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SUBJECT: Forwards response to NRC 870330 request for addl info re inservice testing program for pumps & valves, per 870527 & 28 meeting. Util will submit rev to pump & inservice testing program within approx 9 months following receipt of NRC SER.

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161-00496-JGH/BJA
September 10, 1987

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

ATTN: Document Control Desk

References: (1) Letter from E. A. Licitra, NRC, to E. E. Van Brunt, Jr., ANPP, dated March 30, 1987. Subject: ASME Section XI Pump and Valve Inservice Testing Program-Palo Verde, Units 1, 2 and 3.
(2) Meeting between ANPP and NRC Staff on May 27 and 28, 1987 at the Palo Verde Site. Subject: Meeting to Discuss Palo Verde Inservice Testing Program for Pumps and Valves.

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos: STN 50-528 (License NPF-41)
STN 50-529 (License NPF-51)
STN 50-530 (License NPF-65)
PVNGS Inservice Testing Program
File: 87-A-056-026

By Reference (1), the NRC Staff requested additional information on the PVNGS Inservice Testing Program for pumps and valves. Subsequent to this request, a meeting was held between ANPP and the NRC Staff to discuss ANPP's draft responses to the NRC request. The attachments to this letter provide ANPP's formal response to the NRC request for information. The attachments are arranged in the following order:

Attachment 1 - Responses to NRC Questions
Attachment 2 - Pump and Valve Relief Requests
Attachment 3 - Cold Shutdown Justifications
Attachment 4 - Check Valve Reliability Analysis

ANPP will submit a formal revision to the PVNGS Pump and Valve Inservice Testing Program within approximately nine (9) months following receipt of the NRC SER on the program. The date of implementation of the testing program changes will be specified in the formal program revision submittal, but is expected to be the date of transmittal of the program revision to the NRC.

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If you have any additional questions on this matter, please contact Mr. W. F. Quinn of my staff.

Very truly yours,

J. G. Haynes

J. G. Haynes
Vice President
Nuclear Production

JGH/BJA/mes

Attachments

cc: O. M. De Michele (all w/attachments)
E. E. Van Brunt, Jr.
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ATTACHMENT 1

RESPONSES TO NRC QUESTIONS

8709170200

PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3

IST PROGRAMS (REVISION 0) REVIEW

REQUEST FOR ADDITIONAL INFORMATION

The following information is submitted in response to the Nuclear Regulatory Commission's (NRC) request for additional information concerning the PVNGS Pump and Valve Program. The request for information was supplemented by a meeting between the NRC, the NRC's consultant (EG&G) and Arizona Nuclear Power Project (ANPP) personnel. The meeting occurred on May 27 & 28, 1987. The format of the response is to repeat the NRC's request for information followed by the ANPP response.

I. VALVE TESTING PROGRAM

A. General Comments and Questions

1. The NRC position for inservice testing of valves identified to be tested during cold shutdown is that testing shall commence no later than 48 hours after reaching the cold shutdown condition, rather than the 72 hours specified in the Palo Verde IST Program.

Response: The PVNGS Program will be revised to indicate valve testing during cold shutdown (Mode 5) will be initiated within 48 hours of achieving cold shutdown condition.

2. Are all valves that are Appendix J, Type C, leak rate tested included in the IST program and categorized A or A/C?

Response: In summary, all valves contained in the Type C program will be included in the IST Program and categorized as either A or AC. However, manual Type C valves and valves CH-HV-524, SI-PSV-179, SI-PSV-189, & SI-PSV-474 are not currently in the IST Program, although they are included in the Type C test program per Appendix J. The PVNGS program will be revised to include the above listed valves, except for CH-HV-524. Valve CH-HV-524 has been locked open due to single failure criteria, and is currently being deleted from the Type C program. Valve SI-UV-708 is also currently in the Type C program, but a design change capped off the line just downstream of this valve. Valve SI-UV-708 is in the process of being deleted from the Type C program, and will be deleted from the IST program.

3. The NRC has concluded that the applicable leak test procedures and requirements for containment isolation valves are determined by 10 CFR50 Appendix J, however, the applicant must comply with the Analysis of Leakage Rates and Corrective Action requirements of Section XI, paragraphs IWV-3426 and 3427 (see valve relief request number 41).

Response: Valve Relief Request No. 41 will be amended to indicate that Relief is not sought for IWV-3426 and IWV-3427. PVNGS will comply with IWV-3426 and IWV-3427 as will be noted in the revised IST program.

4. The note on Page 7, Section 2.3.K states that testing of specific valves during cold shutdown is not required if plant operating conditions will not permit the testing of those valves. It is the staff position that specific requests for relief should be provided for any valves that fall into this category.

Response: Note on Page 7, Section 2.3.K will be deleted.

5. Are there any valves in the air/nitrogen supply to the MSIV's and main feedwater isolation valves whose failure could prevent these isolation valves from performing their safety related functions?

Response: No, there are no valves in the air/nitrogen supply to the MSIV's and Main Feedwater Isolation Valves (FWIV's) whose failure would prevent these isolation valves from performing their safety function.

6. A general relief from Code requirements cannot be granted for as yet unspecified valves (Refer to Valve Relief Request No. 42). If a problem does arise with testing any particular valves, then a specific request for relief should be submitted for those valves giving the detailed justification which should include the radiation field intensity, the time required to perform the testing, and any other pertinent information that should be considered when evaluating the request.

Response: Specific relief will be generated when required. As of the present date, no relief has been taken per this request. VRR #42 will be deleted in the next revision of the program.

7. The NRC staff position is that relief may be obtained from the trending requirements of Section XI [Paragraph IWV-3417(a)] for rapid acting valves, however, in order to obtain this relief the licensee is required to assign a maximum limiting stroke time of 2 seconds to those valves and perform corrective action as required by IWV-3417(b) if the measured stroke times exceed the 2 second limit. Valve Relief Request No. 40 is not in compliance with this staff position.

Response: VRR #40 will be deleted. Trending of valves will be performed in accordance with new VRR #44.

3. Provide a more specific technical justification for not full-stroke exercising valves AFA-V015 and AFB-V024 during cold shutdown.

Response: Valve Relief Request #2 has been deleted and replaced with Cold Shutdown Justification CSJ-2.

4. Provide a more specific technical justification for not full-stroke exercising valves AFA-V079 and AFB-V080 during cold shutdown.

Response: Valve Relief Request #3 has been deleted and replaced with Cold Shutdown Justification CSJ-3.

5. Provide a more specific technical justification for not full-stroke exercising valves AFA-V007, AFB-V022, AFA-V137 and AFB-V138 quarterly.

Response: Valve Relief Request #1 has been deleted and replaced with Cold Shutdown Justification CSJ-1.

C. <u>Chemical And Volume Control System</u>

1. Review the safety function of valves CH-V154 and V155 (figure CHP-002: B-13) and CH-HV524 (figure CHP-001; E-15) to determine if they should be included in the IST program.

Response: Valves CH-V154 and CH-V155 are downstream of Boric Acid make-up pumps (BAMP's). BAMP's are not ASME XI Pumps (not class 1E). Therefore, valves downstream of a non-1E powered pump need not be tested. BAMP's are not credited in any safety analysis.

CH-HV-524 is a passive valve (locked open) and is therefore not within the scope of the ASME XI.

2. Review the safety function of valve PCN-V215 to determine if it should be included in the IST program.

Response: PCN-V215 is in the IST Program per an NRC commitment. Reference letter, ANPP-31548, dated 12-20-84. PCN-V215 is the isolation between the charging pump suction from the spent fuel pool.

3. Does valve CHE-PDV-240 have a required fail-safe position?

Response: Yes, CH-PDV-240 fails closed. Additionally, it was noted during the meeting that VRR #5 needed to be deleted and issued as a cold shutdown justification for valve CH-UV-501. See CSJ-5. Valves CH-239 and 240 will be tested quarterly per the code requirements.

4. Does valve CHN-V118 perform any safety function in the closed position? If so, how is this valve verified closed?

Response: Valve CH-V118 does not perform any safety function in the closed position. CH-V118 was installed as an operating convenience valve. The valve was designed to ensure blended make-up is directed to the charging pumps. If CH-V118 fails open, CH-UV-501 can be closed as needed.

5. Provide a more specific technical justification for not full-stroke exercising valves CHA-V177, V190, HV536 and CHN-UV514 during cold shutdown.

Response: CH-HV-536, CH-UV-514, CH-V177 and CH-V190 can be tested at cold shutdown. VRR #4 will be deleted and replaced with a cold shutdown justification. See CSJ-4.

6. What alternate methods have been considered to verify that valves CHB-V305 and CHA-V306 full-stroke open?

Response: Valves CHB-V305 and CHA-V306 can be full-stroke exercised, but only during filling of the Reactor Vessel Cavity at Refueling. See VRR-6.

7. Provide the P&ID that shows valve CHE-HV239.

Response: 13-M-CHP-001 (G-11) provided during meeting.

8. Provide a more specific technical justification for not full-stroke exercising valve CHE-V440 during cold shutdown.

Response: CHE-V440 is in a flow path which is not normally used and is isolated with a manual valve. The valve will be tested per code when the associated boration flow path is required to be operable. VRR #8 will be deleted. Valves will be tested per IWV-3416.

9. Is RCS charging expected to be stopped during <u>each</u> cold shutdown to allow testing of valve CHN-UV501?

Response: Yes, CHN-UV-501 will be tested on a cold shutdown frequency. VRR #5 will be deleted and replaced with a cold shutdown justification. See CSJ-5.

10. How is valve CHE-V435 verified to full-stroke open quarterly?

Response: CH-PDV-240 is closed directing all charging flow through the bypass line where V435 is installed. V435 is a spring loaded check valve.

11. How is valve CHN-V835 verified to full-stroke closed during cold shutdown?

Response: The Reactor Coolant Pump Seal Injection lines are isolated via manual valves. The system is then pressurized via CH-V833 (demin source) and leakage from CH-V834 is verified to stop.

12. Provide a more specific technical justification for not full-stroke exercising valves CHB-UV-515, CHA-UV-516 and CHB-UV-523 during cold shutdown.

Response: The affected valves are full stroked during cold shutdown. See Cold Shutdown Justification CSJ-8. VRR #10 will be deleted and replaced with CSJ-8.

13. Why was the exercise test for valve CHN-V494 deleted from the IST Program?

Response: This valve was considered to be a passive valve as its only safety function was containment isolation. However, the program will be revised to show a full stroke exercise at cold shutdown per CSJ-32.

D. <u>Containment Purge System</u>

1. Are valves CPA-UV4A, UV4B, CPB-UV5A and UV5B full-stroke exercised quarterly?

Response: Valves are full stroked quarterly as noted in the program.

E. <u>Condensate Transfer System</u>

1. Provide a more technical justification for not full-stroke exercising valves CTA-V016 and CTB-V020 quarterly.

Response: Valves will be full stroke exercised quarterly, when required to be operable.

2. Review the safety function of valves CT-V037 and V038 (figure CTP-001; C-4 and B-4) to determine if they should be included in the IST Program.

Response: Valves will be added to IST Program and full stroke exercised quarterly.

F. Diesel Generator System

1. Review the safety function of valves DGA-V002, V003, V006 and DGB-V011, V012 and V015 to determine if they should be included in the IST Program.

Response: The function of the valves has been reviewed. These valves have no safety function and will be deleted from the IST Program.

2. Provide P&ID's 01-M-DGP-001, sheets 6 and 8.

Response: P&ID's provided during the meeting.

G. Essential Chilled Water System

1. Review the safety function of valves ECA-V041 and ECB-V072 to determine if they should be included in the IST Program.

Response: The function of these valves has been reviewed. These valves are the check valves which open to provide make-up to the essential chilled water expansion tanks. These valves do not have a safety function and will be deleted from the IST Program.

2. Do valves EC-TV29 and TV30 (figure ECP-001; E-7 and E-3) have a required fail-safe position?

Response: No, these valves do not have a required fail safe position. These valves are not in the Section XI Program.

H. Essential Cooling Water System

1. Review the safety function of valves EWA-V018, EWB-V029, V077, EWA-V079, EWB-V080 and EWA-V103 to determine if they should be included in the IST Program.

Response: The function of these valves has been reviewed. These valves are the check valves which open to provide makeup to the essential cooling water expansion tanks. These valves do not have a safety function and will be deleted from the IST Program.

2. Provide a more specific technical justification for not full-stroke exercising valves EWA-UV65 and UV145 quarterly.

Response: Due to the pressure differential between these two systems (NC/EW), it is not possible to control surge tank pressure and level in the nuclear cooling water system when cross connected. The NC system would have to be shutdown for the duration of the valve stroke test and that is not possible on line because NC system supplies RCP motor cooling and letdown heat exchanger cooling water. See Cold Shutdown Justification CSJ-12, which replaces VRR #18.

I. HVAC Containment Building System

1. What is the basis for assigning a maximum stroke time of one second to valves HCB-UV44, HCA-UV45, UV46 and HCB-UV47.(See Relief Request No. 40).

Response: FSAR Table 6.2.4-2.

J. Containment Hydrogen Control System

1. Do valves HPA-V002 and HPB-V004 perform any safety function in the open position?

Response: Yes, these valves must open to return hydrogen recombiner flow to containment and they will be added to the IST program.

2. What is the basis for assigning a maximum stroke time of one second to valves HPA-HV7A, HV7B, HPB-HV8A and HV8B? (See Relief Request No. 40).

Response: FSAR Table 6.2.4-2.

K. Instrument and Service Air System

1. Provide a more specific techical justification for not full-stroke exercising valve IAE-UV2 quarterly.

Response: Stroking this valve renders all air operated valves inside containment inoperable for the duration of the test. The valve is solenoid operated and cannot be part stroked. Valve will be full-stroked during cold shutdown. Stroking this valve shut will affect all air operated valves in containment which include pressurizer spray, numerous CH valves (CIV's) etc. VRR #20 will be deleted and replaced with Cold Shutdown Justification CSJ-14.

L. Main Steam System

1. How are valves SGA-V043, V044, SGE-V887 and V888 verified to full-stroke open quarterly during plant operation? Do these valves perform any safety function in the closed position?

Response: The ASME Section XI Program contains a typographical error with respect to valves SGA-V043, V044, SGE-V887 and V888. These valves are only part stroked on line. These valves are tested concurrent with mini-flow testing of pump AFA-P01 (Turbine driven essential Aux. feedwater pump). These steam check valves are full stroke tested concurrent with the full flow injection test of AFA-P01 pursuant to Tech. Spec. 4.7.1.2c.

These valves have no safety function in the closed direction. During operation of the essential feedwater pump pursuant to a AFAS (Aux. Feed Actuation Signal), both A and B Train Steam supplies are feeding the steam driven Aux. Feedwater pumps, although one train is sufficient. The safety function of the valves is to open and supply steam to the turbine. See Cold Shutdown Justification CSJ-28.

2. Review the safety functions of the following valves to determine if they should be included in the IST Program.

Valve	Location (figure SGP-001)
PV306A	A-11
V350	A-10
PV306B	A-13
V360	A-12
PV313B	G-13
V339	G-12
PV313A	H-12
V334	H-11
V346	G-12
V348	G-12
V357	A-12
V358	A-12

Response: These valves are Instrument Air and Nitrogen Supply to the Atmospheric Dump Valve Actuators. They provide System Control functions. These valves need not be individually identified in the IST Program. They will be individually verified to operate when the main steam atmospheric dump valves are full stroke exercised during cold shutdown using only the nitrogen accumulator supply. See cold shutdown justification CSJ-18 which replaces VRR #26.

3. Provide a more specific technical justification for not full-stroke exercising valves SGB-HV178, SGA-HV179, HV184 and SGB-HV185 quarterly.

Response: See Cold Shutdown Justification CSJ-18 which replaces VRR #26.

4. Provide a more specific technical justification for not full-stroke exercising valves SGA-UV134A and UV138A quarterly.

Response: VRR #25 has been revised.

5. Provide the technical justification for not full-stroke exercising valves SGE-UV170, UV171, UV180 and UV181 quarterly.

Response: See Cold Shutdown Justification CSJ-25.

6. Are valves SGA-UV1133, UV1134, SGB-UV1135A, UV1135B, UV1136A and UV1136B full-stroke exercised quarterly in accordance with the requirements of Section XI? If so, what is the purpose of Relief Request No. 27?

Response: The purpose of VRR #27 (as well as VRR #25) is to permit entry into Mode 4 without testing position indication of these solenoid valves. VRR #27 has been augmented and revised, accordingly.

7. Do valves SGE-V642, V652, V653 and V693 perform any safety function in the open position? How is <u>each</u> of these valves verified to close during cold shutdown testing?

Response: These valves provide protection of the feedwater lines from back-flow from the auxiliary feedwater system and ensure that auxiliary feedwater flow is directed into the steam generator. Only one valve per line is required to perform this function. All four valves will be retained in the IST program but the valves in each line will be tested in series as a unit.
These valves provide no safety function in the open direction.

8. What is the basis for assigning a maximum stroke time of one second to valves SGB-HV200 and HV201? (See Relief Request No. 40).

Response: FSAR Table 6.2.4-2.

9. Provide the technical justification for not full-stroke exercising valves SGB-UV132, UV137, SGA-UV174 and UV177 quarterly.

Response: These valves are feedwater isolation valves. These valves are part stroke exercised quarterly and full stroke exercised during cold shutdown as permitted by code. It is not feasible to isolate feedwater flow to an operating steam generator. Reactor/Turbine trip will result. See Cold Shutdown Justification CSJ-26.

10. Review the safety functions of valves SG-V002, V008, V431 and V432 (figure SGP-002, F-15 and B-15) to determine if they should be included in the IST Program.

Response: These valves are non-seismic and not quality related. They are in the "N" Aux Feed Pump supply to the feedwater system and are not within the scope of IWV-1100. Valves need not be included in the IST Program.

11. Do valves SG-FV1113 and FV1123 (figure SGP-002; H-14 and D-14) have a required fail-safe position?

Response: These valves are not in the Section XI IST Program. The valves are flow control valves and are exempt per IWV-1200. (The valves fail locked). Additionally, valves are non-Q, non-seismic & are not with the scope of IWV-1100. Valves need not be included in the IST Program. These valves do not have a required fail safe position.

N. Safety Injection and Shutdown Cooling System

1. How are valves SIA-V120 and SIB-V130 full-stroke exercised quarterly?

Response: Flow from the plant demin water system via valves SI-V885, SI-V254 to valves SI-V551 and SI-V554 respectively. Flow is measured with an ultrasonic flow device.

2. How are valves SIB-V484 and SIA-V485 full-stroked exercised quarterly?

Response: Valves are tested under conditions of shutdown cooling when the Containment Spray Pumps are functioning as Residual Heat Removal pumps. See Cold Shutdown Justification CSJ-30.

3. What are the consequences of valves SIB-UV659 or SIA-UV660 failing closed during their quarterly testing?

Response: The respective Safety Injection train would be inoperative due to lack of minimum flow capabilities. See Cold Shutdown Justification CSJ-20.

4. What alternate methods have been considered for full-stroke exercising valves SIA-V205 and SIB-V206 during cold shutdowns or refueling outages?

Response: The only viable alternate method of full stroking these valves is disassembly and these valves will be disassembled per Valve Relief Request No. 32.

These valves are check valves in the containment recirculation sumps (return lines to ESF pumps). The sumps are always dry.

5. How are valves SIA-V434 and SIB-V446 full-stroke exercised quarterly?

Response: These valves can be part stroke exercised on line and full stroke exercised during cold shutdown. See Cold Shutdown Justification CSJ-29.

6. Is valve SI-V463 (figure SIP-001; D-8) Appendix J, Type C, leak rate tested?

Response: Valve SI-V463 is Appendix J, Type C leak tested. It is a manual isolation valve and will be added to the program as noted in General Questions A-2 and A-3 above.

7. Provide a more specific technical justification for not full-stroke exercising valves SIA-V164 and SIB-V165 during cold shutdowns. What alternate methods have been considered for full-stroke exercising these valves?

Response: Valves are the last isolation valve in containment spray supply lines to the spray nozzles. The only method of full stroke testing would be to spray down containment, and that is not a viable option. These valves will be disassembled and freedom of movement verified every 5 years in connection with air/smoke test per Tech Spec 3/4.2c and as per VRR #31.

8. The NRC staff has approved valve sample disassembly/inspection for full-stroke exercising check valves on a refueling outage frequency. Provide a more specific technical justification for not full-stroke exercising valves SIE-V215, V225, V235 and V245 during refueling outages.

Response: Valves are Safety Injection Tank Discharge check valves. Full stroke testing would require injection into the RCS at high flow rates. This is possible only during refueling with the Reactor head removed. Blowing the Nitrogen blanket gas into the Vessel will create extensive turbulence (crud burst & airborne contamination). Disassembly is the <u>only</u> viable method of verification of freedom of movement. See VRR #33.

9. How are valves SIE-V217, V227, V237 and V247 verified to full-stroke open utilizing RCS shutdown cooling?

Response: See Valve Relief Request No. 34.

10. Provide a more specific technical justification for not full-stroke exercising valves SIA-V522, V523, SIB-V532 and V533 during cold shutdowns.

Response: The valves are part of Long Term Recirculation lines. This portion of the SI system is fed by the HPSI pumps. If the flowrates through these valves are 40 gpm or greater and the Reactor Head is in place, the low temperature overpressure protection (LTOP) relief valves may lift. The RCS is generally maintained at solid conditions during mode 5 and there is no place to remove the excess injected water. Overpressurization will result and the potential for Pressurized Thermal Shock is high. See Valve Relief Request No. 35.

11. Are the following valves Appendix J, Type C, leak rate tested?

SIB-UV615	SIB-UV616
SIA-UV617	SIB-UV625
SIB-UV626	SIA-UV627
SIA-UV635	SIB-UV636
SIA-UV637	SIA-UV645
SIB-UV646	SIA-UV647

Response: No, these valves are Safety Injection, Injection Valves. Their function is to allow flow into the containment building (R.C.S.) during accident situations, and are exempt from Appendix J, leak test.

12. What are the consequences of valves SIB-HV690 and SIA-HV691 failing open during their quarterly testing?

Response: See Cold Shutdown Justification CSJ-27.

13. How is full-stroke exercising verified for <u>each</u> of valves SIE-V540, V541, V542 and V543?

Response: By verifying shutdown cooling flow rate through each valve.

14. Provide a more specific technical justification for not full-stroke exercising valves SIA-HV605, HV606, HV-607, HV-608, SIB-HV-613, HV-633 and HV-643 during cold shutdown.

Response: Valves will be full stroked during cold shutdown and valve relief request #37 will be deleted and replaced with Cold Shutdown Justification CSJ-22.

II. PUMP TESTING PROGRAM

1. What alternative tests have been considered to detect any mechanical degradation of the diesel generator fuel oil transfer pumps?

Response: Pump Relief Request #3 has been revised to provide additional basis for testing the DF pumps solely for flow rate and differential pressure.

2. How is the operational readiness of the diesel generator jacket water cooling pump, lube oil pump, and fuel oil booster pump ascertained during the monthly diesel generator technical specification surveillance test?

Response: The operational readiness of these pumps is ascertained by the evaluation of pertinent system parameters recorded from various locations and time intervals during the monthly Diesel Generator Surveillance test. These parameters include the following:

SYSTEMS	PARAMETER
Jacket Water	Jacket water temperature and pressure, Jacket water coolant temperature and pressure, Jacket water surge tank level, Jacket water pump vibration.
Lube Oil	Lube oil temperature and pressure, Lube oil cooler temperature and pressure, Lube oil sump level, Lube oil pump vibration.
Fuel Oil	Fuel oil pressure and Fuel oil Day tank level, Fuel oil pump vibration.

Please note that the above pumps were designed as non-ASME, and will be deleted from the IST Program, as will the associated PRR #4.

3. Concerning Pump Relief Request #1; Section XI, Paragraph IWP-3100 requires that both pump differential pressure and flow rate to be measured.

Response: Pump Relief Request #1 and #6 will be revised. Pump flow for HPSI, LPSI, and Containment Spray, and for Auxiliary Feedwater will be measured using ultrasonic flow meters. The Relief Request will be changed to Request Relief from the 2% Accuracy required per the Section XI code.

Currently available on site, ANPP has controlotron flow instrumentation. That instrumentation can only be calibrated to ±5% and the present Relief Requests will be modified to Request Relief to use the ±5% Accuracy equipment.

The only functions of this flow instrumentation will be to satisfy code requirements and to verify that the installed flow orifice is not degraded.

Degradation of the pumps could be observed in numerous parameters but typically would be determined by changes in pump pressure and/or flowrate. Pump flow is not varied for there tests, but rather is constant as a result of the fixed resistance of the miniflow line. Changes in flow would be evident with the measurement tolerance of ±5%.

Due to the pump tests being performed at the miniflow recirculation point on the pump curve, changes in pump pressure would be more indicative of pump degradation. Therefore, pump pressure will be measured in accordance with the requirements whereas pump flow will be measured to ±5%.

4. Review the safety functions of the boric acid makeup pumps to determine if they should be included in the IST Program.

Response: IWP-1100 states that only pumps that are provided with an emergency power source are included in the Section XI Program. Boric Acid Makeup Pumps (BAMPS) do not have an emergency power source (non-class 1E). Additionally, FSAR 3.9.6.1 and Table 3.9-21 do not list the BAMPS as Active Pumps.

5. Review the safety functions of the fuel pool cooling pumps to determine if they should be included in the IST Program.

Response: Fuel pool cooling pumps are not included in the IST Program. These pumps are not active as per FSAR 3.9.6.1 and Table 3.9-21. The PC Pumps were discussed with NRR during the Unit 1 pre-licensing review, and NRC agreed at that time that the PC Pumps would not be included in the pump program (Ref. ANPP-31548 WFQ/TFQ, dated December 20, 1984).

6. Table IWP-3100-1 requires the measurement of pump flow rate; why is this parameter listed as being observed in the pump listing.

Response: Pump flow rate (for charging pumps) is measured and recorded in current Section XI, Pump Procedures. The Palo Verde Pump and Valve Program will be revised, to correct the Pump listings.

7. Concerning Pump Relief Request #6, lack of proper flow measurement instrumentation does not negate the Code Requirement that flow be measured.

Response: See response to question Number 3.

ATTACHMENT 2

PUMP AND VALVE RELIEF REQUESTS

PROGRAM:_____ UNIT:_____
REV:_____

PUMP RELIEF REQUEST NO. 1

SYSTEM: Auxiliary Feedwater System (AF)

COMPONENTS: AFN-P01, AFA-P01, AFB-P01

P&ID & COORDINATES: 13-M-AFP-001 @ H8, D8, B8

CLASS: 3

FUNCTION: AFN-P01, AFA-P01, and AFB-P01 are the nonessential Auxiliary Feedwater Pump, the steam driven Aux Feedwater Pump and motor driven Aux Feedwater Pump, respectively, and supply make-up water to the Steam Generator during startup/shutdown conditions and subsequent to receipt of an AFAS (aux feed actuation signal). Note AFN-P01 does not receive an AFAS.

TEST REQUIREMENT: IWP-4110-1 required flow to be measured with an instrument with an accuracy of ±2% of fullscale.

Currently, ANPP has ultrasonic equipment with an accuracy of ±5% of fullscale.

BASIS FOR RELIEF: The hydraulic circuits for the ASME Section XI test for these pumps is via minimum flow recirculation loop. Minimum flow orifices installed in the line control constant flow. High velocity fluid through the orifice ensures that they do not become plugged. Since the only real function of flow measurement in this situation is to check the flow orifice condition, accuracy of ±5% is sufficient.

ALTERNATE TESTING: None, flow is constant and measured.

PROGRAM: ___

UNIT: _____
Rev.: _____

PUMP RELIEF REQUEST NO 2

SYSTEMS: Chemical and Volume Control, Safety Injection

COMPONENTS: CHA-P01, CHB-P01, CHE-P01, SIA-P05, and SIB-P05

P&ID COORDINATES: 13-M-CHP-002 @ B3, D3, and G3
13-M-SIP-001 @ C14 and D14

CLASS: 2

FUNCTION: CHA-P01, CHB-P01, and CHE-P01 are the three charging pumps. SIA-P05 and SIB-P05 are the containment spray chemical addition pumps (SCAP). The charging pumps provide makeup to the reactor coolant system for chemistry and volume control. In addition they provide auxiliary spray to the pressurizer during the final stages of shutdown. The SCAP inject a controlled amount of hydrazine into the containment spray flow to remove radioactive elemental iodine from the containment atmosphere.

TEST REQUIREMENTS: The inlet pressure and differential pressure shall be measured or observed and recorded.

BASIS FOR RELIEF: These pumps are of positive displacement design and as such are designed to deliver constant capacity irrespective of inlet pressure or differential pressure across the pump. The parameters important to monitoring pump degradation are discharge pressure and flow rate. Measuring Inlet pressure and differential pressure provides no meaningful information.

ALTERNATE TESTING: No alternate testing for these parameters is meaningful. However, discharge pressure will be set and recorded and flow rate will be measured & recorded as per Section XI. Flow Rate will be trended.

PROGRAM:_____ UNIT:_____
REV:_____

PUMP RELIEF REQUEST NO. 3

SYSTEM:	Diesel Generator Fuel Oil Transfer System
COMPONENTS:	DFA-P01 and DFB-P01
P&ID & COORDINATES:	13-M-DFP-001 @ B-6 and B-2
CLASS:	3
FUNCTION:	To provide fuel oil to the standby diesel generators.
TEST REQUIREMENTS:	Measure displacement vibration amplitude of pump.
BASIS FOR RELIEF:	These pumps are submersible centrifugal pumps located at the bottom of the Diesel Fuel Oil Storage Tanks under >10 feet of diesel fuel. Access to these pumps is not possible without completely draining the fuel tank. The discharge piping and electrical cable is connected to the pump at the top of the tank. Any vibration readings taken at the flange where the piping is connected would be meaningless due to the dampening effect of the fuel oil and the tank itself.
ALTERNATE TESTING:	None, however, all other parameters required by the Section XI code will be measured and pump performance will be evaluated.

PROGRAM:_____ UNIT:_____
REV:_____

PUMP RELIEF REQUEST NO. 4

SYSTEM: Diesel Generator System

COMPONENTS: DGA-P02, DGB-P02, DGA-P03, DGB-P03, DGB-P05, DGB-P05

PUMP RELIEF REQUEST HAS BEEN DELETED

PROGRAM: ____ UNIT: ____
Rev.: ____

PUMP RELIEF REQUEST NO. 5

SYSTEM:	Safety Injection System (SI)
COMPONENT:	SIA-P01, SIB-P01
P&ID COORDINATES:	13-M-SIP-001 @ B-11, G-11
CLASS:	2
FUNCTION:	SIA-P01 and SIB-P01 are Low Pressure Safety Injection Pumps (LPSI). They function to inject borated water into the core post accident (Emergency Core Cooling) and also serve function as shutdown cooling pumps.
TEST REQUIREMENT:	ASME Section XI, IWP-4120 requires that each instrument used shall be three times the reference value or less.
BASIS FOR RELIEF:	The discharge pressure of the LPSI pump ranges from 220 to 240 psig under minimum recirculation flow. Under conditions of shutdown cooling, the discharge pressure under full flow conditions ranges from 300 psig to 480 psig. The discharge Pressure Indicator for the LPSI pump (SIA-PI-306 and SIB-PI-307) range from 0 - 750 psig. Loop accuracy is nominally 1.14%, compared to Code requirement of 2.0% per IWP-4110-1. It is necessary for the pressure indicator to provide information for both ASME XI and normal plant operation. Indicator range is 3.4 times discharge pressure vice 3.0 times value as per Code. Installation of temporary discharge pressure gauge is impractical due to ALARA considerations ie LPSI discharge piping is 2R/hr. Based on increased accuracy, ALARA considerations and Code intent to use installed instrumentation, PI-306 and 307 should be used. Additionally, IWA-5263 utilizes pressure gauges with a range of 4.0 times the pressure value..
ALTERNATE TESTING:	None, testing to be performed as scheduled.

PROGRAM:_____ UNIT:_____
REV:_____

PUMP RELIEF REQUEST NO. 6

SYSTEM: Safety Injection System (SI)

COMPONENTS: SIA-P01, SIB-P01
SIA-P02, SIB-P02
SIA-P03, SIB-P03

P&ID & COORDINATES: 13-M-SIP-001 @ B-11, G-11, A-11, E-11, C-11, H-11

CLASS: 2

FUNCTION: SIA-P01 and SIB-P01 are Low Pressure Safety Injection Pumps and also serve as Shutdown Cooling Pumps. SIA-P02 and SIB-P02 are High Pressure Safety Injection Pumps. SIA-P03 and SIB-P03 are Containment Spray Pumps. These pumps provide Emergency Core Cooling functions (P01 and P02), residual heat removal function (P01) containment heat removal function (P03).

TEST REQUIREMENTS: IWP-4110-1 required flow measurement equipment with an accuracy of ±2% of fullscale.

Currently, ANPP has ultrasonic equipment with an accuracy of ±5% of fullscale.

BASIS FOR RELIEF: The hydraulic circuits for the ASME Section XI test for these pumps is via minimum flow recirculation loops. Minimum flow orifices installed in the lines control constant flow. High velocity fluid through the orifice ensures that they do not become plugged. Since the only real function of flow measurement in this situation is to check the flow orifice conditions, ±5% accuracy is sufficient.

ALTERNATE TESTING: None, flow is constant and measured.

VALVE RELIEF REQUESTS

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 1

SYSTEM: Auxiliary Feedwater (AF)

COMPONENTS: AFA-V007, AFB-V022, AFA-V137, AFB-V138

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #1

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 2

SYSTEM: Auxiliary Feedwater (AF)

COMPONENTS: AFA-V015, AFB-V024

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #2

PROGRAM: _____ UNIT: _____

REV: _____

VALVE RELIEF REQUEST NO. 3

SYSTEM: Auxiliary Feedwater (AF)

COMPONENTS: AFA-V079, AFB-V080

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #3

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 4

SYSTEM: Chemical and Volume Control (CH)

COMPONENTS: CHA-V177, CHA-V190, CHE-HV536, CHN-UV514

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #4

PROGRAM: _____

UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 5

SYSTEM: Chemical and Volume Control (CH)

COMPONENTS: CHN-UV-501

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #5

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 6

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHB-V305, CHA-306
P&ID & COORDINATES:	13-M-CHP-002 @ C-15
CATEGORY:	C
CLASS:	2
FUNCTION:	Valves are discharge check valves from the Refueling Water Tank (RWT) to the suction of Low Pressure Safety Injection (LPSI) pump, High Pressure Safety Injection (HPSI) pump, and Containment Spray Pump. Valves open to pass borated water to ECCS pumps.
TEST REQUIREMENT:	Full stroke exercise once every three months or part stroke every three months and full stroke exercise at cold shutdown.
BASIS FOR RELIEF:	Valves can be part stroke during operation in support of quarterly testing of LPSI, HPSI and Containment Spray surveillance testing. However, valves require in excess of normal shutdown cooling flow, in order to full stroke valves open. Flow rates of this magnitude are not practical during operations or cold shutdown.
ALTERNATE TESTING:	Part stroke valves every quarter and full stroke during refueling (cavity fill).

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 7

SYSTEM: Chemical and Volume Control (CH)

COMPONENTS: CHE-V431, CHB-HV-203, CHA-HV-205

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #6

PROGRAM: _____

UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 8

SYSTEM: Chemical and Volume Control (CH)

COMPONENTS: CHE-V440

VALVE RELIEF REQUEST DELETED

PROGRAM: _____ UNIT: _____

REV: _____

VALVE RELIEF REQUEST NO. 9

SYSTEM: Chemical and Volume Control (CH)

COMPONENT: CHB-UV-505 and CHA-UV-506

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #7

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 10

SYSTEM: Chemical and Volume Control (CH)

COMPONENTS: CHB-UV-515, CHA-UV-516, CHB-UV-523

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #8

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 11

SYSTEM: Chemical and Volume Control System

COMPONENTS: CHB-HV-530 and CHA-HV-531

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #9

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 12

SYSTEM: Chemical and Volume Control (CH)

COMPONENTS: CHN-V-835, CHE-HV-255

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #10

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 13

SYSTEM: Containment Purge (CP)

COMPONENTS: CPA-UV-2A, CPA-UV-2B, CPB-UV-3A, CPB-UV-3B

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #11

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 14

SYSTEM: Condensate Transfer (CT)

COMPONENTS: CTA-V016, CTB-V020

VALVE RELIEF REQUEST DELETED

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 15

SYSTEM: Diesel Generator (DG)

COMPONENTS: DGA-V002, DGA-V003
DGB-V011, DGB-V012

VALVE RELIEF REQUEST DELETED

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 16

SYSTEM: Diesel Generator (DG)

COMPONENTS: DGA-UV-3, DGB-UV-4, DGA-UV-5, DGB-UV-6, DGA-UV-7 DGB-UV-8, DGA-UV-9, DGB-UV-10, DGA-UV-11, DGB-UV-12 DGA-UV-15, DGB-UV-16

P&ID & COORDINATES: 13-M-CHP-001, sh 5 @ F-7, F-3, D-7, D-3, F-6, F-2
13-M-DGP-001, sh 8 @ F-6, F-3, F-6, F-3
13-M-DGP-001, sh 6 @ D-6, D-2

CATEGORY: B

CLASS: Non-Classed

FUNCTION: Valves UV-3, UV-4, UV-5, UV-6, UV-7, UV-8, UV-15 and UV-16 are part of the Diesel Generator Air Starter System. Valves DG-UV-9, UV-10, UV-11, and UV-12 are part of the Diesel Generator Control Air System to the Fuel Control Linkage.

TEST REQUIREMENTS: Full stroke exercise and time test every three months or part stroke test every three months and full stroke test at cold shutdown.

BASIS FOR RELIEF: The valves are totally enclosed solenoid valves and it is not possible to observe any stem movement. Additionally there are no remote indicator lights. There is no practical way to stroke time the valve since there is no obtainable evidence of valve movement.

Valves were purchased as part of Diesel Generator skid. Valves UV-3, UV-5, UV-7, and UV-15 are controlled from a single handswitch. Valves UV-4, UV-6, UV-8 and UV-16 are controlled from a single handswitch. Valves UV-9 and UV-11 are controlled from a single handswitch. Valves UV-10, UV-12 are controlled from a single handswitch. Independent operation of individual valves is not possible without rendering other valves inoperable.

Technical Specifications 3/4.8.1.1.2a(4) requires monthly starting of Diesel Generator. The Diesel must start and attain speed, frequency and voltage within 10 seconds. Valve malfunction or degradation of operation will reduce D/G starting capacity and D/G will be inoperable.

ALTERNATE TESTING: Test valves concurrent with monthly Diesel Generator start test.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 17

SYSTEM: Essential Cooling Water (EW)

COMPONENTS: EWB-V029, EWB-V077
EWA-V018, EWA-V103

VALVE RELIEF REQUEST DELETED

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 18

SYSTEM: Essential Cooling Water (EW)

COMPONENTS: EWA-UV-65, and EWA-UV-145

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #12

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 19

SYSTEM: Service Gas, Instrument Air, Chilled Water System

COMPONENTS: GAE-V-011, GAE-V-015, IAE-V-021 and WCE-V-039

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #13

PROGRAM: _____

UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 20

SYSTEM: Instrument Air (IA)

COMPONENTS: IAE-UV-2

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #14

PROGRAM: _____

UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 21

SYSTEM: Nuclear Cooling Water (NC)

COMPONENTS: NCE-V118, NCB-UV-401, NCA-UV-402, NCB-UV-403

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #15

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 22

SYSTEM: Reactor Coolant System (RC)

COMPONENTS: RCA-HV-101, RCB-HV-102, RCA-HV-103, RCB-HV-105
RCA-HV-106, RCB-HV-108, RCB-HV-109

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #16

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 23

SYSTEM: Main Steam (SG)

COMPONENTS: SGE-V003, SGE-V005, SGE-V006, SGE-V007
SGE-V642, SGE-V652, SGE-V653, SGE-V693

P&ID & COORDINATES: 13-M-SGP-002, @ E-10, A-10, A-10, E-10
G-11, G-10, C-10, C-11

CATEGORY: C

CLASS: 2

FUNCTION: The normal function of the valves is to open and provide a flow path for feedwater flow to the steam generators. The safety function is to close.

TEST REQUIREMENT: Full stroke exercise every three months or partial stroke exercise every three months and full stroke exercise at cold shutdown.

BASIS FOR RELIEF: These valves are in the feedwater inlet lines to each steam generator and are open during power operations. Full stroke or partial stroke testing of these valves during operations would require securing feedwater flow to the steam generator and cause a reactor trip. Per Technical Specifications, Main Steam System is required to be operable prior to entering Mode 4. These valves require Steam Generator pressure to back pressure test the valves for closing. Adequate pressure in Steam Generator does not exist until in Mode 3.

ALTERNATE TESTING: Test valves in Mode 3 when sufficient pressure is available for stroking valves to the closed position at cold shutdown. Valves SGE-V642 and SGE-652 shall be tested in series, as a unit. Valves SGE-V653 and SGE-V693 shall be testing in series, as a unit.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 24

SYSTEM: Main Steam (SG)

COMPONENTS: SGB-UV-130, SGB-UV-135, SGA-UV-172, SGA-UV-175

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #17

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 25

SYSTEM:	Main Steam (SG)
COMPONENTS:	SGA-UV-134A, SGA-UV-138A
P&ID & COORDINATES:	13-M-SGP-001 @ E14, C14
CATEGORY:	B
CLASS:	2
FUNCTION:	The above valves are used for isolation of the Auxiliary Feedwater turbine warm-up line.
TEST REQUIREMENT:	Perform Valve position indication verification per IWV-3300 once every two years perform stroke time test once every three months per IWV-3412.
BASIS FOR RELIEF:	Technical Specifications 4.7.1.2d does not require the Turbine driven Auxiliary Feedwater pump to be tested (operable) until Mode 3. Also, steam is required to obtain physical evidence that valve is open/closed. Relief is needed to test (or test after maintenance), for valve position indication only, Mode 3 after cold shutdown. This is when steam is available.
ALTERNATE TESTING:	Test position verification of the above hermetically sealed valves in conjunction with the operability testing of the turbine driven Auxiliary Feedwater pump in Mode 3. Stroke time testing will be performed prior to entry to Mode 4, as per ASME Section XI.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 26

SYSTEM: Main Steam (SG)

COMPONENTS: SGB-HV-178, SGA-HV-179, SGA-HV-184, SGB-HV-185

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #18

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 27

SYSTEM: Main Steam (SG)

COMPONENTS: SGA-UV-1133, SGA-UV-1134, SGB-UV-1135A, SGB-UV-1135B SGB-UV-1136A, SGB-UV-1136B

P&ID & COORDINATES: 13-M-SGP-001 @ E14, C14, H11, F11, D11, B11

CATEGORY: B

CLASS: 2

FUNCTION: The above valves provide steam trap isolation for the main steam lines.

TEST REQUIREMENT: Perform valve position verification per IWV-3300 once every two years. Perform stroke time testing every three months.

BASIS FOR RELIEF: The valves cannot be tested for position verification without steam in the line, since there are no isolation valves between the hermetically sealed solenoid valves and the 28" main steam line. Steam needs to be in the 28" line in order to obtain physical evidence that the valve is open/closed. Technical Specification Table 3.6.1 requires that these valves be operable prior to entry into Mode 4. Sufficient steam does not exist until Mode 3. These valves are tested per Section XI requirements. The purpose of this Relief Request is to allow Plant Mode Change prior to position verification testing. Testing is required prior to entry into Mode 4. Testing is required every two years or post-maintenance.

ALTERNATE TESTING: Perform valve position verification in Mode 3 at the conclusion of refueling when there is sufficient steam available in the line for flow/position verification. Perform full stroke exercise and stroke time testing every three months as per Technical Specification 4.0.5.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 28

SYSTEM: Safety Injection and Shutdown Cooling (SI)

COMPONENTS: SIE-V113, SIE-V123, SIE-V133, SIE-V143, SIA-V404, SIB-V405

P&ID & COORDINATES: 13-M-SIP-002 @ F14, F12, F7, F4
13-M-SIP-001 @ F6, B4

CATEGORY: C

CLASS: 2

FUNCTION: Valves open to provide high pressure safety injection flow to the reactor coolant system.

TEST REQUIREMENT: Full stroke exercise every three months or partial stroke exercise every three months and full stroke exercise at cold shutdown.

BASIS FOR RELIEF: These valves can only be full stroke exercised by initiation of flow through the valves and into the Reactor Coolant system. Safety Injection pump head is insufficient to establish flow through the valves against Reactor Coolant System pressure. Additionally, when the Reactor Coolant System pressure is low, over pressurization of the RCS is possible if the Vessel head is installed. Testing would challenge the Low Temperature Over-Pressure protection (LTOP) system, and could damage equipment due to over-pressure and would violate Tech. Spec. pressure/temperature limits. Partial stroke exercising of these valves would require the establishment of a flow path through valves addressed by Technical Specification Surveillance Requirement 4.4.5.2.2d and subsequent containment Radiological Controlled Area entry would be necessary by personnel, in order to meet this Tech. Spec. requirement. Containment entry by personnel during normal operations is an ALARA and radiation protection concern.

ALTERNATE TESTING: The valves will be full stroked during refueling (Mode 6) when the vessel head is not installed.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 29

SYSTEM: Safety Injection and Shutdown Cooling (SI)

COMPONENTS: SIE-V114, SIE-V124, SIE-V134, SIE-V144

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #19

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 30

SYSTEM: Safety Injection (SI)

COMPONENTS: SIA-V157, SIB-V158, SIA-V201, SIB-V200

P&ID & COORDINATES: 13-M-SIP-001 @ G-13, C-13, F-12, B-12

CATEGORY: C

CLASS: 2

FUNCTION: Valves SIA-V157 and SIB-V158 open to provide a flow path from the Refueling Water Tank (RWT) to the Containment Spray Pumps. Valves SIA-V201 and SIB-V200 open to provide a flow path from the RWT to the Low Pressure Safety Injection Pumps (LPSI).

TEST REQUIREMENT: Full stroke exercise every three months or partial stroke exercise every three months and full stroke exercise at cold shutdown.

BASIS FOR RELIEF: These valves can be partial stroked during operation. The valves cannot be full stroked during operation or during cold shutdown. During operation, the only recirculation line (2" with an orfice) and a maxi-recirculation line (6"). Neither line has the capacity to handle full stroke exercise flows. During cold shutdown, these valves are closed and are not part of the shutdown cooling lineup, i.e., the shutdown cooling lines taps into the LPSI and containment spray suction lines down stream from these valves. These valves can be full stroked at refueling as part of filling of the reactor refueling pool from the RWT.

ALTERNATE TESTING; Testing to be performed as partial stroking during normal operations and full stroke testing during refueling.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 31

SYSTEM:	Safety Injection and Shutdown Cooling (SI)
COMPONENTS:	SIA-V164 and SIB-V165
P&ID & COORDINATES:	13-M-SIP-002 @ F8 and F6
CATEGORY:	AC
CLASS	2
FUNCTION:	Valves open to provide flow from Containment Spray pump to the discharge spray nozzles.
TEST REQUIREMENT:	Full stroke exercise every three months or part stroke exercise every three months and full stroke exercise at cold shutdown.
BASIS FOR RELIEF:	Flow cannot be established without discharging water into containment, i.e., spray initiation @ >3500 gpm per valve. Partial stroking during operation is prohibited by ALARA concerns as the valves and test connections are in containment. Valves are never in regular service; the internals are immersed in demineralized water.
ALTERNATE TESTING:	1. Perform air/smoke testing 5 years per T. S. 3/4.6.2e. 2. Disassemble both valves during refueling outages in which air/smoke test is performed.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 32

SYSTEM:	Safety Injection and Shutdown Cooling (SI)
COMPONENTS:	SIA-V205 and SIB-V206
P&ID & COORDINATES:	13-M-SIP-001 @ G14 and A14
CATEGORY:	C
CLASS:	2
FUNCTION:	These valves open to provide flow to the High Pressure Safety Injection pumps (HPSI), Low Pressure Safety Injection (LPSI) and Containment Spray (CS) pumps from the recirculation sump.
TEST REQUIREMENT:	Full stroke exercise every three months or part stroke every three months and full stroke exercise at cold shutdown.
BASIS FOR RELIEF:	The recirculation sump is normally dry, therefore full stroking during operation is impractical. Partial stroking during operation is also impractical.
ALTERNATE TESTING:	Disassemble/Verify valve full stroke capability of one valve every fourth refueling.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 33

SYSTEM:	Safety Injection and Shutdown Cooling (SI)
COMPONENTS:	SIE-V215, SIE-V225, SIE-V235, SIE-V245
P&ID & COORDINATES:	13-M-SIP-002 @ A15, A7 and A5
CATEGORY:	AC
CLASS:	1
FUNCTION:	To prevent backflow of Primary Coolant into the Safety Injection Tanks while providing a flow path for Safety Injection Tank (SIT) water into the RCS loops.
TEST REQUIREMENT:	Full stroke exercise every three months or part stroke exercise every three months and full stroke test during cold shutdown.
BASIS FOR RELIEF:	Full stroke testing is not practical during any plant mode other than when the reactor vessel head is removed, fuel is off-loaded, and the core barrel is removed. Part stroke testing is feasible during hot shutdown. Plant design conditions allows part stroke testing with a maximum of 35 gpm through the valve. Full stroke testing would require a full blowdown of SIT. This is not feasible and would create a significant crud burst, and airborne contamination.
ALTERNATE TESTING:	Part stroke exercise in Mode 3 after each refueling outage when the Safety Injection Tank pressure is above 600 psig. Additionally, disassemble valves and verify freedom of movement of disc motion on a refueling basis, such that one valve is inspected every second refueling outage.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 34

SYSTEM:	Safety Injection and Shutdown Cooling (SI)
COMPONENTS:	SIE-V217, SIE-V227, SIE-V237, SIE-V247
P&ID & COORDINATES:	13-M-SIP-002 @ A13, A10, A6, A4, C14, C11, C6, C4
CATEGORY:	AC
CLASS:	1
FUNCTION:	Valves open to provide a flow path from Safety Injection and Shutdown Cooling to the Primary Loop. Category "AC" valves close to prevent pressurization of SI piping from RCS loop pressure.
TEST REQUIREMENT:	Full stroke open every three months or part stroke open every three months and full stroke open at cold shutdown.
BASIS FOR RELIEF:	These valves can only be stroked open by initiation of flow through the valves and into the RCS. Low Pressure Safety Injection pump head is not sufficient to exercise these valves due to pressure of the RCS. Discharge of Safety Injection Tank through the valves would create significant crud burst, airborne contamination and could uplift core if vessel head and UGS is not in place or Fuel is not loaded.
ALTERNATE TESTING:	Disassemble (1) valve each refueling outage to verify freedom of disc movement, or use ultrasonic methods to verify valve full stroke on a refueling basis. Currently under ANPP review is the movats checkmate system to be used for check valve full stroke determination as an option in lieu of valve disassembly.

NOTE: Valves SIE-V540, V541, V542 and V543 are now covered under CSJ-31.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 35

SYSTEM: Safety Injection and Shutdown Cooling (SI)

COMPONENTS: SIA-V522, SIA-V523, SIB-V532, SIB-V533

P&ID & COORDINATES: 13-M-SIP-002 @ C2, F2, F2, C10, F9

CATEGORY: AC

CLASS: 1

FUNCTION: Valves open to provide a long term recirculation flow path for the High Pressure Safety Injection (HPSI) system to the shutdown cooling lines.

TEST REQUIREMENT: Full stroke exercise test every three months or part stroke exercise every three months and full stroke exercise at cold shutdown.

BASIS FOR RELIEF: These valves can only be full stroked exercised by initiation of flow through the valves and into the RCS. Safety Injection pump head is not sufficient to full stroke exercise these valves due to RCS pressure. SI-V522 and SI-V532 cannot be part stroked during operation due to RCS pressure. SI-V523 and SI-V533 cannot be part stroked during operation due to ALARA concerns as these valves and their test connections are in the containment building. Full stroke exercising during cold shutdown would challenge the Low Temperature Over Pressure (LTOP) relief valves, could damage equipment and would violate RCS Temperature/Pressure limits.

ALTERNATE TESTING: Full stroke exercise test these valves during the refueling mode (Mode 6) when the reactor vessel head is removed using the Safety Injection System.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 36

SYSTEM: Safety Injection and Shutdown Cooling

COMPONENTS: SIA-HV-604, SIB-HV-609, SIC-HV-321, SID-HV-331

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #21

PROGRAM: _____

UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 37

SYSTEM: Safety Injection (SI)

COMPONENTS: SIA-HV-605, SIA-HV-606, SIA-HV-607, SIA-HV-608
SIB-HV-613, SIB-HV-623, SIB-HV-633, SIB-HV-643

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #22

PROGRAM: _____

UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 38

SYSTEM: Safety Injection and Shutdown Cooling (SI)

COMPONENTS: SIB-UV-614, SIB-UV-624, SIA-UV-634, SIA-UV-644

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #23

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 39

SYSTEM: Safety Inspection and Shutdown Cooling (SI)

COMPONENTS: SIA-UV-651, SIB-UV-652, SIA-UV-653, SIB-UV-654
SIA-UV-655, SIB-UV-656

SUPERCEDED BY COLD SHUTDOWN JUSTIFICATION #24

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 40

SYSTEM: Safety Related Valves

COMPONENTS: Various

VALVE RELIEF REQUEST DELETED.

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 41

SYSTEM:	Safety Related Valves
COMPONENTS:	Containment Isolation Valves See Tech Specs 3/4.6.3, Table 3.6-1, Sections A, B, C, D, E, F, G)
P&ID & COORDINATES:	Various (See FSAR 6.2.4 and Figure 6.24-1 sheets 1 to 10)
CATEGORY:	A or AC
CLASS:	2
FUNCTION:	Containment Isolation Valve
TEST REQUIREMENT:	Valves are required to be leak tested per IWV-3421, IWV-3422, IWV-3423, IWV-3424, and IWV-3425 on a two year frequency.
BASIS FOR RELIEF:	Valves requiring testing per 10CFR50, Appendix J are tested on a 24 month frequency. These valves need not be further tested per ASME XI. This basis is in agreement with NRC draft Reg. Guide on Inservice Testing of Valves, issued November, 1981.
ALTERNATE TESTING:	None; valves tested per 10CFR50, Appendix J and Tech. Spec. 3/4.6.1 & 3/4.6.3. Note that relief is not requested for any valve identified in Tech. Spec. 3/4.4.5.2.2 (Reactor Coolant System Operation Leakage). These latter valves will be tested per Tech. Spec. 3/4.4.5.2.2. PVNGS will comply with the Valve Test requirements of IWV-3426 and IWV-3427.

PROGRAM: _____ UNIT: _____

REV: _____

VALVE RELIEF REQUEST NO. 42

SYSTEM: Safety Related Valves

COMPONENTS: Various

VALVE RELIEF REQUEST DELETED

PROGRAM: _____ UNIT: _____

REV: _____

VALVE RELIEF REQUEST NO. 43

SYSTEM: Safety Related Check Valves

COMPONENTS: Various

VALVE RELIEF REQUEST DELETED

PROGRAM: _____ UNIT: _____
REV: _____

VALVE RELIEF REQUEST NO. 44

SYSTEM: Safety Related Power Operated Valves

COMPONENTS: Various

P&ID & COORDINATES: Various

CATEGORY: A and B

CLASS: 1, 2, and 3

TEST REQUIREMENT: IWV-3417(a) requires that valves which exhibit an increase of 25% in stroke time (for valves with actual stroke times of greater than 10 secs) or 50% in stroke time (for valves with stroke times of less than or equal to 10 secs) shall have their frequency of testing increased to monthly until corrective action is taken, at which time the original test frequency shall be resumed.

BASIS FOR RELIEF: Using a fixed reference value, provides a more logical and stringent basis for determining increased test frequencies. Adhering to the Code as stated above, a valve's stroke time could increase during each test and still be considered acceptable, while in fact, the valve could be failing or, at least, worthy of being tested at an increased frequency. Using a fixed reference value as a standard would give rise to an increased test frequency much sooner than the standard set forth in the Code.

ALTERNATE TESTING: If a fixed reference value is exceeded by either:

1) 25% or more for those reference values greater than 10 seconds, or

2) 50% or more for those reference values less than or equal to 10 seconds.

The frequency of testing shall be increased to once a month until the condition is corrected.

ATTACHMENT 3

COLD SHUTDOWN JUSTIFICATIONS

COLD SHUTDOWN JUSTIFICATION #1

SYSTEM:	Auxiliary Feedwater (AF)
COMPONENTS:	AFA-V007, AFB-V022, AFA-V137, AFB-V138
P&ID & COORDINATES:	13-M-AFP-001 @ D7, C7, D6, C6
CATEGORY:	C
CLASS:	3
FUNCTION:	Suction and Discharge check valves on essential steam driven auxiliary feedwater pump and on essential motor driven auxiliary feedwater pump.
BASIS FOR COLD SHUTDOWN TESTING:	Stroking these valves during power operation would result in the injecting of cold auxiliary feedwater into a hot steam generator. This will damage the feedwater piping and/or steam generator via thermal shock/fatigue. Additionally, the injection of cold auxiliary feedwater would upset the steam generator pressures and levels and could lead to a reactor trip and/or Main Steam Isolation Signal (MSIS).
REQUIRED TESTING:	Valves will be full stroke exercised during cold shutdowns.
NOTE:	During Preoperational testing, excessive vibration problems with the AF Pumps and associated AF piping, necessitated a design change to block off the full flow recirculation lines with a specticle blind. Full flow recirculation is no longer a possible test.

COLD SHUTDOWN JUSTIFICATION #2

SYSTEM:	Auxiliary Feedwater (AF)
COMPONENTS:	AFA-V015, AFB-V024
P&ID & COORDINATES:	13-M-AFP-001 @ D5, C5
CATEGORY:	C
CLASS:	3
FUNCTION:	Provide flow path to each steam generator from essential auxiliary feedwater pumps.
BASIS FOR COLD SHUTDOWN TESTING:	Stroking these valves during power operation would result in the injection of cold auxiliary feedwater into a hot steam generator. This will damage the feedwater piping and/or steam generator via thermal shock/fatigue. Additionally, the injection of cold auxiliary feedwater would upset the steam generator pressures and levels and could lead to a reactor trip and/or Main Steam Isolation Signal (MSIS).
REQUIRED TESTING:	Valves will be full stroke exercised during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #3

SYSTEM:	Auxiliary Feedwater (AF)
COMPONENTS:	AFA-V079, AFB-V080
P&ID & COORDINATES:	13-M-AFP-001 @ D2, B2
CATEGORY:	C
CLASS:	2
FUNCTION:	Provide flow path auxiliary feedwater (essential) to each steam generator.
BASIS FOR COLD SHUTDOWN TESTING:	Stroking these valves during power operation would result in the injection of cold auxiliary feedwater into a hot steam generator. This will damage the feedwater piping and/or steam generator via thermal shock/fatigue. Additionally, the injection of cold auxiliary feedwater would upset the steam generator pressures and levels and could lead to a reactor trip and/or Main Steam Isolation Signal (MSIS).
REQUIRED TESTING:	Valves will be full stroke exercised during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #4

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHA-V177, CHA-V190, CHE-HV536, CHN-UV514
P&ID & COORDINATES:	13-M-CHP-002 @ B8, A8, A14, B10
CATEGORY:	C, C, B, B
CLASS:	2, 2, 2, 3
FUNCTION:	Valve opens during emergency boration to provide flow from Refueling Water Tank (RWT) to the suction of the charging pumps via gravity feed or Boric Acid Make-up Pumps.
BASIS FOR COLD SHUTDOWN TESTING:	These valves are normally closed during operation isolating the emergency boration path. Stroking these valves during operation would cause excessive boration due to the high Boron concentration in the Refueling Water Tank. This could increase boron level beyond shutdown margin requirements and would cause a reactor shutdown.
REQUIRED TESTING:	Full stroke test check valves during cold shutdown and per Technical Specification 3/4.1.2.2b. Full stroke test power operated valves during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #5

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHN-UV-501
P&ID & COORDINATES:	13-M-CHP-002 @ C-7
CATEGORY:	B
CLASS:	2
FUNCTION:	CHN-UV-501 is Volume Control Tank (VCT) Discharge Isolation Valve. UV-501 closes on low VCT level to protect charging pumps from loss of NPSH.
BASIS FOR COLD SHUTDOWN TESTING	Disrupting the normal charging system flow path would be required to stroke this valve. This would cause transients in the RCS volume. Closing this valve also will result in the loss of NPSH to the charging pumps and would cause damage to the charging pumps. Loss of charging flow would thermally cycle and damage the Regenerative Heat Exchanger.
REQUIRED TESTING:	Valve to be full stroke exercised and stroke time tested during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #6

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHE-V431, CHB-HV-203, CHA-HV-205
P&ID & COORDINATES:	13-M-CHP-001 @ H9, H10, G11
CATEGORY:	C, B, B
CLASS:	1
FUNCTION:	Valves open to provide a flow path for Auxiliary Spray to the pressurizer.
BASIS FOR COLD SHUTDOWN TESTING:	Their function is to protect the charging system from Reactor Coolant System pressure during normal operations and to provide auxiliary spray to cool/depressurize the pressurizer when the Reactor Coolant pumps are not operating. Partial stroking is not possible since CHB-HV-203 and CHA-HV-205 are solenoid valves and control flow to CHE-V431. Stroking these valves during operation introduces transients in RCS pressure and thermal cycling/fatigue of the pressurizer spray nozzle (reference Tech. Specs. 5.7-1). Exercising these valves during power operation would lead to a reactor trip due to RCS pressure changes.
REQUIRED TESTING:	Full stroke exercise test during cold shutdown for CHE-V431 and full stroke exercise and stroke time test for CHB-HV-203 and CHA-HV-205.

COLD SHUTDOWN JUSTIFICATION #7

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHB-UV-505 and CHA-UV-506
P&ID & COORDINATES:	13-M-CHP-002 @ G13 and G14
CATEGORY:	A, A
CLASS:	2
FUNCTION:	Valves provide containment isolation on Reactor Coolant seal water bleed off line.
BASIS FOR COLD SHUTDOWN TESTING:	These valves are open during normal operation to provide seal water bleed-off from the reactor coolant pumps. Stroking these valves would require discontinuing seal injection to the pumps. Partial stroking is not possible since the valves are not jog capable. Stroking these valves on line would damage Reactor Coolant pump seals and could lead to a Reactor Shutdown.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #8

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHB-UV-515, CHA-UV-516, CHB-UV-523
P&ID & COORDINATES:	13-M-CHP-001 @ H15, H15, F13
CATEGORY:	B, A, A
CLASS:	CHB-UV-515 and CHA-UV-516 are Class 1, all others are Class 2.
FUNCTION:	Valves are contained in the normal letdown/volume control make-up loop.
BASIS FOR COLD SHUTDOWN TESTING:	Disrupting normal letdown flow in order to full stroke these valves could cause transients in the RCS volume/boron concentration. Valves do not have part stroke capabilities. Stroking these valves would cause pressurizer level transients and could cause a reactor shutdown. Additionally, disrupting charging letdown flow will thermally cycle letdown nozzles on the RCS piping and the Regenerative Heat Exchanger.
REQUIRED TESTING:	Full stroke test these valves during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #9

SYSTEM:	Chemical and Volume Control System
COMPONENTS:	CHB-HV530, and CHA-HV531
P&ID & COORDINATES:	13-M-CHP-002 @ C15, and C14
CATEGORY:	B
CLASS:	2
FUNCTION:	Safety Injection Pump to Refueling Water Tank Suction Isolation Valves.
BASIS FOR COLD SHUTDOWN TESTING:	Stroking these valves during operation would violate PVNGS Technical Specifications, Limiting Conditions for Operation, requiring two independent flow paths capable fo taking suction from the Refueling Water Tank on a safety injection actuation signal. Valve is normally open. If valve failed in closed position, this would render one complete safety injection train (eg HPSI, LPSI and Containment Spray Pump) in-operable. This is an unsafe mode of operation.
REQUIRED TESTING:	Full stroke test at cold shutdown.

COLD SHUTDOWN JUSTIFICATION #10

SYSTEM:	Chemical and Volume Control (CH)
COMPONENTS:	CHN-V835, CHE-HV-255
P&ID & COORDINATES:	13-M-CHP-001 @ G3, G4
CATEGORY:	CHE-HV-255 is Category A CHN-V835 is Category AC
CLASS:	2
FUNCTION:	Valves are open to provide a flow path for seal injection to the reactor coolant pumps.
BASIS FOR COLD SHUTDOWN TESTING:	These valves are open during normal operation to provide seal injection to the reactor coolant pumps. Stroking these valves closed would require discontinuing seal injection to the pumps and causing reactor coolant pump seal damage. CHE-HV-255 is not jog capable so CHE-HV-255 and the check valve down stream cannot be part stroked. Damaging the seals would necessitate a reactor shutdown and containment entry.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #11

SYSTEM:	Containment Purge (CP)
COMPONENTS:	CPA-UV-2A, CPA-UV-2B, CPB-UV-3A, CPB-UV-3B
P&ID & COORDINATES:	13-M-CPP-001 @ D6, D5, D2
CATEGORY:	A
CLASS:	2
FUNCTION:	These valves are 42" containment purge supply and exhaust isolation valves.
BASIS FOR COLD SHUTDOWN TESTING:	PVNGS Technical Specifications (3.6.1.7a) requires each 42" containment purge supply and exhaust isolation valve to be sealed closed during operation. Stroking these valves during operation would be a violation of Technical Specification. Failure of these valves in the open position would compromise containment integrity and would violate Tech. Spec. 3/4.6.1.7.
REQUIRED TESTING:	Full stroke test these valves during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #12

SYSTEM:	Essential Cooling Water (EW)
COMPONENTS:	EWA-UV-65 and EWA-UV-145
P&ID & COORDINATES:	13-M-EWP-001 @ C8 and C4
CATEGORY:	B
CLASS:	3
FUNCTION:	Valves open to provide Nuclear Cooling (NC) water system with Essential Cooling Water (EW) in the event that the Nuclear Cooling Water System is inoperable.
BASIS FOR COLD SHUTDOWN TESTING:	Full stroke exercising these valves during operation will produce high pressure in the Nuclear Cooling (NC) water system due to the pressure differential between the NC system and the Essential Cooling Water (EW) system. This will cause the NC surge tank pressure relief valve (PSV) to lift. This will result in the loss of level control of both the NC and the EW system. The EW system is required to be operable above Mode 4. In order to preclude loss of EW system function, the NC system would have to be shutdown to perform the test. However, the NC system supplies cooling water to the Reactor Coolant Pump seals. Loss of NC would require tripping all four RCP's and this would cause a reactor trip.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #13

SYSTEM:	Service Gas, Instrument Air, Chill Water System
COMPONENTS:	GAE-V011, GAE-V015, IAE-V021 and WCE-V039
P&ID & COORDINATES:	13-M-GAP-001 @ D6, F2 13-M-IAP-003 @ G5 and 13-M-WCP-001 @ G7
CATEGORY:	AC
CLASS:	2
FUNCTION:	In board containment isolation valves.
BASIS FOR COLD SHUTDOWN TESTING:	Valves must be tested in a manner that proves that the disk is on its seat. A containment entry would be required to perform this test and the associated system would have to be shutdown for test duration. Containment entry during normal operation to perform this test is not warranted due to ALARA.
REQUIRED TESTING:	Valves will be tested during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #14

SYSTEM:	Instrument Air (IA)
COMPONENTS:	IAE-UV-2
P&ID & COORDINATES:	13-M-IAP-003 @ G7
CATEGORY:	A
CLASS:	2
FUNCTION:	Instrument Air Containment Isolation Valve
BASIS FOR COLD SHUTDOWN TESTING:	Closing this valve during operation isolates all instrument air inside containment. All Air Operation Valves (AOV) inside containment could not be operated. CH, SI and WC valves would be affected. Also letdown would be isolated from the RCS. This would cause transients in the RCS volume and charging piping temperature leads to fatigue. Valve is solenoid operated and cannot be part stroked. RCS Transients could lead to a reactor shutdown.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #15

SYSTEM:	Nuclear Cooling Water (NC)
COMPONENTS:	NCE-V118, NCB-UV-401, NCA-UV-402, NCB-UV-403
P&ID & COORDINATES:	13-M-IAP-003 @ E6, E7, F7, F6
CATEGORY:	AC, A, A, A
CLASS:	2
FUNCTION:	Valves open to provide a flow path for nuclear cooling water supply/return to the reactor coolant pump lube oil coolers, reactor coolant pump seal coolers and Control Element Drive Mechanism (CEDM) air coolers.
BASIS FOR COLD SHUTDOWN TESTING:	These valves are open during normal operation to allow a supply of nuclear cooling water to the reactor coolant pump coolers. Stroking these valves would cause overheating of the reactor coolant pump motor air coolers, lube oil coolers and compromise the integrity of the reactor coolant pump seals. Stroking these valves would also cause overheating of the CEDM's and cause Containment Element Assemblies (CEAs) to drop into the core. Partial stroking is not possible since the valves are not jog capable. Stroking these valves could trip the reactor and damage the Reactor Coolant Pumps and CEDMs.
REQUIRED TESTING:	Full stroke test these valves during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #16

SYSTEM:	Reactor Coolant System (RC)
COMPONENTS:	RCA-HV-101, RCB-HV-102, RCA-HV-103, RCB-HV-105 RCA-HV-106, RCB-HV-108, RCB-HV-109
P&ID & COORDINATES:	13-M-RCP-001, G-15, F-15, G-14, G-13
CATEGORY:	B
CLASS:	1 and 2
FUNCTION:	High point vent for reactor vessel and pressurizer for venting noncondensibles from Reactor Coolant System.
BASIS FOR COLD SHUTDOWN TESTING:	Valves are part of reactor coolant pressure boundary and form part of the double isolation valve required by 10CFR50.2v. Valves are solenoid valves and cannot be part stroked. Full stroke testing of these valves violates reactor coolant pressure boundary. Valve malfunction (e.g., stuck open valve during Mode 1) increases the probability of a LOCA. Additionally, stroking of RC-HV-106 (vent to containment) would release reactor coolant to containment atmosphere. This constitutes an ALARA and radiation protection concern. Stroking these valves would lead to possible equipment damage and personnel safety hazards. Tech. Spec. 4.4.10 requires these valves to be closed during operation. Failure of one of these valves in the open position would require a reactor shutdown.
REQUIRED TESTING:	Full stroke test valves during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #17

SYSTEM:	Main Steam (SG)
COMPONENTS:	SGB-UV-130, SGB-UV-135, SGA-UV-172, SGA-UV-175
P&ID & COORDINATES:	13-M-SGP-002 @ G12, C12, G12 and C12.
CATEGORY:	B
CLASS:	2
FUNCTION:	Downcomer feedwater isolation valves.
BASIS FOR COLD SHUTDOWN TESTING:	These valves are normally open during operation. Full stroke testing of these valves during power operation would isolate up to 15% of the normal feedwater flow to the steam generators and would cause a plant transient and reactor trip. Partial stroking is not possible as the valves are not jog capable.
REQUIRED TESTING	Full stroke testing at cold shutdown.

COLD SHUTDOWN JUSTIFICATION #18

SYSTEM:	Main Steam (SG)
COMPONENTS:	SGB-HV-178, SGA-HV-179, SGA-HV-184, SGB-HV-185
P&ID & COORDINATES:	13-M-SGP-001 @ E14, A14, F14, C14
CATEGORY:	B
CLASS:	2
FUNCTION:	Main Steam atmospheric dump valves for plant cool-down during off-normal or emergency conditions.
BASIS FOR COLD SHUTDOWN TESTING:	Opening these valves releases Main Steam directly to the atmosphere. Stroking the atmospheric dump valves during operation would initiate a plant transient, and uncontrolled primary/secondary cooldown, and an excessive steam flow rate. Changes in steam generator levels and pressures and RCS pressures and temperatures would lead to a plant trip. Additionally, opening the ADV's is a personnel hazard and may release radioactive material to the environment if there is any history of primary/secondary leakage.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #19

SYSTEM:	Safety Injection and Shutdown Cooling (SI)
COMPONENTS:	SIE-V114, SIE-V124, SIE-V134, SIE-V144
P&ID & COORDINATES:	13-M-SIP-002 @ F13, F11, F6 and F4
CATEGORY:	C
CLASS:	2
FUNCTION:	Valves open to provide flow paths from the low pressure safety injection headers to the Primary Coolant System.
BASIS FOR COLD SHUTDOWN TESTING:	Flow cannot be established to full stroke exercise these valves during operation due to the pressure in the Primary Coolant System. Partial stroke exercising of these valves would require entry into the containment Radiological Controlled Area which is contrary to ALARA precepts.
REQUIRED TESTING:	Full stroke exercise during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #20

SYSTEM:	Safety Injection (SI)
COMPONENTS:	SIA-UV-660 and SIB-UV-659
P&ID & COORDINATES:	13-M-SIP-001 @ E-7 and A-6
CATEGORY:	B
CLASS:	2
FUNCTION:	Safety Injection Pump Combined Recirculation.
BASIS FOR COLD SHUTDOWN TESTING:	These valves provide recirculation flow path to the Refueling Water Tank from HPSI, LPSI, and containment spray pumps. If one of these valves were to fail during their quarterly test, a complete Safety Injection train would be rendered inoperable. (No recirculation flow path). This would require plant shutdown until the problem could be corrected. Valves are solenoid operated and cannot be part stroked.
REQUIRED TESTING:	Full stroke and time test at cold shutdown.

COLD SHUTDOWN JUSTIFICATION #21

SYSTEM:	Safety Injection and Shutdown Cooling
COMPONENTS:	SIA-HV-604, SIB-HV-609, SIC-HV-321, SID-HV-331
P&ID & COORDINATES:	13-M-SIP-001 @ G3, C3
CATEGORY:	SIC-HV-321 and SID-HV-331 are Category A. SIA-HV-604 and SIB-HV-609 are Category B
CLASS:	2
FUNCTION:	Isolation Valves in the long term recirculation lines to the reactor coolant system hot legs.
BASIS FOR COLD SHUTDOWN TESTING:	The PVNGS Technical Specifications require these valves be closed with power to the valve operators removed during normal operations. Stroking these valves during operation would be a violation of Technical Specifications.
REQUIRED TESTING:	Full stroke test these valves during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #22

SYSTEM: Safety Injection (SI)

COMPONENTS: SIA-HV-605, SIA-HV-606, SIA-HV-607, SIA-HV-608
SIB-HV-613, SIB-HV-623, SIB-HV-633, SIB-HV-643

P&ID & COORDINATES: 13-M-SIP-002 @ E-15, E-12, E-7, E-4
@ E-15, E-12, E-7, E-4

CATEGORY: B

CLASS; 2

FUNCTION: Safety Injection Tank Nitrogen Vent. Tank is vented during recovery phase of small break LOCA (such as Steam Generator Tube Rupture) to preclude inadvertant discharge of Tank into Reactor Vessel.

BASIS OF COLD SHUTDOWN TESTING: Stroking these valves during operation would be a violation of Technical Specifications. Partial stroking is not possible as these valves are solenoid valves. Full stroking during operation is not practical since the valves are shut and power is removed during operation per Technical Specification 3.5.1e. Cycling the valve during operation would reduce the pressure in the Safety Injection Tank below Technical Specification Limits (600 psi). This would render the Tank inoperable. Rendering each tank (ie 4 of 4) inoperable once each quarter is unwarranted. There are no block valves for the vents. If a valve were to fail open, the effected tank would be inoperable and could not be remedied without a shutdown and containment entry.

REQUIRED TESTING: Full stroke exercise during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #23

SYSTEM:	Safety Injection and Shutdown Cooling System (SI)
COMPONENTS:	SIB-UV-614, SIB-UV-624, SIA-UV-634, SIA-UV-644
P&ID & COORDINATES:	13-M-SIP-002 @ A14, A12, A7 and A4
CATEGORY:	B
CLASS:	1
FUNCTION:	Safety Injection Tank Isolation Valves provide flow paths from the Safety Injection Tanks to the Primary Coolant System during operation. The valves are closed to isolate the Safety Injection Tanks in cold shutdown and refueling.
BASIS FOR COLD SHUTDOWN TESTING:	Full or partial stroke testing of these valves during operation is contrary to the safety function of these valves. The PVNGS Technical Specifications require the isolation valves to be key-locked open and power to the valve removed to ensure an unobstructed flow path. Stroking these valves during operation would be a violation of Technical Specification.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #24

SYSTEM:	Safety Injection and Shutdown Cooling (SI)
COMPONENTS:	SIA-UV-651, SIB-UV-652, SIA-UV-653, SIB-UV-654 SIA-UV-655, SIB-UV-656
P&ID & COORDINATES:	13-M-SIP-002 @ C3, C10, E3, E10, G3, G10
CATEGORY:	SIA-UV-655 and SIB-UV-656 are Category B All others are Category A
CLASS:	SIA-UV-655 and SIB-UV-656 are Class 2 SIA-UV-651, SIB-UV-652, SIA-UV-653, SIB-UV-654 are Class 1
FUNCTION:	Shutdown Cooling Isolation Valve
BASIS FOR COLD SHUTDOWN TESTING:	These valves are provided with interlocks which prevent them from being opened if the pressurizer pressure is in excess of 400 psig. The Class 1 valves provide pressure isolation function between Reactor Coolant System and Shutdown Cooling System as noted in Tech. Spec. 4.4.4.2.1. Opening of these valves would overpressurize their piping system.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #25

SYSTEM:	Main Steam (SG)
COMPONENTS:	SGE-UV170, SGE-UV171, SGE-UV180, SGE-UV181
P&ID & COORDINATES:	13-M-SGP-001 H-10, F-10, D-10, B-10
CATEGORY:	B
CLASS:	2
FUNCTION:	Main Steam Isolation Valves (MSIV)
BASIS FOR COLD SHUTDOWN TESTING:	Valves are tested per code (part stroke test quarterly). These valves cannot be full stroke tested during operation. Closing an MSIV during operation would cause a turbine trip and would cause a reactor trip. Main steam safety valves would lift and secondary pressure/level would vary dramatically.
REQUIRED TESTING:	Full stroke and time test at cold shutdown.

COLD SHUTDOWN JUSTIFICATION #26

SYSTEM:	Main Steam (SG)
COMPONENT:	SGB-UV132, SGB-UV137, SGA-UV174, SGA-UV177
P&ID & COORDINATES:	13-M-SGP-002 E-12, B-12, E-13, B-13
CATEGORY	B
CLASS:	2
FUNCTION:	Feedwater Isolation Valves (FWIV)
BASIS FOR COLD SHUTDOWN TESTING:	These valves are tested per code (part stroke test quarterly). These valves cannot be full stroke tested during operation. Closing an FWIV would isolate feed flow to operating steam generators causing loss of secondary level control and a subsequent reactor trip.
REQUIRED TESTING:	Full stroke and time test at cold shutdown.

COLD SHUTDOWN JUSTIFICATION #27

SYSTEM:	Safety Injection (SI)
COMPONENTS:	SIA-HV691 & SIB-HV690
P&ID & COORDINATES	13-M-SIP-002 H-4, H-13
CATEGORY:	A
CLASS:	2
FUNCTION:	Shutdown cooling warmup bypass valves allow for warmup of shutdown cooling heat exchanger and associated piping, prior to initiation of shutdown cooling.
BASIS FOR COLD SHUTDOWN TESTING:	If the warmup bypass valves were to fail open during their quarterly testing (at power) and a small break LOCA were to occur, shutdown cooling would be required with the warmup bypass closed. Tech Spec #3.7.13 would be violated and the unit would have to be shutdown. If the valve failed closed, the shutdown heat exchanger and associated piping could be thermally shocked.
REQUIRED TESTING:	Full stroke test during cold shutdown.

COLD SHUTDOWN JUSTIFICATION #28

SYSTEM:	Main Steam (SG)
COMPONENTS:	SGA-V043, SGA-V044, SGE-V887, SGE-V888
P&ID & COORDINATES:	13-M-SGP-001, E-12, C-12, D-12, D-12
CATEGORY:	C
CLASS:	3
FUNCTION:	Valves open to provide main steam supply to steam driven auxiliary feedwater pump.
BASIS FOR COLD SHUTDOWN TESTING:	Valves will be part stroke exercised during monthly pump test per T.S.4.7.1.2. Full stroke exercising of valves would require full flow injection of auxiliary feedwater into hot steam generator. Use of auxiliary feedwater during plant operation will damage feedwater piping and/or steam generators via thermal shock/fatigue. Additionally, the injection of cold auxiliary feedwater would upset the steam generator pressure and levels and could lead to a reactor trip and/or main steam isolation signal (MSIS).
REQUIRED TESTING:	Full stroke exercise valves during cold shutdown when main steam pressure permits testing as noted in Tech Spec 4.7.1.2.

COLD SHUTDOWN JUSTIFICATION #29

SYSTEM:	Safety Injection (SI)
COMPONENTS:	SIA-V434, SIB-V446
P&ID & COORDINATES:	13-M-SIP-001, F-9, B-9
CATEGORY:	C
CLASS:	2
FUNCTION:	Valves open to provide low pressure ECCS flow to Reactor Coolant System. Valves also open to provide flow path for shutdown cooling.
BASIS FOR COLD SHUTDOWN TESTING:	Valves will be part-stroke exercised during plant operation. Flow rates needed to achieve full stroke exercise cannot be attained during plant operation. The only flow path capable of providing full flow exercising is into the reactor coolant system. During plant operation, RCS pressure is significantly higher than shut-off head of Low Pressure Safety Injection (LPSI) pump. LPSI pump cannot inject into RCS due to pressure in RCS.
REQUIRED TESTING:	Full flow exercise during shutdown cooling when LPSI pump functions as the shutdown cooling pump.

COLD SHUTDOWN JUSTIFICATION #30

SYSTEM:	Safety Injection (SI)
COMPONENTS:	SIB-V484, SIA-V485
P&ID & COORDINATES:	13-M-SIP-001, C-9, H-9
CATEGORY	C
CLASS:	2
FUNCTION:	Valves open to provide containment spray flow to Containment Building. Valves also open to provide shutdown cooling flow when containment spray pump is used for shutdown cooling.
BASIS FOR COLD SHUTDOWN TESTING:	Valves cannot be full stroked exercised during operation (in containment spray mode) without spraying down inside the Containment Building. Initiation of containment spray during operation will damage equipment by spraying water on electrical equipment and soaking equipment with boric acid. Operation of the containment spray pump as a shutdown cooling pump during plant operation is not possible since the discharge head of the pump is significantly below the Reactor Coolant system pressure.
REQUIRED TESTING:	Full stroke exercise these valves during cold shutdown using the containment spray pump as a shutdown cooling pump.

COLD SHUTDOWN JUSTIFICATION #31

SYSTEM:	Safety Injection (SI)
COMPONENTS:	SIE-V540, SIE-V541, SIE-V542, SIE-V543
P&ID & COORDINATES:	13-M-SIP-002, C-13, C-11, C-6, C-4
CATEGORY:	AC
CLASS:	1
FUNCTION:	Valves open to provide Safety Injection and shutdown cooling flow into the Reactor Coolant system.
BASIS FOR COLD SHUTDOWN TESTING:	The injection flow rate of the Low Pressure Safety Injection (LPSI) pump and injection pressure of the LPSI, plus High Pressure Safety Injection (HPSI) pump combined, is not adequate to overcome Reactor Coolant pressure during normal operation. Flow rates cannot be attained and pressure is well below RCS pressure.
REQUIRED TESTING:	Full stroke exercise these valves during cold shutdown when the SI system is aligned for shutdown cooling.

COLD SHUTDOWN JUSTIFICATION #32

SYSTEM:	Chemical and Volume Control (CH)
COMPONENT:	CHN-V494
P&ID & COORDINATES:	13-M-CHP-003 E-14
CATEGORY:	A/C
CLASS:	2
FUNCTION:	This valves only SAFETY Function is containment isolation.
BASIS FOR COLD SHUTDOWN TESTING:	Valve is inside containment. To full stroke this valve closed during operation would require a containment entry. Containment Entry during operation is not warranted due to ALARA concerns and safety of plant personnel.
REVIEWED TESTING:	Valve will be tested during cold shutdown.

ATTACHMENT 4

CHECK VALVE RELIABILITY ANALYSIS

Reliability Based Recommendation
For Check Valve Testing Frequencies

I. Introduction

A reliability study was performed in order to provide a reliability based recommendation for the frequency of check valve testing in PVNGS ECCS and AFW systems. It is not practical to verify design flow through some of these valves (e.g.- containment sump check valves, SIT check valves) and therefore there are some concerns that partial blockage of flow could occur and not be detected by the plant testing program. In response to this concern the NRC has suggested that it may be beneficial to perform additional Section XI check valve tests and/or inspections.

The NPRDS data base provides data on approximately 5373 safety related check valves representing an estimated 15,560 check valve years of experience. Within this data base there are 440 documented failures of check valves. Only 5 of these 440 failures would potentially result in significant blockage of ECCS check valve flow. (The majority of these failures resulting only in either internal or external leakage and having no significant impact on the valves ability to pass flow in the forward direction). Additionally, there is not a single documented failure of an ECCS check valve of more than 2 inches in diameter to allow sufficient ECCS flow in the forward direction. There is one documented failure of a 2 inch containment spray additive (NaOh) valve to allow sufficient flow due to blockage and one documented failure of a 3 inch diameter boric acid makeup valve due to blockage. Although both of these failures would have been detected during partial flow testing of the affected systems, it was conservatively assumed that these failures would only be detected during full flow testing or during physical inspection. There are also no documented failures of ECCS check valves to allow sufficient flow due to binding of or interference with the check valve flapper , or due to other failures of check valve internals. There are however 3 documented failures of AFW check valves due to this failure mode and the root cause of these failures was conservatively assumed to apply to ECCS check valves.

II. Methodology

The approach taken within this analysis was:

(1) To assess the frequency of check valve failures which would degrade system flow capacity but not be detected by the present plant testing program. Two potential modes of partial flow blockage were identified: blockage of flow by precipitation of boric acid ; and partial blockage of flow by valve

internals . Table 2 documents the results of this analysis . Valve failure rates were assessed by first calculating a failure rate based on observed industry failures and second by subjectively modifying the failure rate based on each valves susceptibility to such failures (e.g. - a 3 inch valve with boric acid concentrations near the solubility limit is much more likely to become blocked then a 12 inch diameter valve with relatively low boron concentrations).

(2) To calculate the frequency of test required to reduce the check valve failures identified in step (1) to minor contributors to system failure relative to failures of active components. The criteria imposed by this analysis was that check valve partial blockage failures should contribute less than ten percent to system failure relative to the failure of active components within the affected flow path. (For the SIT discharge valves this was not possible since there are no active components within the flow path , therefore for this particular flow path it was judged that a partial blockage rate of less than 5.0E-04 was acceptable).

III. Results/Conclusions

ANPP has concluded that full flow testing of certain ECCS check valves (e.g. - the containment sump and SIT check valves) is not practical. For these check valves, additional check valve testing is recommended to ensure that check valve partial blockage failures remain a minor contributor to system failure relative to active component faults. Therefore, the following check valve tests are recommended in lieu of full flow testing:

Valve Group	Recommended Additional Testing
Containment Spray Isolation Check Valves to spray header (SI-V164/V165)	Physically inspect one valve every third refueling outage.
Containment Sump Check Valves (SI-V205/SI-V206)	Physically inspect one valve every fourth refueling outage.

Valve Group	Recommended Additional Testing
SIT discharge Check Valves (SI-V215/225/235/245)	Physically inspect one valve every second refueling outage.
SIT and ECCS Combined Check Valves (SI-V217, V227, V237, V247)	Ultrasonically verify proper valve operation of at least 1 valve each refueling outage.

Periodic disassembly and physical inspection of the SIT and ECCS combined check valves (SI-V217 series) is not recommended. Although such inspections may marginally improve the ability of the plant to mitigate a large LOCA event , such inspections would degrade the ability of the plant to mitigate a loss of residual heat removal event during shutdown. Several recent studies (e.g.- NSAC-84, Zion Residual Heat Removal PRA) indicate that loss of decay heat removal events provide a greater risk than large LOCA events.

TABLE 1
RELIABILITY BASED RECOMMENDATIONS
FOR FREQUENCY OF CHECK VALVE TEST

Check Valve Group	Current Test Program	Check Valve Estimated Partial Blockage Failure Rate (From Table 2)	Required Additional Testing to Ensure that Check Valve Partial Blockage Remains a Minor Contributor to System Failure	Recommended Additional Testing if Full Flow Testing is Determined not to be Practical
Containment Spray Isolation Valve to Spray Header SI-V164/SI-V165	Partial Stroke Tested every 18 months (73ST-XZZ06)	1.0E-04/yr	Test one valve every forth refueling outage.	Physically inspect one valve every third refueling outage.
ESF Sump Check Valve SI-V205/SI-V206	Partial Stroke Tested every 18 months (73ST-XZZ06)	1.9E-04/yr	Verify operability of one valve every forth refueling outage.	Physically Inspect one valve every forth refueling outage.
SIT Discharge Check Valves SI-V215/225/235/245	Partial Stroke Tested Every 18 months	2.9E-04/yr	Since Safety Injection Tank is a passive component, Check Valve Failure is a significant portion of system failure. However, a SIT partial blockage probability of 5E-04 per demand was judged acceptable. This requires that one valve be verified operable every 2nd refueling outage.	Physically inspect one valve every second refueling outage.
SIT and ECCS Combined Check Valves SI-V217/227/237/247	Tested to 4000 gpm (73ST-XZZ06)	1.9E-04/yr	Verify operability of one valve every refueling outage.	Verify proper valve operation every refueling outage, by using ultrasonic testing.

TABLE 2
ESTIMATION OF CHECK VALVE FAILURE
RATES AND BASIS

	Valve Susceptibility To Blockage/ Foreign Material	Blockage Rate Due To Foreign Material	Valve Susceptibility To Valve Deformation/ Binding	Blockage Rate Due To Deformation/ Binding	Total Failure Rate Impacted By Full Flow Test
C.S. Discharge Valves SI-V164/165	Low (10" Diameter) (Containment Bldg) (Infrequent Flow) (Demin Water)	4.4E-05/yr	Low (exposed to neglibile differential pressures)	6.1E-05/yr	1.1E-04/yr
ESF Sump Check Valves SI-V205/206	Low (24" Diameter) (Auxiliary Bldg) (Stagnant flow)	1.3E-04/yr	Low (exposed to negligible differential pressures)	6.1E-05/yr	1.9E-04/yr
SIT Discharge Valves SI-V215/225/235 /245	Low (14" Diameter) (Containment Bldg) (Infrequent flow) (Borated Water)	4.4E-05/yr	Medium (exposed to medium differential pressures quickly applied)	1.9E-04/yr	2.3E-04/yr
SIT & ECCS Combined Check Valves SI-V217/227/237 /247	Low (14" Diameter) (Containment Bldg) (18 Month Flow)	Negligible	Medium (exposed to large differential pressure slowly applied)	1.9E-04/yr	1.9E-04/yr