUMP SUCTION LINE CHECK VALVE	SIP-001 F13 2	20 CK SA	C A OC	FSO FSC PSO	RFO RFO QTR	73ST-9XI29 40ST-9SI09 73ST-9XI09	ROJ-11 ROJ-10 ROJ-11	
SIAV205 CONTAINMENT RECIRCULATION SUMP CHECK VALVE TO SI SUPPLY HEADER	SIP-001 F14 2	24 CK SA	C A O	FSO FSC	STF RFO	73ST-9ZZ25 40ST-9SI09	VRR-07	Disassembled and inspected
SIBV206 CONTAINMENT RECIRCULATION SUMP CHECK VALVE TO SI SUPPLY HEADER	SIP-001 A14 2	24 CK SA	C A O	FSO FSC	STF RFO	73ST-9ZZ25 40ST-9SI09	VRR-07	Disassembled and inspected
SIEPSV0211 SAFETY INJECTION TANK 2A PRESSURE RELIEF VALVE	SIP-002 E15 2	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIEV215 SAFETY INJECTION TANK DISCHARGE CHECK VALVE	SIP-002 A15 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI25 73ST-9SI03	ROJ-07 VRR-08 ROJ-07	Leak test frequency is 18 months per TS SR 3.4.15.1

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIEV217 COLD LEG SAFETY INJECTION LOOP CHECK VALVE	SIP-002 A13 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI27 73ST-9SI03	ROJ-08 VRR-08 ROJ-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEPSV0221 SAFETY INJECTION TANK 2B PRESSURE RELIEF VALVE	SIP-002 E12 2	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIEV225 SAFETY INJECTION TANK DISCHARGE CHECK VALVE	SIP-002 A12 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI25 73ST-9SI03	ROJ-07 VRR-08 ROJ-07	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV227 COLD LEG SAFETY INJECTION LOOP CHECK VALVE	SIP-002 A10 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI27 73ST-9SI03	ROJ-08 VRR-08 ROJ-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEPSV0231 SAFETY INJECTION TANK 1A PRESSURE RELIEF VALVE	SIP-002 E08 2	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIEV235 SAFETY INJECTION TANK DISCHARGE CHECK VALVE	SIP-002 A07 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI25 73ST-9SI03	ROJ-07 VRR-08 ROJ-07	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV237 COLD LEG SAFETY INJECTION LOOP CHECK VALVE	SIP-002 A06 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI26 73ST-9SI03	ROJ-08 VRR-08 ROJ-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEPSV0241 SAFETY INJECTION TANK 1B PRESSURE RELIEF VALVE	SIP-002 E05 2	2 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIEV245 SAFETY INJECTION TANK DISCHARGE CHECK VALVE	SIP-002 A05 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI25 73ST-9SI03	ROJ-07 VRR-08 ROJ-07	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV247 COLD LEG SAFETY INJECTION LOOP CHECK VALVE	SIP-002 A04 1	14 CK SA	AC A OC	FSO FSC PSO LT	RFO STF CSD 18M	73ST-9XI30 73ST-9SI03 73ST-9XI26 73ST-9SI03	ROJ-08 VRR-08 ROJ-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIAPSV0285 SI PUMP COMBINED RECIRC PRESSURE RELIEF VALVE	SIP-001 F09 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBPSV0286 SI PUMP COMBINED RECIRC PRESSURE RELIEF VALVE	SIP-001 B09 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBPSV0287 CONTAINMENT SPRAY LINE PRESSURE RELIEF VALVE	SIP-001 C09 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		

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SIEPSV0288	SIP-001	1	C	SV	10Y	73ST-9ZZ20		
SI MAXIFLOW RECIRC LINE RELIEF VALVE	E05	SV	A					
	3	SA	OC					
SIAPSV0289	SIP-001	0.75	C	SV	10Y	73ST-9ZZ20		
CONTAINMENT SPRAY LINE PRESSURE RELIEF VALVE	G09	SV	A					
	2	SA	OC					
SIAHV0306	SIP-001	10	B	FSO	QTR	73ST-xXI11		FSO includes position stop verification per TS SR 3.5.3.7
LPSI DISCHARGE HEADER ISOLATION VALVE	G05	GL	A	FSC	QTR	73ST-xXI11		
	2	MO	OC	STO	QTR	73ST-xXI11		
				STC	QTR	73ST-xXI11		
				VP	2YR	73ST-xXI11		
SIBHV0307	SIP-001	10	B	FSO	QTR	73ST-xXI12		FSO includes position stop verification per TS SR 3.5.3.7
LPSI HEADER DISCHARGE ISOLATION VALVE	B04	GL	A	FSC	QTR	73ST-xXI12		
	2	MO	OC	STO	QTR	73ST-xXI12		
				STC	QTR	73ST-xXI12		
				VP	2YR	73ST-xXI12		
SICHV0321	SIP-002	3	A	FSO	QTR	73ST-xXI11		FSO includes position stop verification per TS SR 3.5.3.7
HPSI LONG TERM RECIRCULATION CIV (PEN. 77)	G02	GL	A	FSC	QTR	73ST-xXI11		
	2	MO	OC	STO	QTR	73ST-xXI11		
				STC	QTR	73ST-xXI11		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-xXI11		
SIBUV0322	SIP-002	1	B	FSC	QTR	73ST-9XI13		
HOT LEG INJECTION CHECK VALVE LEAK ISOLATION VALVE	E02	GL	A	STC	QTR	73ST-9XI13		
	1	AO	C	FTC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		
SIDHV0331	SIP-002	3	A	FSO	QTR	73ST-xXI12		FSO includes position stop verification per TS SR 3.5.3.7
HPSI LONG TERM RECIRCULATION CIV (PEN. 67)	G09	GL	A	FSC	QTR	73ST-xXI12		
	2	MO	OC	STO	QTR	73ST-xXI12		
				STC	QTR	73ST-xXI12		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-xXI12		
SIBUV0332	SIP-002	1	B	FSC	QTR	73ST-9XI14		
HOT LEG INJECTION CHECK VALVE LEAK ISOLATION VALVE	E10	GL	A	STC	QTR	73ST-9XI14		
	1	AO	C	FTC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIAV404	SIP-001	4	C	FSO	RFO	73ST-9XI33	ROJ-05	
HPSI PMP DISCHARGE CHECK VALVE	F06	CK	A	FSC	RFO	73ST-9XI33	ROJ-05	
	2	SA	OC					
SIBV405	SIP-001	4	C	FSO	RFO	73ST-9XI33	ROJ-05	
HPSI PMP DISCHARGE CHECK VALVE	B04	CK	A	FSC	RFO	73ST-9XI33	ROJ-05	
	2	SA	OC					
SIEPSV0407	SIP-001	1	C	SV	10Y	73ST-9ZZ20		
AFETY INJECTION TANK FILL LINE LIEF VALVE	E08	SV	A					
	3	SA	OC					

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIBPSV0409 HPSI LINE PRESSURE RELIEF VALVE	SIP-001 B02 2	1.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAPSV0417 HPSI LINE PRESSURE RELIEF VALVE	SIP-001 F02 2	1.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAV424 HPSI PUMP RECIRC LINE CHECK VALVE	SIP-001 F10 2	2 CK SA	C A O	FSO	QTR	73ST-9SI10		
SIBV426 HPSI PUMP RECIRC LINE CHECK VALVE	SIP-001 A10 2	2 CK SA	C A O	FSO	QTR	73ST-9SI10		
SIAV434 LPSI PUMP DISCHARGE CHECK VALVE	SIP-001 F09 2	10 CK SA	C A O	FSO PSO	CSD QTR	73ST-9XI26 73ST-9XI09	CSJ-05 CSJ-05	
SIAPSV0439 LPSI LINE PRESSURE RELIEF VALVE	SIP-001 H02 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIBV446 LPSI PUMP DISCHARGE CHECK VALVE	SIP-001 B09 2	10 CK SA	C A O	FSO PSO	CSD QTR	73ST-9XI27 73ST-9XI10	CSJ-05 CSJ-05	
SIBV448 LPSI PMP RECIRC LINE CHECK VALVE	SIP-001 B10 2	2 CK SA	C A O	FSO	QTR	73ST-9SI11		
SIBPSV0449 LPSI LINE PRESSURE RELIEF VALVE	SIP-001 D02 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAV451 LPSI PMP RECIRC LINE CHECK VALVE	SIP-001 G11 2	2 CK SA	C A O	FSO	QTR	73ST-9SI11		
SIEV463 SAFETY INJECTION TANK FILL/DRAIN HEADER OUTBOARD CIV (PEN. 28)	SIP-001 D08 2	2 GL MA	A P C	AJ	CLR	73ST-9CL01		
SIAPSV0468 HPSI LONG TERM RECIRC PRESSURE RELIEF VALVE	SIP-002 G02 2	0.75 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SIAPSV0469 SHUTDOWN COOLING LINE PRESSURE RELIEF VALVE	SIP-002 D03 1	0.75 SV SA	C A OC	SV	5YR	73ST-9ZZ20		
SIEPSV0473 SAFETY INJECTION TANK FILL/DRAIN LINE PRESSURE RELIEF VALVE	SIP-001 E10 2	1 SV SA	C A OC	SV	10Y	73ST-9ZZ20		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIEPSV0474 SAFETY INJECTION TANK FILL/DRAIN LINE PRESSURE RELIEF VALVE	SIP-001 D09 2	0.75 SV SA	AC A OC	AJ SV	CLR 10Y	73ST-9CL01 73ST-9ZZ20		
SIBV484 CONTAINMENT SPRAY PUMP DISCHARGE CHECK VALVE	SIP-001 C10 2	10 CK SA	C A O	FSO PSO	CSD QTR	73ST-9XI27 73ST-9SI06	CSJ-05 CSJ-05	
SIAV485 CONTAINMENT SPRAY PUMP DISCHARGE CHECK VALVE	SIP-001 H10 2	10 CK SA	C A O	FSO PSO	CSD QTR	73ST-9XI26 73ST-9SI06	CSJ-05 CSJ-05	
SIAV486 CONTAINMENT SPRAY PMP RECIRC LINE CHECK VALVE	SIP-001 G10 2	2 CK SA	C A O	FSO	QTR	73ST-9SI06		
SIBV487 CONTAINMENT SPRAY PMP RECIRC LINE CHECK VALVE	SIP-001 C10 2	2 CK SA	C A O	FSO	QTR	73ST-9SI06		
SIAV522 HPSI LONG-TERM RECIRC CHECK VALVE	SIP-002 C02 1	3 CK SA	AC A OC	FSO FSC LT	RFO STF 18M	73ST-9XI33 73ST-9SI03 73ST-9SI03	ROJ-06 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
[illegible]AV523 HPSI LONG-TERM RECIRC INBOARD CIV (PEN. 77)	SIP-002 F02 1	3 CK SA	AC A OC	FSO FSC AJ LT	RFO STF CLR 18M	73ST-9XI33 73ST-9SI03 73ST-9CL01 73ST-9SI03	ROJ-06 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIBV532 HPSI LONG-TERM RECIRC CHECK VALVE	SIP-002 B10 1	3 CK SA	AC A OC	FSO FSC LT	RFO STF 18M	73ST-9XI33 73ST-9SI03 73ST-9SI03	ROJ-06 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIBV533 HPSI LONG-TERM RECIRC INBOARD CIV (PEN. 67)	SIP-002 F09 1	3 CK SA	AC A OC	FSO FSC AJ LT	RFO STF CLR 18M	73ST-9XI33 73ST-9SI03 73ST-9CL01 73ST-9SI03	ROJ-06 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV540 COLD LEG SAFETY INJECTION CHECK VALVE	SIP-002 B13 1	12 CK SA	AC A OC	FSO FSC LT	CSD STF 18M	73ST-9XI27 73ST-9SI03 73ST-9SI03	CSJ-31 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV541 COLD LEG SAFETY INJECTION CHECK VALVE	SIP-002 B11 1	12 CK SA	AC A OC	FSO FSC LT	CSD STF 18M	73ST-9XI27 73ST-9SI03 73ST-9SI03	CSJ-31 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV542 COLD LEG SAFETY INJECTION CHECK VALVE	SIP-002 C06 1	12 CK SA	AC A OC	FSO FSC LT	CSD STF 18M	73ST-9XI26 73ST-9SI03 73ST-9SI03	CSJ-31 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1
SIEV543 COLD LEG SAFETY INJECTION CHECK VALVE	SIP-002 C04 1	12 CK SA	AC A OC	FSO FSC LT	CSD STF 18M	73ST-9XI26 73ST-9SI03 73ST-9SI03	CSJ-31 VRR-08	Leak test frequency is 18 months per TS SR 3.4.15.1

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIAHV0604	SIP-001	3	B	FSO	QTR	73ST-9XI13		
HPSI LONG TERM RECIRC ISOLATION VALVE	G03	GA	A	FSC	QTR	73ST-9XI13		
	2	MO	OC	STO	QTR	73ST-9XI13		
				STC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		
SIAHV0605	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 2A ATMOSPHERIC VENT VALVE	F15	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		
SIAHV0606	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 2B ATMOSPHERIC VENT VALVE	F12	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		
SIAHV0607	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 1A ATMOSPHERIC VENT VALVE	F07	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		
SIAHV0608	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 1B ATMOSPHERIC VENT VALVE	F04	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		
SIBHV0609	SIP-001	3	B	FSO	QTR	73ST-9XI14		
HPSI LONG TERM RECIRC ISOLATION VALVE	C03	GA	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIBUV0611	SIP-002	2	B	FSC	QTR	73ST-9XI04		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
SAFETY INJECTION TANK 2A FILL/DRAIN ISOLATION VALVE	B16	GL	P	STC	QTR	73ST-9XI04		
	2	AO	C	FTC	QTR	73ST-9XI04		
				VP	2YR	73ST-9XI04		
SIBHV0613	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 2A ATMOSPHERIC VENT VALVE	E15	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		
SIBUV0614	SIP-002	14	B	FSO	CSD	73ST-9XI25	CSJ-33	
SAFETY INJECTION TANK 2A DISCHARGE ISOLATION VALVE	A15	GA	A	STO	CSD	73ST-9XI25	CSJ-33	
	1	MO	O	VP	2YR	73ST-9XI25	CSJ-33	

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIBUV0615 LPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 17)	SIP-002 G14 2	12 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-xXI12 73ST-xXI12 73ST-xXI12		FSO includes position stop verification per SR 3.5.3.7
SIBUV0616 HPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 13)	SIP-002 G14 2	2 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-9XI14 73ST-9XI14 73ST-9XI14		
SIAUV0617 HPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 13)	SIP-002 G15 2	2 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-9XI13 73ST-9XI13 73ST-9XI13		
SIBUV0618 SAFETY INJECTION TANK 2A CHECK VALVE LEAKAGE TEST LINE ISOLATION VALVE	SIP-002 B16 1	1 GL AO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04		
SIAHV0619 SIT NITROGEN SUPPLY ISOLATION VALVE	SIP-002 D15 2	1 GL AO	B P C	VP	2YR	73ST-9XI25		
SIBUV0621 SAFETY INJECTION TANK 2B FILL/DRAIN ISOLATION VALVE	SIP-002 B12 2	2 GL AO	B P C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
SIBHV0623 SAFETY INJECTION TANK 2B ATMOSPHERIC VENT VALVE	SIP-002 E12 2	1 GL SO	B A OC	FSO FSC STO STC FTC VP	CSD CSD CSD CSD CSD 2YR	73ST-9XI37 73ST-9XI37 73ST-9XI37 73ST-9XI37 73ST-9XI37 73ST-9XI37	CSJ-26 CSJ-26 CSJ-26 CSJ-26 CSJ-26	
SIBUV0624 SAFETY INJECTION TANK 2B DISCHARGE ISOLATION VALVE	SIP-002 A12 1	14 GA MO	B A O	FSO STO VP	CSD CSD 2YR	73ST-9XI25 73ST-9XI25 73ST-9XI25	CSJ-33 CSJ-33 CSJ-33	
SIBUV0625 LPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 18)	SIP-002 G11 2	12 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-xXI12 73ST-xXI12 73ST-xXI12		FSO includes position stop verification per SR 3.5.3.7
SIBUV0626 HPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 14)	SIP-002 G11 2	2 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-9XI14 73ST-9XI14 73ST-9XI14		
SIAUV0627 HPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 14)	SIP-002 G12 2	2 GL MO	B A O	FSO STO VP	QTR QTR 2YR	73ST-9XI13 73ST-9XI13 73ST-9XI13		
SIBUV0628 SAFETY INJECTION TANK 2B CHECK VALVE LEAKAGE TEST LINE ISOLATION VALVE	SIP-002 B13 1	1 GL AO	B A C	FSC STC FTC VP	QTR QTR QTR 2YR	73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (In) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIAHV0629	SIP-002	1	B	VP	2YR	73ST-9XI25		
SIT NITROGEN SUPPLY ISOLATION VALVE	D12	GL	P					
	2	AO	C					
SIBUV0631	SIP-002	2	B	FSC	QTR	73ST-9XI03		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
SAFETY INJECTION TANK 1A FILL/DRAIN ISOLATION VALVE	C08	GL	P	STC	QTR	73ST-9XI03		
	2	AO	C	FTC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		
SIBHV0633	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 1A ATMOSPHERIC VENT VALVE	E07	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		
SIAUV0634	SIP-002	14	B	FSO	CSD	73ST-9XI25	CSJ-33	
SAFETY INJECTION TANK 1A DISCHARGE ISOLATION VALVE	B07	GA	A	STO	CSD	73ST-9XI25	CSJ-33	
	1	MO	O	VP	2YR	73ST-9XI25	CSJ-33	
SIAUV0635	SIP-002	12	B	FSO	QTR	73ST-xXI11		FSO includes position stop verification per SR 3.5.3.7
[illegible]SI DISCHARGE HEADER OUTBOARD [illegible]V (PEN. 19)	G06	GL	A	STO	QTR	73ST-xXI11		
	2	MO	O	VP	2YR	73ST-xXI11		
SIBUV0636	SIP-002	2	B	FSO	QTR	73ST-9XI14		
HPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 15)	G07	GL	A	STO	QTR	73ST-9XI14		
	2	MO	O	VP	2YR	73ST-9XI14		
SIAUV0637	SIP-002	2	B	FSO	QTR	73ST-9XI13		
HPSI DISCHARGE HEADER OUTBOARD CIV (PEN. 15)	G08	GL	A	STO	QTR	73ST-9XI13		
	2	MO	O	VP	2YR	73ST-9XI13		
SIBUV0638	SIP-002	1	B	FSC	QTR	73ST-9XI03		
SAFETY INJECTION TANK 1A CHECK VALVE LEAKAGE TEST LINE ISOLATION VALVE	B09	GL	A	STC	QTR	73ST-9XI03		
	1	AO	C	FTC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		
SIAHV0639	SIP-002	1	B	VP	2YR	73ST-9XI25		
SIT NITROGEN SUPPLY ISOLATION VALVE	D07	GL	P					
	2	AO	C					
SIBUV0641	SIP-002	2	B	FSC	QTR	73ST-9XI03		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
SAFETY INJECTION TANK 1B FILL/DRAIN ISOLATION VALVE	B06	GL	P	STC	QTR	73ST-9XI03		
	2	AO	C	FTC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		
SIBHV0643	SIP-002	1	B	FSO	CSD	73ST-9XI37	CSJ-26	
SAFETY INJECTION TANK 1B ATMOSPHERIC VENT VALVE	E04	GL	A	FSC	CSD	73ST-9XI37	CSJ-26	
	2	SO	OC	STO	CSD	73ST-9XI37	CSJ-26	
				STC	CSD	73ST-9XI37	CSJ-26	
				FTC	CSD	73ST-9XI37	CSJ-26	
				VP	2YR	73ST-9XI37		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIAUV0644	SIP-002	14	B	FSO	CSD	73ST-9XI25	CSJ-33	
SAFETY INJECTION TANK 1B DISCHARGE	B04	GA	A	STO	CSD	73ST-9XI25	CSJ-33	
ISOLATION VALVE	1	MO	O	VP	2YR	73ST-9XI25	CSJ-33	
SIAUV0645	SIP-002	12	B	FSO	QTR	73ST-xXI11		FSO includes position stop verification per SR 3.5.3.7
LPSI DISCHARGE HEADER OUTBOARD	G04	GL	A	STO	QTR	73ST-xXI11		
CIV (PEN. 20)	2	MO	O	VP	2YR	73ST-xXI11		
SIBUV0646	SIP-002	2	B	FSO	QTR	73ST-9XI14		
HPSI DISCHARGE HEADER OUTBOARD	G04	GL	A	STO	QTR	73ST-9XI14		
CIV (PEN. 16)	2	MO	O	VP	2YR	73ST-9XI14		
SIAUV0647	SIP-002	2	B	FSO	QTR	73ST-9XI13		
HPSI DISCHARGE HEADER OUTBOARD	G05	GL	A	STO	QTR	73ST-9XI13		
CIV (PEN. 16)	2	MO	O	VP	2YR	73ST-9XI13		
SIBUV0648	SIP-002	1	B	FSC	QTR	73ST-9XI03		
SAFETY INJECTION TANK 1B CHECK	B06	GL	A	STC	QTR	73ST-9XI03		
VALVE LEAKAGE TEST LINE ISOLATION	1	AO	C	FTC	QTR	73ST-9XI03		
VALVE				VP	2YR	73ST-9XI03		
SIAHV0649	SIP-002	1	B	VP	2YR	73ST-9XI25		
CIT NITROGEN SUPPLY ISOLATION VALVE	D05	GL	P					
	2	AO	C					
SIAUV0651	SIP-002	16	A	FSO	CSD	73ST-9XI21	CSJ-27	Leak test frequency is 18 months per TS SR 3.4.15.1
SHUTDOWN COOLING SUCTION	C03	GA	A	FSC	CSD	73ST-9XI21	CSJ-27	
ISOLATION VALVE	1	MO	OC	STO	CSD	73ST-9XI21	CSJ-27	
				STC	CSD	73ST-9XI21	CSJ-27	
				LT	18M	73ST-9SI03		
				VP	2YR	73ST-9XI21		
SIBUV0652	SIP-002	16	A	FSO	CSD	73ST-9XI21	CSJ-27	Leak test frequency is 18 months per TS SR 3.4.15.1
SHUTDOWN COOLING SUCTION	C10	GA	A	FSC	CSD	73ST-9XI21	CSJ-27	
ISOLATION VALVE	1	MO	OC	STO	CSD	73ST-9XI21	CSJ-27	
				STC	CSD	73ST-9XI21	CSJ-27	
				LT	18M	73ST-9SI03		
				VP	2YR	73ST-9XI21		
SICUV0653	SIP-002	16	A	FSO	CSD	73ST-9XI21	CSJ-27	Leak test frequency is 18 months per TS SR 3.4.15.1
SHUTDOWN COOLING SUCTION INBOARD	D03	GA	A	FSC	CSD	73ST-9XI21	CSJ-27	
CIV (PEN. 27)	1	MO	OC	STO	CSD	73ST-9XI21	CSJ-27	
				STC	CSD	73ST-9XI21	CSJ-27	
				AJ	CLR	73ST-9CL01		
				LT	18M	73ST-9SI03		
				VP	2YR	73ST-9XI21		
SIDUV0654	SIP-002	16	A	FSO	CSD	73ST-9XI21	CSJ-27	Leak test frequency is 18 months per TS SR 3.4.15.1
SHUTDOWN COOLING SUCTION INBOARD	D10	GA	A	FSC	CSD	73ST-9XI21	CSJ-27	
CIV (PEN. 26)	1	MO	OC	STO	CSD	73ST-9XI21	CSJ-27	
				STC	CSD	73ST-9XI21	CSJ-27	
				AJ	CLR	73ST-9CL01		
				LT	18M	73ST-9SI03		
				VP	2YR	73ST-9XI21		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIAUV0655	SIP-002	16	A	FSO	CSD	73ST-9XI21	CSJ-27	
SHUTDOWN COOLING SUCTION OUTBOARD CIV (PEN. 27)	G03	GA	A	FSC	CSD	73ST-9XI21	CSJ-27	
	2	MO	OC	STO	CSD	73ST-9XI21	CSJ-27	
				STC	CSD	73ST-9XI21	CSJ-27	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI21		
SIBUV0656	SIP-002	16	A	FSO	CSD	73ST-9XI21	CSJ-27	
SHUTDOWN COOLING SUCTION OUTBOARD CIV (PEN. 26)	G10	GA	A	FSC	CSD	73ST-9XI21	CSJ-27	
	2	MO	OC	STO	CSD	73ST-9XI21	CSJ-27	
				STC	CSD	73ST-9XI21	CSJ-27	
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI21		
SIAHV0657	SIP-001	16	B	FSO	QTR	73ST-9XI13		
SHUTDOWN COOLING HEAT EXCHANGER OUTLET THROTTLE VALVE	H03	BF	A	FSC	QTR	73ST-9XI13		
	2	MO	OC	STO	QTR	73ST-9XI13		
				STC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		
SIBHV0658	SIP-001	16	B	FSO	QTR	73ST-9XI14		
SHUTDOWN COOLING HEAT EXCHANGER OUTLET THROTTLE VALVE	C03	BF	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIBUV0659	SIP-001	4	B	FSO	QTR	73ST-9XI14		
SI COMBINED RECIRC TO RWT ISOLATION VALVE	B06	GL	A	FSC	QTR	73ST-9XI14		
	2	SO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				FTC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIAUV0660	SIP-001	4	B	FSO	QTR	73ST-9XI13		
SI COMBINED RECIRC TO RWT ISOLATION VALVE	F06	GL	A	FSC	QTR	73ST-9XI13		
	2	SO	OC	STO	QTR	73ST-9XI13		
				STC	QTR	73ST-9XI13		
				FTC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		
SIAUV0664	SIP-001	2	B	FSO	QTR	73ST-9XI03		
CONTAINMENT SPRAY PUMP RECIRC TO RWT ISOLATION VALVE	G10	GL	A	FSC	QTR	73ST-9XI03		
	2	MO	OC	STO	QTR	73ST-9XI03		
				STC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		
SIBUV0665	SIP-001	2	B	FSO	QTR	73ST-9XI04		
CONTAINMENT SPRAY PUMP RECIRC TO RWT ISOLATION VALVE	B10	GL	A	FSC	QTR	73ST-9XI04		
	2	MO	OC	STO	QTR	73ST-9XI04		
				STC	QTR	73ST-9XI04		
				VP	2YR	73ST-9XI04		
SIAUV0666	SIP-001	2	B	FSO	QTR	73ST-9XI13		
[illegible]SI PUMP RECIRC TO RWT ISOLATION VALVE	F10	GL	A	FSC	QTR	73ST-9XI13		
	2	MO	OC	STO	QTR	73ST-9XI13		
				STC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIBUV0667	SIP-001	2	B	FSO	QTR	73ST-9XI14		
HPSI PUMP RECIRC TO RWT	A10	GL	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIBUV0668	SIP-001	2	B	FSO	QTR	73ST-9XI14		
LPSI PUMP RECIRC TO RWT ISOLATION VALVE	B10	GL	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIAUV0669	SIP-001	2	B	FSO	QTR	73ST-9XI13		
LPSI PUMP RECIRC TO RWT ISOLATION VALVE	G10	GL	A	FSC	QTR	73ST-9XI13		
	2	MO	OC	STO	QTR	73ST-9XI13		
				STC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		
SIBUV0671	SIP-001	8	A	FSO	QTR	73ST-9XI04		
CONTAINMENT SPRAY CONTROL VALVE AND OUTBOARD CIV (PEN. 22)	C06	GA	A	FSC	QTR	73ST-9XI04		
	2	MO	OC	STO	QTR	73ST-9XI04		
				STC	QTR	73ST-9XI04		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI04		
SIAUV0672	SIP-001	8	A	FSO	QTR	73ST-9XI03		
CONTAINMENT SPRAY CONTROL VALVE AND OUTBOARD CIV (PEN. 21)	G06	GA	A	FSC	QTR	73ST-9XI03		
	2	MO	OC	STO	QTR	73ST-9XI03		
				STC	QTR	73ST-9XI03		
				AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI03		
SIAUV0673	SIP-001	24	B	FSO	QTR	73ST-9XI03		
CONTAINMENT SUMP TO SI PUMP SUCTION INBOARD CIV (PEN. 23)	G16	BF	A	STO	QTR	73ST-9XI03		
	2	MO	O	VP	2YR	73ST-9XI03		
SIAUV0674	SIP-001	24	B	FSO	QTR	73ST-9XI03		
CONTAINMENT SUMP TO SI PUMP SUCTION OUTBOARD CIV (PEN. 23)	G14	BF	A	STO	QTR	73ST-9XI03		
	2	MO	O	VP	2YR	73ST-9XI03		
SIBUV0675	SIP-001	24	B	FSO	QTR	73ST-9XI04		
CONTAINMENT SUMP TO SI PUMP SUCTION INBOARD CIV (PEN. 24)	A16	BF	A	STO	QTR	73ST-9XI04		
	2	MO	O	VP	2YR	73ST-9XI04		
SIBUV0676	SIP-001	24	B	FSO	QTR	73ST-9XI04		
CONTAINMENT SUMP TO SI PUMP SUCTION OUTBOARD CIV (PEN. 24)	A14	BF	A	STO	QTR	73ST-9XI04		
	2	MO	O	VP	2YR	73ST-9XI04		
SIAHV0678	SIP-001	10	B	FSO	QTR	73ST-9XI03		
S/D COOLING HEAT EXCHANGER ISOLATION TRAIN A	H09	GA	A	FSC	QTR	73ST-9XI03		
	2	MO	OC	STO	QTR	73ST-9XI03		
				STC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIBHV0679 S/D COOLING HEAT EXCHANGER ISOLATION TRAIN B	SIP-001 C09 2	10 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04		
SIAUV0682 SAFETY INJECTION TANK FILL LINE CIV (PEN. 28)	SIP-001 D10 2	2 GL AO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI03 73ST-9XI03 73ST-9XI03 73ST-9CL01 73ST-9XI03		
SIAHV0683 LPSI PUMP SUCTION ISOLATION TRAIN A	SIP-001 F13 2	20 GA MO	B P O	VP	2YR	73ST-9XI21		
SIAHV0684 CTMT SPRAY TO S/D COOLING HEAT EXCHANGER ISOLATION TRAIN A	SIP-001 H09 2	10 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI03 73ST-9XI03 73ST-9XI03 73ST-9XI03 73ST-9XI03		
SIAHV0685 [illegible]SI PUMP TO SHUTDOWN COOLING [illegible]AT EXCHANGER ISOLATION VALVE	SIP-001 G08 2	10 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI13 73ST-9XI13 73ST-9XI13 73ST-9XI13 73ST-9XI13		
SIAHV0686 SHUTDOWN COOLING HEAT EXCHANGER OUTLET TO LPSI ISOLATION VALVE	SIP-001 H06 2	20 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI13 73ST-9XI13 73ST-9XI13 73ST-9XI13 73ST-9XI13		
SIAHV0687 CTMT SPRAY ISOLATION TRAIN A	SIP-001 G06 2	10 GA MO	B P O	VP	2YR	73ST-9XI21		
SIAHV0688 CONTAINMENT SPRAY BYPASS VALVE	SIP-001 G09 2	10 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI03 73ST-9XI03 73ST-9XI03 73ST-9XI03 73ST-9XI03		
SIBHV0689 CTMT SPRAY TO S/D COOLING HEAT EXCHANGER ISOLATION TRAIN B	SIP-001 C09 2	10 GA MO	B A OC	FSO FSC STO STC VP	QTR QTR QTR QTR 2YR	73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04 73ST-9XI04		
SIBHV0690 SHUTDOWN COOLING WARMUP BYPASS CONTAINMENT ISOLATION VALVE	SIP-002 H13 2	10 GL MO	A P C	FSO STO AJ VP	CSD CSD CLR 2YR	73ST-9XI21 73ST-9XI21 73ST-9CL01 73ST-9XI21		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIAHV0691	SIP-002	10	A	FSO	CSD	73ST-9XI21		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
SHUTDOWN COOLING WARMUP BYPASS CONTAINMENT ISOLATION VALVE	H03	GL	P	STO	CSD	73ST-9XI21		
	2	MO	C	AJ	CLR	73ST-9CL01		
				VP	2YR	73ST-9XI21		
SIBHV0692	SIP-001	20	B	VP	2YR	73ST-9XI21		
LPSI PUMP SUCTION ISOLATION TRAIN B	B13	GA	P					
	2	MO	O					
SIBHV0693	SIP-001	10	B	FSO	QTR	73ST-9XI04		
CONTAINMENT SPRAY BYPASS VALVE	C09	GA	A	FSC	QTR	73ST-9XI04		
	2	MO	OC	STO	QTR	73ST-9XI04		
				STC	QTR	73ST-9XI04		
				VP	2YR	73ST-9XI04		
SIBHV0694	SIP-001	10	B	FSO	QTR	73ST-9XI14		
LPSI CROSS CONNECT VALVE TO SHUTDOWN COOLING HEAT EXCHANGER	C08	GA	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIBHV0695	SIP-001	10	B	VP	2YR	73ST-9XI21		
CTMT SPRAY ISOLATION TRAIN B	C06	GA	P					
	2	MO	O					
SIBHV0696	SIP-001	20	B	FSO	QTR	73ST-9XI14		
SHUTDOWN COOLING HEAT EXCHANGER OUTLET TO LPSI ISOLATION VALVE	C06	GA	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIAHV0698	SIP-001	4	B	FSO	QTR	73ST-9XI13		
HPSI HEADER DISCHARGE ISOLATION VALVE	F04	GA	A	FSC	QTR	73ST-9XI13		
	2	MO	OC	STO	QTR	73ST-9XI13		
				STC	QTR	73ST-9XI13		
				VP	2YR	73ST-9XI13		
SIBHV0699	SIP-001	4	B	FSO	QTR	73ST-9XI14		
HPSI HEADER DISCHARGE ISOLATION VALVE	B03	GA	A	FSC	QTR	73ST-9XI14		
	2	MO	OC	STO	QTR	73ST-9XI14		
				STC	QTR	73ST-9XI14		
				VP	2YR	73ST-9XI14		
SIAUV0708	SIP-001	0.5	B	FSO	QTR	73ST-9XI03		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
CONTAINMENT SUMP TRAIN A SAMPLE TO PASS ISOLATION VALVE (PEN. 23)	G15	GL	P	FSC	QTR	73ST-9XI03		
	2	SO	C	STO	QTR	73ST-9XI03		
				STC	QTR	73ST-9XI03		
				FTC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SIAUV0709	SIP-001	0.5	B	FSO	QTR	73ST-9XI03		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
MINI-FLOW RECIRC LINE SAMPLE ISOLATION VALVE	E08	GL	P	FSC	QTR	73ST-9XI03		
	2	SO	C	STO	QTR	73ST-9XI03		
				STC	QTR	73ST-9XI03		
				FTC	QTR	73ST-9XI03		
				VP	2YR	73ST-9XI03		
SIBUV0710	SIP-001	0.5	B	FSO	QTR	73ST-9XI04		Considered active during first IST interval, re-evaluated as passive during 10-year update, further reviews being performed before dis-continuing exercise testing
MINI-FLOW RECIRC LINE SAMPLE ISOLATION VALVE	B07	GL	P	FSC	QTR	73ST-9XI04		
	2	SO	C	STO	QTR	73ST-9XI04		
				STC	QTR	73ST-9XI04		
				FTC	QTR	73ST-9XI04		
				VP	2YR	73ST-9XI04		
SIAPSV0754	SIP-002	0.5	C	SV	5YR	73ST-9ZZ20		
PRESSURE LOCKING RELIEF VALVE FOR SIAUV0651 BONNET	B03	SV	A					
	1	SA	OC					
SIBPSV0755	SIP-002	0.5	C	SV	5YR	73ST-9ZZ20		
PRESSURE LOCKING RELIEF VALVE FOR SIBUV0652 BONNET	B03	SV	A					
	1	SA	OC					
SIAV997	SIP-002	1	AC	FSO	RFO	73ST-9XI21	ROJ-12	
PRESSURE LOCKING CHECK VALVE FOR SICUV0653 BONNET	E03	CK	A	FSC	RFO	73ST-9XI21	ROJ-12	
	1	SA	OC	AJ	CLR	73ST-9CL01		
SIBV998	SIP-002	1	AC	FSO	RFO	73ST-9XI21	ROJ-12	
PRESSURE LOCKING CHECK VALVE FOR SIDUV0654 BONNET	D10	CK	A	FSC	RFO	73ST-9XI21	ROJ-12	
	1	SA	OC	AJ	CLR	73ST-9CL01		
SPBV012	SPP-001	24	C	FSO	QTR	73ST-9SP01		
ESSENTIAL SPRAY POND PUMP DISCHARGE CHECK VALVE	C06	CK	A					
	3	SA	O					
SPAPSV0029	SPP-002	1	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL COOLING WATER HEAT EXCHANGER PRESSURE RELIEF VALVE	D03	SV	A					
	3	SA	OC					
SPBPSV0030	SPP-002	1	C	SV	10Y	73ST-9ZZ20		
ESSENTIAL COOLING WATER HEAT EXCHANGER PRESSURE RELIEF VALVE	D06	SV	A					
	3	SA	OC					
SPAV041	SPP-001	24	C	FSO	QTR	73ST-9SP01		
ESSENTIAL SPRAY POND PUMP DISCHARGE CHECK VALVE	C04	CK	A					
	3	SA	O					
SPAPSV0137	SPP-002	2.5	C	SV	10Y	73ST-9ZZ20		
EDG FUEL OIL COOLER PRESSURE RELIEF VALVE	G02	SV	A					
	3	SA	OC					
SPBPSV0138	SPP-002	2.5	C	SV	10Y	73ST-9ZZ20		
EDG LUBE OIL COOLER PRESSURE RELIEF VALVE	G06	SV	A					
	3	SA	OC					

Valve ID / Description	Drawing / Coord/ Sht# / ISI Class	Size (in) / Type / Act.	Cat. / A/P / S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SPAPSV0139 EDG JACKET WATER COOLER PRESSURE RELIEF VALVE	SPP-002 F02 3	2.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SPBPSV0140 EDG AIR INTERCOOLER PRESSURE RELIEF VALVE	SPP-002 F06 3	2.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SPAPSV0141 EDG AIR INTERCOOLER PRESSURE RELIEF VALVE	SPP-002 F02 3	2.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SPBPSV0142 EDG JACKET WATER COOLER PRESSURE RELIEF VALVE	SPP-002 F06 3	2.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SPAPSV0143 EDG LUBE OIL COOLER PRESSURE RELIEF VALVE	SPP-002 E02 3	2.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SPBPSV0144 EDG FUEL OIL COOLER PRESSURE RELIEF VALVE	SPP-002 F06 3	2.5 SV SA	C A OC	SV	10Y	73ST-9ZZ20		
SPEHCV0207 SPRAY POND CROSSCONNECT VALVE	SPP-001 E05 3	10 BF MA	B A OC	FSO FSC	QTR QTR	73ST-9XI31 73ST-9XI31		
SPEHCV0208 SPRAY POND CROSSCONNECT VALVE	SPP-001 E04 3	10 BF MA	B A OC	FSO FSC	QTR QTR	73ST-9XI31 73ST-9XI31		
SSBUV0200 HOT LEG SAMPLE LINE OUTBOARD CIV (PEN. 42C)	SSP-001 G05 2	0.375 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI06 73ST-9XI06 73ST-9XI06 73ST-9CL01 73ST-9XI06		
SSBUV0201 PRESSURIZER SURGE LINE SAMPLE LINE OUTBOARD CIV (PEN. 42A)	SSP-001 F05 2	0.375 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI06 73ST-9XI06 73ST-9XI06 73ST-9CL01 73ST-9XI06		
SSBUV0202 PRESSURIZER STEAM SPACE SAMPLE LINE OUTBOARD CIV (PEN. 42B)	SSP-001 F05 2	0.375 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI06 73ST-9XI06 73ST-9XI06 73ST-9CL01 73ST-9XI06		
SSAUV0203 HOT LEG SAMPLE LINE INBOARD CIV (PEN. 42C)	SSP-001 G07 2	0.375 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI06 73ST-9XI06 73ST-9XI06 73ST-9CL01 73ST-9XI06		

Valve ID Description	Drawing Coord/ Sht# ISI Class	Size (in) Type Act.	Cat. A/P S.P.	Test	Freq	Procedure	CSJ/ ROJ/ VRR	Remarks
SSAUV0204 PRESSURIZER SURGE LINE SAMPLE LINE INBOARD CIV (PEN. 42A)	SSP-001 F07 2	0.375 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI06 73ST-9XI06 73ST-9XI06 73ST-9CL01 73ST-9XI06		
SSAUV0205 PRESSURIZER STEAM SPACE SAMPLE LINE INBOARD CIV (PEN. 42B)	SSP-001 E07 2	0.375 GL SO	A A C	FSC STC FTC AJ VP	QTR QTR QTR CLR 2YR	73ST-9XI06 73ST-9XI06 73ST-9XI06 73ST-9CL01 73ST-9XI06		
WCEV039 NORMAL CHILLED WATER SUPPLY TO CONTAINMENT INBOARD CIV (PEN. 60)	WCP-001 E05 2	10 CK SA	AC A C	FSC AJ	CSD CLR	73ST-9XI28 73ST-9CL01	CSJ-28	
WCBUV0061 NORMAL CHILLED WATER RETURN FROM CONTAINMENT INBOARD CIV (PEN. 61)	WCP-001 G05 2	10 GA MO	A A C	FSC STC AJ VP	QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
WCAUV0062 NORMAL CHILLED WATER RETURN FROM CONTAINMENT OUTBOARD CIV (PEN. 61)	WCP-001 G05 2	10 GA MO	A A C	FSC STC AJ VP	QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		
WCBUV0063 NORMAL CHILLED WATER SUPPLY TO CONTAINMENT OUTBOARD CIV (PEN. 60)	WCP-001 G06 2	10 GA MO	A A C	FSC STC AJ VP	QTR QTR CLR 2YR	73ST-9XI07 73ST-9XI07 73ST-9CL01 73ST-9XI07		

Pump Relief Request No. 1 (PRR-01)

Essential Auxiliary Feedwater Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
AFA-P01	Essential Auxiliary Feedwater Pump (Turbine-Driven)	3	AFP-001 / D06
AFB-P01	Essential Auxiliary Feedwater Pump (Motor-Driven)	3	AFP-001 / B06

Function The essential auxiliary feedwater pumps supply water to the steam generators during an accident. They also can be used to supply feedwater to the steam generators during plant startup and shutdown.

Test Requirement Pump flow rate shall be measured and compared with its reference value. (OM-6 para. 5.2)

Alternate Testing AFA-P01 and AFB-P01 will be tested at mini-flow conditions during plant operation, but flow rate will not be measured. AFA-P01 and AFB-P01 will be tested at design flow on a Cold Shutdown frequency, with all Code-required parameters measured.

Basis for Relief There are only two practical flow paths available for testing AFA-P01 and AFB-P01. The primary flow path is into the main feedwater lines to the steam generators. The other flow path is the minimum flow recirculation line that recirculates back to the condensate storage tank. The flow path to the steam generators is equipped with flow instrumentation, but the recirculation line is a fixed-resistance circuit with no provisions for flow indication.

Use of the primary flow path at power would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

AFA-P01 and AFB-P01 are standby pumps. Little degradation is expected during plant power operation when the pumps are idle except for testing. Testing the pumps at design flow on a Cold Shutdown frequency will provide additional information regarding the condition of the pumps. This information compensates for not measuring flow rate during the quarterly test.

Approval This relief request complies with the requirements of Generic Letter 89-04 Position 9. No additional approval is required.

Note: This relief was previously granted during the first 10-year IST interval per SER dated November 15, 1988, TER section 3.2.2, Pump Relief Request No. 1.

Pump Relief Request No. 2 (PRR-02)

Non-Essential Auxiliary Feedwater Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
AFN-P01	Non-Essential Aux. Feedwater Pump (Motor-Driven)	NA	AFP-001 / H06

Function

The non-essential auxiliary feedwater pump AFN-P01 supplies feedwater to the steam generators during plant startup and shutdown. AFN-P01 is not within the required scope of the IST Program because it is not ASME Code Class 1, 2, or 3, and it does not perform a required function in shutting down the reactor, maintaining the shutdown condition, or mitigating the consequences of an accident. It is included in the IST Program as an augmented component to facilitate testing required by Technical Specification 4.7.1.2(a)(1).

Test Requirement

Pump flow rate shall be measured and compared with its reference value. (OM-6 para. 5.2)

Alternate Testing

AFN-P01 will be tested at mini-flow conditions during plant operation, but flow rate will not be measured.

Basis for Relief

There are only two practical flow paths available for testing AFN-P01. The primary flow path is into the main feedwater lines to the steam generators. The other flow path is the minimum flow recirculation line that recirculates back to the condensate storage tank. The flow path to the steam generators is equipped with flow instrumentation, but the recirculation line is a fixed-resistance circuit with no provisions for flow indication.

Use of the primary flow path at power would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

AFN-P01 is a standby pump normally used only during startup. Little degradation is expected during plant power operation when the pump is idle except for testing.

Approval

Since AFN-P01 is an augmented component, deviations from the Code do not require regulatory approval. This relief request is provided for information only.

Note: This relief was previously granted during the first 10-year IST interval per SER dated November 15, 1988, TER section 3.2.2, Pump Relief Request No. 1.

Pump Relief Request No. 3 (PRR-03)

Charging Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
CHA-P01	Charging Pump	2	CHP-002 / B03
CHB-P01	Charging Pump	2	CHP-002 / D03
CHE-P01	Charging Pump	2	CHP-002 / G03

Function The charging pumps provide makeup water to the reactor coolant system for chemistry and volume control. They also provide auxiliary spray to the pressurizer.

Test Requirement The full-scale range of each analog instrument shall be not greater than three times the reference value. (OM-6 para. 4.6.1.2(a))

Alternate Testing None. The installed flow instrument, CHB-FI-212, will be used to measure charging pump during inservice testing.

Basis for Relief Each charging pump is a constant-speed, positive displacement pump with a typical flow rate reference value of 43 gpm. The analog charging flow indicator CHB-FI-212 is located in the common discharge line of the three pumps. The full-scale range of CHB-FI-212 is 150 gpm, which exceeds the range requirement of 4.6.1.2(a).

The combined requirements of OM-6 Table 1 (flow rate accuracy within 2% of full-scale) and para. 4.6.1.2(a) (full scale range not greater than 3 times the reference value) result in a measurement within 6% of the reference value. 6% is also the guideline for instrument acceptability provided in NUREG-1482, Paragraph 5.5.1.

The loop accuracy of CHB-FI-212 (based on the square root of the sum of the squares of the inaccuracies of each instrument or component in the loop) is ± 1.32% of full-scale. When combined with the 150 gpm range of the instrument, which is 3.49 times the reference value, the accuracy of the CHB-FI-212 instrument loop is within 4.7% of the reference value. Therefore, flow indicator CHB-FI-212 meets the combined requirement for measurement accuracy within 6% of the reference value. This accuracy is sufficient to provide an acceptable level of quality and safety.

Approval Note: This relief was previously granted during the first 10-year IST interval per SER dated August 11, 1994, Pump Relief Request No. 9.

Pump Relief Request No. 4 (PRR-04)

Spent Fuel Pool Cooling Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
PCA-P01	Spent Fuel Pool Cooling Pump	3	PCP-001 / D15
PCB-P01	Spent Fuel Pool Cooling Pump	3	PCP-001 / B15

Function

The spent fuel pool cooling (PC) pumps provide cooling water flow to remove decay heat from the spent fuel pool.

The PC pumps are augmented components in the IST Program. However, they are not within the required scope of the IST Program because they do not perform a required function in shutting down the reactor, maintaining the shutdown condition, or mitigating the consequences of an accident. Therefore they are included in the IST Program as augmented components in recognition of the importance of spent fuel cooling.

Test Requirement

Instrument accuracy shall be within the limits of Table 1. (OM-6 para. 4.6.1.1)

The acceptable accuracy for digital flow rate instruments is ± 2% over the calibrated range. (OM-6 Table 1)

Alternate Testing

Measure pump flow rate using an ultrasonic flowmeter calibrated to ± 3% or better over the calibrated range.

Basis for Relief

The spent fuel pool cooling system does not have provisions for direct flow measurement. The only practical means of measuring the flow of this system is to use a portable (clamp-on type) ultrasonic flowmeter. The nominal accuracy of the ultrasonic flowmeters used at PVNGS is ± 3% over the calibrated range. Although this does not meet the Code requirement, 3% accuracy is sufficient to provide an acceptable level of quality and safety commensurate with the function of these pumps. Note that this accuracy is within the guidelines provided for instrument acceptability of ± 6 percent provided in NUREG-1482, Paragraph 5.5.1.

Approval

Since PCA-P01 and PCB-P01 are augmented components, deviations from the Code do not require regulatory approval. This relief request is provided for information only.

Note: This relief was included in the IST program for the first 10-year IST interval as Pump Relief Request 10.

Pump Relief Request No. 5 (PRR-05)

LPSI Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
SIA-P01	Low Pressure Safety Injection (LPSI) Pump	2	SIP-001 / F11
SIB-P01	Low Pressure Safety Injection (LPSI) Pump	2	SIP-001 / B11

Function

LPSI pumps SIA-P01 and SIB-P01 provide low-pressure coolant injection of borated water into the reactor coolant system under accident conditions. They also provide shutdown cooling flow post-accident and during normal reactor startup and shutdown.

Test Requirement

Where system resistance cannot be varied, flow rate and pressure shall be determined and compared to their respective reference value. (OM-6, Para. 5.2(c))

Alternate Testing

LPSI pumps SIA-P01 and SIB-P01 will be tested at mini-flow conditions during plant operation per OM-6 para. 5.2(c), but flow rate will not be measured. SIA-P01 and SIB-P01 will be tested at design flow on a Cold Shutdown frequency, with all Code-required parameters measured and evaluated per OM-6 para. 5.2(d).

Basis for Relief

During normal power operation, the LPSI pumps cannot develop sufficient discharge pressure to overcome RCS pressure and allow flow through the safety injection headers. Thus, during quarterly testing, LPSI flow is routed through a minimum flow recirculation line to the refueling water tanks. The minimum-flow recirculation flowpath is a fixed resistance circuit containing a flow-limiting orifice capable of passing only a small fraction of the design flow. The installed flow instrumentation (permanently mounted ultrasonic flowmeter) has only limited capability, and its accuracy is not sufficient to meet OM-6 accuracy requirements. A larger recirculation flowpath is available; however, it uses the same flow instrument as the minimum-recirculation line.

The LPSI pumps are normally used to provide shutdown cooling flow during shutdown operations, and occasionally for recirculating the refueling water tank when the unit is at power. Little degradation is expected during power operation. Thus, the alternate testing will adequately monitor these pumps to ensure continued operability and availability for accident mitigation.

Approval

This relief request complies with the requirements of Generic Letter 89-04 Position 9. No additional approval is required.

Note: This relief was previously granted during the first 10-year IST interval per SER dated November 15, 1988, TER section 3.2.3, PRR No. 6.

Pump Relief Request No. 6 (PRR-06)

HPSI Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
SIA-P02	High Pressure Safety Injection (HPSI) Pump	2	SIP-001 / E11
SIB-P02	High Pressure Safety Injection (HPSI) Pump	2	SIP-001 / A11

Function The HPSI pumps provide high-pressure coolant injection of borated water into the reactor coolant system under accident conditions. They also provide flow for long-term cooling and flushing to prevent boron precipitation.

Test Requirement Where system resistance cannot be varied, flow rate and pressure shall be determined and compared to their respective reference value. (OM- 6, Para. 5.2(c))

Alternate Testing HPSI pumps SIA-P02 and SIB-P02 will be tested at mini-flow conditions during plant operation per OM-6 para. 5.2(c), but flow rate will not be measured. SIA-P02 and SIB-P02 will be tested at design flow on a Refueling frequency, with all Code-required parameters measured and evaluated per OM-6 para. 5.2(d).

Basis for Relief During normal power operation, the HPSI pumps cannot develop sufficient discharge pressure to overcome RCS pressure and allow flow through the safety injection headers. Thus, during quarterly testing, HPSI flow is routed through a minimum flow recirculation line to the refueling water tanks. The minimum-flow recirculation flowpath is a fixed resistance circuit containing a flow-limiting orifice capable of passing only a small fraction of the design flow. The installed flow instrumentation (permanently mounted ultrasonic flowmeter) has only limited capability, and its accuracy is not sufficient to meet OM-6 accuracy requirements.

During cold shutdown conditions, full flow operation of the HPSI pumps to the RCS is restricted to preclude RCS pressure transients that could result in exceeding Technical Specification pressure-temperature limits (LTOP).

The HPSI pumps are standby pumps. SIB-P02 is used only occasionally to recharge the safety injection tanks. Little degradation is expected during power operation. Thus, the alternate testing will adequately monitor these pumps to ensure continued operability and availability for accident mitigation.

Approval This relief request complies with the requirements of Generic Letter 89-04 Position 9. No additional approval is required.

Note: This relief was previously granted during the first 10-year IST interval per SER dated November 15, 1988, TER section 3.2.3, PRR No. 6.

Pump Relief Request No. 7 (PRR-07)

Charging Pump Vibration Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
CHA-P01	Charging Pump	2	CHP-002 / B03
CHB-P01	Charging Pump	2	CHP-002 / D03
CHE-P01	Charging Pump	2	CHP-002 / G03

Function
The charging pumps provide makeup water to the reactor coolant system for chemistry and volume control. They also provide auxiliary spray to the pressurizer.

Test Requirement
The frequency response range of the vibration measuring transducers and their readout system shall be from one-third minimum pump rotational speed to at least 1000 Hz. (OM-6 para. 4.6.1.6)

Alternate Testing
The instrumentation used to measure charging pump vibration will have a frequency response range from 1.6 hz to 100 hz.

Basis for Relief
The charging pumps are positive-displacement pumps with a constant running speed of 199 rpm (equivalent to 3.3 hz). Compliance with para. 4.6.1.6 would require using vibration instrumentation with a frequency response range of 1.1 hz to at least 1000 hz.

Two different vibration probes are used at PVNGS, one with a frequency response range of 4.9 hz to 1000 hz, and a special low-speed probe with a frequency response range of 1.6 hz to 100 hz. The low-speed probe was purchased specifically for charging pump testing when the IST requirement for frequency response was one-half pump speed to at least pump shaft rotational speed. This probe does not meet the lower bound or the upper bound of the Code-required frequency response range.

The charging pump bearings are oil-lubricated, sleeve type journal bearings. Because of the high reciprocating loads, the charging pump bearings are not susceptible to oil whirl, which is the primary failure mode that causes vibration below pump shaft rotational speed. There are no other failure mechanisms that manifest themselves with elevated vibration levels in the range of one-third to one-half pump shaft rotational frequency; all the remaining failure modes cause vibration at or above the pump speed. Experience with these pumps confirms this fact. Therefore vibration instrumentation with a frequency response range above 1.6 hz is acceptable for monitoring vibration of the charging pumps.

The low-speed probe is sensitive to vibration frequencies up to 30 times the running speed of the charging pumps. This is sufficient to identify bearing degradation, mechanical rubs, and other pump problems producing high-frequency vibrations. The charging pumps are monitored for other types of degradation under the PVNGS Predictive Maintenance Program (see the PRR on smooth-running pumps for a description of the PVNGS Predictive Maintenance Program). Therefore use of this probe during charging pump inservice testing will provide an acceptable level of quality and safety.

Approval
Relief request submitted in accordance with 10 CFR 50.55a(f)(5)(iii).

NOTE: THIS RELIEF REQUEST HAS BEEN MODIFIED FROM THE VERSION SUBMITTED TO THE NRC ON JANUARY 15, 1998. THE FINAL VERSION NEEDS TO BE RE-SUBMITTED NO LATER THAN 12 MONTHS AFTER THAT DATE (JANUARY 15, 1999) PER 10 CFR 50.55A(F)(5)(iv).

Pump Relief Request No. 8 (PRR-08)

Smooth-Running Pumps

Pump ID	Pump Description	Code Class	Drawing / Coord.
Various	Centrifugal Pumps with Shaft Speeds ≥ 600 rpm	Various	Various

Function Various

Test Requirement

If deviations fall within the alert range of Table 3, the frequency of testing specified in para. 5.1 shall be doubled until the cause of the deviation is determined and the condition corrected. If deviations fall within the required action range of Table 3, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected. (OM-6 para. 6.1)

Reference values shall only be established when the pump is known to be operating acceptably. If the particular parameter being measured or determined can be significantly influenced by other related conditions, then these conditions shall be analyzed. (OM-6 para. 4.3)

Alternate Testing

On centrifugal pumps with shaft speeds ≥ 600 rpm, vibration parameters that would have reference values ≤ 0.05 ips may be considered "smooth-running". The Alert and Required Action values for these parameters will be determined as if their reference value is 0.05 ips; that is, the Alert Range will be > 0.125 ips to 0.3 ips, and the Required Action Range will be > 0.3 ips.

In addition to the Code-mandated monitoring, these pumps are monitored under the PVNGS Predictive Maintenance Program. This program includes the following:

- Spectrum band monitoring
- Bearing acceleration monitoring (on ball and roller bearings only)
- Bearing oil analysis (for oil lubricated bearings)
- Motor Current Signature analysis (for all but the smallest motors)

If any of these parameters are outside normally-expected ranges, an evaluation will be performed and appropriate corrective actions will be taken.

Before being treated as "smooth-running" under this relief request, each candidate will be evaluated to verify that testing performed under the provisions of this relief request will not prevent the detection of significant pump degradation.

Basis for

The repeatability of pump vibration readings at PVNGS is in the range of 0.05

Relief

ips due to hydraulic flow noise in this amplitude range and the repeatability of the vibration instruments. When vibration velocities are less than 0.05 ips, changes have been shown to be non-significant.

At vibration velocities less than 0.05 ips, flow noise and instrument repeatability can significantly affect reference values. Candidates for "smooth-running" status will be analyzed per OM-6 para. 4.3 to verify that use of this relief request will not prevent the detection of significant pump degradation.

For displacement reference values less than 0.5 mils, it is noted that the Section XI code in effect for the first interval IST Program (1980 Edition, Winter 1981 Addenda) sets the Alert Range at >1.0 mil and the Required Action Range at >1.5 mil. This implies a minimum reference value of 0.5 mils, which is equivalent to 0.047 ips for 1800 rpm pumps and 0.094 ips for 3600 rpm pumps. The effective reference values proposed for smooth-running pumps are roughly equal to the implied Section XI reference values for 1800 rpm pumps and more conservative than the implied reference values for 3600 rpm pumps. Without this relief request, the Alert Ranges for some smooth running pumps will be reduced by a factor of 10.

The PVNGS Predictive Maintenance Program uses vibration analysis, lubricant analysis, and infrared thermographic analysis to predict the need for maintenance so that equipment can be reworked prior to failure. The components included in this program include those considered important to safe and reliable plant operation, including all the pumps in the IST Program. The intervals for monitoring are based on manufacturer's recommendations, maintenance history, cost effectiveness, and experience. Although the monitoring, analyses, database, and software used in the Predictive Maintenance Program do not fall under the PVNGS Quality Program, the Predictive Maintenance Program still provides valuable information for assuring the operational readiness of smooth-running pumps.

The vibration analysis program monitors the vibration of rotating machinery. In addition to the vibration at pump bearings, the vibration of the driver (turbine or motor) bearings are also collected and trended. Analyzed parameters and methods include vibration velocity, bearing acceleration, G's spike energy (high frequency detection), and spectral analysis.

The lubricant analysis program samples lubricants and analyzes them to identify degradation or negative trends. Most testing is performed at the on-site lubrication laboratory, where capabilities include emission spectroscopy, fourier transform infrared spectroscopy, total base number auto-titration, rotating bomb oxidation testing, wear particle analysis, as well as testing for total acid number, water content, viscosity, flash point, grease penetration/consistency, grease dropping point, particle count, filter residue, solids, and rust-preventing characteristics.

[illegible]

In both the vibration monitoring and lubricant analysis programs, recently acquired data is compared with previous data to detect any indicated degradation of equipment condition. If degradation indicates the reliability of operating equipment may be negatively affected, or if acceptance criteria is no longer being met, appropriate corrective action is taken. Corrective action may include: continuing trending of the degraded condition, if the condition is not considered to be immediately threatening to the equipment and can be corrected during a time window convenient to plant operation; additional testing or monitoring to confirm the suspected degraded condition; inspection and repair of the equipment as necessary; changes to preventive maintenance procedures or schedules; or design changes.

Approval Since conformance with the Code requirement cited above has not been determined to be impractical per 10 CFR 50.55a(f)(5) and (f)(6), this relief request is submitted as a proposed alternative per 10 CFR 50.55a(a)(3). It is permissible to implement this relief request immediately on "augmented" pumps, i.e. pumps not within the required scope of IST whose testing is "augmented" by testing them in the IST Program. The provisions of this relief request will not be implemented for the remaining pumps until authorized by the NRC per 10 CFR 50.55a(a)(3).

Pump Relief Request No. 9 (PRR-09)

Evaluation as Corrective Action

Pump ID	Pump Description	Code Class	Drawing / Coord.
Various	This is a general request for relief	Various	Various

Function Various

Test Requirement If deviations fall within the alert range of Table 3, the frequency of testing specified in para. 5.1 shall be doubled until the cause of the deviation is determined and the condition corrected. If deviations fall within the required action range of Table 3, the pump shall be declared inoperable until the cause of the deviation has been determined and the condition corrected. (OM-6 para. 6.1)

Alternate Testing In cases where a pump's test parameters fall within either the alert or action required ranges and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established. The supporting analysis will include verification of the pump's operational readiness and an evaluation of test data that verifies that the subject pump is not expected to fall below the minimum required performance level in the periods between testing. The analysis will include both pump and system level operational readiness evaluations, description of the cause of the change in pump performance, and an evaluation of the trends indicated by the available test and maintenance data. The results of this analysis will be documented in the record of tests.

Basis for Relief The 1995 Edition of ASME OM Code provides an alternate concept of corrective action should a pump's performance enter the action required range. Specifically, Paragraph ISTB 6.2.2 permits an analysis of the pump and establishment of new reference values. This can avoid premature maintenance of a pump that is subject to expected continual and gradual deterioration over time while operating at a level where it is fully capable of reliably performing its designated safety function.

By using the test requirements of the 1995 Code edition, PVNGS can reduce the frequency of unnecessary pump maintenance with essentially no adverse affect on plant safety since the new Code requirements are equivalent to (or better than) the requirements of the 1988 addenda.

In addition, by expanding this capability to pumps that are in the alert range, frequent and unnecessary testing can be avoided. Note that more frequent testing of pumps is a degrading mechanism for these pumps. This also is required to avoid unnecessary plant shutdown for pumps that are tested at cold

shutdown should a pump enter the alert range during such testing.

The proposed alternative testing is consistent with the response to Question 3.3.2 in the "Summary of Public Workshops Held in NRC Regions on Inspection Procedure 73756".

Approval Since conformance with the Code requirement cited above has not been determined to be impractical per 10 CFR 50.55a(f)(5) and (f)(6), this relief request is submitted as a proposed alternative per 10 CFR 50.55a(a)(3). The provisions of this relief request will not be implemented until its use has been authorized by the NRC per 10 CFR 50.55a(a)(3).

Pump Relief Request No. 10 (PRR-10)

ANII Involvement in Pump Inservice Testing

Pump ID	Pump Description	Code Class	Drawing / Coord.
Various	This is a general request for relief	Various	Various

Function Various

Test Requirement

Duties of the Authorized Nuclear Inspector include:
(c) verifying that the visual examinations and tests on pumps and valves have been completed and the results recorded. (Preface to Section XI)

It is the duty of the Inspector:
(1) to perform a detailed review of the inspection plan (IWA-2400) prior to the start of preservice inspection and each inspection interval . . . Review of the inspection plan shall cover any features of the inspection plan which are affected by the requirements of this Division, as applicable, and shall include the following:

(a) examination categories and items
(b) test and examination requirements
(e) inservice test quantities
(g) test frequency

(2) to review any revisions to the inspection plan during the preservice inspection or the inspection interval;
(3) to submit a report to the Owner documenting review of the items identified in (1) and (2) above; (IWA-2110(a))

It is the duty of the Inspector to verify that the inservice tests required on pumps, valves, and component supports (IWF, IWP, and IWV) have been completed and the results recorded. (IWA-2110(c))

Alternate Testing

The PVNGS Pump and Valve IST Program will be developed and implemented in accordance with applicable regulations, codes, quality assurance requirements, plant procedures, and Authorized Inspection Agency requirements. ANII involvement with the Pump and Valve IST Program will not be required.

Basis For Relief

In the nuclear industry, the Authorized Nuclear Inservice Inspectors (ANIIs) have historically been involved primarily with the development and implementation of the Inservice *Inspection* Program. Involvement with the Inservice Testing Program has been minimal. This is consistent with the experience and training of the individual inspectors, who are well schooled in the areas of plant construction and repair. Recognizing this, ASME recently published the OMb-1997 addenda to the ASME/ANSI OM Code, which

includes a change that eliminates all involvement of the ANII in the development and implementation of the Inservice Testing Program.

Each revision to the PVNGS IST Program is subjected to a comprehensive review process including technical reviews, management reviews, and a review under 10 CFR 50.59. In addition, quality assurance evaluations and self-assessments periodically monitor the implementation of the IST Program. These measures, along with the constant attention by highly qualified individuals tasked with program implementation ensure that the previous duties of the inspector are routinely and adequately performed and the intent of the ASME Code is maintained. Thus the proposed alternative testing provides an acceptable level of quality and safety.

Approval Submitted as a proposed alternative in accordance with 10 CFR 50.55a(a)(3). As such, the provisions of this relief request will not be implemented until authorized by the NRC.

Pump Relief Request No. 11 (PRR-11)

Containment Spray Pump Flow Rate Measurement

Pump ID	Pump Description	Code Class	Drawing / Coord.
SIA-P03	Containment Spray (CS) Pump	2	SIP-001 / H11
SIB-P03	Containment Spray (CS) Pump	2	SIP-001 / C11

Function

CS pumps SIA-P03 and SIB-P03 deliver borated water to the containment spray headers, providing containment cooling and pressure control during accident conditions. The CS pumps can also be lined up to provide flow for shutdown cooling.

Test Requirement

The full-scale range of each analog instrument shall be not greater than three times the reference value. (OM-6, para. 4.6.1.2(a))

Where system resistance cannot be varied, flow rate and pressure shall be determined and compared to their respective reference value. (OM-6, para. 5.2(c))

Alternate Testing

CS pumps SIA-P03 and SIB-P03 will be tested at mini-flow conditions during plant operation per OM-6 para. 5.2(c), but flow rate will not be measured. SIA-P03 and SIB-P03 will be tested at design flow during cold shutdown periods when the pump is used for shutdown cooling. During design flow testing, all Code-required parameters will be measured and evaluated per OM-6 para. 5.2(d).

Basis for Relief

The containment spray pumps are single stage, vertical pumps normally lined up to the containment spray headers. The "rumble range" of the pumps, where operation is unstable due to flow oscillations, is approximately 1800-2800 gpm. Each CS pump has two possible recirculation flowpaths: a minimum-flow recirculation flowpath with a flow-limiting orifice capable of passing only a small fraction of the design flow, and a larger flowpath used mainly for RWT mixing. All the flowpaths pass through the flowmeter just downstream of the CS pump discharge. The recirculation flowpaths also pass through a common recirculation line flowmeter. The CS pump discharge flowmeter is an orifice-type analog flowmeter with a range of 0-5000 gpm. The common recirculation line flowmeter is a permanently-mounted ultrasonic flowmeter which has only limited capability. The accuracy of the ultrasonic flowmeter is not sufficient to meet OM-6 accuracy requirements or to be relied upon for determining pump operability.

The normal containment spray flow path cannot be used for testing the CS pumps without spraying down the inside of the containment building and risking damage to important equipment. The RCS injection portion of the

shutdown cooling flow path cannot be used for testing during power operation because the CS pumps are unable to develop sufficient discharge pressure to overcome RCS pressure.

The flow rate through the pump discharge flowmeter must be at least 1634 gpm to satisfy the full-scale range requirement of OM-6 para. 4.6.1.2(a). The flow capacity of the minimum-flow recirculation line is well below 1634 gpm. The larger recirculation flowpath is capable of carrying more than 1634 gpm, but routine surveillance testing at flow rates above this value is not practical because of the pump rumble range (1800-2800 gpm). Testing in or near the rumble range is not practical because of the potential for equipment damage. Testing at flow rates above the rumble range (> 2800 gpm) is not practical because flow velocities in the recirculation piping would exceed the design criteria.

The CS pumps are standby pumps. Little degradation is expected during power operation. The alternate testing will adequately monitor these pumps to ensure continued operability and availability for accident mitigation.

Approval

This relief request complies with the requirements of Generic Letter 89-04 Position 9. No additional approval is required.

This relief request is similar to Pump Relief Request No. 6 previously approved during the first 10-year IST interval per SER dated November 15, 1988, TER section 3.2.3, except that design flow testing will be performed on a Cold Shutdown frequency rather than a Refueling frequency.

NOTE: THIS RELIEF REQUEST WAS CREATED AFTER THE IST PROGRAM WAS SUBMITTED TO THE NRC ON JANUARY 15, 1998. IT NEEDS TO BE SUBMITTED TO THE NRC NO LATER THAN 12 MONTHS AFTER THAT DATE (JANUARY 15, 1999) PER 10 CFR 50.55A(F)(5)(iv).

Cold Shutdown Justification No. 1 (CSJ-01)

Auxiliary Feedwater Pump Suction Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
AFAV007	AFW Pump AFA-P01 Suction Header Check Valve	3	C	AFP-001 / D07
AFBV022	AFW Pump AFB-P01 Suction Header Check Valve	3	C	AFP-001 / C07

Function

These check valves open to provide flowpaths from the Condensate Storage Tank to the respective auxiliary feedwater pump. They have no specific safety function in the closed position.

Alternate Testing

These valves will be partial-stroke exercised open during quarterly pump testing via the minimum flow recirculation lines, and full-stroke exercised open during cold shutdown periods.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Full-stroke exercising at power is not practical because this would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to unnecessary thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

This cold shutdown justification is similar to CSJ-1 in the first interval IST Program.

Cold Shutdown Justification No. 2 (CSJ-02)

AFW Pump Discharge Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
AFAV137	Essential AFW Pump AFA-P01 Discharge Check Valve	3	C	AFP-001 / D06
AFBV138	Essential AFW Pump AFB-P01 Discharge Check Valve	3	C	AFP-001 / C06

Function

These check valves open to provide flowpaths from the respective essential auxiliary feedwater pumps to the auxiliary feedwater supply headers. They have no specific safety function in the closed position.

Alternate Testing

These valves will be partial-stroke exercised open during quarterly pump testing via the minimum flow recirculation lines, and full-stroke exercised open during cold shutdown periods.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Full-stroke exercising at power is not practical because this would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to unnecessary thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

This cold shutdown justification is similar to CSJ-1 in the first interval IST Program.

Cold Shutdown Justification No. 3 (CSJ-03)

AFW Discharge Header Check Valve Open and Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
AFAV015	AFW Pump AFA-P01 Discharge Header Check Valve	3	C	AFP-001 / E05
AFBV024	AFW Pump AFB-P01 Discharge Header Check Valve	3	C	AFP-001 / C05

Function These check valves open to provide flowpaths from the respective auxiliary feedwater pump to the auxiliary feedwater headers. They close so that if one pump fails to start after an auxiliary feedwater actuation signal (AFAS), flow from the operating pump is not diverted back through the idle pump.

Alternate Testing These valves will be full-stroke exercised open and exercised closed during cold shutdown periods.

Basis These are simple check valves with no external means of exercising or for determining disc position. Full-stroke exercising at power is not practical because this would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to unnecessary thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

Closure testing these valves can be performed by two methods. The normal method is to operate the opposite pump with the pumps lined up for parallel operation to the steam generators while the pump associated with the valve being tested is idle. Performing this test at power is not practical because it would inject cold auxiliary feedwater into the main feedwater lines, with the temperature perturbations and undesirable consequences described above. Alternately, a source of pressurized water could be introduced between the check valve and the normally-closed downstream flow control and header isolation valves. Performance of this test would require draining the AFW pump recirculation lines and entry into an extended LCO for the duration of the test (approx. 4-6 hours).

During power operation these valves remain closed and cannot be opened due to the lack of an available discharge path. Thus, it is extremely unlikely that a valve would be discovered in the open position during periodic closure testing. Therefore quarterly closure testing is considered impractical because the risk of performing this testing outweighs the anticipated benefits.

This CSJ is similar to CSJ-2 in the first interval IST Program.

Cold Shutdown Justification No. 4 (CSJ-04)
AFW Header Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
AFAV079	AFW Header Check Valve	2	C	AFP-001 / E02
AFBV080	AFW Header Check Valve	2	C	AFP-001 / C02

Function These check valves open to provide flowpaths from the auxiliary feedwater pump headers to the respective feedwater line and steam generator. They have no specific safety function in the closed position.

Alternate Testing These valves will be full-stroke exercised open during cold shutdown periods.

Basis These are simple check valves with no external means of exercising or for determining disc position. Full-stroke exercising at power is not practical because this would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to unnecessary thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

This cold shutdown justification is similar to CSJ-3 in the first interval IST Program.

Cold Shutdown Justification No. 5 (CSJ-05)

LPSI and CS Pump Discharge Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAV434	LPSI Pump Discharge Check Valve	2	C	SIP-001 / F09
SIBV446	LPSI Pump Discharge Check Valve	2	C	SIP-001 / B09
SIAV485	CS Pump Discharge Check Valve	2	C	SIP-001 / H10
SIBV486	CS Pump Discharge Check Valve	2	C	SIP-001 / G10

Function

Open for pump discharge flowpath for shutdown cooling or low pressure safety injection. These valves close to prevent reverse flow, but closure is not a required safety function.

Alternate Testing

These valves will be partial-stroke exercised open quarterly, and full-stroke exercised open during cold shutdown periods when the associated pump is used for shutdown cooling.

Basis

These are simple check valves with no external means of exercising or for determining disc position. During power operation, the valves can be part-stroke exercised open with flow when the associated pump is operated via the 6" recirculation line. Full-stroke exercising during power operation is not practical because pump discharge pressure is not sufficient to overcome RCS pressure, and there is not a recirculation flow path capable of handling maximum accident condtion flow as required by Generic Letter 89-04 Position 1. The valves will be full-stroke exercised open at cold shutdown when the associated pump is used for shutdown cooling.

This cold shutdown justification is similar to CSJ-29 and CSJ-30 in the first interval IST Program.

Cold Shutdown Justification No. 6 (CSJ-06)

Auxiliary Pressurizer Spray Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHBHV0203	Auxiliary Pressurizer Spray Isolation Valve	1	B	CHP-001 / H10
CHAHV0205	Auxiliary Pressurizer Spray Isolation Valve	1	B	CHP-001 / H11
CHEV431	Auxiliary Pressurizer Spray Check Valve	1	C	CHP-001 / G09

Function

These valves open to provide flowpaths from the charging pump discharge header to the pressurizer for auxiliary pressurizer spray. Valves CHBHV0203 and CHAHV0205 close for spray/pressure control. Check valve CHEV431 is not relied upon to perform a specific safety function in the closed direction.

Alternate Testing

The auxiliary pressurizer spray isolation valves will be full-stroke exercised open and closed during cold shutdown. Stroke time testing and fail-safe testing will be performed in conjunction with exercise tests.

The auxiliary pressurizer spray check valve will be full-stroke exercised open during cold shutdown.

Basis

Opening either of the auxiliary pressurizer spray isolation valves during power operation initiates spray flow to the pressurizer. This could cause an RCS pressure transient that could adversely affect plant safety and lead to a plant trip. In addition, the pressurizer spray piping and nozzle would be subjected to unnecessary thermal shock. Opening these valves at power is considered impractical for these reasons.

CHEV431 is a simple check valve with no external means of exercising or for determining disc position. Thus testing in the open direction requires a flow test. In order to full-stroke exercise this valve, either CHBHV0203 or CHAHV0205 must be fully opened. As discussed above, routinely opening these valves during plant operation is impractical. Therefore testing this valve is also considered impractical at power.

This cold shutdown justification is similar to CSJ-6 in the first interval IST Program.

Cold Shutdown Justification No. 7 (CSJ-07)

Boration Flowpath Isolation Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHEHV0532	Isolation for Refueling Water Tank to Boric Acid Makeup Pumps	3	B	CHP-002 / E16
CHEHV0536	Boration Flowpath Isolation Valve To Charging Pump Suction	3	B	CHP-002 / A14

Function

CHEHV0532 is normally open to provide an emergency boration flowpath to the charging pump suction header. It is closed to prevent sluicing water from the spent fuel pool to the Refueling Water Storage Tank (RWT) during emergency boration when using the spent fuel pool as a borated water source.

CHEHV0536 opens for an emergency boration flowpath to the charging pump suction header. It has no specific safety function in the closed position.

Alternate Testing

CHEHV0532 will be full-stroke exercised open and closed during cold shutdown. Stroke time testing and fail-safe testing will be performed in conjunction with the exercise tests.

CHEHV0536 will be full-stroke exercised open during cold shutdown. Stroke time testing will be performed in conjunction with the exercise test.

Basis

CHEHV0532 could be closed at power for testing, however this would isolate the common line from the RWT to multiple boration flowpaths. This is considered impractical, because CHE-HV532 is non-redundant and failure to re-open would render multiple boration flowpaths inoperable.

Opening CHEHV0536 for a short period of time during power operation would have little effect on the plant, however, should it fail to re-close, highly concentrated boric acid solution from the RWT could be introduced to the RCS via the charging pumps. This would result in the addition of excess boron to the RCS. The rapid insertion of negative reactivity during plant operation would result in a RCS cooldown and depressurization which could result in an unscheduled plant trip or safety injection system actuation. The line from the RWT could be isolated during testing by closing CHEHV0532, however this is not practical as discussed above.

This justification is consistent with the guidelines on deferring testing provided in NUREG-1482, Paragraphs 3.1.1(1).

This CSJ is similar to CSJ-4 in the first interval IST Program.

Cold Shutdown Justification No. 8 (CSJ-08)
VCT Outlet Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHNUV0501	Volume Control Tank (VCT) Outlet Valve	2	B	CHP-002 / C07

Function This valve opens to provide a flowpath from the Volume Control Tank (VCT) to the suction of the charging pumps for normal chemical and volume control - non-safety function. It is closed during emergency boration to ensure charging pump suction is directed from the emergency boration flowpaths.

Alternate Testing This valve will be full-stroke exercised closed during cold shutdown periods. Stroke time testing will be performed in conjunction with exercise test.

Basis Closing this valve during power operation would isolate the VCT from the charging pump suction header. This would interrupt the flow of charging flow to the RCS, upsetting the charging / letdown flow balance and risking damage to the operating charging pumps. It could also lead to a pressurizer level transient and plant trip.

This cold shutdown justification is similar to CSJ-5 in the first interval IST Program.

Cold Shutdown Justification No. 9 (CSJ-09)

Letdown Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHBUV0515	Reactor Coolant Letdown Isolation Valve	1	B	CHP-001 / H15
CHAUV0516	Reactor Coolant Letdown Inbd. Isolation Valve	1	A	CHP-001 / G15
CHBUV0523	Reactor Coolant Letdown Otbd. Isolation Valve	1	A	CHP-001 / F13

Function

These valves open to provide a flowpath for reactor coolant letdown flow - non-safety function. CHBUV0515 and CHAUV0516 close to secure letdown on a Safety Injection Actuation signal (SIAS). CHAUV0516 and CHBUV0523 close on a Containment Isolation Actuation signal (CIAS) signal for containment isolation.

Alternate Testing

These valves will be full-stroke exercised closed during cold shutdown periods. Stroke time testing and fail-safe testing will be performed in conjunction with exercise test.

Basis

Closing any of these valves isolates the letdown line from the RCS. During power operation, this would result in undesirable pressurizer level transients with the potential for a plant trip. If a valve failed to reopen, then a plant shutdown may be required.

This cold shutdown justification is similar to CSJ-8 in the first interval IST Program.

Cold Shutdown Justification No. 10 (CSJ-10)
Containment Refueling Purge Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CPAUV0002A	Containment Purge Supply Otbd. Isolation Valve	2	A	CPP-001 / D06
CPAUV0002B	Containment Purge Exhaust Inbd. Isolation Valve	2	A	CPP-001 / E03
CPBUV0003A	Containment Purge Supply Inbd. Isolation Valve	2	A	CPP-001 / D05
CPBUV0003B	Containment Purge Exhaust Otbd. Isolation Valve	2	A	CPP-001 / E02

Function

These 42" valves open to provide flowpaths for containment ventilation during shutdown periods - non-safety function. They are required to close on a containment purge isolation actuation signal (CPIAS) during a loss of shutdown cooling or a fuel handling accident in containment. They are locked closed for containment isolation during power operation (Modes 1-4).

Alternate Testing

These valves will be full-stroke exercised closed during cold shutdown periods. Stroke time testing will be performed in conjunction with exercise test.

Basis

Per PVNGS Technical Specification 3.6.1.7a, these valves must remain closed during operation. These valves are administratively maintained in the closed position at all times when the plant is operating in Modes 1-4. The valves are not capable of closing against accident pressure. Thus they are not required to operate (stroke closed) during operational periods. Due to the large size of these valves and the potential for damage as a result of frequent cycling, it is not prudent to operate them more than is absolutely necessary.

This cold shutdown justification is similar to CSJ-11 in the first interval IST Program.

Cold Shutdown Justification No. 11 (CSJ-11)

RCP Seal Injection Containment Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHNV835	Reactor Coolant Pump Seal Injection Check Valve	2	AC	CHP-001 / G03
CHBHV0255	Reactor Coolant Pump Seal Injection Isolation Valve	2	A	CHP-001 / G04

Function These valves open to provide flowpaths from the charging pump discharge header to the reactor coolant pump (RCP) seals - non-safety function. They close for containment isolation.

Alternate Testing CHNV835 will be exercised closed during cold shutdown.

CHBHV0255 will be exercised closed during cold shutdown. Stroke time testing will be performed in conjunction with exercise test.

Basis During power operation when the RCPs are running, these valves are normally open to supply seal water to the RCPs. Seal injection is necessary for the proper operation of the RCP seals. Closing these valves for testing would necessitate isolating seal injection flow and risking damage to the seals. Stopping the RCPs at power for the sole purpose of valve testing is not considered practical because the reactor will trip.

It is noted that paragraph 3.1.1.4 of NUREG-1482 permits deferral of tests that require shutdown of RCPs until refueling outages. However, since PVNGS typically secures RCPs during cold shutdown outages, this test will be performed at cold shutdown.

This cold shutdown justification is similar to CSJ-10 in the first interval IST Program.

Cold Shutdown Justification No. 12 (CSJ-12)

EW/NC Crosstie Valves Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
EWAUV0065	Nuclear Cooling Water Return Isolation Valve	3	B	EWP-001 / C08
EWAUV0145	Nuclear Cooling Water Supply Isolation Valve	3	B	EWP-001 / C04

Function

These valves can be opened for the essential cooling water (EW) system to augment cooling to the nuclear cooling water (NC) system - non-safety function. If opened, they automatically close on a safety injection actuation signal (SIAS) to ensure adequate cooling is available to the essential heat loads.

Alternate Testing

These valves will be full-stroke exercised closed during cold shutdown. Stroke time testing will be performed in conjunction with exercise test.

Basis

Plant Technical Specifications require the EW system to be operable in Modes 1 - 4. Opening these valves cross-connects the EW system to the non-safety-related NC System, rendering the EW system inoperable.

Due to the normal operating pressure differential between these systems, opening the valves with the NC system in operation could result in a pressure increase that would exceed the setpoint of the NC Surge Tank pressure relief valves. Following this initial transient, level control of both the NC and the EW system surge tanks would be lost.

In order to preclude the loss of both EW and NC system functions, the NC system is normally secured before opening these valves. Since the NC system supplies cooling water to priority loads such as reactor coolant pump seals and CEDMs, it is impractical to secure this cooling water flow without endangering this equipment. Therefore this test will be performed each cold shutdown, when RCP cooling water is not needed and the EW system is not required to be operable.

It is noted that paragraph 3.1.1.4 of NUREG-1482 permits deferral of tests that require shutdown of RCPs until refueling outages. However, since PVNGS typically secures RCPs during cold shutdown outages, this test will be performed at cold shutdown. Otherwise this justification is consistent with the guidance in NUREG-1482, Paragraph 3.1.1.4.

This cold shutdown justification is similar to CSJ-12 in the first interval IST Program.

Cold Shutdown Justification No. 13 (CSJ-13)

Instrument Air Containment Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
IAAUV0002	Instrument Air Supply To Containment Isolation Valve	2	A	IAP-003 / G07
IAEV0021	Instrument Air Supply To Containment Isolation Check Valve	2	AC	IAP-003 / G05

Function

These valves open to provide a flowpath for instrument air to the containment - non-safety function. They close to provide containment isolation.

Alternate Testing

IAAUV0002 will be full-stroke exercised closed during cold shutdown periods. Stroke time testing and fail-safe testing will be performed in conjunction with exercise testing.

IAEV0021 will be full-stroke exercised closed during cold shutdown periods.

Basis

Closing either of these valves during power operation isolates operating air to important equipment within the containment building, including the pressurizer spray control valves and letdown isolation valves. This would, in turn, risk pressurizer level and pressure transients with a potential for a plant trip. If IAAUV0002 were to fail to re-open, an expedited plant shutdown would be required. It is also noted that closure testing of IAEV0021 requires containment entry.

This cold shutdown justification is similar to CSJ-13 and CSJ-14 in the first interval IST Program.

Cold Shutdown Justification No. 14 (CSJ-14)

NC Containment Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
NCBUV0401	Nuclear Cooling Water Supply Containment Isolation Valve	2	A	NCP-003 / E07
NCAUV0402	Nuclear Cooling Water Return Containment Isolation Valve	2	A	NCP-003 / F07
NCBUV0403	Nuclear Cooling Water Return Containment Isolation Valve	2	A	NCP-003 / F06

Function

These valves open to provide flowpaths for cooling water to and from important equipment inside the containment - non-safety function. They close to provide containment isolation.

Alternate Testing

These valves will be full-stroke exercised closed during cold shutdown periods. Stroke time testing will be performed in conjunction with the exercise testing.

Basis

Closing any of these valves during operation would isolate cooling water flow to or from important equipment in the containment, including the reactor coolant pumps (RCPs) and CEDMs. It is impractical to secure this cooling water flow at power without endangering this important equipment.

It is noted that paragraph 3.1.1.4 of NUREG-1482 permits deferral of tests that require shutdown of RCPs until refueling outages. However, since PVNGS typically secures RCPs during cold shutdown outages, this test will be performed at cold shutdown.

This cold shutdown justification is similar to CSJ-15 in the first interval IST Program.

Cold Shutdown Justification No. 15 (CSJ-15)

Reactor Head Vent and Pressurizer Vent Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
RCAHV0101	Reactor Vessel Vent Valve	2	B	RCP-001 / G15
RCBHV0102	Reactor Vessel Vent Valve	2	B	RCP-001 / G15
RCAHV0103	Pressurizer Vent Valve	2	B	RCP-001 / G14
RCBHV0105	Reactor Coolant System Common Vent Valve To RDT	2	B	RCP-001 / G13
RCAHV0106	Reactor Coolant System Common Vent Valve To Containment	2	B	RCP-001 / G13
RCBHV0108	Pressurizer Vent Valve	2	B	RCP-001 / G13
RCBHV0109	Pressurizer Vent Valve	2	B	RCP-001 / G13

Function

These valves open to remotely vent non-condensible gasses from the reactor vessel and/or pressurizer steam space. They can also be used to depressurize the RCS. They close for reactor coolant system integrity.

Alternate Testing

These valves will be full-stroke exercised open and closed during cold shutdown periods. Stroke time testing and fail-safe testing will be performed in conjunction with the exercise testing.

Basis

These valves are administratively controlled in the keylocked closed position with the power supply disconnected to prevent inadvertent operation. Since these are reactor coolant system boundary valves, failure of a valve to close or significant leakage following closure can result in a loss of coolant in excess of the limits imposed by the Technical Specifications leading to a plant shutdown. Furthermore, if a valve were to fail open or valve indication fail to show the valve returned to the fully closed position after exercising, it is likely that a plant shutdown would be required. Note also that Technical Specifications require that these valves be closed in Modes 1-4.

This justification is consistent with the guidelines for deferring testing provided in NUREG-1482, Paragraph 3.1.1.

This cold shutdown justification is similar to CSJ-16 in the first interval IST Program.

Cold Shutdown Justification No. 16 (CSJ-16)

Feedwater Economizer Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGEV0003	Main Feedwater Inbd. Check Valve To Steam Gen. #1 Economizer	2	C	SGP-002 / E10
SGEV0005	Main Feedwater Otbd. Check Valve To Steam Gen. #2 Economizer	2	C	SGP-002 / A10
SGEV0006	Main Feedwater Inbd. Check Valve To Steam Gen. #2 Economizer	2	C	SGP-002 / A10
SGEV0007	Main Feedwater Otbd. Check Valve To Steam Gen. #1 Economizer	2	C	SGP-002 / E10

Function

These check valves are normally open during steaming operations to provide flowpaths for feedwater flow to the steam generators - non-safety function. They close to isolate and maintain the integrity of the steam generators.

Alternate Testing

These valves will be verified to close during cold shutdown periods.

Basis

In order to exercise these valves to the closed position, flow through the associated feedwater header must be secured. During power operations isolation of a feedwater header would require a significant power reduction and could result in unacceptable steam generator level transients with the potential for a plant trip.

Closure testing will not include pre-test open exercising, since the valve is known to be open during power operation prior to the closure verification. This testing satisfies Code requirements and is consistent with the discussion in NUREG-1482, Appendix A, Question Group 24.

This cold shutdown justification is similar to CSJ-33 in the first interval IST Program.

Cold Shutdown Justification No. 17 (CSJ-17)

Turbine-Driven AFW Pump Steam Supply Check Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGAV0043	Main Steam Supply From SG #1 To AFW Pump AFA-P01 Check Valve	3	C	SGP-001, Sh. 1 / E12
SGAV0044	Main Steam Supply From SG #2 To AFW Pump AFA-P01 Check Valve	3	C	SGP-001, Sh. 1 / C12

Function

These valves open to provide flowpaths for steam from the steam generators to turbine-driven Auxiliary Feedwater Pump, AFA-P01. They close to prevent blowdown of the opposite steam generator after a main steam line break when an AFAS opens the associated isolation valve.

Alternate Testing

These valves will be partial-stroke exercised open and exercised closed during quarterly pump minimum-flow recirculation testing. Full-stroke exercising open will be performed during pump full-flow testing at cold shutdown.

Basis

Full-stroke exercising of these valves would require operation of Auxiliary Feedwater Pump AFA-P01 at full rated capacity. This is not practical during power operation because it would inject cold auxiliary feedwater into the main feedwater lines. The resulting temperature perturbations could lead to unnecessary thermal shock / fatigue damage to the feedwater piping and steam generators, and the cooldown of the reactor coolant system could cause undesirable reactivity variations and power fluctuations.

This cold shutdown justification is similar to CSJ-28 in the first interval IST Program.

Cold Shutdown Justification No. 18 (CSJ-18)
Feedwater Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGBUV0130	Inbd. FWIV to SG #1 Downcomer	2	B	SGP-002 / G11
SGBUV0132	Inbd. FWIV to SG #1 Economizer	2	B	SGP-002 / E12
SGBUV0135	Inbd. FWIV to SG #2 Downcomer	2	B	SGP-002 / C11
SGBUV0137	Inbd. FWIV to SG #2 Economizer	2	B	SGP-002 / A12
SGAUV0172	Otbd. FWIV to SG #1 Downcomer	2	B	SGP-002 / G12
SGAUV0174	Otbd. FWIV to SG #1 Economizer	2	B	SGP-002 / E12
SGAUV0175	Otbd. FWIV to SG #2 Downcomer	2	B	SGP-002 / C12
SGAUV0177	Otbd. FWIV to SG #2 Economizer	2	B	SGP-002 / A12

Function

The main feedwater isolation valves (FWIVs) are normally open during steaming operations to provide flowpaths for main feedwater flow to the steam generators - non-safety function. They close to isolate and maintain the integrity of the steam generators and to secure feeding a faulted steam generator in the event of a steam leak inside containment.

Alternate Testing

Each of these valves will be full-stroke exercised closed during cold shutdown periods. Stroke time testing and fail-safe testing will be performed in conjunction with the exercise testing.

Basis

Closing any of these valves isolates the associated feedwater header. During power operation, isolation of a feedwater header would require a significant power reduction and could result in unacceptable steam generator level and reactor power transients with the potential for a plant trip.

The downcomer isolation valves do not have partial-stroke capability, however the economizer isolation valves are capable of partial stroke exercising. Part-stroke exercising is not considered practical because of the risk of full closure. This risk was recognized by NUREG-1432, Vol 1, Rev. 1, "Standard Technical Specifications - Combustion Engineering Plants Specifications", which states that "MFIVs should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power" as the basis for the 18-month test frequency specified by SR 3.7.3.1.

This cold shutdown justification is similar to CSJ-17 and CSJ-26 in the first interval IST Program.

Cold Shutdown Justification No. 19 (CSJ-19)

Main Steam Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGEUV0170	Main Steam Isolation Valve From Steam Gen. #1	2	B	SGP-001, Sh. 1 / G10
SGEUV0171	Main Steam Isolation Valve From Steam Gen. #2	2	B	SGP-001, Sh. 1 / D10
SGEUV0180	Main Steam Isolation Valve From Steam Gen. #1	2	B	SGP-001, Sh. 1 / F10
SGEUV0181	Main Steam Isolation Valve From Steam Gen. #2	2	B	SGP-001, Sh. 1 / B10

Function

These valves are normally open during steaming operations to provide flowpaths for steam flow to the main turbine generators and associated auxiliaries - non-safety function. They close to isolate and maintain the integrity of the steam generators.

Alternate Testing

Each of these valves will be full-stroke exercised closed during cold shutdown periods. Stroke time testing and fail-safe testing will be performed in conjunction with exercise testing.

Basis

Closing any of these valves isolates the associated steam header. During power operations, isolation of a main steam header would require a significant power reduction and could result in unacceptable steam generator level and reactor power transients with the potential for a plant trip.

The main steam isolation valves are capable of partial stroke exercising. Part-stroke exercising is not considered practical because of the risk of closure. This risk was recognized by NUREG-1432, Vol 1, Rev. 1, "Standard Technical Specifications - Combustion Engineering Plants Specifications", which states that "MSIVs should not be tested at power since even a part stroke exercise increases the risk of a valve closure with the unit generating power" as the basis for the 18-month test frequency specified by SR 3.7.2.1.

This cold shutdown justification is similar to CSJ-25 in the first interval IST Program.

Cold Shutdown Justification No. 20 (CSJ-20)

HPSI Header Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV113	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F14
SIEV123	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F12
SIEV133	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F07
SIEV143	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F04

Function

These valves open to provide flowpaths from the high pressure safety injection headers to the reactor coolant system. They close to prevent flow diversion during LPSI operation.

Alternate Testing

Each of these valves will be verified closed during cold shutdown periods. Tests performed during cold shutdown will not necessarily include pre-test open exercising.

Basis

These are simple check valves with no external means of exercising nor for determining disk position. Thus they can only be verified closed by developing a differential pressure across the valve disc and then determining reverse-direction leakage. During power operation the LPSI pump could be operated to pressurize the downstream piping thus providing a pressure differential across the respective valve, however, pressurizing the safety injection headers can unseat downstream check valves V540, V541, V542, and V543. Per TS SR 3.4.15.1, this would then require leak testing of these valves which would entail containment entry. Thus, closure verification at power is considered impractical.

As discussed in NUREG-1482, Appendix A, Question Group 24, closure testing of valves with safety functions in both directions requires that the valves be opened and then verified to close. It is impractical to exercise these valves open except during refueling outages, as discussed in the ROJ for open exercising. Since these valves can be verified closed more frequently (cold shutdown) than the valves can be opened (refueling), closure verification will be performed at cold shutdown without opening the valve. This strategy is consistent with the Current Considerations under Question Group 24.

Cold Shutdown Justification No. 21 (CSJ-21)

LPSI Header Check Valve Open and Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV114	Low Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F13
SIEV124	Low Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F11
SIEV134	Low Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F06
SIEV144	Low Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F04

Function

These valves open to provide flowpaths from the low pressure safety injection headers to the reactor coolant system for safety injection and shutdown cooling. They close to prevent flow diversion during HPSI operation.

Alternate Testing

Each of these valves will be full-stroke exercised open and exercised closed during cold shutdown periods.

Basis

These are simple check valves with no external means of exercising nor for determining disc position. Part-stroke exercising open at power through the safety injection check valve test line test via valves SIEUV0618, 628, 638, and 648 is not practical, because this would unseat check valves SIEV540, V541, V542, and V543, requiring a containment entry to perform the leak test required by TS SR 3.4.15.1. Full-stroke exercising open at power is not possible because the discharge pressure of the LPSI pumps is not sufficient to overcome RCS pressure. The valves can be full-stroke exercised open at cold shutdown while the shutdown cooling system is in operation.

These valves can only be verified closed by developing a differential pressure across the valve disc and then determining reverse-direction leakage. During power operation the HPSI pump could be operated to pressurize the downstream piping thus providing a pressure differential across the respective valve, however, pressurizing the safety injection headers can unseat downstream check valves SIEV540, V541, V542, and V543. Per TS SR 3.4.15.1, this would then require leak testing of these valves which would entail containment entry. Thus, closure verification at power is considered impractical.

Cold Shutdown Justification No. 22 (CSJ-22)

Turbine-Driven AFW Pump Steam Supply Warmup Line Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGEV887	Turbine-Driven AFW Pump Steam Supply Warmup Line Check Valve	3	C	SGP-001 / D12
SGEV888	Turbine-Driven AFW Pump Steam Supply Warmup Line Check Valve	3	C	SGP-001 / C13

Function

To prevent the turbine-driven auxiliary feedwater pump from overspeeding and tripping during the start sequence, the valves in the warmup lines open to clear any residual condensation and to warm up the steam lines. The warmup line check valves close to prevent spurious opening of the solenoid-operated warmup line isolation valves SGAUV0134A and SGAUV0138A due to pressure under the seat after a main steam line break, which would result in flow diversion that could cause the pump to overspeed.

Alternate Testing

These valves will be exercised closed during cold shutdown periods.

Basis

This is a simple check valve with no external means of exercising or for determining disc position. The only way of verifying valve closure is by performing a reverse flow test. Performing this test involves the setup and use of hoses, gauges, and other test equipment. NUREG-1482 section 4.1.4 states that "The NRC has determined that the need to set up test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage". However, this test was performed on a cold shutdown frequency during the first IST interval. PVNGS does not consider the burden of continuing to perform this test on a cold shutdown frequency so great that deferral to refueling outages is necessary.

It is noted that performing this test at power would render the turbine-driven auxilary feedwater pump inoperable for the duration of the test (approximately 1-3 hours). Testing at power also involves potential hazards to test personnel when venting the steam systems and connecting / disconnecting the test equipment. Although these factors are not sufficient to justify test deferral by themselves, they were considered along with the need for test equipment when the determination was made to perform this test on a cold shutdown frequency.

Cold Shutdown Justification No. 23 (CSJ-23)

Nitrogen Containment Isolation Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
GAEV015	Nitrogen Supply To Containment Check Valve	2	AC	GAP-001 / E02

Function

This check valve opens to provide a flowpath for nitrogen to several non-critical components inside containment - non-safety function. It closes for containment isolation.

Alternate Testing

This valve will be verified closed during cold shutdown periods. Closure testing will not necessarily include pre-test open exercising.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Thus the only way of verifying valve closure is by performing a reverse flow test. Performing this test on this valve requires containment entry. Containment entry for routine inservice testing is considered impractical during power operations.

Since this valve performs a safety function only in the closed position, exercising open before closure verification is not required. This testing satisfies Code requirements and is consistent with the discussion in NUREG-1482, Appendix A, Question Group 24.

This cold shutdown justification is similar to CSJ-13 in the first interval IST Program.

Cold Shutdown Justification No. 24 (CSJ-24)

Hydrogen Return Containment Isolation Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
HPAV002	Hydrogen Sample/Recombiner Return To Containment Check Valve	2	AC	HPP-001 / F15
HPBV004	Hydrogen Sample/Recombiner Return To Containment Check Valve	2	AC	HPP-001 / C15

Function These check valves open to provide air return flowpaths to the containment from the recombiners and the post-LOCA hydrogen monitors. They close for containment isolation.

Alternate Testing These valves will be verified to close during cold shutdown periods.

Basis These are simple check valves with no external means of exercising or for determining disc position. Thus the only way of verifying valve closure is by performing a reverse flow test. Performing this test on these valves requires plugging the line which would require operator action to restore in the event of an accident during testing. Performing this test also requires containment entry. Containment entry for routine inservice testing is considered impractical during power operations.

Cold Shutdown Justification No. 25 (CSJ-25)

(Superseded by ROJ-12)

Cold Shutdown Justification No. 26 (CSJ-26)

SIT Vent Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAHV0605	Safety Inj. Tank 2A Vent Valve	2	B	SIP-002 / F15
SIAHV0606	Safety Inj. Tank 2B Vent Valve	2	B	SIP-002 / F12
SIAHV0607	Safety Inj. Tank 1A Vent Valve	2	B	SIP-002 / F07
SIAHV0608	Safety Inj. Tank 1B Vent Valve	2	B	SIP-002 / F04
SIBHV0613	Safety Inj. Tank 2A Vent Valve	2	B	SIP-002 / E15
SIBHV0623	Safety Inj. Tank 2B Vent Valve	2	B	SIP-002 / E12
SIBHV0633	Safety Inj. Tank 1AVent Valve	2	B	SIP-002 / E07
SIBHV0643	Safety Inj. Tank 1B Vent Valve	2	B	SIP-002 / E04

Function

These valves are normally closed to ensure the integrity of the associated safety injection tank (SIT) so that the required nitrogen overpressure is maintained. They are opened to reduce the nitrogen pressure in the SITs during plant depressurization to preclude nitrogen injection into the RCS.

Alternate Testing

Each of these valves will be exercised open and closed during cold shutdown periods. Stroke time testing and fail-safe testing will be performed in conjunction with exercise testing.

Basis

These valves are normally closed during power operation. Plant technical specifications require that power be removed from the valves, and that the SIT nitrogen cover gas pressure be maintained within the required range. Exercising a valve during operation would render the associated SIT inoperable if the cover gas pressure were reduced below the required range. A valve failing open during testing would completely depressurize the SIT and result in an expedited plant shutdown.

This cold shutdown justification is similar to CSJ-22 in the first interval IST Program.

Cold Shutdown Justification No. 27 (CSJ-27)

Shutdown Cooling Suction Isolation Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAUV0651	Shutdown Cooling Suction Isolation Valve	1	A	SIP-002 / C03
SIBUV0652	Shutdown Cooling Suction Isolation Valve	1	A	SIP-002 / C10
SICUV0653	Shutdown Cooling Suction Inboard Containment Isolation Valve	1	A	SIP-002 / D03
SIDUV0654	Shutdown Cooling Suction Inboard Containment Isolation Valve	1	A	SIP-002 / D10
SIAUV0655	Shutdown Cooling Suction Outboard CIV	2	A	SIP-002 / G03
SIBUV0656	Shutdown Cooling Suction Outboard CIV	2	A	SIP-002 / G10

Function

These valves are normally closed to ensure the integrity of the reactor coolant system (SIAHV0651, SIBHV0652, SICHV0653, SIDHV0654) and to provide containment isolation (SICHV0653, SIDHV0654, SIAUV0655, SIB-UV0656). They are opened during plant cooldown to initiate shutdown cooling.

Alternate Testing

Each of these valves will be full-stroke exercised open and closed during cold shutdown periods. Stroke time testing will be performed in conjunction with the exercise testing.

Basis

These valves provide pressure barriers between the reactor coolant system pressure and the lesser rated shutdown cooling piping systems. As an installed safety feature they are provided with electrical interlocks that prevent them from being opened when pressurizer pressure is greater than 400 psig. Although this interlock can be overridden, routine operation of these valves with a large differential pressure across the seats is considered impractical due to the risk of damage to the seating surfaces of the valves.

This cold shutdown justification is similar to CSJ-24 in the first interval IST Program.

Cold Shutdown Justification No. 28 (CSJ-28)

Normal Chilled Water Containment Isolation Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
WCEV039	Chilled Water Supply To Containment Check Valve	2	AC	WCP-001 / E05

Function This valve is normally opened to supply cooling water to the containment - non-safety function. It closes for containment isolation.

Alternate Testing This valve will be verified closed during cold shutdown periods. Closure testing will not necessarily include pre-test open exercising.

Basis This is a simple check valve with no external means of exercising nor for determining disc position. Closure verification must be performed by developing a differential pressure across the disc and measuring reverse flow. Performing these tests requires containment entry. Containment entry for routine inservice testing is considered impractical during power operations. In addition, exercising this valve to the closed position requires an extended shutdown of the primary containment cooling system. This could cause the containment temperature to exceed the technical specification limit for air temperature and hamper testing activities inside containment.

Since this valve performs a safety function only in the closed position, exercising open before closure verification is not required. This testing satisfies Code requirements and is consistent with the discussion in NUREG-1482, Appendix A, Question Group 24.

This cold shutdown justification is similar to CSJ-13 in the first interval IST Program.

Cold Shutdown Justification No. 29 (CSJ-29)

RMW Supply to RDT Containment Isolation Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHNV494	Reactor Makeup Water Supply Check Valve to RDT Inboard CIV	2	AC	CHP-003 / E15

Function

Opens to supply RMW to the reactor drain tank - not a safety function. Closes for containment isolation.

Alternate Testing

This valve will be verified closed during cold shutdown periods. Closure testing will not necessarily include pre-test open exercising.

Basis

This is a simple check valve with no external means of exercising nor for determining disc position. Closure verification must be performed by developing a differential pressure across the disc and measuring reverse flow. Performing this tests requires a containment entry. Containment entry for routine inservice testing is considered impractical during power operations.

Since this valve performs a safety function only in the closed position, exercising open before closure verification is not required. This testing satisfies Code requirements and is consistent with the discussion in NUREG-1482, Appendix A, Question Group 24.

This cold shutdown justification is similar to CSJ-32 in the first interval IST Program.

Cold Shutdown Justification No. 30 (CSJ-30)

NC to Containment Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
NCEV118	Nuclear Cooling Water Supply To Containment Check Valve	2	AC	NCP-003 / E06

Function This valve opens to provide a flowpath for cooling water to important equipment inside the containment - non-safety function. It closes to provide containment isolation.

Alternate Testing These valves will be full-stroke exercised closed during cold shutdown periods.

Basis This is a simple check valve with no external means of exercising nor for determining disc position. Closure verification must be performed by developing a differential pressure across the disc and measuring reverse flow. Performing this test requires securing cooling water flow to important equipment within the containment building, including the reactor coolant pumps (RCPs). It is impractical to secure this cooling water flow for an extended period with the RCPs running without endangering the reactor coolant pumps and motors. Thus testing at power is impractical because it would require the unnecessary shutdown of all of the reactor coolant pumps. Testing at cold shutdown is practical because the RCPs are typically not running during cold shutdown periods.

It is noted that paragraph 3.1.1.4 of NUREG-1482 permits deferral of tests that require shutdown of RCPs until refueling outages. However, since PVNGS typically secures RCPs during cold shutdown outages, this test will be performed at cold shutdown.

Closure testing will not include pre-test open exercising, since the valve is known to be open during power operation prior to the closure verification. This testing satisfies Code requirements and is consistent with the discussion in NUREG-1482, Appendix A, Question Group 24.

This cold shutdown justification is similar to CSJ-15 in the first interval IST Program.

Cold Shutdown Justification No. 31 (CSJ-31)

SI Header Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV540	Safety Injection Header Check Valve	1	AC	SIP-002 / C13
SIEV541	Safety Injection Header Check Valve	1	AC	SIP-002 / C11
SIEV542	Safety Injection Header Check Valve	1	AC	SIP-002 / C06
SIEV543	Safety Injection Header Check Valve	1	AC	SIP-002 / C04

Function

These valves open to provide flowpaths from the safety injection headers to the reactor coolant system for safety injection and shutdown cooling. They close to isolate the safety injection system from the reactor coolant system.

Alternate Testing

Each of these valves will be full-stroke exercised open during cold shutdown.

Basis

These are simple check valves with no external means of exercising nor for determining disc position. Part-stroke exercising open at power through the safety injection check valve test line test via valves SIEUV0618, 628, 638, and 648 is not practical, because because unseating the check valves requires a containment entry to perform the leak test required by TS SR 3.4.15.1. The valves can be full-stroke exercised by directing LPSI flow to the RCS, but this is not possible at power because the discharge pressure of the LPSI pumps is not sufficient to overcome RCS pressure.

This cold shutdown justification is similar to CSJ-31 in the first interval IST Program.

Cold Shutdown Justification No. 32 (CSJ-32)
RCP Seal Bleed-Off Isolation Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHBUV0505	Reactor Coolant Pump Seal Bleed-off Otbd. Isolation Valve	2	A	CHP-002 / H13
CHAUV0506	Reactor Coolant Pump Seal Bleed-off Inbd. Isolation Valve	2	A	CHP-002 / H14

Function

These valves are normally open during power operation to provide a flowpath for seal bleed-off from the reactor coolant pumps (RCPs) – non-safety function. They close for containment isolation.

Alternate Testing

These valves will be exercised closed during cold shutdown periods. Stroke time testing and fail safe testing will be performed in conjunction with exercise testing.

Basis

These air-operated valves are electrically interlocked so that they cannot be closed when any of the reactor coolant pumps are in operation. Closing either of these valves during RCP operation would interrupt bleed-off flow from the RCP seals and could result in damage to the seals. Thus testing these valves at power would require the unnecessary shutdown of all of the reactor coolant pumps.

It is noted that paragraph 3.1.1.4 of NUREG-1482 permits deferral of tests that require shutdown of RCPs until refueling outages. However, since PVNGS typically secures RCPs during cold shutdown outages, this test will be performed at cold shutdown.

This cold shutdown justification is similar to CSJ-7 in the first interval IST Program.

Cold Shutdown Justification No. 33 (CSJ-33)

SIT Outlet MOV Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIBUV0614	SIT 2A Discharge Isolation Valve	1	B	SIP-002 / A15
SIBUV0624	SIT 2B Discharge Isolation Valve	1	B	SIP-002 / A12
SIBUV0634	SIT 1A Discharge Isolation Valve	1	B	SIP-002 / B07
SIBUV0644	SIT 1B Discharge Isolation Valve	1	B	SIP-002 / B04

Function

The Safety Injection Tank (SIT) discharge isolation valves are normally locked open with power removed to provide a flowpath from the SITs to the safety injection headers. If closed, they open upon receipt of a SIAS. They can be closed to isolate the SIT during cold shutdown and refueling outages, but this is not a required safety function.

Alternate Testing

Each of these valves will be full-stroke exercised open during cold shutdown periods. Stroke time testing will be performed in conjunction with exercise testing.

Basis

Plant Technical Specifications require that the SIT isolation valves be key-locked open and power to the valve removed during power operation to ensure an unobstructed flow path. Open exercising requires first closing the valve, which renders the associated SIT inoperable. A valve failing closed during testing would result in an expedited shutdown.

This Cold Shutdown Justification is similar to CSJ-23 in the first interval IST Program.

Refueling Outage Justification No. 1 (ROJ-01)

Boration Flow Path Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHAV177	Boration Flowpath Check Valve To Charging Pump Suction	2	C	CHP-002 / B07
CHAV190	Emerg. Boration Flowpath Check Valve To Charging Pump Suction	2	C	CHP-002 / A07

Function

These check valves open to provide emergency boration flowpaths from the boration header (CHAV177) or via gravity drain directly from the Refueling Water Tank (RWT) (CHAV190). They have no specific safety function in the closed position.

Alternate Testing

These check valves will be part-stroke exercised open during cold shutdown and full stroke exercised open during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining disc position, thus, testing these valves in the open direction requires system flow. Since there is no recirculation flowpath capable of full flow (68 gpm per TRM TSR 3.1.101.2), the only practical flowpath is into the charging pump suction header. This would introduce highly concentrated boric acid solution from the RWT into the RCS via the charging pumps. The rapid insertion of negative reactivity during plant operation would cause a RCS cooldown and depressurization which could result in an unscheduled plant trip or safety injection system actuation.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The radioactive waste processing system would also be overburdened by the large amounts of RCS coolant that would require processing to decrease the boron concentration at startup. Since the boron concentration is normally increased to a limited extent for shutdown margin prior to reaching cold shutdown, a part-stroke exercise of these valves could be performed at that time.

This refueling outage justification is similar to CSJ-4 in the first interval IST Program.

Refueling Outage Justification No. 2 (ROJ-02)

RWT Outlet Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHAV306	Refueling Water Tank Outlet Check Valve	2	C	CHP-002 / C13
CHBV305	Refueling Water Tank Outlet Check Valve	2	C	CHP-002 / B15

Function

These check valves open to provide flowpaths from the Refueling Water Tank (RWT) to the suctions of the safety injection and containment spray pumps. They close during post-accident recirculation cooling to prevent backflow of water from the containment sump to the RWT.

Alternate Testing

These valves will be part-stroke exercised open during quarterly testing of the safety injection pumps via the pumps' minimum flow circuit, and full-stroke exercised open during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining obturator position. Thus, testing these valves in the open direction requires system flow. The various pump mini-flow lines are capable of part-stroke testing only since their size precludes passing full accident flow through these valves. Full-stroke exercising these valves to the open position requires injection into the RCS via the simultaneous operation of the containment spray and LPSI pumps in the train. During plant operation this is precluded because neither the containment spray nor the LPSI pumps can develop sufficient discharge pressure to overcome RCS pressure. At cold shutdown there is no available reservoir in the reactor coolant system to accept the injected water, and the shutdown cooling system cannot provide sufficient flow back to the RWT. Also, the excessive quantities of boric acid injected during such testing would seriously hamper the ensuing startup. Therefore, the only practical opportunity for full-flow testing these valves is during refueling outages when the reactor head has been removed and RWT inventory is used to fill the refueling cavity.

This refueling outage justification is similar to VRR-6 in the first interval IST Program.

Refueling Outage Justification No. 3 (ROJ-03)

BAMP Discharge Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHNV154	Boric Acid Make-up Pump CHN-P02A Discharge Check Valve	3	C	CHP-002 / B13
CHNV155	Boric Acid Make-up Pump CHN-P02B Discharge Check Valve	3	C	CHP-002 / B13

Function

The boric acid makeup pump (BAMP) discharge check valves open to allow flow through the idle BAMPs as part of the emergency boration flowpaths (Ref. TRM TLCO 3.1.101). They have no specific safety function in the closed position.

Alternate Testing

These check valves will be part-stroke exercised open quarterly and full-stroke exercised open during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Testing these valves in the open direction requires system flow. The boric acid makeup pumps can be operated to open these valves, however there is no installed flow instrumentation in the BAMP recirculation line. Therefore the only practical instrumented flowpath is into the RCS via the charging pumps. During plant operation, the rapid insertion of negative reactivity resulting from the introduction of highly concentrated boric acid solution to the RCS would result in a RCS cooldown and de-pressurization, which could cause an unscheduled plant trip or possible safety injection system actuation.

During cold shutdown, the introduction of excess quantities of boric acid into the RCS is undesirable from the aspect of maintaining proper plant chemistry and the inherent difficulties that may be encountered during the subsequent startup due to over-boration of the RCS. The radioactive waste processing system would also be overburdened by the large amounts of RCS coolant that would require processing to decrease the boron concentration at startup.

This refueling outage justification is similar to CSJ-4 in the first interval IST Program.

Refueling Outage Justification No. 4 (ROJ-04)

HPSI Header Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV113	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F14
SIEV123	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F12
SIEV133	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F07
SIEV143	High Pressure Safety Injection Pump Header Check Valve	2	C	SIP-002 / F04

Function These valves open to provide flowpaths from the high pressure safety injection (HPSI) headers to the reactor coolant system. They close to prevent flow diversion during LPSI operation.

Alternate Testing These valves will be full-stroke exercised open during each refueling outage.

Basis These are simple check valves with no external means of exercising or for determining disc position. Part-stroke exercising open at power through the safety injection check valve test line test via valves SIEUV0618, 628, 638, and 648 is not practical, because this would unseat check valves SIEV540, V541, V542, and V543, requiring a containment entry to perform the leak test required by TS SR 3.4.15.1. Full-stroke exercising at power is not possible because the discharge pressure of the HPSI pumps is not sufficient to overcome RCS pressure. Exercising at cold shutdown is not practical because low-temperature over-pressure concerns preclude directing HPSI flow to the RCS.

This refueling outage justification is similar to VRR-28 in the first interval IST Program.

Refueling Outage Justification No. 5 (ROJ-05)

HPSI Pump Discharge Check Valve Open and Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAV404	High Pressure Safety Injection Pump 1 Discharge Check Valve	2	C	SIP-001 / F06
SIBV405	High Pressure Safety Injection Pump 2 Discharge Check Valve	2	C	SIP-001 / B04

Function

These valves open to provide flowpaths from the high pressure safety injection (HPSI) pumps to the safety injection headers and thence to the reactor coolant system. They close to prevent flow diversion through an idle HPSI pump during HPSI operation.

Alternate Testing

These valves will be full-stroke exercising open and exercised closed during each refueling outage. The valve will be exercised open prior to closure verification.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Full-stroke exercising at power is not possible because the discharge pressure of the HPSI pumps is not sufficient to overcome RCS pressure. Part-stroke exercising open at power through the safety injection check valve test line test via valves SIEUV0618, 628, 638, and 648 is not practical, because this would unseat check valves SIEV540, V541, V542, and V543, requiring a containment entry to perform the leak test required by TS SR 3.4.15.1. Exercising at cold shutdown is not practical because low-temperature over-pressure (LTOP) concerns preclude directing HPSI flow to the RCS.

Since these valves have safety functions in both the open and closed positions, closed exercising requires the valve to be exercised to the open position and then be verified to close. Exercising open is not practical except at refueling as described above.

Verification of closure without opening the valve is not practical more frequently than refueling because closure verification requires a reverse-flow test, which is performed by connecting a pressure source downstream of the check valve and determining reverse flow. The opposite-train HPSI pump can be used as the pressure source via the cross-connect valves, but this is not practical at power since cross-connecting the two trains of HPSI renders both trains inoperable. It is also not practical at cold shutdown, because any leakage through the HPSI header isolation valves could challenge the LTOP protection system. Using another pressurized water source via a downstream

[illegible]

test connection is not practical at power or cold shutdown, because the risk of routinely placing the HPSI system in this configuration and the burden of setting up the test equipment outweighs the benefits of testing.

This refueling outage justification is consistent with the provisions of NUREG-1482 section 4.1.4, which states that the NRC has determined that the need to set up test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage. It is also consistent with the requirements for exercising check valves with a safety function in both positions by exercising the valve open and then verifying that it closes discussed in NUREG-1482, Appendix A, Question Group 24, and with the guidelines for deferring valve testing given in NUREG-1482 section 3.1.1.

This refueling outage justification is similar to VRR-28 in the first interval IST Program.

Refueling Outage Justification No. 6 (ROJ-06)

HPSI Long-Term Recirculation Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAV522	HPSI Long-Term Recirc. Check Valve	1	AC	SIP-002 / C02
SIAV523	HPSI Long-Term Recirc. Ctmt. Isolation Check Valve	1	AC	SIP-002 / F02
SIBV532	HPSI Long-Term Recirc. Check Valve	1	AC	SIP-002 / B10
SIBV533	HPSI Long-Term Recirc. Ctmt. Isolation Check Valve	1	AC	SIP-002 / F09

Function

These valves open to provide flowpaths from the high pressure safety injection headers to the reactor coolant system for hot leg injection. They close to isolate the safety injection system from the reactor coolant system.

Alternate Testing

These valves will be full-stroke exercised open during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Exercising with flow can be accomplished with the HPSI pumps (or the charging pumps via cross-tie valves) to the RCS. SIAV523 and SIBV533 can also be part-stroke exercised using the SIT fill/drain line via valves SIBUV0322 and SIBUV0332. Exercising at power is not practical because unseating the valves would require a containment entry to perform the leak test required by TS SR 3.4.15.1; containment entry is not considered practical for quarterly surveillance testing. Exercising at cold shutdown is not practical because of the potential for a low-temperature over-pressure (LTOP) event, which could challenge the LTOP relief valves, violate RCS temperature/pressure limits, or damage equipment.

This refueling outage justification is similar to VRR-35 in the first interval IST Program.

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Refueling Outage Justification No. 7 (ROJ-07)
SIT Discharge Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV215	Safety Injection Tank 2A Discharge Check Valve	2	AC	SIP-002 / A15
SIEV225	Safety Injection Tank 2B Discharge Check Valve	2	AC	SIP-002 / A12
SIEV235	Safety Injection Tank 1A Discharge Check Valve	2	AC	SIP-002 / A07
SIEV245	Safety Injection Tank 1B Discharge Check Valve	2	AC	SIP-002 / A05

Function

These check valves open to provide flowpaths from the safety injection tanks (SITs) to the safety injection headers. They close to isolate the SITs from the reactor coolant system to prevent overpressurization and to prevent HPSI or LPSI flow diversion.

Alternate Testing

Each SIT discharge check valve will be part-stroke exercised open at cold shutdown.

During each refueling outage, all the valves will be full-stroke exercised with flow. Non-intrusive verification of full-stroke exercise will be performed on one valve on a rotating schedule each time testing is performed. If problems are found with the sample valve that are determined to affect the operational readiness of the valve, all the valves will either be tested using non-intrusive techniques or disassembled for inspection during the same outage.

Following disassembly for inspection or maintenance, a part-stroke exercise open test will be performed.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Two possible flow paths exist for exercising these valves: from the SITs through the SIT drain line via valves SIEUV0618, 628, 638, or 648, or through the SI/RCS check valves into the RCS.

Full-stroke exercising is not possible through the SIT drain lines because these flow paths are not capable of carrying the necessary flow rate. Part-stroke exercising could be performed at power via the SIT drain lines, however, after any exercise at power these check valves must be leak rate tested within 24 hours per TS SR 3.4.15.1 which entails containment entry. Thus, neither part-stroke nor full-stroke exercising is practical at power.

Full-flow testing during cold shutdown is impractical because the RCS does not have sufficient volume to receive the contents of a SIT. Part-stroke testing and subsequent leak rate testing are practical at cold shutdown. Therefore the SIT check valves will be part-stroke exercised open at cold shutdown periods.

The valves will be full-stroke exercised open during each refueling outage when the reactor vessel head is removed. In this condition, a reduced-pressure SIT discharge test can be performed with flow to the RCS. Although the reduced-pressure test cannot attain the maximum required accident condition flow rate through the valve, the flow rate is sufficient to stroke the check valve discs to the full-open position. Non-intrusive verification of full stroke will be performed for one valve of the group on a rotating schedule each refueling outage.

The SIT discharge check valves are identical with respect to size, design, orientation, and operating conditions. Each has been inspected and/or non-intrusively tested several times during previous refueling outages. Based on these inspections and tests, there has been no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow needed to fulfill their safety function.

This justification is consistent with the requirements and recommendations of NRC Generic Letter 89-04, Position 1 for full-stroke exercising check valves, and NUREG-1482 section 4.1.2 for exercising check valves with flow and non-intrusive techniques. The NUREG states that relief is not required because flow testing at repeatable conditions performed on all valves in a group while only one valve in the group is non-intrusive tested on a rotating schedule is considered an acceptable “other positive means”.

This refueling outage justification is similar to VRR-33 in the first interval IST Program.

Refueling Outage Justification No. 8 (ROJ-08)

SI/RCS Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV217	Safety Injection/RCS Check Valve	1	AC	SIP-002 / A13
SIEV227	Safety Injection/RCS Check Valve	1	AC	SIP-002 / A10
SIEV237	Safety Injection/RCS Check Valve	1	AC	SIP-002 / A06
SIEV247	Safety Injection/RCS Check Valve	1	AC	SIP-002/ A04

Function

These check valves open to provide flowpaths from the safety injection header to the reactor coolant system (RCS). They close to isolate the safety injection system from the RCS.

Alternate Testing

Each SI/RCS check valve will be part-stroke exercised open at cold shutdown.

During each refueling outage, all the valves will be full-stroke exercised with flow. Non-intrusive verification of full-stroke exercise will be performed on one valve on a rotating schedule each time testing is performed. If problems are found with the sample valve that are determined to affect the operational readiness of the valve, all the valves will either be tested using non-intrusive techniques or disassembled for inspection during the same outage.

Following any disassembly for inspection or maintenance, a part-stroke exercise open test will be performed.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Although a flowpath from the charging pumps through the cross-tie to HPSI is capable of part-stroke exercising these valves at power, this is not considered practical because unseating the valves would require a containment entry to perform the leak test required by TS SR 3.4.15.1. Containment entry for routine inservice testing is considered impractical during power operations.

The valves can be part-stroke exercised at cold shutdown during shutdown cooling operation. Full-flow testing during cold shutdown is impractical because the shutdown cooling system cannot attain the maximum required accident condition flow rate through the valves, and because the RCS with the reactor vessel head installed does not have sufficient volume to receive the contents of a SIT. Therefore the SI/RCS check valves will be part-stroke exercised open at cold shutdown periods.

The valves will be full-stroke exercised open during each refueling outage

when the reactor vessel head is removed. In this condition, a reduced-pressure SIT discharge test can be performed with flow to the RCS. Although the reduced-pressure test cannot attain the maximum required accident condition flow rate through the valve, the flow rate is sufficient to stroke the check valve discs to the full-open position. Non-intrusive verification of full stroke will be performed for one valve of the group on a rotating schedule each refueling outage.

The SI/RCS check valves are identical with respect to size, design, orientation, and operating conditions. Each has been inspected and/or non-intrusively tested several times during previous refueling outages. Based on these inspections and tests, there has been no evidence of valve degradation with respect to their ability to open and satisfactorily pass the required flow needed to fulfill their safety function.

This justification is consistent with the requirements and recommendations of NRC Generic Letter 89-04, Position 1 for full-stroke exercising check valves, and NUREG-1482 section 4.1.2 for exercising check valves with flow and non-intrusive techniques. The NUREG states that relief is not required because flow testing at repeatable conditions performed on all valves in a group while only one valve in the group is non-intrusive tested on a rotating schedule is considered an acceptable "other positive means".

This refueling outage justification is similar to VRR-34 in the first interval IST Program.

Refueling Outage Justification No. 9 (ROJ-09)

Regenerative Heat Exchanger Inlet Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHEVM70	Charging to Regenerative Heat Exchanger Inlet Inboard Containment Isolation Check Valve	2	AC	CHP-001 / F15

Function Valve opens for charging flowpath to support boration and auxiliary pressurizer spray. Closes for containment isolation.

Alternate Testing This valve will be verified closed during each refueling outage. Closure testing will not necessarily include open exercising immediately prior to the closure verification.

Basis This is a simple check valve with no external means of exercising nor for determining disc position. Testing in the closed direction requires a reverse flow test. The valve alignment for this test requires isolating and draining a portion of the charging line. Performing this test at power or cold shutdown is not practical because it renders auxiliary pressurizer spray and multiple boration flowpaths out of service for an extended period of time, requires several entries into high radiation areas inside containment, and violates containment integrity, with entry into numerous LCOs. During testing, manual realignment of numerous valves would be required to restore the system to an operable status if the system functions became necessary during inservice testing.

As discussed in NUREG-1482, Appendix A, Question Group 24, closure testing of valves with safety functions in both directions requires that the valves be opened and then verified to close. This valve is exercised open with normal charging flow during power operation. This satisfies the code requirement for verifying the valve is open prior to the closure verification.

Refueling Outage Justification No. 10 (ROJ-10)
Safety Injection Pump Suction Flowpath Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
CHAV306	RWT Outlet Check Valve	2	C	CHP-002 / C13
CHBV305	RWT Outlet Check Valve	2	C	CHP-002 / B15
SIBV200	LPSI Pump Suction Line Check Valve	2	C	SIP-001 / B12
SIAV201	LPSI Pump Suction Line Check Valve	2	C	SIP-001 / F13

Function

CHAV306 and CHBV305 open to provide flowpaths from the Refueling Water Tank (RWT) to the suctions of the safety injection and containment spray pumps. They close during post-accident recirculation cooling to prevent backflow of water from the containment sump to the RWT.

SIBV200 and SIAV201 open to provide flowpaths to the suctions of the respective LPSI pumps. They close to prevent overpressurization of the sump piping, to prevent CS and HPSI from drawing a suction on shutdown cooling, and to prevent loss of makeup during a LOCA should RCS pressure backseat the containment sump or RWT check valves.

Alternate Testing

These valves will be exercised to the open position and then verified to close during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining disc position. Testing in the closed direction involves a reverse flow test requiring set up of hoses, gauges, and other test equipment. The test also requires a valve alignment that renders the complete safety injection train (LPSI, HPSI, and containment spray) inoperable, with entry into multiple LCOs for an extended period of time. During this test, manual realignment of numerous valves would be required to restore the system to an operable status if the system functions became necessary during inservice testing. Therefore testing is considered impractical during power operation and cold shutdown.

This justification is consistent with the guidelines on extension of test intervals to refueling outage for check valves verified closed by leak testing provided in NUREG-1482, section 4.1.4.

The valves will be exercised to the open position and then verified to close as required for check valves with safety functions in both directions per NUREG-1482, Appendix A, Question Group 24.

Refueling Outage Justification No. 11 (ROJ-11)

LPSI and CS Pump Suction Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAV157	Containment Spray Pump Suction Line Check Valve	2	C	SIP-001 / G13
SIBV158	Containment Spray Pump Suction Line Check Valve	2	C	SIP-001 / B13
SIBV200	LPSI Pump Suction Line Check Valve	2	C	SIP-001 / B12
SIAV201	LPSI Pump Suction Line Check Valve	2	C	SIP-001 / F13

Function

These valves open to provide flowpaths to the suctions of the respective pumps.

SIBV200 and SIAV201 close to prevent overpressurization of the sump piping, to prevent the CS and HPSI pumps from drawing a suction on shutdown cooling, and to prevent loss of makeup during a LOCA should RCS pressure backseat the containment sump or RWT check valves.

Alternate Testing

These check valves will be part-stroke exercised open quarterly and full-stroke exercised open during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining disc position. During power operation, the valves can be part-stroke exercised open with flow when the associated pump is operated via the recirculation lines. Full-stroke exercising during power operation is not practical because pump discharge pressure is not sufficient to overcome RCS pressure, and there is not a recirculation flow path capable of routinely handling maximum accident condition flow as required by Generic Letter 89-04 Position 1. Full-stroke exercising during cold shutdown while on shutdown cooling is not practical because these valves are not in the shutdown cooling lineup (the shutdown cooling lines tap into the suction lines downstream from these valves). These valves can be full-stroke exercised open during refueling outages while the reactor refueling pool is being filled from the RWT by the LPSI and CS pumps.

This refueling outage justification is similar to VRR-30 in the first interval IST Program.

Refueling Outage Justification No. 12 (ROJ-12)

Shutdown Cooling Isolation Valve Bonnet Vent Check Valve Open and Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAVA10	Shutdown Cooling Isolation Valve Bonnet Vent Check Valve	2	AC	SIP-002 / G03
SIBVA15	Shutdown Cooling Isolation Valve Bonnet Vent Check Valve	2	AC	SIP-002 / G10
SIAV997	Shutdown Cooling Isolation Valve Bonnet Vent Check Valve	1	AC	SIP-002 / E03
SIBV998	Shutdown Cooling Isolation Valve Bonnet Vent Check Valve	1	AC	SIP-002 / D10

Function

These valves open to provide flowpaths from the bonnet area of SIAUV0655, SIBUV0656, SICUV0653, and SIDUV0654 to prevent pressure locking of the valves. They close for containment isolation.

Alternate Testing

Each of these valves will be full-stroke exercised open and exercised closed during each refueling outage.

Basis

These are simple check valves with no external means of exercising or for determining disc position. The only way to exercise the valves open is by initiating flow through the valves with an external pressure source via test fittings installed for that purpose. The only way to verify valve closure is to perform a reverse-flow test in the same manner. The shutdown cooling isolation valve associated with the check valve is rendered inoperable during testing.

Both the open and closure tests require the use of test equipment, whose setup makes testing impractical during power operation and cold shutdown outages. This justification is consistent with the provisions of NUREG-1482 section 4.1.4, which states that the NRC has determined that the need to set up test equipment is adequate justification to defer backflow testing of a check valve until a refueling outage. In addition, performing this testing on SIAV997 and SIBV998 requires containment entry. Containment entry for routine inservice testing is considered impractical during power operations.

This refueling outage justification is similar to CSJ-34 in the first interval IST Program.

Valve Relief Request No. 1 (VRR-01)

Emergency Diesel Generator Skid-Mounted Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
DGAV317	EDG Engine-Driven Jacket Water Circ Pump Discharge Check Valve	3	C	DGP-001 Sh. 4 / F06
DGAV318	EDG Motor-Driven Jacket Water Circ Pump Discharge Check Valve	3	C	DGP-001 Sh. 4 / D06
DGAV364	Pre-Lube Pump and Heater Check Valve	3	C	DGP-001 Sh. 3 / C06
DGBV417	Engine-Driven Jacket Water Circ Pump Discharge Check Valve	3	C	DGP-001 Sh. 4 / F02
DGBV418	Motor-Driven Jacket Water Circ Pump Discharge Check Valve	3	C	DGP-001 Sh. 4 / D02
DGBV464	Pre-Lube Pump and Heater Check Valve	3	C	DGP-001 Sh. 3 / C02

Function

These check valves on the emergency diesel generator (EDG) skid open for jacket water flow and lube oil flow when the EDG is starting or running.

Test Requirement

Check valves shall be exercised nominally every 3 months, except as provided by Paragraph 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. (OM-10 para. 4.3.2)

Alternate Testing

These check valves will be tested during periodic EDG testing performed in accordance with plant Technical Specifications; All valves will be tested at least once per quarter. Acceptable valve operation will be verified by successfully meeting the starting and running acceptance criteria for the EDG.

Basis For Relief

These check valves were purchased as part of the EDG skid and are mounted on the skid. They are simple check valves with no external means of exercising or for determining disc position. Thus, testing these valves in the open direction requires establishing maximum required accident condition flow through the valve and verifying, by measurement, that the required flow is attained. Due to system design there is no flowpath available with suitable installed instrumentation capable of measuring flow through these valves.

Current plant Technical Specifications require test starting the EDG every 31 days. During testing, each redundant starting subsystem is tested on a rotating basis to ensure that a failure in one starting subsystem is not masked by operation of the other starting subsystem. The EDG must start and attain proper speed, frequency, and voltage within 10 seconds to be considered a successful test. Valve malfunction or degradation will reduce EDG starting and running capability. Therefore testing the EDG is adequate since EDG

testing adequately tests these skid-mounted valves.

The provisions of this relief request are consistent with NUREG-1482 section 3.4, and para. ISTC 1.2(c) of OMa-1996.

Approval

Approval not required. NUREG-1482 section 3.4 states that "testing of the major component is an acceptable means for verifying the operational readiness of the skid-mounted and component subassemblies if the licensee documents this approach in the IST Program." This VRR provides the requisite documentation.

This valve relief request is similar to VRR-16 in the first interval IST Program.

Valve Relief Request No. 2 (VRR-02)

ADV Nitrogen Solenoid Valve Stroke Timing

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGBPV0306A	ADV Nitrogen Solenoid Valve	3	B	SGP-001 Sh. 2 / F5
SGBPV0306B	ADV Nitrogen Solenoid Valve	3	B	SGP-001 Sh. 2 / E5
SGAPV0313A	ADV Nitrogen Solenoid Valve	3	B	SGP-001 Sh. 2 / C5
SGAPV0313B	ADV Nitrogen Solenoid Valve	3	B	SGP-001 Sh. 2 / H5

Function

These valves are normally closed to isolate the normal atmospheric dump valve (ADV) actuation system (instrument air) from the nitrogen backup system - not a safety function. They open on low instrument air header pressure to supply nitrogen from the accumulators to the ADV.

Test Requirement

The limiting value(s) of full-stroke time of each power-operated valve shall be specified by the Owner. (OM-10 para. 4.2.1.4(a))

The stroke time of all power-operated valves shall be measured to at least the nearest second. (OM-10 para. 4.2.1.4(b))

Alternate Testing

The ADV nitrogen solenoid valves will be exercised during quarterly testing of the associated ADV nitrogen backup system. The ADV nitrogen solenoid valves will not be individually stroke time tested. Operational readiness of the solenoid valves will be verified by acceptable exercising and stroke timing of the ADV when actuated by the nitrogen backup system.

Basis For Relief

Each ADV has a nitrogen backup system that can be used to actuate the ADV if instrument air is not available. The solenoid valves are simple solenoid-operated valves that automatically open to enable the nitrogen backup system when low pressure is sensed in the instrument air header. There are no hand switches for manual operation of the valves, and no means of visually determining valve position. Stroke timing these valves is not possible without lifting leads or using other intrusive testing equipment, which would render the ADV inoperable for the duration of the test. Therefore stroke timing these valves is not considered practical.

The solenoid valves have no specific time in which they must actuate to fulfill their safety function. Solenoid valve malfunction or degradation will reduce ADV stroking capability. The ADV must stroke properly within the required stroke time to be considered a successful test. Testing the ADV is adequate to verify the operational readiness of the solenoid valves.

The provisions of this relief request are consistent with the guidance provided

in NUREG-1482 section 3.4 on testing component subassemblies, and and with para. ISTC 1.2(c) of OMa-1996.

Approval Approval not required. NUREG-1482 section 3.4 states that "testing of the major component is an acceptable means for verifying the operational readiness of the skid-mounted and component subassemblies if the licensee documents this approach in the IST Program." This VRR provides the requisite documentation.

Valve Relief Request No. 3 (VRR-03)

EC Surge Tank Nitrogen Supply Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
ECAV043	Nitrogen Supply Check Valve to Essential Chilled Water Exp Tank ECA-T01	3	C	ECP-001 / C07
ECBV064	Nitrogen Supply Check Valve to Essential Chilled Water Exp Tank ECB-T01	3	C	ECP-001 / C03

Function

These check valves open to provide flowpaths from the plant service nitrogen header to the associated essential chilled water expansion tank - non-safety function. They close to ensure that inventory is preserved and overpressure is maintained in the Essential Chilled Water expansion tank.

Test Requirement

Check valves shall be exercised nominally every 3 months, except as provided by Paragraph 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. (OM-10 para. 4.3.2)

As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to determine operability of check valves may be used. (OM-10 para. 4.3.2.4(c))

Alternate Testing

During each reactor refueling outage, at least one of these valves will be disassembled, inspected, and manually exercised closed on a rotating schedule. If the disassembled valve is not capable of closing or there is binding or failure of valve internals, the other valve in that group will also be disassembled, inspected, and manually full-stroke exercised during the same outage.

Basis For Relief

These are simple check valves with the same manufacturer, size, model, materials, orientation, and service conditions. There is no external means of exercising or for determining disc position. It is not practical to verify these valves closed by performing a reverse-flow test, because each of these check valves is installed in series immediately downstream of another check valve. The check valve pair has no intermediate test connections or other provisions for verifying that the valve being tested is closed.

Disassembling and inspecting each valve every refueling outage is burdensome because the valve cannot be isolated from the associated EC expansion tank. The expansion tank must be depressurized and vented to disassemble the valve, which renders the entire train of EC inoperable for an

extended period of time. The EC system provides cooling for the LPSI pump rooms, and other cooling functions which are required during refueling outages. Extended outages of both EC trains during every refueling outage would be a hardship because refueling outages are scheduled on a train basis, i.e. one safety train is out of service for most of the outage and the work done on the other train is minimized. The outage train is alternated from one outage to the next. Inspecting the check valve on the non-outage train would have a major impact on scheduling that could extend the duration of the outage. One inspection each refueling outage will allow the ECAV043 to be inspected during "A-train" outages and ECBV064 to be inspected during "B-train" outages.

Approval Specific approval not required. This alternate testing complies with the guidelines of NRC Generic Letter 89-04, Position 2 and with related comments and recommendations in NUREG-1482, Appendix A.

Valve Relief Request No. 4 (VRR-04)

SI Pump Room Floor Drain Check Valve Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
RDAV020	Containment Spray Pump "A" Room Floor Drain Check Valve	3	C	RDP-002 / B14
RDAV021	HPSI Pump "A" Room Floor Drain Check Valve	3	C	RDP-002 / B14
RDAV022	LPSI Pump "A" Room Floor Drain Check Valve	3	C	RDP-002 / B14
RDBV040	Containment Spray Pump "B" Room Floor Drain Check Valve	3	C	RDP-002 / B05
RDBV041	HPSI Pump "B" Room Floor Drain Check Valve	3	C	RDP-002 / B05
RDBV042	LPSI Pump "B" Room Floor Drain Check Valve	3	C	RDP-002 / B05

Function

These check valves open to allow floor drain flow from the respective pump room to the associated engineered safety feature sump. They close to prevent back-flooding from the sump to the pump rooms.

Test Requirement

During plant operation, each check valve shall be exercised or examined in a manner which verifies obturator travel to the closed, full-open or partially open position required to fulfill its function. (OM-10 para. 4.3.2.2)

As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to verify operability of check valves may be used. (OM-10 para. 4.3.2.4(c))

Alternate Testing

Each fuel cycle, at least 3 of these valves (on a rotating schedule) will be disassembled, inspected, and manually full-stroke exercised. If, during inspection, it is discovered that a valve is incapable of performing its required functions, then the remaining valves will be disassembled, inspected, and manually full-stroke exercised during the same refueling outage (if the inspection is performed during a refueling outage) or within 96 hours after the subject valve is returned to service (if the inspection is performed at other times).

Basis For Relief

These are simple check valves with no external provision for exercising or for determining disc position. The only methods of exercising open and closed are by flow testing, or by disassembly and inspection. Due to the system configuration, forward and reverse flow testing measurements are impractical.

All six of these valves are identical with respect to manufacturer, size, model,

orientation, and service conditions. Numerous previous inspections have not found any evidence of valve degradation that would affect their ability to open or close.

Since the frequency for disassembling and inspecting these valves in the floor drain system is not determined by refueling outages, inspection may be performed on a schedule that does not conform to a refueling outage schedule, such as during power operation. This is allowed as discussed in NUREG-1482, Appendix A, Question Group 14, under "Current Considerations".

Generic Letter 89-04 Position 2 allows a sample disassembly and inspection plan to be implemented where the licensee determines that it is burdensome to disassemble and inspect all applicable valves during each refueling outage. Although these valves are not especially difficult to access, disassemble, or inspect, inspecting every valve in the group each fuel cycle is burdensome in that it creates a hardship without a compensating increase in the level of quality and safety.

The proposed sample disassembly schedule results in each valve being disassembled and inspected every 3 years. It is noted that this is half of the maximum inspection interval of 6 years recommended under Position 2. The proposed inspection frequency is adequate for assuring continued reliability and operational readiness of these valves.

Approval — Specific approval not required. The disassembly and inspection sampling plan complies with the guidelines of NRC Generic Letter 89-04, Position 2 for disassembly and inspection of check valves, and with related comments and recommendations in NUREG-1482, Appendix A.

Valve Relief Request No. 5 (VRR-05)
Downcomer Feedwater Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SGEV642	Downcomer Feedwater Otbd. Check Valve To Steam Gen. #1	2	C	SGP-002 / G11
SGEV652	Downcomer Feedwater Inbd. Check Valve To Steam Gen. #1	2	C	SGP-002 / G10
SGEV653	Downcomer Feedwater Inbd. Check Valve To Steam Gen. #2	2	C	SGP-002 / C10
SGEV693	Downcomer Feedwater Otbd. Check Valve To Steam Gen. #2	2	C	SGP-002 / C11

Function

These valves are normally open during power operation to provide flowpaths for feedwater flow to the steam generators - non-safety function. They close to isolate and maintain the integrity of the steam generators and to prevent diversion of auxiliary feedwater flow from the associated steam generator to the non-safety grade main feedwater system.

Test Requirement

During plant operation, each check valve shall be exercised or examined in a manner which verifies obturator travel to the closed, full-open or partially open position required to fulfill its function. (OM-10 para. 4.3.2.2(a))

Alternate Testing

These valves will be verified to close by performing a reverse-flow test on the series combination of valves at cold shutdown. In the event that both valves fail to close, the combination will be declared inoperable and corrective actions will be taken for both valves, as necessary.

Basis For Relief

In order to test these valves to the closed position, flow through the associated feedwater header must be secured. During power operations isolation of a feedwater header would require a significant power reduction and could result in unacceptable steam generator level transients with the potential for a plant trip.

These are simple check valves with no external means of exercising nor for determining disk position. Attempts to verify closure by non-intrusive testing have been inconsistent. Consequently, the only practical method for determining disk position is by performing a reverse-flow test, however, these check valves are installed with each pair in series with no intermediate test connections or other provisions for verifying that each individual valve is closed.

Both valves are designated as ISI Class 2, and are subject to the same ISI and

quality assurance requirements. Note that only one of these valves needs to close to provide the required isolation function.

Approval Submitted for relief in accordance with 10 CFR 50.55a(f)(5)(iii). This relief request complies with the guidelines for series check valve pairs provided in NUREG-1482, Paragraph 4.1.1.

Valve Relief Request No. 6 (VRR-06)

Containment Spray Check Valve Open and Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAV164	Containment Spray Discharge To Spray Headers Check Valve	2	AC	SIP-002 / F08
SIBV165	Containment Spray Discharge To Spray Headers Check Valve	2	AC	SIP-002 / F06

Function

These check valves open to provide flowpaths from the containment spray pump discharge headers to the containment spray headers. They close for containment isolation.

Test Requirement

Check valves shall be exercised nominally every 3 months, except as provided by Paragraph 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. (OM-10 para. 4.3.2)

As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to determine operability of check valves may be used. (OM-10 para. 4.3.2.4(c))

Alternate Testing

During each reactor refueling outage at least one of these valves will be disassembled, inspected, and manually exercised on a sequential and rotating schedule. If, in the course of this inspection a valve is found to be inoperable with respect to its function to fully open, then the other valve will be inspected during the same outage.

Each of these valves will be leakrate tested

- Following re-assembly after inspection, and
- On a schedule consistent with the Appendix J Containment Leak Rate Testing Program.

Basis For Relief

These are simple check valves with no external means of exercising or determining disc position. The only method for exercising to the full open position requires establishing accident flow through each valve. Since no recirculation flowpath exists downstream of these valves, the only flowpath available for such a test would result in injecting radioactive-contaminated borated water into the containment spray headers and into the containment building via the spray nozzles. Dousing personnel and equipment in this manner is clearly undesirable.

Since these are simple check valves, they can only be verified closed by developing a differential pressure across the valves disc and measuring reverse flow. To perform such a test requires entry into the primary

containment, installation of a closure flange and performance of a local leakrate test. This evolution is beyond the scope of work performed during typical cold shutdown (non-refueling) outages. Note also that with the implementation of Appendix J Option B, these valves may be leak tested at intervals exceeding two years and each fuel cycle.

Per NUREG-1482, Appendix A, Question Group 24, closure testing of these valves requires each valve be opened and then confirmed to close. As discussed above, exercising in the open direction is not practical except by disassembly. In these cases these valves will be verified to be closed, however the testing will not include prior opening.

Each of these valves has been disassembled and inspected at least twice in the past and they have not displayed any indication of degradation that would impede their capability to perform their safety functions to open or close. These valves are identical with the same manufacturer, size, model designation, orientation, and service conditions.

Approval

Specific approval not required. This alternate testing complies with the guidelines of NRC Generic Letter 89-04, Position 2 and with related comments and recommendations in NUREG-1482, Appendix A.

This valve relief request is similar to VRR-31 in the first interval IST Program.

Valve Relief Request No. 7 (VRR-07)

Containment Sump Discharge Check Valve Open Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIAV205	Containment Sump Discharge Check Valve	2	C	SIP-001 / F14
SIBV206	Containment Sump Discharge Check Valve	2	C	SIP-001 / A14

Function

These check valves open to provide flowpaths from the containment sump to the containment spray and safety injection pumps during post-accident recirculation cooling.

Test Requirement

Check valves shall be exercised nominally every 3 months, except as provided by Paragraph 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. (OM-10 para. 4.3.2)

As an alternative to the testing in (a) or (b) above, disassembly every refueling outage to determine operability of check valves may be used. (OM-10 para. 4.3.2.4(c))

Where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. . . . A different valve of each group is required to be disassembled, inspected, and manually full-stroke exercised at each successive refueling outage, until the entire group has been tested. . . . Once this is completed, the sequence of disassembly must be repeated unless extension of the interval can be justified. (NUREG-1482, Appendix A, Position 2, (c))

Alternate Testing

One valve will be disassembled, inspected, and full-stroke exercised during a refueling outage, and the other valve during the next refueling outage. If both inspections are satisfactory, no inspections will be performed during the following two outages. The inspection cycle will then be repeated, starting with the first valve inspected.

If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the other valve will also be disassembled, inspected, and full-stroke exercised during the same outage. The inspection intervals will be evaluated and reduced as necessary to ensure continued operational readiness of all valves in the group.

(Note: The inspection interval will be one valve each refueling outage until this relief request is approved by the NRC.)

Basis For Relief

These are 24" simple check valves with no external means of exercising or determining obturator position. The valves are identical with the same manufacturer, size, model designation, orientation, and service conditions.

Exercising with system flow is not practical since there is no water inventory available in the containment sump. Flooding the sump for such a test is undesirable and impractical since it would have the potential for upsetting the chemistry of the RCS by introducing contaminants into the safety injection system.

Partial stroking of the valves could be achieved at any plant condition (at power or shutdown) by pressurizing the upstream piping with air or nitrogen via the air test connection. This is not considered practical because of the potential for creating an airborne contamination personnel hazard in the auxiliary and containment buildings. Note also that such a test would be of little value in verifying valve operational readiness.

Disassembly of these large valves is difficult and consumes a considerable amount of plant resources. Therefore these valves were placed in a rotating disassembly and inspection program during the first IST interval, where a different valve was inspected during each refueling outage. Now that experience has been gained with these valves, sufficient justification exists to extend the inspection interval.

The new inspection schedule would inspect one valve during an outage, the other valve during the next outage, and then skip two outages before the cycle is repeated. Under the proposed schedule, each valve would be inspected once every 6 years, same as if the interval were simply doubled so that one valve were inspected every other refueling outage. Doubling the interval is not practical because refueling outages are scheduled on a train basis, i.e. one safety train is out of service for most of the outage and the work done on the other train is minimized. The outage train is alternated from one outage to the next. Inspecting one valve every other refueling outage would result in performing all the inspections either in "A" train outages or "B" train outages. Performing this inspection on the non-outage train would have a major impact on scheduling that could extend the duration of the outage.

The proposed schedule is acceptable for the following reasons:

- All 6 valves (2 in each unit) have been disassembled and inspected at least twice during the first IST interval. The condition of each valve and the valve's capability to be full-stroked is documented in detail in the applicable surveillance test packages and work orders. All the inspections

satisfactorily demonstrated the ability of the valve to stroke fully. Only one inspection found any kind of abnormality: When 3SIAV205 was inspected in 1994, a brown rust-like coating was found on the swing arm. Although this coating did not interfere with the operation of the valve, it did inhibit a complete visual inspection of the swing arm as required by site procedures. After evaluation the foreign material was removed and the inspection was completed.

- Industry experience, including a number of NPRDS reports, were reviewed to determine if there were any known check valve failures for similar applications. The review identified 7 cases of bonnet gasket leakage, but no material or functional failures affecting to the ability of the check valve to function.

- The installation of the valves has been reviewed as part of the PVNGS check valve program, which was developed in response to INPO SOER 86-03. Although the location of the valves does not meet the EPRI criteria regarding upstream flow disturbances, i.e. elbows and tees within 5 pipe diameters or pumps and valve within10 pipe diameters, the evaluation determined that these criteria are not applicable because these valves are normally not subjected to flow.

- Stress corrosion cracking of the swing arm or hinge pin are not significant concerns because these parts have been heat treated to reduce their susceptibility to these phenomena.

- The proposed test schedule retains the benefits of a sampling inspection program, even though the intervals between inspections are not equal. As stated above, all the containment sump check valves have been inspected at least twice, and no problem or defect affecting operational readiness has ever been found. The valves are not exercised except during testing or an emergency, so excessive wear between inspections is not a concern. The valves are installed in a clean system, so silting or excessive corrosion from sitting idle during the test interval are not concerns either. Because of the reliability of the valves, both predicted and demonstrated, it is unlikely that the benefits of continuing to perform a sample disassembly every refueling outage would ever be realized. Therefore it is concluded that the loss of benefits of sampling is minimal.

- In order to assess the impact on plant safety of implementing the proposed inspection schedule, the change was evaluated from a probabilistic risk perspective. This study determined that the increase in core damage frequency is on the order of 9.0E-08/yr, representing a 0.190% increase. However, this study did not account for fewer inspections decreasing the chance of the valve being reassembled incorrectly. The aggregate effect

of the schedule change is very little, if any, impact on plant safety.

- The radiation exposure received during disassembly and inspection of one of these valves is approximately 0.5 man-rem. With 3 units on the proposed inspection schedule, PVNGS would save an average of 0.5 man-rem per year. Although a small percentage of the annual site exposure, it is still a significant dose savings.

- It costs approximately $10,000 to disassemble and inspect one of these valves. Again, although a $10,000 savings per year is not a major impact on the site budget, it is still a significant amount.

This justification shows that the proposed schedule for disassembly and inspection meets all the criteria given in NUREG-1482 Appendix A Position 2 for extending the interval. The proposed disassembly and inspection schedule provides an acceptable level of quality and safety.

Approval

Submitted as an alternative in accordance with 10 CFR 50.55a(a)(3). As such, this alternative will not be implemented until authorized by the NRC. While awaiting authorization, the inspection interval will be one valve each refueling outage on a rotating basis per Generic Letter 89-04 Position 2. This relief request complies with the guidelines of NRC Generic Letter 89-04, Position 2 and with related comments and recommendations in NUREG-1482, Appendix A.

This valve relief request supersedes VRR-32 in the first interval IST Program.

Valve Relief Request No. 8 (VRR-08)

SI Check Valve Closed Exercising

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
SIEV215	SIT Discharge Check Valve	1	AC	SIP-002 / A15
SIEV217	Safety Injection Check Valve	1	AC	SIP-002 / A13
SIEV225	SIT Discharge Check Valve	1	AC	SIP-002 / A12
SIEV227	Safety Injection Check Valve	1	AC	SIP-002 / A10
SIEV235	SIT Discharge Check Valve	1	AC	SIP-002 / A07
SIEV237	Safety Injection Check Valve	1	AC	SIP-002 / A06
SIEV245	SIT Discharge Check Valve	1	AC	SIP-002 / A05
SIEV247	Safety Injection Check Valve	1	AC	SIP-002 / A04
SIEV540	SI Header Check Valve	1	AC	SIP-002 / B13
SIEV541	SI Header Check Valve	1	AC	SIP-002 / B11
SIEV542	SI Header Check Valve	1	AC	SIP-002 / C06
SIEV543	SI Header Check Valve	1	AC	SIP-002 / C04
SIAV522	HPSI Long-Term Recirc. Check Valve	1	AC	SIP-002 / C02
SIAV523	HPSI Long-Term Recirc. Check Valve	1	AC	SIP-002 / F02
SIAV532	HPSI Long-Term Recirc. Check Valve	1	AC	SIP-002 / B10
SIAV533	HPSI Long-Term Recirc. Check Valve	1	AC	SIP-002 / F09

Function These valves close to provide safety system isolation from the reactor coolant system.

Test Requirement Check valves shall be exercised nominally every 3 months, except as provided by Paragraph 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. (OM-10 para. 4.3.2)

Alternate Testing The closure capability of these check valves will be demonstrated by performing leak rate testing in accordance with applicable Technical Specification requirements.

Basis For Relief These are simple check valves with no external means of exercising nor for determining disc position. The only practical means of verifying closure is by performing a leakage or back flow test. This typically involves a considerable effort with the test connections and valves required for the test alignment in radiation areas with inconvenient access provisions.

Leak testing to verify the closure capability of these valves is primarily for the purpose of confirming their capability of preventing over-pressurization of the

related safety injection piping and components. In this regard, the Palo Verde Technical Specifications address the valve test frequency in a manner appropriate for these valves. Technical Specifications (SR 3.4.15.1) requires verifying that the leakage of each valve is within its limit at least once per 18 months, and prior to entering MODE 2 whenever the plant has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months, except for SDC PIVs, and within 24 hours following valve actuation due to automatic or manual action or flow through the valve, except for SDC PIVs. Performing leak testing as prescribed in the Technical Specifications is adequate to ensure proper and reliable closure of these valves.

Approval Submitted for relief in accordance with 10 CFR 50.55a(f)(5)(iii).

Valve Relief Request No. 9 (VRR-09)

Verification of Thermal Equilibrium During Safety/Relief Valve Testing

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
Various	All safety and relief valves tested under ambient conditions using a test medium at ambient conditions	Various	C	Various

Function Provide over-pressure protection to associated systems.

Test Requirement Temperature Stability. The test method shall be such that the temperature of the valve body shall be known and stabilized before commencing set pressure testing, with no change in measured temperature of more than 10 deg-F (5 deg-C) in 30 minutes. (OM-1 para. 8.1.2.4 and 8.1.3.4)

Alternate Testing For safety and relief valves tested under ambient conditions using a test medium at ambient conditions, the valve body temperature will be measured and recorded prior to each series of tests (which may consist of multiple lifts) but there will be no verification of attaining thermal equilibrium.

Basis For Relief This is a generic request for relief for all safety and relief valves tested under ambient conditions using a test medium at ambient conditions. For valves tested under normal prevailing ambient conditions with test medium at approximately the same temperature, the requirement for verifying temperature stability is inappropriate and of no value. There is little or no consequence of minor variations in ambient temperature.

This issue has been identified by the ASME OM Code Committees and is reflected in the 1995 version of the Code, Paragraphs I 8.1.2(d) and I 8.1.3(d).

Approval Submitted as an alternative in accordance with 10 CFR 50.55a(a)(3). As such, this alternative will not be implemented until authorized by the NRC.

Valve Relief Request No. 10 (VRR-10)

Accumulator Volume for Safety/Relief Valve Testing

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
Various	All Class 2 and 3 safety and relief valves used for compressible fluid services other than steam	Various	C	Various

Function Provide over-pressure protection to associated systems

Test Requirement Accumulator Volume. There shall be a minimum accumulator volume below the valve inlet, based on the valve capacity (cu ft) and calculated from the following formula:

Minimum Volume = [valve capacity (cu ft per sec) x time open (sec) / 10. (OM-1 para. 8.1.2.2)

Alternate Testing The volume of the accumulator drum and the pressure source flow rate shall be sufficient to determine the valve set-pressure. (Ref. ASME OM Code-1995, para. I 8.1.2)

Basis For Relief This is a generic request for relief for all Class 2 and 3 safety and relief valves used for compressible fluid services other than steam. The accumulator volume required by OM-1 para. 8.1.2.2 is not needed for determination of the set pressure for these valves. This has been recognized by the ASME Code Committee and reflected in more recent versions of the OM Code.

Approval Submitted as an alternative in accordance with 10 CFR 50.55a(a)(3). As such, this alternative will not be implemented until authorized by the NRC.

Valve Relief Request No. 11 (VRR-11)
ANII Involvement in Valve Inservice Testing

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
Various	Various	Various	Various	Various

Function

Various

Test Requirement

Duties of the Authorized Nuclear Inspector include:
(c) verifying that the visual examinations and tests on pumps and valves have been completed and the results recorded. (Preface to Section XI)

It is the duty of the Inspector:
(1) to perform a detailed review of the inspection plan (IWA-2400) prior to the start of preservice inspection and each inspection interval . . . Review of the inspection plan shall cover any features of the inspection plan which are affected by the requirements of this Division, as applicable, and shall include the following:

- (a) examination categories and items
- (b) test and examination requirements
- (e) inservice test quantities
- (g) test frequency

(2) to review any revisions to the inspection plan during the preservice inspection or the inspection interval;
(3) to submit a report to the Owner documenting review of the items identified in (1) and (2) above; (IWA-2110(a))

It is the duty of the Inspector to verify that the inservice tests required on pumps, valves, and component supports (IWF, IWP, and IWV) have been completed and the results recorded. (IWA-2110(c))

Alternate Testing

The PVNGS Pump and Valve IST Program will be developed and implemented in accordance with applicable regulations, codes, quality assurance requirements, plant procedures, and Authorized Inspection Agency requirements. ANII involvement with the Pump and Valve IST Program will not be required.

Basis For Relief

This is a generic relief request for all valves tested in the PVNGS Pump and Valve IST Program. In the nuclear industry, the Authorized Nuclear Inservice Inspectors (ANIIs) have historically been involved primarily with the development and implementation of the Inservice *Inspection* Program. Involvement with the Inservice Testing Program has been minimal. This is consistent with the experience and training of the individual inspectors, who

are well schooled in the areas of plant construction and repair. Recognizing this, ASME recently published the OMb-1997 addenda to the ASME/ANSI OM Code, which includes a change that eliminates all involvement of the ANII in the development and implementation of the Inservice Testing Program.

Each revision to the PVNGS IST Program is subjected to a comprehensive review process including technical reviews, management reviews, and a review under 10 CFR 50.59. In addition, quality assurance evaluations and self-assessments periodically monitor the implementation of the IST Program. These measures, along with the constant attention by highly-qualified individuals tasked with program implementation ensure that the previous duties of the inspector are routinely and adequately performed and the intent of the ASME Code is maintained. Thus the proposed alternative testing provides an acceptable level of quality and safety.

Approval Submitted as a proposed alternative in accordance with 10 CFR 50.55a(a)(3). As such, the provisions of this relief request will not be implemented until authorized by the NRC.

Valve Relief Request No. 12 (VRR-12)

MOV Exercising and Stroke Timing

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
Various	MOVs in the IST Program	Various	Various	Various

Function Various

Test Requirement

Active Category A and B valves shall be tested nominally every 3 months, except as provided by paras. 4.2.1.2, 4.2.1.5, and 4.2.1.7. (OM-10 para. 4.2.1.1)

The limiting value(s) of full-stroke time of each power-operated valve shall be specified by the Owner. (OM-10 para. 4.2.1.4(a))

The stroke time of all power-operated valves shall be measured to at least the nearest second. (OM-10 para. 4.2.1.4(b))

Alternate Testing

All MOVs in the PVNGS IST Program are included in a periodic verification and preventive maintenance program. The activities of that program will be performed in place of Code-prescribed stroke time testing.

As part of the PVNGS MOV Program, the following preventive maintenance activities are performed periodically. The initial interval for preventive maintenance is every refueling cycle:

- The valve stem is lubricated
- The gear box and motor pinion compartment greases are sampled and analyzed
- The valve is full-stroke exercised in both the open and closed directions

Static diagnostic testing is performed periodically. The initial interval for static diagnostic testing is every second refueling cycle. The following activities are performed in conjunction with static diagnostic testing:

- Stem thrust or torque (as applicable), motor current, spring pack movement, actuation of torque and limit switches, and stroke time are measured and evaluated
- Actuator performance and packing loads are assessed
- The thrust/torque setpoint is verified to be within the required band
- The thrust/torque setpoint is adjusted, if required
- The limit switch settings are verified
- A visual inspection of the overall actuator condition and limit switch compartment is performed

The results of each test or preventive maintenance activity are evaluated to identify trends. This evaluation also considers additional factors such as the valve's importance to safety, maintenance and performance history, and other pertinent information to determine whether test and preventive maintenance intervals continue to be appropriate or should be revised.

Basis For Relief

The industry has long recognized the limitations of using stroke-time testing as a means of monitoring the operational readiness of MOVs. After nuclear power plant experience, valve performance problems, and MOV research revealed that the focus of the ASME Code on stroke time and leak-rate testing for MOVs was not sufficient, the NRC issued Generic Letters 89-10 and 96-05. GL 89-10 requested licensees to ensure the capability of MOVs in safety-related systems to perform their intended functions by reviewing MOV design bases, verifying MOV switch settings initially and periodically, testing MOVs under design basis conditions where practicable, improving evaluations of MOV failures and necessary corrective action, and trending MOV problems. Generic Letter 96-05 requested licensees to establish a program, or to ensure the effectiveness of their current programs, to verify on a periodic basis that safety-related MOVs continue to be capable of performing their safety functions.

The PVNGS MOV Program was developed as part of the response to GLs 89-10 and 96-05. This program, which includes both periodic testing and preventive maintenanance elements, complies with the requirements of GL 89-10. The requirements of GL 96-05 are being implemented as described in the response to GL 96-05.

All MOVs in the PVNGS IST Program are included in the PVNGS MOV Program. The periodic verification and preventive maintenance activities performed under the PVNGS MOV Program, together with the other testing performed on these valves in the IST Program, such as valve position verification testing and leak rate testing, provide adequate assurance of MOV operational readiness. The additional assurance of operational readiness provided by continuing traditional IST exercising and stroke time testing is negligible. Thus the testing proposed by this relief request provides an acceptable level of quality and safety.

Approval

Submitted as a proposed alternative in accordance with 10 CFR 50.55a(a)(3). GL 96-05 states that the NRC would consider a periodic verificaton program that provides an acceptable level of quality and safety as an alternative to the current IST requirements for stroke-time testing and could authorize such an alternative, upon application by a licensee, pursuant to the provision of 10 CFR 50.55a(a)(3)(i). The provisions of this proposed alternative will not be implemented until authorized by the NRC. Until this authorization is granted, the MOVs in the IST Program will continue to be exercised and stroke time tested in accordance with OM-10 and as described elswhere in the PVNGS IST Program.

Valve Relief Request No. 13 (VRR-13)
Check Valve Condition Monitoring

Valve ID	Valve Description	Code Class	Category	Drawing / Coord.
Various	Various check valves	Various	C and AC	Various

Function Various

Test Requirement Check valves shall be exercised nominally every 3 months, except as provided by paras. 4.3.2.2, 4.3.2.3, 4.3.2.4, and 4.3.2.5. (OM-10 para. 4.3.2.1)

Alternate Testing As an alternative to the testing or examination requirements of OM-10 para. 4.3.2.1 through 4.3.2.5, check valves may be placed in a condition monitoring program. The program shall be implemented in accordance with the ASME OMa-1996 Code, Appendix II, Check Valve Condition Monitoring Program. If the condition monitoring program is discontinued, the requirements of OM-10 section 4.3.2 shall apply.

Basis For Relief The purpose of the Condition Monitoring Program is to both improve check valve performance and to optimize testing, examination, and preventive maintenance activities in order to maintain the continued acceptable performance of a select group of check valves. Certain check valves (i.e. "bad performers") need more attention in order to determine their failure or maintenance patterns. Once these mechanisms have been analyzed, confirmed, and the valve or group of similar valves have had their performance improved, then the same level of attention is no longer needed. Certain other check valves (i.e. "good performers") need less attention as they have continuouisly exhibited acceptable operation every time they have been disaassembled and examined or every time they have been non-intrusively tested. After the reasons for their behavior have been analyzed, and confirmed, then the test, examination, and preventive maintenance activities necessary to maintain the continued acceptable performance can be optiminzed. Once optimized, the same level of attention is no longer needed.

These examples demonstrate how the same types of tests and their associated intervals may need to be periodically adjusted based on the valves's performance. The use of Appendix II provides a process that allows certain flexibility in establishing the types of test, examination, and preventive maintenance activities and their associated intervals. Use of condition monitoring will:

- Make inservice testing more flexible to adapt to different testing situations or preferences. Different types of analysis techniques can be used. Each

valve can be approached in a slightly different manner based on the increasing skill levels of the individuals involved or the resources available.

- Allow for analysis and provide some flexibility for decision making regarding the specification of the type and of the interval of tests, examinations, and preventive maintenance activities.
- Shift emphasis to the "bad performers" or problem valves by increasing the scope or interval of testing, monitoring, or examining activities until the cause is determined and the condition is corrected.
- Shift emphasis from the "good performers" or valves that have continuously exhibited acceptable performance by decreasing the scope of frequency of testing, monitoring, or examining activities. Sufficient test, examination and preventive maintenance activity experience is needed before the scope of activities and their interval is adjusted.
- Improve on failure detection capability and on the predictive capability as other activities that are geared to determine the condition of the valve are used. The current IST testing just uses exercising which provides a "snapshot" picture of the valve but gives no clue as to the future performance capability of the valve.
- Increase preventive maintenance activities, not just by creating activities, but because there is a reason for doing them.

The current check valve testing program as described in OM-10 is extremely rigid and inflexible. Once this program is established, there is the tendency to put it on "auto pilot". Yet for all the of the plant resources that go into running this test program, check valve failures are still likely to occur. Many of these failures cannot be predicted by OM-10 testing, and studies show that many are not even detected by OM-10 testing.

The ASME OM Committee spent several years developing requirements for a check valve condition monitoring program that would lead to these goals. After review and approval at many different levels, these requirements were published with the OMa-1996 Addenda to the OM Code. Implementation of these requirements in place of the check valve exercising requirements of OM-10 para. 4.3.2 will provide an equivalent level of quality and safety.

Approval Submitted as a proposed alternative in accordance with 10 CFR 50.55a(a)(3). As such, the provisions of this relief request will not be implemented until authorized by the NRC.

Legends and Abbreviations

Pump Table Legend

Pump ID	Plant equipment identifier. The first 2 letters in the ID indicate the system.
Description	Name / description of the pump
Code Class	ISI classification of the pump: 1, 2, 3, or N (non-class)
Drawing / Coord.	Piping and Instrument Diagram number and coordinates showing the pump
Test Parameters	The table indicates the frequency which pump speed, pressure, flow rate, and vibration are measured, along with any applicable relief requests
Test Procedure	Procedure(s) which satisfy the testing requirements
Remarks	Additional explanation or clarification, if required

Valve Table Legend

Valve ID	Plant equipment identifier. The first 2 letters in the ID indicate the system.
Description	Name / description of the valve
Drawing	Piping and Instrument Diagram number showing the valve
Coord	Coordinates where the valve is located on the drawing
Sht#	Drawing sheet number
ISI Class	ISI classification of the valve: 1, 2, 3, or N (non-class)
Size	Nominal pipe size of the valve, in inches
Type	Valve type: BF Butterfly Valve CK Check Valve DI Diaphragm valve GA Gate Valve GL Globe Valve PSV Pressure Safety Relief Valve
Act.	Valve actuator type: AO Air Operated HY Hydraulically Operated MA Manually Operated MO Motor Operated SA Self Actuating SO Solenoid Operated
Cat.	Valve category, per OM-10 para. 1.4 and 2: A, B, C, or D.
A/P	A (active) or P (passive) valve, per OM-10 para. 1.3.
S.P.	Safety position: O (open), C (closed), or OC (both open and closed).

Test Test(s) performed on the valve. The first two letters indicate the type of test:

AJ	Appendix J Leak Test
FS	Full Stroke Exercise Test
FT	Fail Safe Test
LT	Leak Test other than an Appendix J Test
PS	Partial Stroke Exercise Test
ST	Stroke Time Test
SV	Pressure Safety Relief Valve Test
VP	Valve Position Indication Test

A third letter is used where required to indicate stroke direction: O (open) or C (closed).

Freq Frequency at which a test is performed:

CLR	Per the Containment Leak Rate Program
CSD	Cold Shut Down
QTR	Quarterly
RFO	Refueling Outage
STF	Special Test Frequency
1YR	Once per year
18M	Once per 18 months
2YR	Once every 2 years
5YR	Per OM-1 para. 1.3.3.1 (at least once every 5 years)
10Y	Per OM-1 para. 1.3.4.1 (at least once every 10 years)

Procedure Procedure in which the test is performed

CSJ/ROJ/VRR Applicable Cold Shutdown Justification, Refueling Outage Justification, or Valve Relief Request

Remarks Additional explanation or clarification, if required

Abbreviations

ACU	Air Conditioning Unit
AF	Auxiliary Feedwater system
AFAS	Auxiliary Feedwater Actuation Signal
AFW	Auxiliary Feedwater
ANII	Authorized Nuclear Inservice Inspector
AOV	Air-Operated Valve
ASME	American Society of Mechanical Engineers
BAMP	Boric Acid Makeup Pump
CEDM	Control Element Drive Mechanism
CH	Charging system
CIAS	Containment Isolation Actuation Signal
CIV	Containment Isolation Valve
CP	Containment Purge system
CPIAS	Containment Purge Isolation Actuation Signal
CS	Containment Spray
CSD	Cold Shutdown
CSJ	Cold Shutdown Justification
CST	Condensate Storage Tank
CT	Condensate Transfer system
DF	Diesel Fuel system

DG	Diesel Generator system
DW	Demineralized Water system
EC	Essential Chilled Water system
EDG	Emergency Diesel Generator
ESF	Engineered Safety Features
EW	Essential Cooling Water system
FP	Fire Protection system
FWIV	Feedwater Isolation Valve
GA	Service Gas system
GL	Generic Letter
GR	Gaseous Radwaste system
H2	Hydrogen
HC	Containment HVAC system
HP	Hydrogen Purge system
HPSI	High Pressure Safety Injection
HVAC	Heating, ventilation, and air conditioning
IA	Instrument Air system
ISI	Inservice Inspection
IST	Inservice Testing
LCO	Limiting Condition for Operation
LOCA	Loss of Coolant Accident
LPSI	Low Pressure Safety Injection
LTOP	Low Temperature Over Pressure
MFIV	Main Feedwater Isolation Valve
MOV	Motor-Operated Valve
MSIV	Main Steam Isolation Valve
NC	Nuclear Cooling Water system
PASS	Post-Accident Sampling System
PEN.	Penetration
PRR	Pump Relief Request
PVNGS	Palo Verde Nuclear Generating Station
RC	Reactor Coolant system
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RD	Radioactive Drains
RDT	Reactor Drain Tank
RMW	Reactor Makeup Water
ROJ	Refueling Outage Justification
RWT	Refueling Water Tank
SDC	Shutdown Cooling
SG	Steam Generator
SG	Main Steam system
SI	Safety Injection system
SIAS	Safety Injection Actuation Signal
SIT	Safety Injection Tank
SOV	Solenoid-Operated Valve
SP	Essential Spray Pond system
SR	Surveillance Requirement
SS	Sampling system
TDAFW	Turbine-Driven Auxiliary Feedwater Pump
TRM	Technical Requirements Manual
TS	Technical Specification
TSR	TRM Surveillance Requirement
VCT	Volume Control Tank
VRR	Valve Relief Request
WC	Normal Chilled Water system

Attachment 2

Engineering Study:

Evaluation of Palo Verde Nuclear Generating Station, Unit 3, Level Oscillations With Modified Steam Generators, 27-AS95-DB-001, Revision 00, December 20, 1995

PROPRIETARY
(Affidavit Included)

AFFIDAVIT PURSUANT TO 10 CFR 2.790

I, I.C. Rickard, depose and say that I am the Director, Operations Licensing, of Combustion Engineering, Inc., duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations and in conduction with the application of Arizona Public Services for withholding this information.

The information for which proprietary treatment is sought is contained in the following document:

> 27-AS95-DB-001 "EVALUATION OF PALO VERDE NUCLEAR GENERATING STATION UNIT 3 LEVEL OSCILLATIONS WITH MODIFIED STEAM GENERATORS"

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Combustion Engineering in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1. The information sought to be withheld from public disclosure, is owned and has been held in confidence by Combustion Engineering. It consists of information regarding the application of the LTC computer code and methodology for analysis of plant natural circulation cooldown.
2. The information consists of test data or other similar data concerning a process, method or component, the application of which results in substantial competitive advantage to Combustion Engineering.
3. The information is of a type customarily held in confidence by Combustion Engineering and not customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The details of the aforementioned system were provided to the Nuclear Regulatory Commission via letter DP-537 from F. M. Stern to Frank Schroeder dated December 2, 1974. This system was applied in determining that the subject document herein is proprietary.
4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.
5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.
6. Public disclosure of the information is likely to cause substantial harm to the competitive position of Combustion Engineering because:

    a. A similar product is manufactured and sold by major pressurized water reactor competitors of Combustion Engineering.
    b. Development of this information by Combustion Engineering required tens of thousands of dollars and hundred of manhours of effort. A competitor would have to undergo similar expense in generating equivalent information.

c. In order to acquire such information, a competitor would also require considerable time and inconvenience for development of a computer code application and methodology for analysis of plant natural circulation cooldown.

d. The information consists of the application of the LTC computer code and methodology for analysis of plant natural circulation cooldown; the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Combustion Engineering, take marketing or other actions to improve their product's position or impair the position of Combustion Engineering's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

e. In pricing Combustion Engineering's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of Combustion Engineering's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.

f. Use of the information by competitors in the international marketplace would increase their ability to market nuclear steam supply systems by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on Combustion Engineering's potential for obtaining or maintaining foreign licensees.

Further the deponent sayeth not.

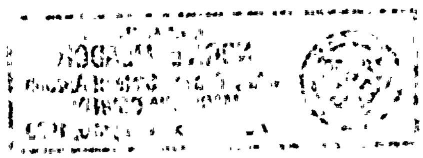
I.C. Rickard, Director
Operations Licensing

Sworn to before me
This 9th day of December, 1998

Nora E. Meador
Notary Public

My commission expires: Apr. 06, 1999

OFFICIAL SEAL
NORA E. MEADOR
Notary Public - State of Arizona
MARICOPA COUNTY
My Comm. Expires April 6, 1999



Enclosure

Responses to September 8, 1998 NRC Request for Additional Information Regarding Charging System Commitments for the Palo Verde Nuclear Generating Station

Responses to September 8, 1998, NRC Request for Additional Information Regarding Charging System Commitments for the Palo Verde Nuclear Generating Station

During a telephone conference call between members of the NRC staff and PVNGS personnel on September 8, 1998, the NRC requested additional information regarding previous submittals that address Charging System Commitments for the Palo Verde Nuclear Generating Station. The information requested pertained primarily to the fidelity of the LTC Code used to perform Natural Circulation Cooldown Analyses. These analyses had been submitted to demonstrate the PVNGS design is robust and reliable relative to the natural circulation cooldown functions, rendering additional modifications to the charging system unnecessary. The information requested by the NRC is summarized below followed by the APS response to each request.

NRC Question 1:

Although the LTC code is not a QA verified, licensed Code, it was acceptable for the original 1987 RSB 5-1 analysis because the Code had been benchmarked and validated by the PVNGS natural circulation cooldown test and by independent validation for NRC by Brookhaven National Labs. Since 1987, changes have been made to the LTC code as described in sections 3.2.1 (changes made prior to power uprate) and 3.2.2 (changes made specifically for the power uprate analysis) of CE calculation 25/26/27-AS95-C-016. What benchmarks/validations have been done since 1987 that would demonstrate that, with these changes, the LTC code still produces accurate and correct results?

APS Response 1:

The original computer simulation of Branch Technical Position (RSB) 5-1 for the Palo Verde Nuclear Generating Station is documented in Combustion Engineering Letter LD-83-074 to the Nuclear Regulatory Commission dated August 12, 1983. At that time, the LTC code was a "batch run" code executed on Combustion Engineering's Cyber 855 and Cyber 990 main frame computers. Since 1983, LTC has been converted to a PC based code and various improvements have been made. The question of benchmarking of the current version of the LTC computer code is a significant one. It is important that a high level of assurance exist that the LTC code, after several years of evolution, gives the same level of accuracy and correctness of results as the 1983 version that was validated by the PVNGS natural circulation cooldown test and by independent validation for the NRC by Brookhaven National Labs.

There are three basic approaches that will be used to address the issue of code benchmarking. Any one of the three taken individually provides a high level of

confidence that the LTC code still produces accurate and correct results. All three taken together add further to the level of confidence in the accuracy and correctness of the results. All three approaches are described in more detail below. In short, the three approaches to demonstrating that the LTC code still produces accurate and correct results are as follows:

1. Comparison of results of the current calculation to the original 1983 simulation results;

2. Comparison of the LTC Code with actual plant transient data; and

3. A review of all modifications made to the LTC code and the impact of these modifications on the accuracy and correctness of results.

Comparison of Results from the Current Calculation to the Original 1983 Analysis

Section 4.3 of the current analysis (Calculation 25/26/27-AS95-C-016, Rev. 00) is a comparison of the current results to the results from the 1983 analysis (LD-83-074). The intent of Section 4.3 is to benchmark the current version of the LTC code with the 1983 version and to demonstrate that the current results are reasonable. Differences exist in five key plant parameters between the previous and the current analysis as indicated in the following table.

Plant Parameter	Previous Analysis	Current Analysis
Core thermal power (Mwt)	3800	3876
RCS cold leg temperature (°F)	565	554
Full load SG pressure (psia)	1070	980
ADV capacity (lbm/hr/valve)	9.59E5 @1070 psia	1.43E6 @1000 psia
Decay heat curve	1971 ANS	1979 ANS

The two key results of the RSB 5-1 analyses are the time to reach shutdown cooling system entry conditions and the total condensate usage. In general, the increase in core thermal power is expected to increase the time to reach SDC system entry conditions and also condensate usage. The decrease in RCS cold leg temperature, the decrease in full load SG pressure and the change in decay heat curves are each expected to produce a decrease in both the time to reach SDC system conditions and also condensate usage. The change in ADV capacity is expected to have a negligible impact, as discussed below in the response to Question 2. Accordingly it is reasonable as a benchmark to expect the results of the previous analysis and the results of the current analysis to be similar.

As noted in Section 4.3, Case 2 of the current calculation is a simulation nearly identical to the 1983 analysis. In the previous analysis, the time to reach shutdown cooling system entry conditions was 10.5 hours and the total condensate usage was 210,000 gallons. In the current analysis, the time to reach shutdown cooling system entry conditions is 10.7 hours and the total condensate usage is 211,900 gallons. As anticipated, these results are similar and therefore the current version of the LTC code performs the substantially same as the old version of the LTC code in the Branch Technical Position (RSB) 5-1 simulations.

It should be noted that the reason for performing the new BTP (RSB) 5-1 analysis for stretch power was to demonstrate that cold shutdown conditions could be reached without the use of the charging and the auxiliary spray systems. In the current analysis, as indicated in Case 1, charging can be accomplished by use of the high pressure safety injection (HPSI) system and depressurization can be accomplished by use of the reactor coolant gas vent system (RCGVS). Since both of the HPSI system and the RCGVS are fully safety grade, they provide a diverse and redundant means of adding water to the RCS and cooling the pressurizer for the Branch Technical Position (RSB) 5-1 simulations.

Comparison Of The LTC Code With Actual Plant Transient Data

Since 1983, the primary use of the LTC code for the PVNGS units has been in the evaluation of plant transients and the effect of plant modifications on normal plant operational performance, especially control system modifications. The current PC based version of the LTC code has been routinely used to simulate actual events at Palo Verde, including failures that have resulted in plant trips. The LTC code was used by plant engineers in these instances as a working tool to better understand the particular events. The LTC code outputs have consistently tracked the actual plant events with notable fidelity, as documented in numerous engineering reports and studies. Two examples of engineering studies using LTC simulations, dated February 1993 and December 1995, are attached. Although these studies were not performed for the purpose of benchmarking the LTC code, the LTC simulations and actual plant transient parameters reported in the studies provide examples of LTC simulation fidelity. Please note that the February 1995 engineering study contains information that is proprietary to ABB-CE, for which an affidavit is provided.

In the early 1980's, following the accident at Three Mile Island, the LTC computer code was used extensively for analysis of long term events such as natural circulation cooldowns and long term cooling following postulated accidents. In recent years, a number of simulations of actual plant transients have been performed using the LTC code. Such simulations have provided a means of benchmarking of the code; however, these simulations have been primarily of short duration transients such as rapid, large load changes, turbine trip, loss of a feedwater pump, feedtrain malfunctions, and various plant trips. As such, the simulations are of relatively short duration as compared to a natural circulation cooldown. However, the actual operational transients

simulated are very challenging from a code performance standpoint and require a code which provides very accurate and reliable results. The high level of fidelity between the LTC code results and actual plant data for these types of events provides a high level of confidence that the code will accurately predict the plant response for slower, more benign events such as a natural circulation cooldown.

It should be noted that the types of questions being answered by the natural circulation cooldown analysis are relatively straight forward in nature. For example, the required condensate usage to reach shutdown cooling entry conditions is a simple mass/energy calculation of the amount of condensate which must be converted to steam in order to remove sensible (stored) heat of the NSSS and to remove core decay heat. Thus, the simulation of a natural circulation cooldown is well within the capabilities of a code like LTC. In addition, the basic models important to the simulation of this event (such as the core model, RCS loop and heat transfer models, and steam generator/ADV models) have not been changed in any substantive way since the code was first benchmarked against actual natural circulation cooldown results in the early 1980's.

Evaluation of Modifications Made to LTC Since 1983

Although the LTC code has undergone extensive modification since 1983, there have been no significant changes to the major models in the code, i.e., core model, RCS model, steam generator/steam system models, etc., which would affect the accuracy of the results for a natural circulation cooldown analysis. This section discusses the evolution of the LTC code since 1983.

Section 2.1 of the current calculation (25/26/27-AS95-C-016, Rev. 00) discusses the selection of LTC for the analysis and points out that the code has been continually and successfully benchmarked to actual plant data over the years since 1983. Section 2.2 then gives a brief history of evolutionary changes to the PC version of the code and Section 2.3 gives a brief overview of changes between PC Version 3.0 and PC Version 3.07, the version used in the current calculation. Section 3.2 provides a detailed listing of the code changes made between PC Version 3.0 and PC Version 3.07, both prior to and directly in support of 102% stretch power, and why they either have no impact on the natural circulation cooldown analysis or are justified for use. The following is a more detailed description of the evolution of the PC version of the LTC computer code.

In 1983, the LTC code was a "batch run" FORTRAN 77 code that was executed on Combustion Engineering's Cyber 855 and Cyber 990 main frame computers. Version 1.0 of the PC version of the LTC code was essentially identical to the mainframe version. The code was merely ported over to the PC and compiled using Microsoft's FORTRAN compiler. A baseline simulation was used to benchmark the code and show that for a given set of inputs the code produced identical results to the mainframe version of the code when executed on a PC. This benchmarking to show that PC Version 1.0 of the LTC code produced identical results on the PC platform as compared

to the mainframe platform has been documented in a formal calculation in accordance with Combustion Engineering's quality assurance program.

As mentioned previously, the LTC code was originally a "batch run" code, meaning the engineer had to pre-define all of the code inputs on input cards. PC Version 2.0 of the LTC code added a graphical user interface (runtime display of parameters on a PC monitor) and an interactive, keyboard user interface so that the user could control equipment such as pumps, valves, sprays, etc., during a simulation run. The major models of the code (RCS, core, steam generators, etc.) were not changed in any significant way.

PC Version 3.0 of the LTC code was primarily an upgrade to include a detailed node and flow path model that represents all the major feedtrain piping, valves and pumps from the main condenser to the steam generators. The model improved the ability to model feedtrain upsets, such as a loss of condensate pump or feed pump malfunction, and the effects on steam generator level and thus the feedwater control system (FWCS). However, the RSB 5-1 natural circulation cooldown analysis does not credit the main feedwater system and this portion of the code is deactivated at the outset for a natural circulation cooldown simulation. Thus, the revisions to feedtrain model in PC Version 3.0 of the LTC code have no effect on the results of the current calculation.

Section 3.2.1 of the current calculation describes changes (both code and input data changes) made between PC Version 3.0 and PC Version 3.07 of the LTC code prior to beginning the APS 102% stretch power effort. Each change, and its potential effect on the natural circulation cooldown analysis, is discussed in detail in the calculation. The changes fall into one of three categories. First, many of the changes are to models of systems or features which are not used or credited in the natural circulation cooldown analysis and thus have no effect on the results. These include FWCS post-trip refill model, S/G main feedline models, feedtrain model, FWCS model, turbine runback model, and pressurizer main spray model. Second, other changes affect the code user interface and have no effect on the code models. Third, a few changes are made to the steam generator model, however, the changes (such as tuning constants) improve the dynamic behavior of the steam generator downcomer and thus the level response for operational transients (such as load maneuvers) and have no significant effect on the results of a natural circulation cooldown simulation.

Section 3.2.2 of the current calculation describes changes (both code and input data changes) made between PC Version 3.0 and PC Version 3.07 of the LTC code directly in support of the APS 102% stretch power effort. Each change and its potential effect on the natural circulation cooldown analysis is discussed in detail in the calculation.

Sections 3.2.2.1 through 3.2.2.15 describe updates to the code input data or to the code itself which reflect actual plant or equipment parameters more accurately or updates which reflect changes as a result of 102% stretch power. A justification or reference is given for each update. A few of the changes are normally made to support

a natural circulation cooldown simulation. For example, Section 3.2.2.2 describes a temporary code change to deactivate the modeling of reactor vessel upper head wall heat losses. This conservatively maximizes the heat retention in the upper head region and thus maximizes the tendency for steam voiding in the upper head region. Note that this conservatism was also made in the original 1983 analysis.

Summary of Response to Question 1

In summary, the current PC based version of the LTC code, Version 3.07, produces essentially the same level of accuracy and correctness of results for the Branch Technical Position (RSB) 5-1 natural circulation cooldown as the main frame version used in the original 1983 analysis. This same level of accuracy and correctness has been assured as stated below by checks of the LTC computer code both as part of the current analysis and as the code was revised between 1983 and today.

- Output from test cases run on the main frame and on a PC were compared and found to be identical.
- Results from the current calculation were compared to results from the original 1983 calculation and found to be reasonable and consistent.
- Actual plant transients have been analyzed since 1983 using the PC version of LTC, and the code produced results that tracked closely with actual plant data.
- Actual changes to the PC version of the code since Revision 1.0 do not affect primary models such as core, steam generators, RCS, etc., and therefore have negligible or zero impact on the Branch Technical Position (RSB) 5-1 natural circulation analysis.

NRC Question 2:

On page 41 of 46 of the CE calculation, the change in ADV capacity from the previous analysis is discussed. It is stated that the change in ADV capacity is small. The NRC feels this is a large change and would like more information regarding this change. The calculation states the ADV capacity was updated to reflect PV as-built conditions. What are the as-built conditions that are different from what was originally assumed?

APS Response 2:

The original computer simulation of Branch Technical Position (RSB) 5-1 for the Palo Verde Nuclear Generating Station is documented in Combustion Engineering Letter LD-83-074 to the Nuclear Regulatory Commission dated August 12, 1983. That simulation was performed using the LTC code and used a value of 0.122 ft^2 as the effective flow

area of each atmospheric dump valve. (In the Palo Verde design there are four safety-grade ADVs on each unit, two per steam generator.) For the computer simulation performed as part of 102% stretch power (ABB Combustion Engineering Calculation 25/26/27-AS95-C-016, Rev. 00, dated November 1995), the LTC code was again used and the effective flow area of each atmospheric dump valve was set at 0.198 ft^2.

The effective flow area used in the original simulation is based on a valve capacity of $9.59x10^5$ lbm/hr at 1070 psia. This is a conservative value and is less than the minimum capacity specified in the plant design bases. Calculations performed since the original computer simulation in 1983 (13-MC-SG-207, Rev. 01) indicate that the actual valve capacity is higher, $1.466x10^6$ lbm/hr at 1000 psia. Note that the original design criteria for the valves specified a minimum capacity of $9.5x10^5$ lbm/hr and a maximum capacity of $1.72x10^6$ lbm/hr both at 1000 psia.

For the stretch power analysis performed in 1995, a higher valve capacity was used as the basis for calculating effective flow area. This is consistent with the original analysis in that Branch Technical Position (RSB) 5-1 computer simulations have historically been performed on a best estimate basis. Since the higher flowrate reflects actual valve capacity it is considered to be a best estimate value. (Note that the current calculation in fact uses $1.43x10^6$ lbm/hr which is slightly less than the capacity calculated in 13-MC-SG-207.)

As stated above, the effective flow area used in the original 1983 BTP (RSB) 5-1 computer simulation of the atmospheric dump valves was 0.122 ft^2. The effective flow area used in the 1995 stretch power analysis is 0.198 ft^2. This is an increase in the effective flow area of 62%. While this certainly represents a substantial increase in the calculated capacity of the atmospheric dump valves, it turns out that the impact on the results of the stretch power Branch Technical Position (RSB) 5-1 computer simulation is negligible, i.e., even if the smaller flow area had been used in the current analysis the results and conclusion would be unchanged.

In support of the statement that results and conclusions remain unchanged even if the smaller effective flow area is used, refer first to Figures 1-19 and 2-19 of the current analysis. These figures plot SG-1 ADV position in terms of percent open versus time. (Although not included with the plots, SG-2 ADV position is identical to that of SG-1.) In both cases analyzed, the position of the atmospheric dump valve reached 62% open at just over 8.8 hours into the simulation. At 62% open, the effective flow area of the valves is $0.62*0.198 = 0.122$ ft^2. At 8.8 hours into the simulation, therefore, the flow area equals that used in the original 1983 analysis.

Referring next to Figure 1-2 and Figure 2-2, the RCS hot leg temperature at 8.8 hours is 350°F in both cases analyzed. If the smaller flow area had been used in the current analysis, at 8.8 hours into the simulation the ADVs would have been 100% open. Cooldown would continue but the cooldown rate would begin to drop below the current rate of 50°F/hr since the valves would now be in a flow limiting state. At 8.8 hours,

however, dropping below the current cooldown rate of 50°F/hr becomes a moot point since the temperature of the RCS is already at the point where shutdown cooling can be initiated, i.e., $T_h \leq 350°F$.

In the current analysis at 8.8 hours once hot leg temperature reaches 350°F, the simulation is continued until time 12 hours. Two things are accomplished in the remaining time: plant depressurization and shutdown cooling system alignment. In order to get into shutdown cooling, the plant must be depressurized to less than 385 psia. This depressurization is accomplished in both cases analyzed by forming then collapsing a steam bubble in the reactor vessel upper head. Shutdown cooling entry pressure is reached at approximately 11 hours. The simulation is then continued for one more hour, the time needed for plant operators to align the shutdown cooling system. In both cases analyzed, shutdown cooling system alignment occurs at 12 hours and total emergency feedwater usage is 227,200 gallons. (Total available emergency feedwater per plant Technical Specifications is 300,000 gallons per unit.)

If the smaller atmospheric dump valve flow area had been used in the current analysis, the time to reach 350°F would be unchanged, 8.8 hours as discussed above. The only change to the current analysis would be in RCS temperatures between 8.8 hours and 12 hours, the period during which the RCS is depressurize to shutdown cooling system entry pressure and the plant operators perform their system lineup. RCS temperatures would be slightly higher than in the current analysis since the cooldown rate would drop below 50°F/hr as discussed above.

In the current analysis, depressurization is accomplished in Case I using the reactor coolant gas vent system and in Case II using pressurizer auxiliary spray. This process is not affected by slightly higher RCS temperatures and therefore would not be impacted had the smaller ADV capacity been used. Further, since shutdown cooling entry temperatures were reached at 8.8 hours anyway, the time to initiate shutdown cooling, 12 hours, would also not be impacted had the smaller ADV capacity been used. Therefore it is concluded that the use of an atmospheric dump valve capacity in the current analysis that is substantially larger than that used in the original 1983 analysis has a negligible impact, i.e., even if the smaller flow area had been used in the current analysis the results and conclusion would be unchanged.

NRC Question 3:

In section 3.1.5 of the CE calculation, the use of the steam driven Emergency Feedwater Pump is described. Verify that there is sufficient steam pressure/capacity available throughout the cooldown until shutdown cooling entry to drive the steam driven EFW pump.

APS Response 3:

Reactor coolant temperature must be reduced to 350 F during a natural circulation cooldown to allow for shutdown cooling entry. The saturation pressure at 350 F is approximately 135 psig. The steam driven EFP is designed to deliver 550 gpm at a discharge pressure of 140 psig, when provided with steam at a supply pressure of 135 psig. Thus there is sufficient steam pressure throughout the cooldown to support EFP operation. Note that achievement of shutdown cooling entry using the steam driven EFP was demonstrated during the natural circulation cooldown test performed at PVNGS Unit 1 in January 1986 as described in the February 1987 Natural Circulation Cooldown Report.

NRC Question 4:

APS has stated in the previous submittals that a conservative upper bound to achieve shutdown cooling entry is 13.3 hours (adjusted time from the actual PVNGS test) and a best estimate time is 10.7 hours per the power uprate analysis. The NRC's experience with other plants is it takes more like 17 hours to achieve shutdown cooling entry. Provide additional assurance that 13.3 hours is a real upper bound or assurance that there exists sufficient condensate tank capacity to support a 17 hour cooldown.

APS Response 4:

As described in the February 1987 Natural Circulation Cooldown Test Report, the total duration of the Natural Circulation test was 14.83 hours, from 100% power to shutdown cooling entry conditions. This time duration was then adjusted as described in the report to account for differences between the test conditions and required RSB 5-1 postulated conditions. This adjustment resulted in the upper bound 13.3 hour duration. Since shutdown cooling entry conditions have actually been achieved in 14.83 hours during the more restrictive test conditions, 14.83 hours should be considered an absolute upper bound. APS considers it appropriate, however, to adjust the test duration to account for these differences; therefore 13.3 hours is taken to be a conservative upper bound. The primary difference between the analysis best estimate value of 10.7 hours and the adjusted test duration upper bound value is the very deliberate and conservative approach taken during the natural circulation cooldown test to depressurize the RCS, intentionally form and confirm reactor head void formation, and subsequently collapse the void. In an actual natural circulation cooldown, although depressurization would be undertaken in a deliberate manner, intentional void formation would not be required. If a void were to form, procedures exist to detect and collapse the void as demonstrated during the natural circulation cooldown test.

NRC Question 5:

Provide information regarding the ability to replenish the condensate tank. What actions are identified in the Emergency Operating Procedures, what is the condensate tank make up capacity etc?

APS Response 5:

The Condensate Storage Tank (CST) is a safety class 2, quality group B, and seismic class 1 component. At the minimum water level permitted by Technical Specifications, analyses demonstrate that the tank contains more than sufficient inventory to support a natural circulation cooldown under the conditions described in Branch Technical Position RSB 5-1.

Normal makeup to the CST is provided from the Demineralized Water Storage Tank (DWST) by the Demineralized Water (DW) Transfer pumps. The DWST has a nominal capacity of 125,000 gallons. The two, parallel DW pumps each have a rated flow of about 300 gpm at a head of 230 feet. Normally, one pump runs continuously to pressurize the demineralized water header and the other operates intermittently based on system demand. During normal operations, the CST level is automatically maintained several feet above the Technical Specification minimum by a level control system. If the CST were to approach the Technical Specification limit, the control room alarm response procedures contain provisions for manual line up of the DW header to the CST.

Since the CST is a passive component that is safety grade and seismically qualified, its failure within the first 24 hours is not a credible design basis event. As a consequence, the Demineralized Water system was designed as non-safety grade system, which therefore is not seismically qualified or capable of being powered from vital AC power sources. Upon a loss of offsite power, the operators would perform the Standard Post-Trip Actions and enter the Loss of Offsite Power/Loss of Forced Circulation (LOOP/LOFC) emergency operating procedure (EOP). Prior to initiating a cooldown, that EOP directs the performance of a Standard Appendix to determine the maximum time available before shutdown cooling must be placed in service based on the available condensate inventory. A step in this Appendix directs the operators to fill the CST (with normal makeup) if available.

If the CST could not support a cooldown, the operators would then continue in the LOOP/LOFC procedure or transition to either the Loss of All Feedwater or Functional Recovery EOPs based on the judgment of the Control Room Supervisor. All of these procedures reference a Standard Appendix for aligning the Reactor Makeup Water Tank (RMWT) as an alternate demineralized water supply for the class auxiliary feedwater pumps. The normal operating range for the RMWT level is several feet above that needed to provide the minimum required condensate volume; however, the

RMWT is a non-quality related component and designed only to seismic class 3 requirements.

If the RMWT were not available, the operators would transition/remain in the Functional Recovery EOP. Without sufficient condensate, the safety function status checks for core heat removal safety function cannot met. With core heat removal in jeopardy, the operators would begin the Continuing Actions, one of which includes provisions for feeding a steam generator with water from the Demineralized Water (DW), Domestic Water (DS), and Fire Protection (FP) systems. While the first two would not be available following a loss of offsite power, the FP system contains two diesel-driven fire water pumps that can supply domestic quality water to the power block. The twin Fire Water Storage Tanks each have a nominal capacity of 500,000 gallons. Each diesel-driven fire pump is rated at 500-2500 gpm at a discharge head of 125 psig. The tanks and pumps are quality augmented, seismic class 3 components. Since this contingency is outside of the design basis, specific step-by-step procedures for adding water to the CST using the diesel-driven fire pumps through multiple 1-inch hose connections (in parallel) would be developed extemporaneously by Engineering and Operations Staff in the Technical Support Center. This procedure development process is described in the Emergency Plan and in Emergency Planning departmental procedures as a responsibility of the Technical Engineering Manager.

In the event that offsite power and the condensate pumps were recoverable, both the Loss of All Feedwater and the Functional Recovery procedures reference a Standard Appendix for depressurizing the steam generators with Atmospheric Dump Valves (ADVs) and feeding with the condensate pumps. Another Standard Appendix available in these procedures aligns the condensate pump from another unit to feed the affected unit's steam generator via the condensate cross-tie. Normal operating procedures also provide guidance for filling the CST using the condensate from the same or different unit.

If offsite power is not available, the Functional Recovery procedure Continuing Actions for core heat removal contain a contingency step to restore vital auxiliaries to components needed to make the steam generator success path functional. This would include cross-connection of a vital 4.1 kV bus up through the ESF transformer to the non-class 1E electrical distributions so that an emergency diesel generator could be used to energize a condensate pump. While the Functional Recovery procedure includes a Standard Appendix which provides some guidance for this last evolution, supplemental procedural steps would be needed from the TSC as described above.

Attachment 1

Engineering Study:

Evaluation and Simulation of 2/4/93 Unit 3 Post-Trip AFW Addition and SIAS Actuation, Dated February 16, 1993

ASEA BROWN BOVERI

February 16, 1993
V-MECH-93-009

Arizona Public Service Company
P. O. Box 52034
Phoenix, Arizona 85072-2034

Attention: Mr. Gary Anderson
System Engineering Department
Mail Station 7566

Subject: PALO VERDE NUCLEAR GENERATING STATION
Evaluation And Simulation Of 2/4/93 Unit 3 Post-Trip AFW Addition And SIAS Actuation

Reference: (1) S. L. Gubin to G. Anderson, "Evaluation Of Post-Trip Quick Open Tracking Block", V-MECH-93-008, dated 3/17/93

Attachment: Ten Plots From LTC Simulation Of 2/4/93 Event

Dear Mr. Anderson,

This correspondence summarizes the results of an evaluation and computer simulation of the 2/4/93 reactor trip, AFW actuation and SIAS actuation at Palo Verde Nuclear Generating Station Unit 3. The purpose of this evaluation was to quantify the role of adding cold auxiliary feedwater (AFW) water in actuating SIAS following the reactor trip.

BACKGROUND

On 2/4/93, while operating at steady-state full power conditions, Palo Verde Unit 3 experienced a coastdown of one of the two running main feedwater pumps. The pump did not trip, but rather

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coasted down when the speed demand failed to zero. Because the pump did not trip, reactor power cutback and turbine setback/runback were not actuated and steam generator level decreased until the reactor tripped on low steam generator wide range level. Following the trip, auxiliary feedwater was initiated to the steam generators, which when combined with post-trip SBCS action, led to NSSS overcooling and SIAS. SIAS actuated about 50 seconds after the reactor trip.

REVIEW OF PLANT DATA

ABB Combustion Engineering Nuclear Services (ABB CENS) reviewed TDAS plots of the 2/4/93 Unit 3 event that were provided by APS System Engineering. Observations based on the actual plant data were as follows:

(1) Following the trip on low steam generator level, the wide range level indication dipped below the 25% wide range level setting for AFAS actuation and initiated the addition of cold auxiliary feedwater flow to the steam generators.

(2) SBCS action appears to be nominal with all valves stroking within the expected stroke time. SBCS modulation controller action also was as expected.

(3) Based on the plant data provided, ABB CENS estimates that between 900-1100 lbm of cold auxiliary feedwater was added to the steam generators prior to the time of SIAS actuation at about 50 seconds after the trip.

(4) Following the coastdown of the feedwater pump, total feedwater flow stabilizes at about 70%. This is less than would have been expected based on the sizing of the pumps and feedtrain pressure drops. ABB CENS would expect a nominal flowrate of about 80%-85% with one feedwater pump running at maximum speed which is corroborated by plant data from previous Palo Verde events. The reason for this lower than expected flowrate is not known, but it may have been in part due to the fact that the failed feedwater pump was just coasting down and had not tripped. This may have resulted in pump recirculation flow back to the condenser resulting in a reduced flow to the steam generators.

HAND CALCULATION

As a simple method of estimating whether the post-trip addition of auxiliary feedwater could account for the SIAS actuation on 2/4/93, the following comparison was made:

From a previous occurrence at Palo Verde Unit 2 on 7/12/89, it is known that a delay of 2-3 seconds in the release of the SBCS valves from quick open to modulation (prior to optimization of the SBCS) resulted in a post-trip SIAS. A calculation the energy removal associated with 3 seconds of SBCS flow is shown below.

SBCS flow with all eight valves fully open is equal to about 80% of the nominal full power steaming rate of 17,180,000 lbm/hr:

$$\frac{17{,}180{,}000 \text{ lbm}}{\text{hr}} \times \frac{\text{hr}}{3600 \text{ sec}} = 4772 \text{ lbm/sec}$$

$$\frac{4772 \text{ lbm}}{\text{sec}} \times 0.80 \times 3 \text{ sec} = 11453 \text{ lbm}$$

The energy is removed by converting the relatively warm post-trip feedwater (450 deg-F) to saturated steam, so, the energy removed is:

The enthalpy of 450 deg-F water at 1100 psia = 430
The enthalpy of saturated steam at 1100 psia = 1189

11453 lbm x (1189-430) Btu/lbm = 8,693,000 Btu

For comparison, the energy removal associated with converting 1100 lbm (8250 lbm) of cold AFW water (100 deg-F) to steam was calculated.

The enthalpy of 100 deg-F water at 1100 psia = 71
The enthalpy of saturated steam at 1100 psia = 1189

8250 lbm x (1189-71) Btu/lbm = 9,224,000 Btu

Note that the addition of 1100 gallons of cold AFW water accounts for almost the same energy removal as a 3 second delay in the SBCS valve closure and would be expected to result in about the same plant response. This is confirmed by the actual plant response on 2/4/93 where the addition of this volume of cold AFW water resulted in SIAS actuation.

SIMULATION OF THE 2/4/93 UNIT 3 EVENT

As additional confirmation that the post-trip addition of cold AFW could account for the SIAS actuation for the 2/4/93 Unit 3 event, a simulation was performed using the LTC plant simulation code. The results of this simulation are shown in the ten attached plots. The plots include the simulation results (solid line) and for nine key parameters the actual plant data (from TDAS) is plotted for comparison (dashed line).

The simulation assumed initial full power, steady state operating conditions. At time=10 seconds, one main feedwater pump speed demand is set to 1 rpm to cause it to coast down. At the same time, a -300 rpm bias is added to the speed of the other pump to cause the total feedwater flow to provide a better match to the plant data. This also provided a good match in conditions at the time of reactor trip and accounts for whatever conditions in the feedtrain led to the lower than expected flow with a single pump (i.e., possibly pump recirculation flow). Following the trip on low steam generator water level, no manual operator actions were simulated. Although the operators actually took several manual actions, such as tripping two RCPs and starting a third charging pump and opening downcomer valves, these all occurred after SIAS actuation and therefore are not of any real concern in relating the AFW action to SIAS. In addition, the failure of one AFW isolation valve to open was not simulated since the total AFW flow is still about the same as would be normally expected.

The simulation results agree closely with the actual plant data. The trip occurs within about 10 seconds of that shown by the actual plant data and the response after the trip is nearly identical. The post-trip pressure response is very similar and shows the cold AFW water would have resulted in the pressurizer pressures seen. Any slight differences between the simulation and actual plant data are probably due to factors such as the

post-trip downcomer flow not going to zero in the actual plant and slight differences between the actual and predicted AFW flowrate.

When the same case was run with AFW disabled, the minimum pressurizer pressure was about 1900 psia. This indicates that the AFW flow alone accounts for the pressure dropping to the SIAS setpoint.

Reference 1 is an evaluation which demonstrated that disabling the SBCS quick open tracking feature following reactor trips will improve the margin to post-trip SIAS actuation without impacting the margin to post-trip lifting of secondary safeties. Reference 1 included a simulation of the 2/4/93 event and in addition demonstrated that sufficient margin could be gained by disabling the quick open tracking feature following reactor trips such that SIAS would not be actuated for the AFW addition which occurred.

CONCLUSIONS

The conclusions are as follows:

- The SBCS exhibited a nominal post-trip response following the 2/4/93 Unit 3 trip.

- The addition of cold AFW following the trip on low steam generator water level was sufficient to erode the normal margin to post-trip SIAS. Without the cold AFW addition following the 2/4/93 trip, SIAS would NOT have been actuated. This was confirmed by both hand calculation and computer simulation.

- Reference 1 shows that disabling the SBCS quick open tracking feature following reactor trips will add sufficient margin to prevent post-trip SIAS actuation for similar events where AFW is actuated.

Please call either myself (203-285-5474) or Mr. Shelby Gubin (203-285-5486) if you have any questions or comments.

Very Truly Yours,

Carl A. Nielsen
Project Manager

cc:	M. Oren	(APS - MS 7512)
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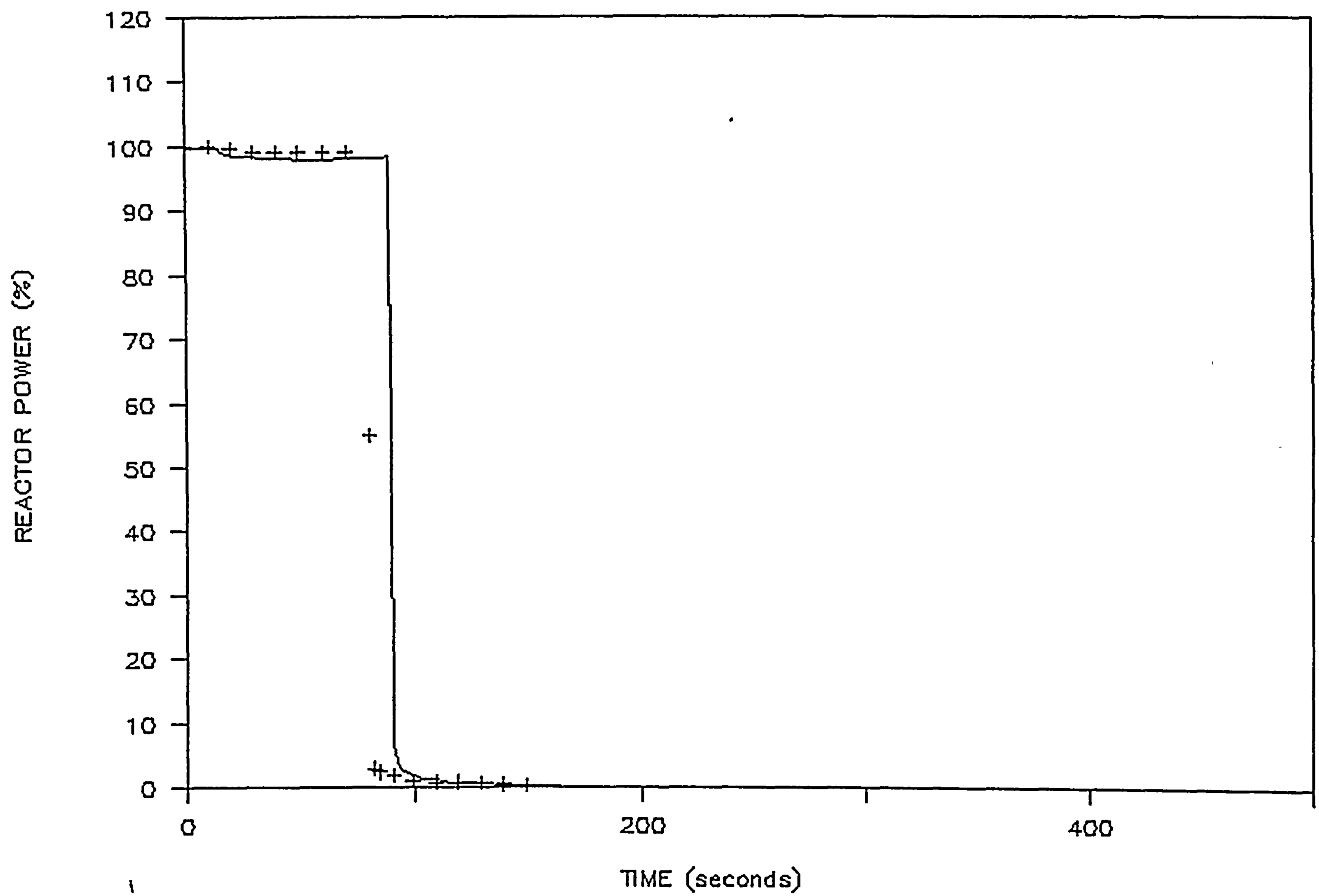
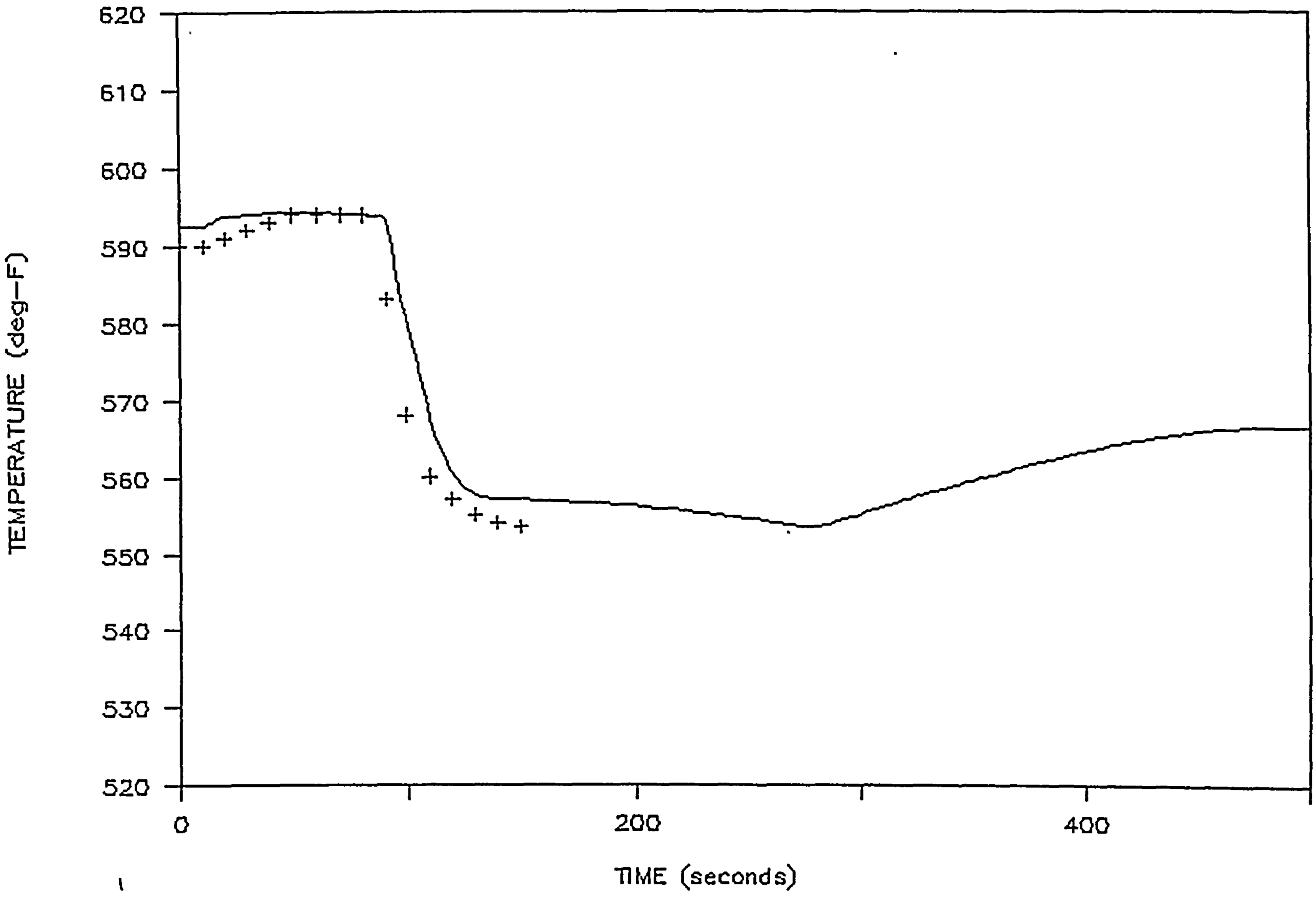
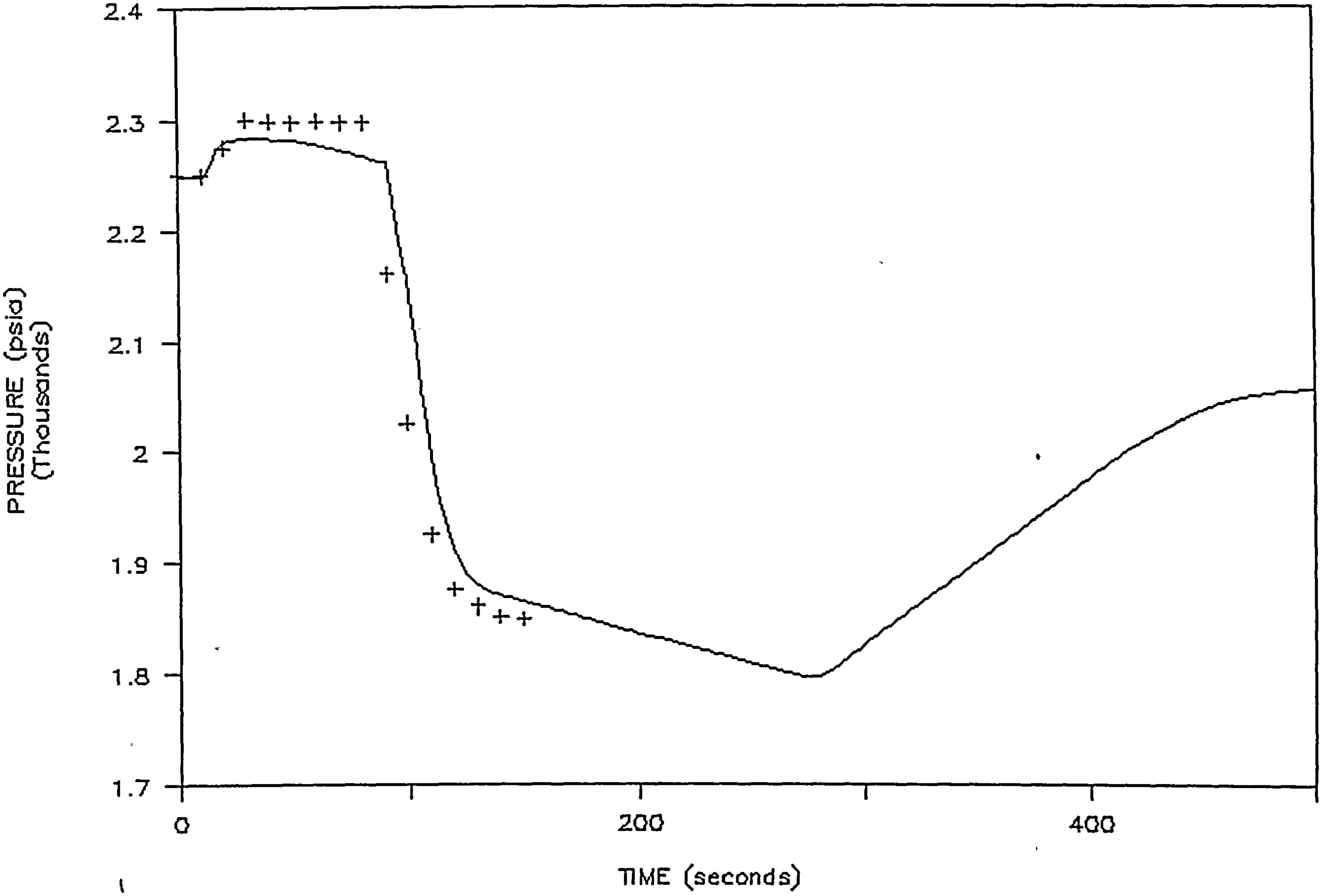
REACTOR POWER vs TIME

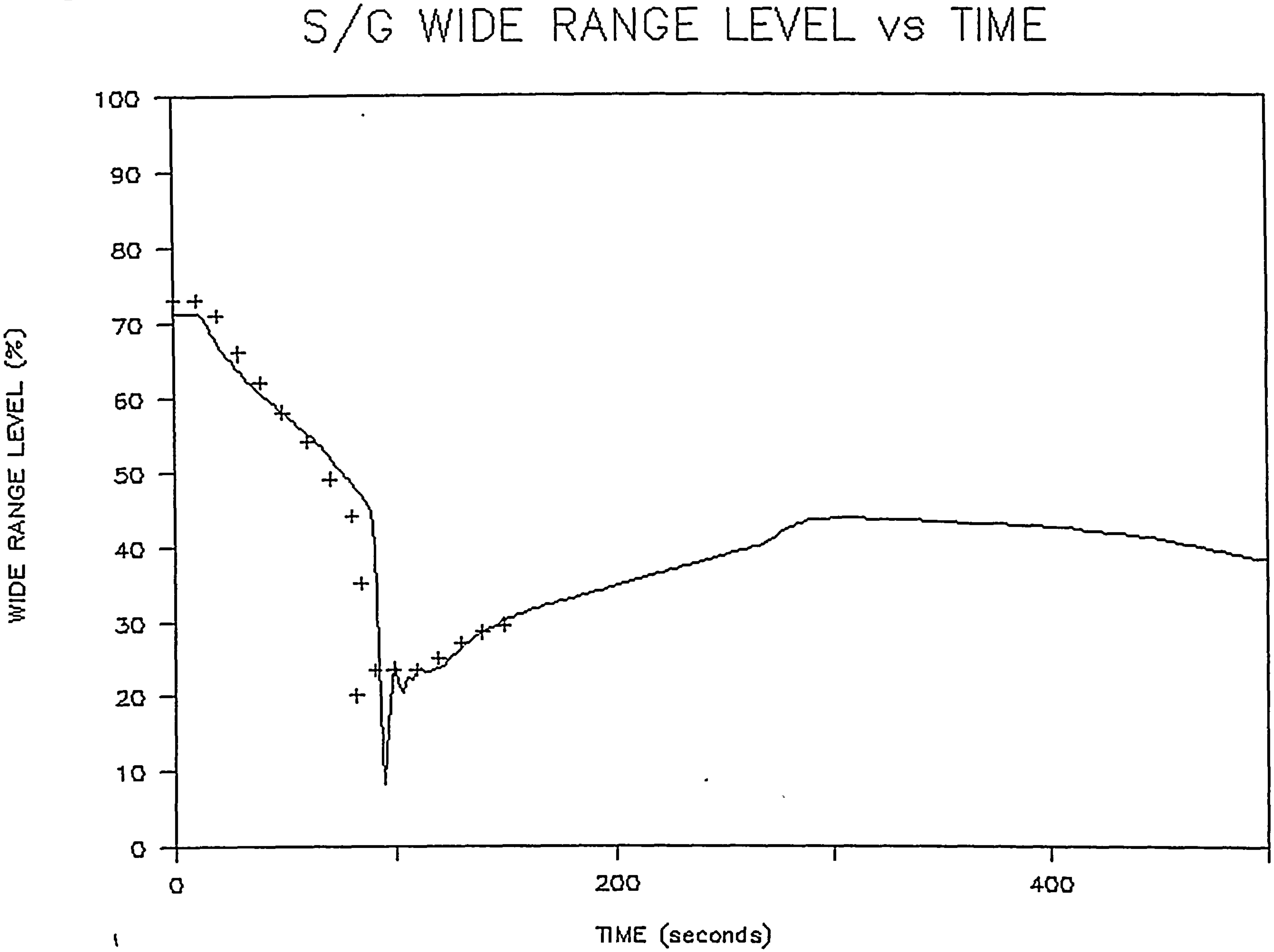


RCS AVERAGE COOLANT TEMPERATURE vs TIME

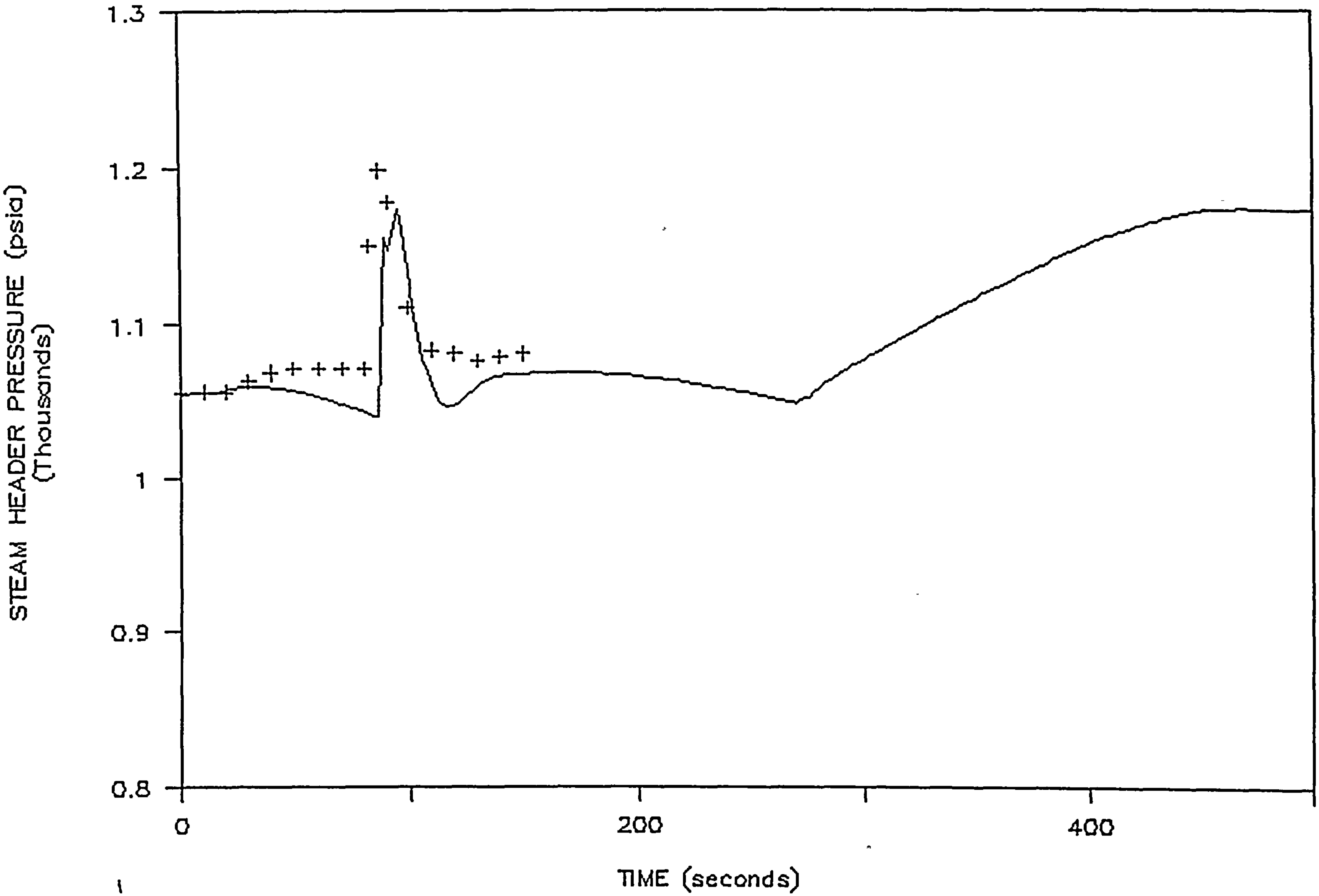


PRESSURIZER PRESSURE vs TIME

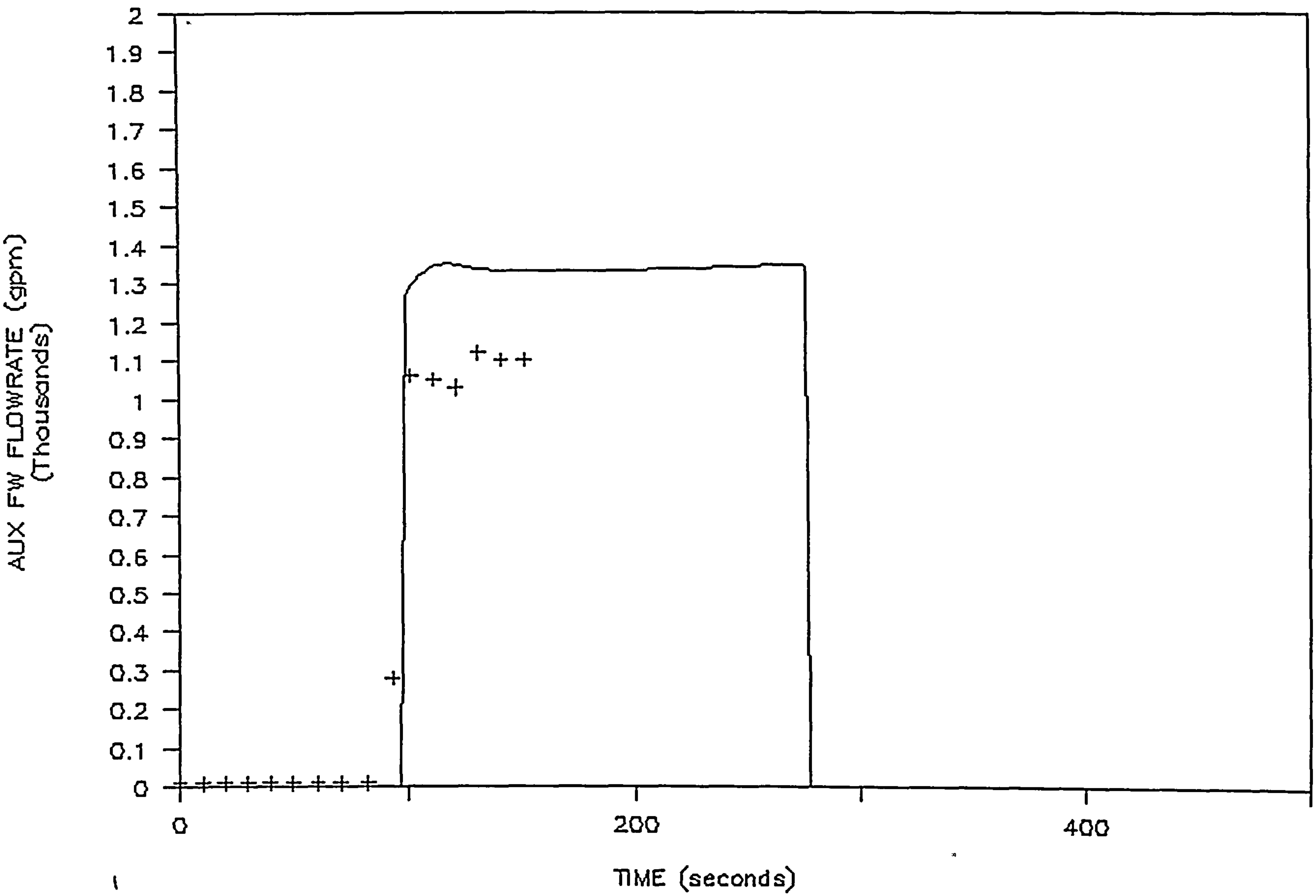



S/G WIDE RANGE LEVEL vs TIME
WIDE RANGE LEVEL (%)
100
90
80
70
60
50
40
30
20
10
0
0
200
400
TIME (seconds)

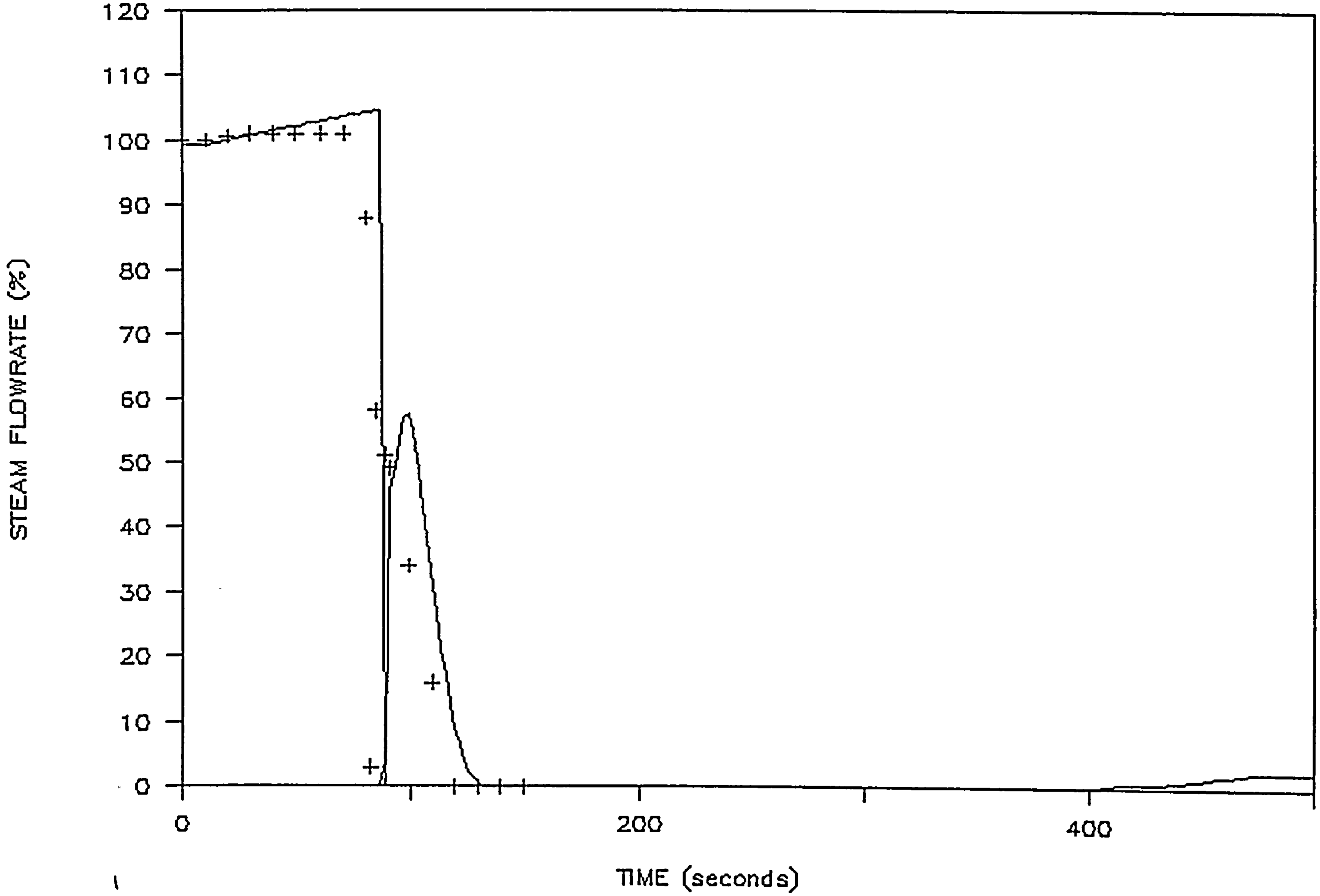
STEAM HEADER PRESSURE vs TIME



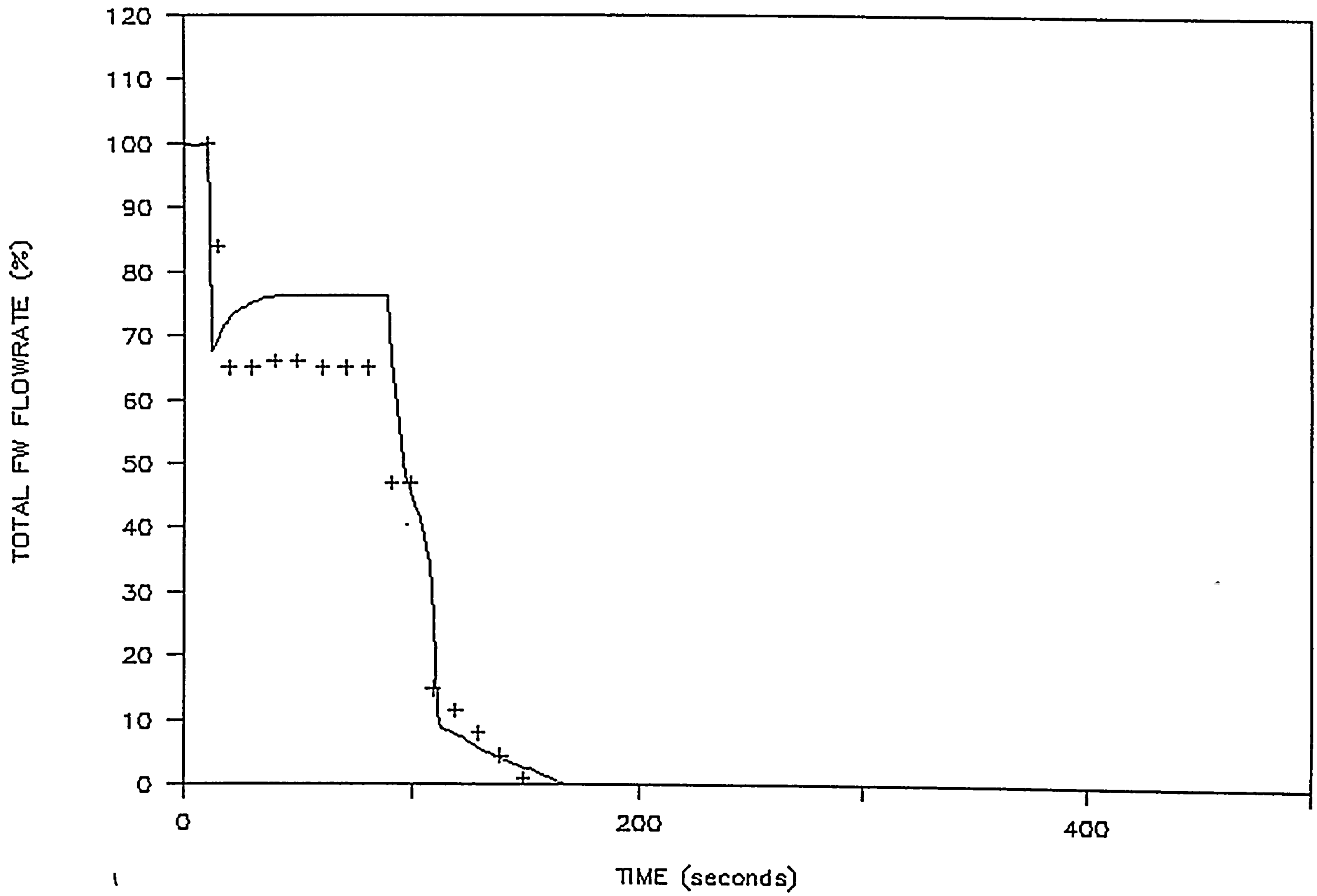
AFW FLOWRATE vs TIME

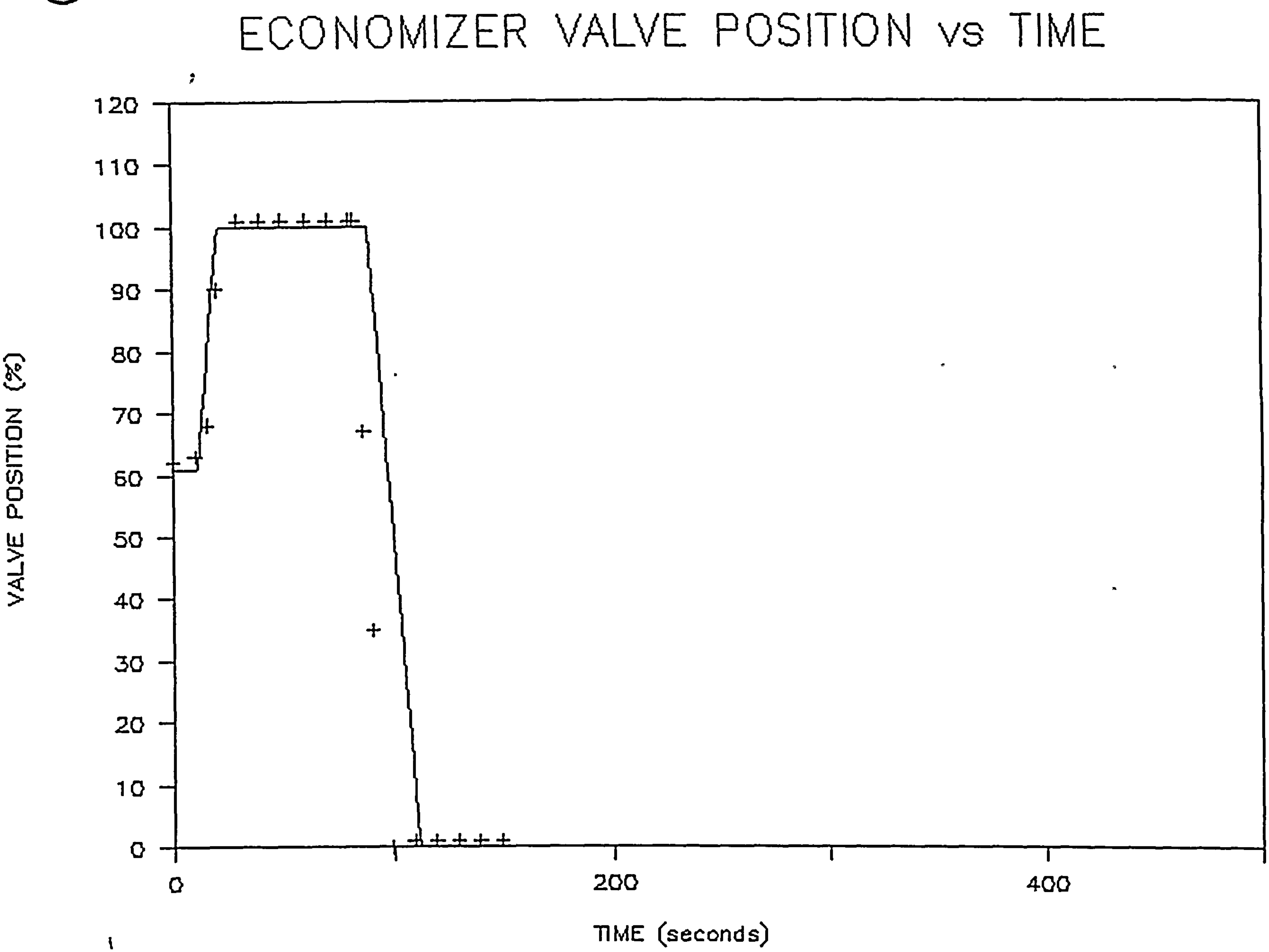


STEAM FLOWRATE vs TIME



TOTAL FW FLOWRATE vs TIME




ECONOMIZER VALVE POSITION vs TIME
VALVE POSITION (%)
120
110
100
90
80
70
60
50
40
30
20
10
0
0
200
400
TIME (seconds)

TOTAL SBCS VALVE AREA vs TIME