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February 13, 1996
RC-96-0032

Document Control Desk
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Washington, DC 20555

Gentlemen:

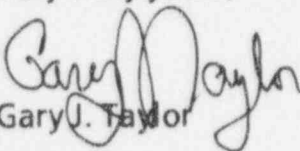
Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
RESPONSE TO GENERIC LETTER 95-07
"PRESSURE LOCKING & THERMAL BINDING OF SAFETY-RELATED POWER
OPERATED GATE VALVES"

Pursuant to your request in generic letter 95-07, South Carolina Electric & Gas Company (SCE&G) is submitting the following response under oath of affirmation.

VCSNS has completed a detailed evaluation of safety related power-operated gate valves. The attached enclosures contain a description of the detailed evaluations performed by VCSNS. The evaluations include a review and analysis of the operational configuration for safety-related power operated gate valves which have been screened as susceptible to pressure locking and/or thermal binding, a list of susceptible safety-related power operated gate valves at VCSNS, corrective actions identified, and a schedule for completion of the identified corrective actions and justification for the scheduled time frames.

Should you have any questions, please call Mr. J. W. Pease, at (803) 345-4124, at your convenience.

Very truly yours,


Gary J. Taylor

JWP/GJT/nkk
Enclosures (4)

c: J. L. Skolds (w/o enclosures)
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9602200336 960213
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P PDR



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STATE OF SOUTH CAROLINA :
: TO WIT :
COUNTY OF FAIRFIELD :

I hereby certify that on the 13th day of February 1996, before me, the subscriber, personally appeared Gary J. Taylor, being duly sworn, states that he is Vice President, Nuclear Operations of the South Carolina Electric & Gas Company, a corporation of the State of South Carolina, that he provides the foregoing response for the purposes therein set forth, that the statements made are true and correct to the best of his knowledge, information, and belief, and that he was authorized to provide the response on behalf of said Corporation.

WITNESS my Hand and Notarial Seal

Jeffrey W. Reese
Notary Public for South Carolina

My Commission Expires

July 26, 2005
Date

EVALUATION OF SAFETY-RELATED POWER OPERATED GATE VALVES FOR SUSCEPTIBILITY TO PRESSURE LOCKING OR THERMAL BINDING

PURPOSE:

This is an evaluation of the operational configuration of safety-related, power operated (including motor-, air-, and hydraulically-operated) gate valves for susceptibility to pressure locking (PL) and/or thermal binding (TB) per NRC Generic Letter 95-07 "PRESSURE LOCKING AND THERMAL BINDING OF SAFETY-RELATED POWER OPERATED GATE VALVES". Additional analysis and/or corrective actions will be performed for safety-related power operated gate valves (POGV) determined to be susceptible to pressure locking (PL) or thermal binding (TB) to ensure they are capable of performing their safety functions within the current licensing bases of the V.C. Summer Nuclear Station (VCSNS).

DEFINITIONS:

1. Safety-Related (SR) - Structures, Systems and Equipment which are required to function to ensure the integrity of the reactor coolant pressure boundary, shutdown the reactor and maintain it in a safe shutdown condition, or in preventing or mitigating the consequences of an accident which could result in potential offsite exposures comparable to the 10CFR Part 100 guidelines.
2. Safe Shutdown Condition - The safe shutdown design basis of the VCSNS is hot standby (Mode 3). Under abnormal conditions, the plant is designed to remain in a safe hot standby condition until (a) normal systems can be restored to permit either return to power operation or cooldown to cold shutdown conditions, or (b) sufficient systems capability can be restored (depending on plant condition) to permit cooldown to cold shutdown conditions under abnormal plant conditions. This design basis is considered to constitute a safe design.
3. Active Code Class 1, 2, and 3 valves - Active components whose operability is relied upon to perform a safety function (as well as reactor shutdown function) during the transients or events considered in the respective operating condition categories.
4. Normally Open Valves with an Open Safety Function- These normally open valves have a Design Basis open safety function and can reasonably be expected to be closed temporarily during the course of normal operations.

SCOPE:

The scope of this evaluation includes all Safety-Related (SR) POGVs.

EVALUATION METHOD:

I. PL & TB Screening

INITIAL SCREENING

1. Is the valve a SR POGV?

Only valves that are gate valves are susceptible to THERMAL BINDING (TB) and/or PRESSURE LOCKING (PL).

2. Does the POGV have an Active Safety Function to open or is it normally open with an open Safety Function with the potential for being closed?

TB and PL can prevent the valve from opening from a full closed position. They cannot occur with a full or partially open valve. If the valve does not have an open safety function from a closed position then it is not susceptible to TB and/or PL.

Table 1 of Enclosure 2 identifies the POGVs that require further PL and TB Screening.

THERMAL BINDING SCREENING

3. Is the valve closed hot (system operating temperature greater than 200 degrees F) followed by a significant cooldown (greater than 100 degrees F) and then required to open?

The threshold temperature for thermal binding is 200 degrees F. Valves that are closed with system temperatures less than 200 degrees F are not subject to TB per Industry Experience and ESBU/WOG-95-387 "Generic Temperature and Pressure Screening Criteria for Valves Susceptible to PLTB (MUHP-6050)". Flex Wedge gate valves closed hot (system temperatures greater than 200 degrees F) followed by a subsequent cooldown of less than 100 degrees F, before being required to reopen, are not subject to TB per Industry Experience and ESBU/WOG-95-387. The 200 degrees F threshold and 100 degrees F delta temperature values are also consistent with GL 95-07 which states that "flexible-wedge gate valves experiencing significant temperature changes or

operating with significant upstream and downstream temperature differences may thermally bind". It should also be noted that VCSNS does not have any solid wedge SR POGVs.

4. Does the gate valve have a disk other than a "double disc" or "parallel disk" design?

Due to their design double disk and parallel disk valves are not considered to be susceptible to TB.

Table 2 of Enclosure 2 identifies the POGVs that are potentially susceptible to TB.

PRESSURE LOCKING SCREENING

5. Does the valve have a process medium of water or steam?

Thermally induced PL occurs when the fluid in a water/liquid filled bonnet experiences temperature increases which can cause rapid pressure increases in the bonnet, due to the incompressibility of the fluid. Thermally induced PL can result in increasing the thrust required to open the valve. With the presence of any amount of compressible fluid (gas or steam), the pressure rise due to temperature increase is mitigated. As an added note, steam valves are considered for thermally induced pressure locking because of the possibility of the bonnet filling with condensate. Hydraulic pressure locking can occur when a system experiences a rapid pressure decrease prior to the valve being required to open.

6. Does the valve lack a design feature that mitigates pressure locking?

Valves equipped with bonnet bypass lines, bonnet pressure relief's or holes in their disk are designed to prevent pressure locking.

Table 3 of Enclosure 2 identifies the POGVs that are potentially susceptible to PL.

POGVs POTENTIALLY SUSCEPTIBLE TO PL OR TB

7. POGVs that remain after the screening process are considered to be potentially susceptible to PL and/or TB.

Individual evaluations are required for the valves that have been identified as being potentially susceptible to PL and/or TB.

II. INDIVIDUAL EVALUATIONS

The individual evaluations will determine if the valves that have been determined to be potentially susceptible using the screening process are actually susceptible to PL and/or TB. The individual evaluations will identify any additional analysis and/or corrective actions needed to ensure that the susceptible valves are capable of performing their intended licensing bases safety functions under all modes of plant operation, including test configuration. The following are some of the criteria that may be used in determining if potentially susceptible valves are actually susceptible to PL and/or TB:

THERMAL BINDING CRITERIA

1. Thermal Binding (TB) occurs when a valve is closed hot followed by a significant cooldown and then required to open. Significant temperature gradients that develop across a valve after it is closed may also result in TB when the valve is required to open. The following are some of the factors that may help mitigate TB conditions:
 - Do procedures require the periodic opening of the valves during cooldown?
 - Does the actuator have a compensating spring pack?

PRESSURE LOCKING CRITERIA

1. Thermally induced pressure locking occurs when the temperature of the fluid (water) in a water filled bonnet increases sufficiently enough to cause a significant pressure increase in a water solid bonnet prior to the valve being required to open. This is a situation that must be evaluated on a case by case basis. Ambient temperature swings occurring during

normal plant operation (equipment operation, seasonal changes and etc.) do not cause thermally induced pressure locking due to the slow nature of the temperature variations allowing the pressure in the bonnet to equalize with the system. Temperature increases which result in thermally induced PL generally occur due to one of the following:

- Is the POGV installed in an application which could result in bonnet temperature/pressure increases from fluid within the piping system?
- Is a large heat source located adjacent to the valve? Convection can cover large distances to heat up the bonnet of a closed valve but is usually a relatively slow process.
- High Energy Line Breaks (HELB) in the vicinity of the valve. The following factors need to be reviewed to determine if the valve will experience thermally induced PL due to a HELB:
 - A. Is the POGV located in an area which may experience elevated temperatures due to postulated HELBs?
 - B. Does the POGV have to OPEN (automatic or remote manual actuation) after or during exposure to the heat source which could cause an increase in bonnet fluid temperature/pressure?
 - C. Does the POGV have to open to mitigate the event which caused the bonnet fluid temperature/pressure increase?

If the answer to A, B or C is NO then the valve is not susceptible to thermally induced PL due to a HELB. If all the answers are YES then further evaluation is required to determine if the valve is actually susceptible to PL.

2. Hydraulic pressure locking occurs when a rapid pressure decrease occurs in the system prior to opening the valve. Hydraulic pressure locking occurs in a closed valve when high pressure is trapped in the bonnet relative to both sides of the valve, due to a previously high system pressure. In this case the system pressure leaked by the upstream disc, pressurizing the bonnet. With the valve closed, there is a rapid system pressure decrease (such as securing a pump, line break and etc.), leaving the bonnet pressurized. The high bonnet pressure acts against

both discs which increases the unseating thrust. Industry testing indicates that the bonnet depressurization rates are such that, for some cases, the bonnet pressure would be reduced to the point where it would equalize with the system pressure within several hours after the system depressurization.

3. Steam valves are only susceptible to PL if the bonnet is subject to filling up with condensation. The following are valve orientations subject to trapping condensation in the valve bonnet:

- Valves installed in a vertical run of piping. With the valve shut in a vertical line, condensate could form above the valve disc. System pressure could force this condensate past the upstream disc, causing the bonnet to fill with water.
- Valves installed in a horizontal run with the actuator installed below 45 degrees from vertical. With the valve shut and the actuator rolled such that the highest point inside of the bonnet is below the top of the inside of the pipe, condensate could form on one side of the valve disc, filling that side of the pipe. System pressure could force this condensate past the upstream disc, causing the bonnet to fill up with water.
- Valves installed in a low point in the system with the top of the bonnet below the high point immediately adjacent to the valve. With the valve shut and installed in a system low point, condensate could form on one or both sides of the valve disc, filling that side of the pipe. System pressure could force this condensate past the upstream disc, causing the bonnet to fill up with water.

Enclosure 3 contains summary descriptions of the individual evaluations.

GENERAL PL & TB CRITERIA

1. Inadvertent Mispositioning is not considered as part of the operational requirements for the valve.
2. Check valve leakage is assumed if it results in a worst case scenario. Even though check valves may prevent gross backleakage, they may not prevent pressure from increasing in the pipe between the check valve(s) and the POGV under evaluation.

3. The operational configurations of the valves shall consider all modes of plant operation (within the licensing basis of the station), including test configurations.
4. Hydrostatic testing is not a concern due to the actions taken previously to prevent PL during hydrostatic testing.
5. Thermal binding due to stem growth (stem heat up and subsequent expansion) will only be considered for valves determined to be susceptible to TB.
6. Temperature increases due to radiation are considered negligible.

III. RESULTS

Valves that are susceptible to PL and/or TB will be identified along with any additional analysis and/or corrective actions. The methodology used to determine which POGVs are susceptible to PL and/or TB as well as the corrective actions will be approved by the Generic Letter 95-07 Expert Panel. The Expert Panel will provide the interdisciplinary input necessary to ensure that valves susceptible to PL or TB are identified and the appropriate corrective actions are taken.

Enclosure 4 identifies the susceptible POGVs.

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV INITIAL PL & TB SCREENING
TABLE 1

VALVE NO.			Description	ACTUATOR TYPE	INITIAL SCREENING		ADDITIONAL PL & TB SCREENING REQUIRED
					POGV (I.1)	OPEN SAFETY FUNCTION (I.2)	
XVG	7501	AC	AC SUPPLY HEADER CONTAINMENT Isolation VALVE	MOTOR	YES	NO	NO
XVG	7502	AC	AC SUPPLY HEADER CONTAINMENT Isolation VALVE	MOTOR	YES	NO	NO
XVG	7503	AC	AC RETURN HEADER CONTAINMENT ISOL VALVE	MOTOR	YES	NO	NO
XVG	7504	AC	AC RETURN HEADER CONTAINMENT ISOL VALVE	MOTOR	YES	NO	NO
XVG	265	AS	AUXILIARY BUILDING AS SUP HDR STOP VLV	AIR	YES	NO	NO
XVG	273	AS	AUXILIARY BUILDING AS SUP HDR STOP VLV	AIR	YES	NO	NO
XVG	503 ABC	BD	STEAM GEN A/B/C BLOWDOWN HEADER ISOL VALVE	AIR	YES	NO	NO
XVG	9568	CC	EXCESS LTDN HX & RCP Motors CC Supply ISOL VLV	MOTOR	YES	NO	NO
XVG	9576	CC	RC DRAIN TANK HX CC OUT ISOLATION VLV	MOTOR	YES	NO	NO
XVG	9583	CC	EXCESS LETDOWN HX CC OUT ISOL VLV	MOTOR	YES	NO	NO
XVG	9600	CC	RCP Thermal Barrier Supply ISOLATION VALVE	MOTOR	YES	NO	NO
XVG	9605	CC	Reactor Building CC RETURN HEADER ISOL VALVE	MOTOR	YES	NO	NO
XVG	9606	CC	Reactor Building CC RETURN HEADER ISOL VALVE	MOTOR	YES	NO	NO
XVG	9625	CC	Noness. Loop to CC Booster Pump ISOLATION VALVE	MOTOR	YES	NO	NO

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV INITIAL PL & TB SCREENING
TABLE 1

VALVE NO.			Description	ACTUATOR TYPE	INITIAL SCREENING		ADDITIONAL PL & TB SCREENING REQUIRED
					POGV (I.1)	OPEN SAFETY FUNCTION (I.2)	
XVG	9626	CC	Noness. Loop to CC Booster Pump ISOLATION VALVE	MOTOR	YES	NO	NO
XVG	9627 AB	CC	SW SYS OUTLET HDR CC LOOP A/B XCONN VALVE	AIR	YES	YES	YES
XVG	9684 ABC	CC	CHG PP A/B/C OIL CLR CCW SUPPLY ISOL VALVE	AIR	YES	YES	YES
LCV	115B	CS	RWST to CHG /HHSI PUMP SUCTION ISOL VALVE	MOTOR	YES	YES	YES
LCV	115C	CS	VOLUME CONTROL TANK OUTLET ISOL VALVE	MOTOR	YES	NO	NO
LCV	115D	CS	RWST to CHG /HHSI PUMP SUCTION ISOL VALVE	MOTOR	YES	YES	YES
LCV	115E	CS	VOLUME CONTROL TANK OUTLET HR ISOL VLV	MOTOR	YES	NO	NO
XVG	8106	CS	CHARGING /HHSI PUMPS MINI FLOW HDR ISOL VALVE	MOTOR	YES	NO	NO
XVG	8107	CS	CHARGING PUMPS DISCHARGE HDR ISOL VALVE	MOTOR	YES	NO	NO
XVG	8108	CS	CHARGING PUMPS DISCHARGE HDR ISOL VALVE	MOTOR	YES	NO	NO
XVG	8130 AB	CS	CHG /HHSI PUMPS A TO C SUCT XCONN VALVE	MOTOR	YES	YES	YES
XVG	8131 AB	CS	CHG /HHSI PUMPS B TO C SUCT XCONN VALVE	MOTOR	YES	YES	YES
XVG	8132 AB	CS	CHG /HHSI PUMPS A TO C DISCH XCONN VALVE	MOTOR	YES	YES	YES
XVG	8133 AB	CS	CHG /HHSI PUMPS B TO C DISCH XCONN VALVE	MOTOR	YES	YES	YES

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV INITIAL PL & TB SCREENING
TABLE 1

VALVE NO.			Description	ACTUATOR TYPE	INITIAL SCREENING		ADDITIONAL PL & TB SCREENING REQUIRED
					POGV (I.1)	OPEN SAFETY FUNCTION (I.2)	
XVG	1001 AB	EF	MTR DR EF PUMP A/B SW A/B SUCT XCONN VALVE	MOTOR	YES	YES	YES
XVG	1002	EF	TURB DR EF PUMP SW B SUCT XCONN VALVE	MOTOR	YES	YES	YES
XVG	1008	EF	TURB DR EF PUMP SW A SUCT XCONN VALVE	MOTOR	YES	YES	YES
XVG	1037 AB	EF	A/B Train SW to Emergency Feedwater	MOTOR	YES	YES	YES
XVG	6797	FS	RB SPRINKLER SYS SUPPLY HEADER ISOL VLV	MOTOR	YES	NO	NO
XVG	1611 ABC	FW	MAIN FW TO STM GEN A/B/C HDR ISOL	AIR	YES	NO	NO
XVG	6056	HR	REACTOR BUILDING PURGE INLET VALVE	AIR	YES	NO	NO
XVG	6057	HR	BACK-UP PURGE LINE ISOLATION VALVE	AIR	YES	NO	NO
XVG	6066	HR	REACTOR BUILDING PURGE OUTLET VALVE	AIR	YES	NO	NO
XVG	6067	HR	ALTERNATE PURGE EXHAUST ISOLATION VALVE	AIR	YES	NO	NO
XVG	2802 A	MS	MS Loop 2 Turbine Driven EFW Pump Turbine Supply	MOTOR	YES	YES	YES
XVG	2802 B	MS	MS Loop 3 Turbine Driven EFW Pump Turbine Supply	MOTOR	YES	YES	YES
XVG	8000 ABC	RC	PZR PWR OPER RELIEF VLV INLET ISOL VLV	MOTOR	YES	YES	YES
FCV	602 AB	RH	RHR /LHSI PUMP A/B MINIFLOW VALVE	MOTOR	YES	YES	YES

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV INITIAL PL & TB SCREENING
TABLE 1

VALVE NO.			Description	ACTUATOR TYPE	INITIAL SCREENING		ADDITIONAL PL & TB SCREENING REQUIRED
					POGV (I.1)	OPEN SAFETY FUNCTION (I.2)	
XVG	8701 AB	RH	RH HEADER A/B ISOLATION VALVE (IRC)	MOTOR	YES	NO	NO
XVG	8702 AB	RH	RH INLET HEADER A/B ISOLATION VALVE	MOTOR	YES	NO	NO
XVG	8706 AB	RH	CHG/HHSI PUMP SUCT FROM RHR/LHSI A/B	MOTOR	YES	YES	YES
XVG	8801 AB	SI	HI HEAD INJ TO RCS Cold Legs A/B	MOTOR	YES	YES	YES
XVG	8808 ABC	SI	SI ACCUMULATOR A/B/C DISCH HEADER VALVE	MOTOR	YES	NO*	NO
XVG	8809 AB	SI	RWST TO RHR/LHSI PUMPS A/B	MOTOR	YES	YES	YES
XVG	8811 AB	SI	Recirculation Sump to RHR/LHSI Pump A/B	MOTOR	YES	YES	YES
XVG	8812 AB	SI	Recirculation Sump to RHR/LHSI Pump A/B	MOTOR	YES	YES	YES
XVG	8884	SI	HHSI to RCS Hot Legs	MOTOR	YES	YES	YES
XVG	8885	SI	Alternate HHSI to RCS Cold Legs	MOTOR	YES	YES	YES
XVG	8886	SI	HHSI to RCS Hot Legs	MOTOR	YES	YES	YES
XVG	8887 AB	SI	A/B Train LHSI Cross-Connect Valves	MOTOR	YES	YES	YES
XVG	8888 AB	SI	LHSI to RCS Cold Legs	MOTOR	YES	YES	YES
XVG	8889	SI	LHSI to RCS Hot Legs VALVE	MOTOR	YES	YES	YES
XVG	3001 AB	SP	RWST to Reactor Building Spray Pump A/B Suction	MOTOR	YES	YES	YES
XVG	3002 AB	SP	NaOH to Reactor Building Spray Pump A/B Suction	MOTOR	YES	YES	YES

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV INITIAL PL & TB SCREENING
TABLE 1

VALVE NO.			Description	ACTUATOR TYPE	INITIAL SCREENING		ADDITIONAL PL & TB SCREENING REQUIRED
					POGV (I.1)	OPEN SAFETY FUNCTION (I.2)	
XVG	3003 AB	SP	A/B Train Reactor Building Spray Header Isolation	MOTOR	YES	YES	YES
XVG	3004 AB	SP	Recirculation Sump to RB Spray Pump A/B Suction	MOTOR	YES	YES	YES
XVG	3005 AB	SP	Recirculation Sump to RB Spray Pump A/B Suction	MOTOR	YES	YES	YES
XVX	9356 AB	SS	PZR GAS/LIQUID SAMPLE HDR ISOL VALVE (IRC	SOLENOID	YES	NO	NO
XVX	9357	SS	PRESSURIZER SAMPLE HEADER ISOLATION VLV	SOLENOID	YES	NO	NO
XVG	3103 AB	SW	RBCU 1A&2A/1B&2B RETURN HEADER ISOLATION VLV	MOTOR	YES	YES	YES
XVG	3105 AB	SW	DIESEL GENERATOR COOLER A/B FS SUPPLY VLV	AIR	YES	NO	NO
XVG	3107 AB	SW	A/B Train RB Cooling Unit Outlet Return to SW Pond	MOTOR	YES	YES	YES
XVG	3108 ABCD	SW	RB COOLING UNIT 1A/2A/1B/2B INLET ISOLATION VLV	MOTOR	YES	YES	YES
XVG	3109 ABCD	SW	RB COOLING UNIT 1A/2A/1B/2B OUTLET ISOLATION VLV	MOTOR	YES	YES	YES
XVG	3111 AB	SW	A/B Train RB Cooling Units CI Return Isolation	MOTOR	YES	NO	NO
XVG	3112 AB	SW	A/B Train RB Cooling Units CI Return Isolation	MOTOR	YES	NO	NO
XVG	3113 AB	SW	SW SCREEN WASH A/B ISOLATION VLV	MOTOR	YES	NO	NO

* Valves are opened to align the accumulators to the RCS prior to entering Mode 3 and the breakers are then locked open. The valves act as a passive device in the open position.

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV GL 95-07 THERMAL BINDING SCREENING
TABLE 2

VALVE NO.			Description	Valve Closed Hot Followed by a Significant Cooldown Then Required to Open (I.3)	Disk Other than a Double or Parallel Type (I.4)	POGV Potentially Susceptible to TB (I.7)
XVG	9627 AB	CC	SW SYS OUTLET HDR CC LOOP A/B XCONN VALVE	NO	YES	NO
XVG	9684 ABC	CC	CHG PP A/B/C OIL CLR CCW SUPPLY ISOL VALVE	NO	NO	NO
LCV	115B	CS	RWST to CHG /HHSI PUMP SUCTION ISOL VALVE	NO	YES	NO
LCV	115D	CS	RWST to CHG /HHSI PUMP SUCTION ISOL VALVE	NO	YES	NO
XVG	8130 AB	CS	CHG /HHSI PUMPS A TO C SUCT XCONN VALVE	NO	YES	NO
XVG	8131 AB	CS	CHG /HHSI PUMPS B TO C SUCT XCONN VALVE	NO	YES	NO
XVG	8132 AB	CS	CHG /HHSI PUMPS A TO C DISCH XCONN VALVE	NO	YES	NO
XVG	8133 AB	CS	CHG /HHSI PUMPS B TO C DISH XCONN VALVE	NO	YES	NO
XVG	1001 AB	EF	MTR DR EF PUMP A/B SW A/B SUCTION XCONN VALVE	NO	YES	NO
XVG	1002	EF	TURB DR EF PUMP SW B SUCTION XCONN VALVE	NO	YES	NO
XVG	1008	EF	TURB DR EF PUMP SW A SUCTION XCONN VALVE	NO	YES	NO
XVG	1037 AB	EF	A/B Train SW to Emergency Feedwater	NO	YES	NO
XVG	2802 A	MS	MS Loop 2 Turbine Driven EFW Pump Turbine Supply	NO	YES	NO
XVG	2802 B	MS	MS Loop 3 Turbine Driven EFW Pump Turbine Supply	NO	YES	NO

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV GL 95-07 THERMAL BINDING SCREENING
TABLE 2

VALVE NO.			Description	Valve Closed Hot Followed by a Significant Cooldown Then Required to Open (I.3)	Disk Other than a Double or Parallel Type (I.4)	POGV Potentially Susceptible to TB (I.7)
XVG	8000 ABC	RC	PZR PWR OPER RELIEF VLV INLET ISOL VLV	YES	YES	YES
FCV	602 AB	RH	RHR /LHSI PUMP A/B MINIFLOW VALVE	NO	YES	NO
XVG	8706 AB	RH	CHG/HHSI PUMP SUCT FROM RHR/LHSI A/B	NO	YES	NO
XVG	8801 AB	SI	HI HEAD INJ TO RCS Cold Legs A/B	NO	YES	NO
XVG	8809 AB	SI	RWST TO RHR/LHSI PUMPS A/B	NO	YES	NO
XVG	8811 AB	SI	Recirculation Sump to RHR/LHSI Pump A/B	NO	YES	NO
XVG	8812 AB	SI	Recirculation Sump to RHR/LHSI Pump A/B	YES	YES	YES
XVG	8884	SI	HHSI to RCS Hot Legs	NO	YES	NO
XVG	8885	SI	Alternate HHSI to RCS Cold Legs	NO	YES	NO
XVG	8886	SI	HHSI to RCS Hot Legs	NO	YES	NO
XVG	8887 AB	SI	A/B Train LHSI Cross-Connect Valves	NO	YES	NO
XVG	8888 AB	SI	LHSI to RCS Cold Legs	NO	YES	NO
XVG	8889	SI	LHSI to RCS Hot Legs VALVE	NO	YES	NO
XVG	3001 AB	SP	RWST to Reactor Building Spray Pump A/B Suction	NO	YES	NO
XVG	3002 AB	SP	NaOH to Reactor Building Spray Pump A/B Suction	NO	YES	NO
XVG	3003 AB	SP	A/B Train Reactor Building Spray Header Isolation	NO	YES	NO

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV GL 95-07 THERMAL BINDING SCREENING
TABLE 2

VALVE NO.			Description	Valve Closed Hot Followed by a Significant Cooldown Then Required to Open (I.3)	Disk Other than a Double or Parallel Type (I.4)	POGV Potentially Susceptible to TB (I.7)
XVG	3004 AB	SP	Recirculation Sump to RB Spray Pump A/B Suction	NO	NO	NO
XVG	3005 AB	SP	Recirculation Sump to RB Spray Pump A/B Suction	NO	YES	NO
XVG	3103 AB	SW	RBCU 1A&2A/1B&2B RETURN HEADER ISOLATION VLV	NO	YES	NO
XVG	3107 AB	SW	A/B Train RB Cooling Unit Outlet Return to SW Pond	NO	YES	NO
XVG	3108 ABCD	SW	RB COOLING UNIT 1A/2A/1B/2B INLET ISOLATION VLV	NO	YES	NO
XVG	3109 ABCD	SW	RB COOLING UNIT 1A/2A/1B/2B OUTLET ISOLATION VLV	NO	YES	NO

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV GL 95-07 PRESSURE LOCKING SCREENING
TABLE 3

VALVE NO.			Description	POGV has a process medium of water or steam (I.5)	POGV lacks a design feature that mitigates PL (I.6)	POGV Potentially Susceptible to PL (I.7)
XVG	9627 AB	CC	SW SYS OUTLET HDR CC LOOP A/B XCONN VALVE	YES	YES	YES
XVG	9684 ABC	CC	CHG PP A/B/C OIL CLR CCW SUPPLY ISOL VALVE	YES	YES	YES
LCV	115B	CS	RWST to CHG /HHSI PUMP SUCTION ISOL VALVE	YES	YES	YES
LCV	115D	CS	RWST to CHG /HHSI PUMP SUCTION ISOL VALVE	YES	YES	YES
XVG	8130 AB	CS	CHG /HHSI PUMPS A TO C SUCT XCONN VALVE	YES	YES	YES
XVG	8131 AB	CS	CHG /HHSI PUMPS B TO C SUCT XCONN VALVE	YES	YES	YES
XVG	8132 AB	CS	CHG /HHSI PUMPS A TO C DISCH XCONN VALVE	YES	YES	YES
XVG	8133 AB	CS	CHG /HHSI PUMPS B TO C DISH XCONN VALVE	YES	YES	YES
XVG	1001 AB	EF	MTR DR EF PUMP A/B SW A/B SUCTION XCONN VALVE	YES	YES	YES
XVG	1002	EF	TURB DR EF PUMP SW B SUCTION XCONN VALVE	YES	YES	YES
XVG	1008	EF	TURB DR EF PUMP SW A SUCTION XCONN VALVE	YES	YES	YES
XVG	1037 AB	EF	A/B Train SW to Emergency Feedwater	YES	YES	YES
XVG	2802 A	MS	MS Loop 2 Turbine Driven EFW Pump Turbine Supply	YES	YES	YES
XVG	2802 B	MS	MS Loop 3 Turbine Driven EFW Pump Turbine Supply	YES	YES	YES
XVG	8000 ABC	RC	PZR PWR OPER RELIEF VLV INLET ISOL VLV	YES	YES	YES

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV GL 95-07 PRESSURE LOCKING SCREENING
TABLE 3

VALVE NO.			Description	POGV has a process medium of water or steam (I.5)	POGV lacks a design feature that mitigates PL (I.6)	POGV Potentially Susceptible to PL (I.7)
FCV	602 AB	RH	RHR /LHSI PUMP A/B MINIFLOW VALVE	YES	YES	YES
XVG	8706 AB	RH	CHG/HHSI PUMP SUCT FROM RHR/LHSI A/B	YES	YES	YES
XVG	8801 AB	SI	HI HEAD INJ TO RCS Cold Legs A/B	YES	YES	YES
XVG	8809 AB	SI	RWST TO RHR/LHSI PUMPS A/B	YES	YES	YES
XVG	8811 AB	SI	Recirculation Sump to RHR/LHSI Pump A/B	YES	YES	YES
XVG	8812 AB	SI	Recirculation Sump to RHR/LHSI Pump A/B	YES	YES	YES
XVG	8884	SI	HHSI to RCS Hot Legs	YES	YES	YES
XVG	8885	SI	Alternate HHSI to RCS Cold Legs	YES	YES	YES
XVG	8886	SI	HHSI to RCS Hot Legs	YES	YES	YES
XVG	8887 AB	SI	A/B Train LHSI Cross-Connect Valves	YES	YES	YES
XVG	8888 AB	SI	LHSI to RCS Cold Legs	YES	YES	YES
XVG	8889	SI	LHSI to RCS Hot Legs VALVE	YES	YES	YES
XVG	3001 AB	SP	RWST to Reactor Building Spray Pump A/B Suction	YES	YES	YES
XVG	3002 AB	SP	NaOH to Reactor Building Spray Pump A/B Suction	YES	YES	YES
XVG	3003 AB	SP	A/B Train Reactor Building Spray Header Isolation	YES	YES	YES
XVG	3004 AB	SP	Recirculation Sump to RB Spray Pump A/B Suction	YES	NO	NO
XVG	3005 AB	SP	Recirculation Sump to RB Spray Pump A/B Suction	YES	YES	YES

Enclosure 2
V.C.SUMMER NUCLEAR STATION
POGV GL 95-07 PRESSURE LOCKING SCREENING
TABLE 3

VALVE NO.			Description	POGV has a process medium of water or steam (I.5)	POGV lacks a design feature that mitigates PL (I.6)	POGV Potentially Susceptible to PL (I.7)
XVG	3103 AB	SW	RBCU 1A&2A/1B&2B RETURN HEADER ISOLATION VLV	YES	YES	YES
XVG	3107 AB	SW	A/B Train RB Cooling Unit Outlet Return to SW Pond	YES	YES	YES
XVG	3108 ABCD	SW	RB COOLING UNIT 1A/2A/1B/2B INLET ISOLATION VLV	YES	YES	YES
XVG	3109 ABCD	SW	RB COOLING UNIT 1A/2A/1B/2B OUTLET ISOLATION VLV	YES	YES	YES

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

THERMAL BINDING EVALUATIONS

XVG08000A,B,C-RC - Pressurizer PORV Block Valve

Normal Position - Open

Safety Function - Close to isolate a leaking PORV. The Block valves may also be required to reopen to unisolate a leaking PORV to reduce RCS pressure in response to a S/G tube rupture.

Scenario - The normally open valves are closed to isolate an inoperable PORV. The valves would only be required to reopen if it became necessary to unisolate an inoperable PORV to reduce RCS pressure. The valve could be closed at a temperature of 680 degrees F to isolate the leaking PORV and required to reopen at ambient temperature (after formation of the loop seal) which results in the valves being screened as potentially susceptible to TB.

Evaluation - The TB condition is minimized by the POGV design. The valves have flexible wedge disks and have spring compensators which help mitigate the potential TB condition. The valves have been closed numerous times during various modes of plant operation and subsequently reopened at ambient temperature, due to the formation of the loop seal (it normally takes about 40 minutes to form the loop seal after closing the block valve), without experiencing TB. Technical Specifications requires the quarterly stroke testing of the block valves including block valves that have been closed to isolate a leaking PORV. It should also be noted that the PORV Block valves are not used for cold over pressure protection. Based on the above the PORV Block valves have been determined to not be susceptible to TB.

Susceptible to TB - _____ YES X NO

Corrective Actions - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

THERMAL BINDING EVALUATIONS

XVG08812A,B-SI - Recirculation Sump to RHR/LHSI Pump A/B

Normal Position - Closed

Safety Function - Automatically open on receipt of a Safety Injection Signal coincident with a Low-Low RWST level to align the suction of the LHSI pumps to the Containment Sumps.

Scenario - The valve is opened and then closed during startup, before entering Mode 3 (HOT STANDBY), with the RHR system at a temperature of 250 degrees F or less. The above scenario results in the valves being potentially closed at a system temperature of 250 degrees F and subsequently cooling down to ambient before being required to open which results in the valves being screened out as potentially susceptible to TB.

Evaluation - The valves are cycled under ambient conditions on a quarterly basis. The valves have been cycled since experiencing the TB conditions without any problems. The valves are stroked prior to entering Mode 3 to eliminate the potential for PL the valves. The valves will have holes drilled in their disk during the next refueling outage (Refuel 9) to eliminate the potential for PL which will remove the requirement for stroking the valves prior to entering Mode 3. Removing the requirement for stroking the valves prior to Mode three will eliminate the potential TB conditions.

Susceptible to TB - _____ YES X NO

Corrective Actions - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG09627A,B-CC - SW SYS OUTLET HDR CC LOOP A/B XCONN VALVE

NORMAL POSITION - Closed

SAFETY FUNCTION - Automatically opens on low CCW pressure or low Surge tank level

SCENARIO - The valves are opened to supply SW to the CCW system as an emergency makeup supply in the event of a loss of normal makeup capability. The valves were screened as potentially susceptible to PL due to the fact that they are normally closed and are required to open.

EVALUATION - These valves are not susceptible to PL. The valves are located in a low pressure low temperature system and are not required to open under conditions which could potentially result in PL.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG09684A,B,C-CC - CHG PP A/B/C OIL CLR CCW SUPPLY ISOL VALVE

NORMAL POSITION - Closed

SAFETY FUNCTION - Open to supply CCW to the CHG/HHSI pump gear/oil coolers

SCENARIO - These valves open to supply cooling water to the Charging/HHSI pump oil coolers. The valves were screened as potentially susceptible to PL due to the fact that they are normally closed (CHG/HHSI pump secured) and open to supply cooling water when the pumps are energized.

EVALUATION - These valves are not susceptible to PL. The valves are located in a low pressure low temperature system and are not required to open under conditions which could potentially result in PL.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

LCV0115B,D-CS - RWST to CHG/HHSI PUMP SUCTION ISOL VALVE

NORMAL POSITION - Closed

SAFETY FUNCTION - Valve automatically opens upon receipt of a SI signal. This valve is closed under remote manual operation during SI recirculation to isolate the Charging/HHSI pumps suction from the RWST.

SCENARIO - The valves are potentially susceptible to PL if required to open during emergency boration operations. Emergency boration operations could result in the upstream side of the valves being pressurized to the head of a boric acid transfer pump prior to receiving a SI signal to open. The SI signal would open the valves and trip the boric acid transfer pumps at the same time resulting in potential PL conditions.

EVALUATION - The valves are not susceptible to PL due to the Charging (CHG) pump flow preventing the flow from one boric acid pump being able to pressurize the CHG pump suction header. The operation of two boric acid transfer pumps could potentially provide enough flow to pressurize the CHG pump suction header but with two pumps running there would be two flow paths (one upstream of the Volume Control Tank (VCT) to CHG pump suction header check valve and one downstream of the check valve) which would prevent pressurizing the CHG pump suction header above the VCT pressure.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG08130A,B-CS - CHG/HHSI PUMPS A TO C SUCT XCONN VALVES

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is closed under remote manual operation during SI recirculation to provide HHSI train separation.

SCENARIO - The valves are normally open and are only closed for train separation when the HHSI system is aligned for Cold Leg recirculation. Once closed the valves are not required to be reopened. The valves were screened as potentially susceptible to PL due to the quarterly surveillance testing.

EVALUATION - The surveillance test does not result in any potential PL conditions

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG08131A,B-CS - CHG/HHSI PUMPS B TO C SUCT XCONN VALVES

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is closed under remote manual operation during SI recirculation to provide HHSI train separation.

SCENARIO - The valves are normally open and are only closed for train separation when the HHSI system is aligned for Cold Leg recirculation. Once closed the valves are not required to be reopened. The valves were screened as potentially susceptible to PL due to the quarterly surveillance testing.

EVALUATION - The surveillance test does not result in any potential PL conditions

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG08132A,B-CS - CHG/HHSI PUMPS A TO C DISCH XCONN VALVES

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is closed under remote manual operation during SI recirculation to provide HHSI train separation.

SCENARIO - The valves are normally open and are only closed for train separation when the HHSI system is aligned for Cold Leg recirculation. Once closed the valves are not required to be reopened. The valves were screened as potentially susceptible to PL due to the quarterly surveillance testing.

EVALUATION - The surveillance test does not result in any potential PL conditions

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG08133A,B-CS - CHG/HHSI PUMPS B TO C DISCH XCONN VALVES

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is closed under remote manual operation during SI recirculation to provide HHSI train separation.

SCENARIO - The valves are normally open and are only closed for train separation when the HHSI system is aligned for Cold Leg recirculation. Once closed the valves are not required to be reopened. The valves were screened as potentially susceptible to PL due to the quarterly surveillance testing.

EVALUATION - The surveillance test does not result in any potential PL conditions

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG01001A,B-EF - MTR DR EF PUMP A/B SW A/B SUCT XCONN VALVE

NORMAL POSITION - Closed

SAFETY FUNCTION - Valves automatically open on a 2 of 4 Low EFW Suction Header Pressure Signal.

SCENARIO - The valves are required to open to mitigate a High Energy Line Break (HELB). Since the valves are located in areas exposed to HELBs the valves are potentially susceptible to PL. During the testing of the EFW pumps, the opposite train EFW pump suction isolation valves may experience a pressure spike as a result of starting the opposite trains EFW pump and having 2 in series check valves leak by.

EVALUATION - These valves are not susceptible to PL due to a HELB. The valves would either be required to open immediately due to the loss of the Condensate Storage Tank (CST), which would not allow sufficient time for the water in the valve bonnets to heat up and pressurize, or would be required to open upon the depletion of the CST which would take several hours during which time the water in the valve bonnets would have returned to the initial environmental temperature. The review indicates that these valves are susceptible to PL during the surveillance test of the opposite train EFW pump.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

Revise the surveillance test procedure to require monitoring the pressure on the opposite (non-tested) train to ensure no inadvertent pressurization is taking place that would result in PL.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG01002-EF - TURB DR EF PUMP SW B SUCT XCONN VALVE

NORMAL POSITION - Closed

SAFETY FUNCTION - Valves automatically open on a 2 of 4 Low EFW Suction Header Pressure Signal.

SCENARIO - The valves are required to open to mitigate a High Energy Line Break (HELB) in the event of the loss of or depletion of the Condensate Storage Tank (CST). Since the valves are located in areas exposed to HELBs the valves are potentially susceptible to PL.

EVALUATION - These valves are not susceptible to PL. The valves would either be required to open immediately due to the loss of the Condensate Storage Tank (CST), which would not allow sufficient time for the water in the valve bonnets to heat up and pressurize, or would be required to open upon the depletion of the CST which would take several hours during which time the water in the valve bonnets would have returned to the initial environmental temperature.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG01008-EF - TURB DR EF PUMP SW A SUCT XCONN VALVE

NORMAL POSITION - Closed

SAFETY FUNCTION - Valves automatically open on a 2 of 4 Low EFW Suction Header Pressure Signal.

SCENARIO - The valves are required to open to mitigate a High Energy Line Break (HELB) in the event of the loss of or depletion of the Condensate Storage Tank (CST). Since the valves are located in areas exposed to HELBs the valves are potentially susceptible to PL.

EVALUATION - These valves are not susceptible to PL. The valves would either be required to open immediately due to the loss of the Condensate Storage Tank (CST), which would not allow sufficient time for the water in the valve bonnets to heat up and pressurize, or would be required to open upon the depletion of the CST which would take several hours during which time the water in the valve bonnets would have returned to the initial environmental temperature.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG01037A,B-EF - Service Water (SW) to Emergency Feedwater

NORMAL POSITION - Closed

SAFETY FUNCTION - Valves automatically open on a 2 of 4 Low EFW Suction Header Pressure Signal.

SCENARIO - The valves are required to open to mitigate a High Energy Line Break (HELB) in the event of the loss of or depletion of the Condensate Storage Tank (CST). Since the valves are located in areas exposed to HELBs the valves are potentially susceptible to PL.

EVALUATION - These valves are not susceptible to PL. The valves would either be required to open immediately due to the loss of the Condensate Storage Tank (CST), which would not allow sufficient time for the water in the valve bonnets to heat up and pressurize, or would be required to open upon the depletion of the CST which would take several hours during which time the water in the valve bonnets would have returned to the initial environmental temperature.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility.

PRESSURE LOCKING EVALUATIONS

XVG02802A,B-MS - MS LOOP 2/3 Turbine Driven EFW Pump Supply

NORMAL POSITION - Open

SAFETY FUNCTION - Valve receives a confirmatory open signal on either a Steam Generator 2 of 3 Low-Low Level, ATWS, or ESF Bus Undervoltage Signal. The MOVs may also be closed under remote manual operation to isolate a faulted or ruptured Steam Generator.

SCENARIO - The valves are closed during surveillance testing. The quarterly surveillance testing resulted in these normally open valves being screened as potentially susceptible to PL.

EVALUATION - The valves are normally open and are required to be open during an accident. Once closed the valves are not required to be reopened. Surveillance testing does not result in PL conditions.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08000A,B,C-RC - Pressurizer PORV Block Valve

NORMAL POSITION - Open

SAFETY FUNCTION - Close to isolate a leaking PORV. The Block valves may also be required to reopen to unisolate a leaking PORV to reduce RCS pressure in response to a S/G tube rupture.

SCENARIO - The normally open valves are only closed to isolate an inoperable PORV. The valves would only be required to be reopened if it became necessary to unisolate an inoperable PORV to reduce RCS pressure. The worst case would occur if the valves were reopened after a S/G tube rupture. The RCS pressure could drop from 2485 psig (Safety Valve open setpoint) to 1700 psig which could result in PL the valves .

EVALUATION - The review indicates that these valves are susceptible to PL. PL thrust calculations indicate that the valves have adequate capability to overcome a bonnet pressure of 2485 psig with a upstream pressure of 1700 psig and assuming 0 psig downstream pressure.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

FCV00602A,B-RH - RHR/LHSI PUMP A/B MINIFLOW VALVE

NORMAL POSITION - Open

SAFETY FUNCTION - Valve receives a confirmatory open signal when RHR pump discharge flow is below its minimum value and automatically closes when sufficient flow is established.

SCENARIO - During normal operation the valves are placed in the open position prior to going into mode 4 (Hot Standby). During a LOCA, the valves would be open and would remain open until the RCS pressure dropped below the head of the RHR/LHSI pumps and LHSI flow reached @ 1400 GPM. The valves would not be required to reopen once the LHSI flow was established.

EVALUATION - The valves are not subjected to PL conditions within the current licensing bases of the plant. Surveillance testing does not result in any potential PL conditions

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08706A,B-RH - CHG/HHSI PUMP SUCT FROM RHR/LHSI A/B

NORMAL POSITION - Closed

SAFETY FUNCTION - Valves are normally closed and are opened under remote manual operation during SI recirculation.

SCENARIO - These valves are potentially susceptible to PL when they are opened to align the RHR/LHSI pump discharge to the suction of the CHG/HHSI pumps to initiate CL recirculation.

EVALUATION - The valves are opened against the head of a LHSI pump right after aligning the LHSI pump suction to the sumps. There is insufficient time for the water in the valve bonnets to heat up before the valves are opened. The valves are not susceptible to PL.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08801A,B-SI - HI HEAD INJ TO RCS COLD LEGS A/B

NORMAL POSITION - Closed

SAFETY FUNCTION - Automatically opens upon receipt of a Safety Injection Signal. The valves are closed under remote manual operation during SI recirculation.

SCENARIO - The valve bonnets could be pressurized to 2826 PSIG due to CHG/HHSI pump pressure before a station blackout and could be required to open with low system pressure before the HHSI pumps come up to speed. XVG08801B-SI is also susceptible to PL when opened to reestablish train B Cold Leg Recirculation with the HHSI pump secured. The valve bonnet could be pressurized to 1854 PSIG with negligible system pressure.

EVALUATION - The review indicates that these valves are susceptible to PL. PL thrust calculations indicate that the valves have adequate capability to overcome the PL conditions.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08809A,B-SI - RWST TO RHR/LHSI PUMPS A/B

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is closed under remote manual operation during SI recirculation.

SCENARIO - The valves are opened during startup, prior to entering Mode 3 (Hot Standby) and are only cycled during the performance of the RHR Pump and Valve Operability Test. The valves were screened as potentially susceptible to PL due to the valve cycling during the surveillance test.

EVALUATION - These valves are not susceptible to PL. During a LOCA the valves are closed to swap over to Cold Leg recirculation and are not required to be reopened. Surveillance testing does not result in any potential PL conditions.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08811A,B-SI - Recirculation Sump to RHR/LHSI Pump A/B

NORMAL POSITION - Closed

SAFETY FUNCTION - Automatically open upon receipt of a SI signal coincident with a 2 of 4 RWST Low-Level Signal.

SCENARIO - Thermally induced PL may occur due to the water in the valve bonnets being heated up by the hot sump water. RHR operations may also cause the valves to hydraulically PL.

EVALUATION - These valves were identified as being susceptible to PL during VCSNss review of IN 95-14.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

SHORT TERM The sumps have been filled with water and Operating procedures have been revised to require stroking the valves prior to entering Mode 3.

LONG TERM Have a hole drilled in the disk during Refuel #9 (Spring 1996).

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08812A,B-SI - Recirculation Sump to RHR/LHSI Pump A/B

NORMAL POSITION - Closed.

SAFETY FUNCTION - Automatically open upon receipt of a SI signal coincident with a 2 of 4 RWST Low-Level Signal.

SCENARIO - RHR operations may cause the valves to hydraulically PL.

EVALUATION - These valves were identified as being susceptible to PL during VCSNSs review of IN 95-14.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

SHORT TERM Operating procedures have been revised to require stroking the valves prior to entering Mode 3.

LONG TERM Have a hole drilled in the disk during Refuel #9 (Spring 1996).

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08884-SI - HHSI TO RCS HOT LEGS

NORMAL POSITION - Closed

SAFETY FUNCTION - Open and close under remote manual operation as required during SI recirculation to accomplish switchover from RCS cold legs to hot legs and back.

SCENARIO - The valve experiences potential PL conditions when it is opened to establish Hot Leg Recirculation.

EVALUATION - The valve is not susceptible to thermally induced PL. Even though the water in the potentially water filled bonnet could rise from the time of the Injection phase to the Hot Leg recirc phase the temperature variations would have been slow which would result in the bonnet pressure remaining constant with the system pressure. The valve is susceptible to hydraulic PL when the valve is opened, after securing the HHSI pump, to align train A for Hot Leg recirc. Securing the pump before opening the valve could result in a pressure of 1854 psig being trapped in the bonnet with negligible system pressure. PL thrust calculations indicate that the valve has adequate capability to overcome the PL conditions.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08885-SI - Alternate HHSI to RCS Cold Legs

NORMAL POSITION - Closed

SAFETY FUNCTION - Open and close under remote manual operation as required during SI recirculation to accomplish switchover from RCS cold legs to hot legs and back.

SCENARIO - The valve experiences PL conditions when the valve is opened to initiate Cold Leg recirculation and when it is opened to reestablish Cold Leg recirculation.

EVALUATION - The valve is not susceptible to thermally induced PL. The valve is opened to initiate Cold Leg recirculation right after aligning the HHSI pump suction to the LHSI pump discharge, which does not allow sufficient time for the water in the potentially water filled bonnet to heat up. The valve is susceptible to hydraulic PL when the valve is opened to reestablish Cold Leg recirculation with the CHG/HHSI pump secured. Securing the pump before opening the valve could result in a pressure of 1854 psig being trapped in the bonnet with negligible system pressure. PL thrust calculations indicate that the valve has adequate capability based on the as tested stem factor to overcome the PL conditions.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS - Additional analyses will be performed by the end of 1996 to provide increased margin.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08886-SI - HHSI TO RCS HOT LEGS

NORMAL POSITION - Closed

SAFETY FUNCTION - Open and close under remote manual operation as required during SI recirculation to accomplish switchover from RCS cold legs to hot legs and back.

SCENARIO - The valve experiences potential PL conditions when it is opened to establish Hot Leg Recirculation.

EVALUATION - The valve is not susceptible to thermally induced PL. Even though the water in the potentially water filled bonnet could rise from the time of the Injection phase to the Hot Leg recirc phase the temperature variations would have been slow which would result in the bonnet pressure remaining constant with the system pressure. The valve is susceptible to hydraulic PL when the valve is opened, after securing the HHSI pump, to align train B for Hot Leg recirc. Securing the pump before opening the valve could result in a pressure of 1854 psig being trapped in the bonnet with negligible system pressure. PL thrust calculations indicate that the valve has adequate capability to overcome the PL conditions.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08887A,B-SI - A/B TRAIN LHSI CROSS-CONNECT VALVES

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is opened and closed under remote manual operation as required to transfer LHSI recirculation between the RCS Cold Legs and Hot Legs and back.

SCENARIO - The valves experience potential PL conditions when they are opened to align the LHSI pumps for Hot Leg recirc.

EVALUATION - These valves are not susceptible to PL. The valves are closed to align the LHSI pumps for Cold Leg recirc and are reopened to align the LHSI pumps for Hot Leg recirc at a lower temperature. All Valve operations occur with the LHSI pumps running.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08888A,B-SI - LHSI TO RCS COLD LEGS

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is opened and closed under remote manual operation as required to transfer LHSI recirculation between the RCS Cold Legs and Hot Legs and back.

SCENARIO - The valves experience potential PL conditions when they are opened to reestablish Cold Leg recirc and when they are cycled during surveillance testing.

EVALUATION - These valves are only exposed to PL conditions when they are cycled during surveillance testing. The valves are opened against the LHSI pump head to reestablish Cold Leg recirc which does not result in PL. The quarterly RHR pump and valve operability test could potentially result in PL the valves since the valves are closed during the test and are reopened with the RHR pumps secured. The surveillance procedure should be revised to remove the requirement for closing the valves in Modes 1 through 3.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

Revise the surveillance test procedure to eliminate closing valves XVG08888A,B-SI during the performance of the RHR pump and valve operability test in Modes 1, 2 and 3. By leaving the valves open, the hydraulic PL conditions will be eliminated.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG08889-SI - LHSI TO RCS HOT LEGS

NORMAL POSITION - Closed

SAFETY FUNCTION - The valve is opened under remote manual operation to align LHSI recirculation from the RCS Cold Legs to the Hot Legs. Valve is also closed under remote manual operation for long term containment isolation.

SCENARIO - The valve is potentially susceptible to PL when the valve is opened to align the LHSI pumps for Hot Leg recirculation.

EVALUATION - Even though the temperature of the water in the potentially water filled bonnet could rise from the time of the Injection phase to the time of going to Hot Leg recirculation, the temperature rise would be slow which would result in the valve bonnet pressure remaining constant with the system pressure due to the valve depressurization rate. The valve would not experience PL due to the leakage of the two in-series check valves since the check valves must pass stringent leakage and testing requirements, the valve is stroked quarterly without any problems to date and the valve would not be required to open until hours after the LOCA which would allow the bonnet pressure to decrease. All valve operations occur with the LHSI pumps running. The valve is not susceptible to PL.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03001A,B-SP - RWST TO REACTOR BUILDING SPRAY PUMP A/B SUCTION

NORMAL POSITION - Open

SAFETY FUNCTION - Valve receives a confirmatory Reactor Building Spray Actuation open signal. This valve is closed under remote manual operation during SI recirculation to isolate the RB Spray Pump suction from the RWST.

SCENARIO - The valves were screened as potentially susceptible to PL due to quarterly surveillance testing.

EVALUATION - Surveillance testing does not result in any PL conditions. The valves are not susceptible to PL.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03002A,B-SP - NaOH TO REACTOR BUILDING SPRAY PUMP A/B SUCTION

NORMAL POSITION - Closed

SAFETY FUNCTION - Valve automatically opens upon receipt of a Phase A Containment Isolation signal. This valve is closed under remote manual operation during SI recirculation to isolate the RB Spray pump suction from the NaOH tank.

SCENARIO - Surveillance testing of the Spray pumps potentially results in PL conditions. During the testing of the Spray pumps, the opposite train may experience inadvertent pressurization as a result of running the Spray pump if the globe valve, used to isolate the two trains, leaks by.

EVALUATION - The Surveillance testing of the Spray pumps results in potentially pressurizing the opposite train. The valves are susceptible to PL during the surveillance test.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

Revise the surveillance test procedure to require monitoring the pressure on the opposite (non-tested) train to ensure no inadvertent pressurization is taking place.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03003A,B-SP - A/B TRAIN REACTOR BUILDING SPRAY HEADER ISOL

NORMAL POSITION - Closed

SAFETY FUNCTION - Valve automatically opens upon receipt of a Phase A Containment Isolation signal. This valve is closed under remote manual operation for long term containment isolation.

SCENARIO - Surveillance testing of the Spray pumps potentially results in PL conditions.

EVALUATION - Surveillance testing of the Spray pumps results in potentially pressurizing the valve bonnets, to the head of a Spray pump, on the tested train and on the non-tested train. During the surveillance test of a Spray pump the opposite (non-tested) train may experience inadvertent pressurization as a result of the globe valve, used for train isolation, leaking by. The valve associated with the tested train may also experience PL conditions due to the valve bonnet pressurizing to the head of the Spray pump. The valves are susceptible to PL during surveillance testing.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

Revise the surveillance test procedure to require venting the valve bonnet cavity, of the valve associated with the tested train, prior to securing from the test and require monitoring the pressure on the opposite (non-tested) train to ensure no inadvertent pressurization is taking place.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03005A,B-SP - Recirculation Sump to RB Spray Pump A/B Suction

NORMAL POSITION - Closed

SAFETY FUNCTION - Valve automatically opens upon receipt of a SI signal coincident with 2 of 4 RWST Low-Low Level signals

SCENARIO - Surveillance testing of the Spray pumps potentially results in PL conditions. During the testing of the Spray pumps, the opposite train may experience inadvertent pressurization as a result of running the Spray pump if the globe valve, used to isolate the two trains, leaks by.

EVALUATION - The Surveillance testing of the Spray pumps results in potentially pressurizing the opposite train. The valves are susceptible to PL during the surveillance test.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

Revise the surveillance test procedure to require monitoring the pressure on the opposite (non-tested) train to ensure no inadvertent pressurization is taking place.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03103A,B-SW - RBCU 1A&2A/1B&2B RETURN HEADER ISOLATION VLV

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is closed under remote manual operation for long term containment isolation.

SCENARIO - The valves are normally open and would only be closed for long term containment isolation and would not be required to reopen. The valves were screened as potentially susceptible to PL due to quarterly surveillance testing.

EVALUATION - The surveillance testing does not result in any potential PL conditions.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03107A,B-SW - A/B TRAIN RBCU OUTLET RETURN TO SW POND

NORMAL POSITION - Closed

SAFETY FUNCTION - Valve automatically opens when the respective Service Water Booster Pump starts.

SCENARIO - These valves are normally closed and are interlocked with the SW Booster Pump to open when the associated booster pump starts and close when the pump is secured. The valves are potentially susceptible to PL when they are required to open.

EVALUATION - The valves are not susceptible to PL since they open at the same time the SW Booster pump starts.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03108A,B,C,D-SW - RBCU 1A/2A/1B/2B INLET ISOLATION VLV

NORMAL POSITION - Open

SAFETY FUNCTION - Valve is normally open and receives a confirmatory SI open signal.

SCENARIO - The valves are normally open and would only be closed for RBCU maintenance. The valves were screened as potentially susceptible to PL due to quarterly surveillance testing.

EVALUATION - The surveillance testing does not result in any potential PL conditions.

SUSCEPTIBLE TO PL - ☐ YES ☒ NO

CORRECTIVE ACTIONS - None Required.

ENCLOSURE 3

Summary Descriptions of the Individual Evaluations Performed for Potentially Susceptible POGVs to Determine Susceptibility

PRESSURE LOCKING EVALUATIONS

XVG03109A,B,C,D-SW - RBCU 1A/2A/1B/2B OUTLET ISOLATION VLV

NORMAL POSITION - Open

SAFETY FUNCTION - Valve remains open or automatically closes upon receipt of a Safety Injection Signal, based on which Reactor Building Cooling Units (RBCUs) are selected for post-accident operation.

SCENARIO - Surveillance testing results in potential PL of the valves. During the performance of the test, two of the four valves are closed and two are left open. The valves that are closed are exposed to the head of the SW booster pump and are subsequently required to open against the head of the Industrial Cooling (CI) pump which results in a possible pressure of 65 psig being trapped in the valve bonnets.

EVALUATION - The valves are susceptible to Hydraulic PL conditions during the performance of the surveillance test. Revise the procedure to ensure the valves are left open during the test.

SUSCEPTIBLE TO PL - ☒ YES ☐ NO

CORRECTIVE ACTIONS -

Revise the surveillance test procedure to ensure the valves are left in the open position prior to performing the test.

ENCLOSURE 4

POGVs Susceptible To Pressure Locking & Corrective Actions

Page 1

Tag Number	Title	Resolution
XVG01001A-EF	Motor Driven EF Pump "A" SW Suction Cross-Connect	1
XVG01001B-EF	Motor Driven EF Pump "B" SW Suction Cross-Connect	1
XVG08000A-RC	Pressurizer PORV Block	2
XVG08000B-RC	Pressurizer PORV Block	2
XVG08000C-RC	Pressurizer PORV Block	2
XVG08801A-SI	High Head Injection to RCS Cold Legs	2
XVG08801B-SI	High Head Injection to RCS Cold Legs	2
XVG08811A-SI	Recirculation Sump to RHR/LHSI Pump "A"	3, 4
XVG08811B-SI	Recirculation Sump to RHR/LHSI Pump "B"	3, 4
XVG08812A-SI	Recirculation Sump to RHR/LHSI Pump "A"	4
XVG08812B-SI	Recirculation Sump to RHR/LHSI Pump "B"	4
XVG08884-SI	HHSI to RCS Hot Legs	2
XVG08885-SI	Alternate HHSI to RCS Cold Legs	5
XVG08886-SI	HHSI to RCS Hot Legs	2
XVG08888A-SI	LHSI to RCS Cold Legs	6
XVG08888B-SI	LHSI to RCS Cold Legs	6
XVG03002A-SP	NaOH to Reactor Building Spray Pump "A" Suction	1
XVG03002B-SP	NaOH to Reactor Building Spray Pump "B" Suction	1
XVG03003A-SP	"A" Train Reactor Building Spray Header Isolation	1, 7
XVG03003B-SP	"B" Train Reactor Building Spray Header Isolation	1, 7
XVG03005A-SP	Recirculation Sump to RB Spray Pump "A" Suction	1
XVG03005B-SP	Recirculation Sump to RB Spray Pump "B" Suction	1
XVG03109A-SW	RB Cooling Unit 1A Outlet Isolation	6
XVG03109B-SW	RB Cooling Unit 2A Outlet Isolation	6
XVG03109C-SW	RB Cooling Unit 1B Outlet Isolation	6
XVG03109D-SW	RB Cooling Unit 2B Outlet Isolation	6

Notes:

- 1 The surveillance test procedure will be revised to verify that the non-tested train does not experience inadvertent pressurization. This procedure revision will be complete prior to the next scheduled performance of the surveillance test.
- 2 A hydraulic pressure locking analysis consistent with the Commonwealth Edison methodology has shown that this valve has sufficient opening thrust capability, consistent with Generic Letter 89-10 methodology, to overcome the postulated pressure locking forces.
- 3 The SI recirculation sumps have been partially filled with water to address the potential effects of thermally induced pressure locking for these valves as an interim measure. This valve will have a pressure equalizing hole installed in the disk prior to the completion of Refuel 9 in Spring of 1996 as the long term resolution.
- 4 Operating procedures have been revised to vent any trapped pressure within the bonnet cavity of this valve prior to Mode 3 entry as an interim measure. This valve will have a pressure equalizing hole installed in the disk prior to the completion of Refuel 9 in Spring of 1996 as the long term resolution.
- 5 A hydraulic pressure locking analysis consistent with the Commonwealth Edison methodology has shown that this valve has sufficient opening thrust capability to overcome the postulated pressure locking forces. Additional analyses will be performed by the end of 1996 to provide increased margin.
- 6 The surveillance test procedure will be revised to keep this valve OPEN to remove the potential susceptibility. This procedure revision will be complete prior to the next scheduled performance of the surveillance test.
- 7 The surveillance test will be revised to vent the bonnet cavity of this valve prior to securing from the test. This procedure revision will be complete prior to the next scheduled performance of the test.