Alfred M. Paglia, Jr.
Manager
Nuclear Licensing
New Nuclear Deployment

SCE&G®
A SCANA COMPANY

March 13, 2013
NND-13-0085
10 CFR 50.90
10 CFR 52.63

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Virgil C. Summer Nuclear Station (VCSNS) Units 2 & 3
Combined License Nos. NPF-93 and NPF-94
Docket Nos. 52-027 and 52-028

Subject: LAR 13-07, License Amendment Request and Exemption: Changes to the Chemical and Volume Control System (CVS)

Reference: 1. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4 Request for License Amendment and Exemption: Changes to the Chemical and Volume Control System (CVS), (LAR-13-002) dated January 11, 2013 (Adams Accession Number ML13016A091)

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant Units 3 and 4 Request for License Amendment and Exemption: Changes to the Chemical and Volume Control System (CVS) (LAR-13-002S) Supplement 1dated February 27, 2013 (Adams Accession Number ML13059A499)

In accordance with provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G) requests an amendment to Virgil C. Summer Nuclear Station (VCSNS) Units 2 & 3 combined license (COL) numbers NPF-93 and NPF-94 respectively. The proposed amendment would allow changes to the Chemical and Volume Control System (CVS) to introduce a spring assisted check valve, replace a valve with a combination of two different types of valves, and separate the zinc and hydrogen injection paths. These changes require a departure from certified Design Control Document (DCD) Tier 2 material that has been previously incorporated into the VCSNS Units 2 and 3 Updated Final Safety Analysis Report (UFSAR) and involves associated Tier 1 material. Pursuant to the provisions of 10 CFR 52.63(b)(1), an exemption from elements of the design as certified in 10 CFR 52, Appendix D, design certification rule, is requested for the plant-specific DCD Tier 1 departures. This license amendment also seeks a revision to the associated material included in Appendix C of the VCSNS COLs.

D083
NRO

Enclosure 1 provides the description, technical evaluation, and regulatory evaluation (including the Significant Hazards Consideration determination) for the proposed changes. Enclosure 2 provides the background and supporting basis for the requested exemption. Enclosure 3 provides markups depicting the requested changes to plant-specific DCD Tier 1 information, the corresponding changes to COL Appendix C, and UFSAR text, tables, and figures.

This proposed change is consistent and identical in technical content with Southern Nuclear Operating Company License Amendment Requests LAR-13-002, identified as reference 1 of this letter, and LAR-13-002S, a supplement to the associated License Amendment Request, identified as Reference 2 to this letter.

In order to support the VCSNS Unit 2 construction schedule, SCE&G requests NRC staff review and approval of the proposed license amendment by June 11, 2013. Approval by this date will allow sufficient time to implement the licensing basis change prior to initiation of the proposed CVS changes. This license amendment will be implemented by SCE&G within 30 days of approval.

In accordance with 10 CFR 50.91, SCE&G is notifying the State of South Carolina of this LAR by transmitting a copy of this letter and enclosures to the designated State Official.

This letter contains no regulatory commitments.

Should you have any questions, please contact me by telephone at (803) 941-9876, or by email at apaglia@scana.com.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this 13 day of MARCH, 2013.

Sincerely,

Alfred M Paglia
Manager,
Nuclear Licensing

DK/AMP/dk

Enclosure 1: Virgil C. Summer Nuclear Station Units 2 & 3 – Request for License Amendment Regarding Changes to the Chemical and Volume Control System (CVS) (LAR 13-07)

Enclosure 2: Virgil C. Summer Nuclear Station Units 2 & 3 – Request for Exemption Regarding Changes to the Chemical and Volume Control System (CVS)

Enclosure 3: Virgil C. Summer Nuclear Station Units 2 & 3 – Proposed Changes to Licensing Basis Documents (LAR 13-07)

c: Denise McGovern
Ravindra Joshi
Rahsean Jackson
Victor McCree
Jim Reece
Stephen A. Byrne
Jeffrey B. Archie
Ronald A. Jones
Alvis J. Bynum
Kathryn M. Sutton
Amy M. Monroe
Joe I. Gillespie, III
Dean Kersey
Amy G. Aughtman
Dan Churchman
Tom Sliva
Brian McIntyre
Thom Ray
William E. Hutchins
Curt Castell
William A. Fox, III
William M. Cherry
Rhonda O'Banion
Susan E. Jenkins
VCSummer2&3ProjectMail@Shawgrp.com
vcsummer2&3project@westinghouse.com
DCRM-EDMS@SCANA.COM

South Carolina Electric & Gas Company

NND-13-0085

Enclosure 1

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

Request for License Amendment Regarding
Changes to the Chemical and Volume Control System (CVS)
(LAR 13-07)

Table of Contents

Pursuant to 10 CFR 50.90, South Carolina Electric & Gas (SCE&G) hereby requests an amendment to Combined License (COL) Numbers NPF-93 and NPF-94 for the Virgil C. Summer Nuclear Station (VCSNS), Units 2 and 3, respectively.

1. Summary Description

The proposed changes would alter the design of the facility in regard to the Chemical and Volume Control System (CVS) by:

(1) Providing a spring-assisted check valve (CVS-PL-V067) around the air-operated Reactor Coolant System (RCS) Purification Return Line Stop Check Valve (CVS-PL-V081),

(2) Replacing the CVS zinc addition inboard containment isolation lift check valve with an air-operated globe valve (valve tag number, CVS-PL-V094, is unchanged) and adding a thermal relief valve (CVS-PL-V098), and

(3) Separating the zinc and hydrogen injection paths and relocating the zinc injection point.

The proposed changes require a change to Updated Final Safety Analysis Report (UFSAR) information (see Section 2 for details), which also require a change to the plant-specific Tier 1 information (see Section 2 for details) along with the corresponding changes to COL Appendix C (as applicable with Tier 1 changes). This enclosure requests approval of the license amendment necessary to implement these changes.

2. Detailed Description and Technical Evaluation

The CVS controls the RCS chemistry, purity and inventory by performing the major functions of purification, chemical shim and chemical control, oxygen control, filling and pressure testing the RCS, borated makeup to the auxiliary equipment, and pressurizer auxiliary spray (Tier 1 Section 2.3.2 and UFSAR Subsection 9.3.6).

The safety functions provided by CVS are limited to containment isolation of CVS lines penetrating containment, termination of inadvertent RCS boron dilution, isolation of makeup on a steam generator or pressurizer high level signal, and preservation of the RCS pressure boundary, including isolation of normal CVS letdown from the RCS (UFSAR Subsection 9.3.6.1.1).

2.1. CVS Overpressure Protection

Detailed Description

Under the current design, the RCS Purification Return Line Stop Check Valve (CVS-PL-V081, 3" ASME Boiler and Pressure Vessel Code (ASME Code) Section III Class 1 stop check valve) provides a design function of isolating flow in the charging line to the RCS. Upon loss of power, the actuator for CVS-PL-V081 would fail to the open position thereby allowing the valve to act as a check valve. The safety analysis is unchanged whether CVS-PL-V081 fails open or fails closed. If CVS-PL-V081 fails open, the check valve function stops flow; if it fails closed, flow is also stopped consistent the safety function of the check valve. In addition, CVS-PL-V081 provides overpressure protection for the Regenerative Heat Exchanger (RHX) by providing a relief path to the RCS.

However, it was identified that a valve that could perform all of the above design functions is not commercially available. Consequently, a design change is proposed that would remove the RHX overpressure protection design function from CVS-PL-V081 and assign this design function to the new spring-assisted Makeup Return Line Bypass Check Valve (CVS-PL-V067, 1" ASME Code Section III Class 1 check valve).

Between Revisions 18 and 19 of the AP1000 DCD, a portion of a deferred change was incorporated into Tier 2 Figure 9.3.6-1. Specifically, a bypass line with two valves (CVS-PL-V068, 1" ASME Code Section III Class 3 globe valve, and CVS-PL-V069, 1" ASME Code Section III Class 1 check valve) was added to this figure. Therefore, the design represented in this figure is considered the current design. However, this deferred change was reflected only in Figure 9.3.6-1 and is not in any other text, tables, or figures. Under the current design, the nonsafety-related design function of diverting CVS flow into the Passive Core Cooling System (PXS) for filling and chemistry adjustments is accomplished inside containment by closing the manual valve, CVS-PL-V068, in the makeup return bypass line that was added to bypass CVS-PL-V081. To avoid making containment entries at power, the proposed design would remove the manual valve and instead close CVS-PL-V081 and the Auxiliary Pressurizer Spray Isolation Valve (CVS-PL-V084, 2" ASME Code Section III Class 1 globe valve), thus preserving the nonsafety-related design function. As a result, the manual valve, CVS-PL-V068, would be removed from the bypass line. In addition, the check valve, CVS-PL-V069, which also was added to the bypass line in Figure 9.3.6-1, would be replaced with the new spring-assisted check valve, CVS-PL-V067.

The table below details the licensing basis changes sought with regard to the CVS overpressure protection change:

Enclosure 1 Table 2.1-1

Plant-Specific Changes	**Description of Proposed Change**
Tier 1 and COL App. C Table 2.3.2-1	Add CVS-PL-V067 and requirements
UFSAR Table 3.2-3	Add CVS-PL-V067 and requirements
UFSAR Table 3.9-12	Add CVS-PL-V067 to the list of ASME Class 1, 2 and 3 active valves
UFSAR Table 3.9-16	Add CVS-PL-V067 to the valve in-service test requirements list and add CVS-PL-V067 to Notes 6 and 32
UFSAR Table 3.11-1	Add CVS-PL-V067 to the list of environmentally qualified electrical and mechanical equipment
UFSAR Table 3I.6-3	Under Active Valves - Add CVS-PL-V067 to the list of AP1000 safety-related electrical and mechanical equipment that is not high frequency sensitive

Plant-Specific Changes	Description of Proposed Change
UFSAR Figure 9.3.6-1	Delete valves CVS-PL-V068 and CVS-PL-V069, add valve CVS-PL-V067 to the bypass line off the main process line originating at a point downstream of the connection to the Auxiliary Pressurizer Spray Line Isolation Valve (CVS-PL-V084) and upstream of valve CVS-PL-V081.

Technical Evaluation

The proposed CVS changes maintain the existing UFSAR design functions. Two ASME Code Section III valves (CVS-PL-V081 and CVS-PL-V067) would maintain the flow isolation design function (UFSAR Subsection 9.3.6.3.7) and preserve the RCS pressure boundary safety function (UFSAR Subsection 5.2.1.3). The spring-assisted check valve (CVS-PL-V067) would provide the engineering design function of RHX overpressure protection with an enclosed spring housing suitable for a closed discharge suction application. Check valve CVS-PL-V067 does not contain any electrical components required to be designated as "Qualified for a Harsh Environment" in Tier 1 Table 2.3.2-1.

The flow isolation design function is maintained by CVS-PL-V081, because it is a normally open, air-operated stop check valve that functions to isolate the flow in the charging line to the RCS. CVS-PL-V081 can be closed from the Main Control Room (MCR) or Remote Shutdown Room (RSR) to perform the isolation function. This valve is closed to support the auxiliary spray function. The valve fails open on loss of power or loss of instrument air so the charging line to the RCS remains available. The flow isolation design function also is maintained by CVS-PL-V067, because it is a spring-assisted check valve, which will remain closed unless significant back pressure exists. The use of a bypass line with a check valve to provide overpressure protection for a process line with a remotely operated isolation valve is similar to other CVS system applications, such as the CVS Makeup Line Containment Isolation Thermal Relief Valve, CVS-PL-V100, which is in the bypass line around the associated motor-operated valve, CVS-PL-V091, in the CVS Make-Up line that passes through CVS penetration C03, shown on Figure 9.3.6-1 (Sheet 1 of 2).

UFSAR Subsection 5.2.1.3 identifies that "... A portion of the chemical and volume control system inside containment is not classified as safety-related. The classification of the AP1000 reactor coolant pressure boundary deviates from the requirement that the reactor coolant pressure boundary be classified as safety related and be constructed using the ASME Code, Section III as provided in 10 CFR 50.55a. The safety-related classification of the AP1000 reactor coolant pressure boundary ends at the third isolation valve between the reactor coolant system and the chemical and volume control system ...." CVS-PL-V081 and CVS-PL-V067 each are the middle safety-related valves in the series of three valves between the RCS and the non-safety CVS purification loop designed to satisfy this CVS alternate classification of the reactor coolant pressure boundary (RCPB). The CVS-PL-V081

and CVS-PL-V067 valves are in the two parallel paths between CVS-PL-V082 and CVS-PL-V080.

To maintain the engineering overpressure design function to protect the RHX, CVS-PL-V067, a welded ASME Code Section III spring-assisted check valve would be provided. This valve would open with a 515 psid pressure differential across the seat under conditions of a maximum inlet pressure of 3000 psig. This valve performance capability and configuration would meet the integrated overpressure protection requirement of Article NB-7120 within a system design that does not exceed 3100 psig.

To maintain the nonsafety-related design function of diverting CVS flow into the PXS for filling and chemistry adjustments, procedural controls would close or confirm closure of CVS valves CVS-PL-V081 and CVS PL V084.

Because the CVS changes would use ASME Code Section III qualified components for flow isolation and thermal pressure relief, they would continue to meet the quality requirements and support an extremely high probability of accomplishing their safety functions. Removal of the thermal pressure relief function for CVS-PL-V081 does not add, remove, or alter any inservice testing requirements for this valve, as specified in Table 3.9-16. The CVS equipment continues to be designed to the existing CVS design criteria, including seismic qualification of the AOV and spring-assisted check valve, as well as the isolation logics.

The CVS does not share components with other units.

These changes have no effect on the CVS purification subsystem, which removes radioactive effluents that are then transferred to the radwaste system for processing. Likewise, there is no effect on the quantity of these effluents or any related personnel operational exposure, except that the elimination of manual operator action inside containment could result in a reduction in occupational radiation exposure. Furthermore, because the CVS safety functions have been preserved, the proposed CVS configuration changes would neither impact any accident source term parameter or fission product barrier nor affect radiological dose consequence analysis.

Because these changes have no effect on the CVS makeup capacity, there is no effect on the existing system small break makeup performance.

CVS-PL-V081 is shown in its system configuration in UFSAR Figure 9.3.6-1 (Sheet 1) and satisfies the functional, ASME Code, equipment qualification, including seismic, and in-service testing (IST) criteria for CVS pressure boundary and isolation valves. (Note that the Tier 1 functional diagram for the CVS (Figure 2.3.2-1) appropriately depicts the CVS-PL-V081 check valve function. This is consistent with the AP1000 DCD Tier 1 Section 1.2 discussion regarding Interpretation of Figures.)

The spring-assisted check valve (CVS-PL-V067) that would be added to maintain the RCPB is consistent with other lift check valves (e.g., CVS-PL-V085) currently described in the UFSAR, so the proposed change involves no new failure modes or equipment failure initiators from those considered for other lift check valves. Further, the proposed change to add a spring-assisted check valve around an air-operated

makeup stop check valve will continue to support the intended operational functions of the CVS, and therefore, does not create any new malfunctions, failure mechanisms, or accident initiators.

Therefore, the proposed valve changes would continue to meet the CVS design functions of flow isolation, RCPB protection and RHX overpressure protection with ASME Code Section III designed and qualified valves, including seismic requirements. These proposed changes would satisfy the regulatory requirements of 10 CFR 50 Appendix A, General Design Criteria (GDC) 1, 2, 5, 14, 29, 33, 60, and 61.

2.2. Isolation Valve Type Change

Detailed Description

The proposed CVS changes include lift check valve replacement with an air-operated globe valve (CVS-PL-V094, 1" ASME Code Section III Class B globe valve) and the addition of a pressure relief valve (CVS-PL-V098, 1" ASME Code Section III Class B pressure relief valve). The change to an air-operated globe valve is proposed to maintain a highly reliable inboard isolation valve. Zinc injection uses a positive displacement pump, which would expose the current isolation check valve to undesirable high closure cycles, thereby leading to reliability and maintenance concerns. The proposed addition of a pressure relief valve[1] is required to perform the overpressure relief function previously performed by the check valve. These proposed changes represent design improvements while maintaining the existing design functions. An ASME Code Section III seismically qualified air-operated valve and a thermal relief valve would maintain the containment isolation boundary and preserve the RCS pressure boundary safety functions. The CVS design function includes a safety-related containment isolation function, because portions of the zinc addition (the terms zinc "addition" and "injection" are used interchangeably in this application) flow path originate outside the containment. In addition, the RCPB integrity retention design function requires addressing pressure relief from thermal overpressure conditions, such as the zinc addition flow path at the containment penetration boundary. This overpressure condition is typically postulated for containment penetrations where the fluid trapped between the closed inboard and outboard isolation valves is heated (thermal) from inside the containment due to the temperature increase of a postulated design basis accident inside containment. In this design configuration, the relief valve exhausts directly into the containment.

The CVS zinc addition inboard containment isolation lift check valve replacement with an air-operated globe valve (CVS-PL-V094) provides a more appropriate valve for this application. The design, analysis, installation, testing and qualification, including seismic qualification requirements, are addressed along with the identical outboard air-operated valve (AOV) (CVS-PL-V092, 1" ASME Code Section III Class B globe valve) on the same line. The AOV normally would

[1] "Pressure" relief valve and "thermal" relief valve may be used interchangeably in this LAR, because the valve will lift on thermal initiated overpressure conditions. In tables, the valve designator remains the same (e.g., CVS-PL-V098) while either the term "Thermal" or "Pressure" may be used in the valve name to be consistent with other similar entries in the respective tables.

be open and can be opened or closed via the Plant Control System (PLS) soft level controls from the MCR or RSR, and CVS-PL-V094 would close automatically upon a Protection and Safety Monitoring System (PMS) Low-1 pressurizer level or containment isolation signal. Administrative opening of the AOV cannot occur while the isolation signal exists. In addition, CVS-PL-V094 would be interlocked to close via the PMS upon a CVS isolation signal or by a purification line isolation signal, as described in UFSAR subsections 7.3.1.2.15 and 7.3.1.2.18, respectively.

The proposed new thermal relief valve (CVS-PL-V098) would be added inside the containment between the inboard and outboard zinc addition line isolation valves and would provide the overpressure protection previously provided by the lift check valve. This overpressure protection design configuration has been applied and has been approved in similar AP1000 containment isolation valve locations. CVS-PL-V098 would discharge into the containment atmosphere.

The table below details the licensing basis changes sought with regard to the isolation valve type change:

Enclosure 1 Table 2.2-1

Plant-Specific Changes	**Description of Proposed Change**
Tier 1 and COL App. C Figure 2.2.1-1	Revise CVS-PL-V094 inboard containment isolation lift check valve type to AOV and add CVS-PL-V098 pressure relief valve[2]
Tier 1 and COL App. C Table 2.3.2-1	Revise CVS-PL-V094 AOV requirements/title and add CVS-PL-V098 pressure relief valve, and requirements
Tier 1 and COL App. C Figure 2.3.2-1	Revise CVS-PL-V094 inboard containment isolation valve type from a lift check valve to an AOV and add CVS-PL-V098 pressure relief valve
UFSAR Table 3.2-3	Add CVS-PL-V098 and requirements
UFSAR Table 3.9-12	Add CVS-PL-V098 and requirements
UFSAR Table 3.9-16	Revise CVS-PL-V094 from check valve to AO globe valve and revise the requirements from those applicable to a lift check valve to those applicable to an AOV (including changing Safety Functions from 'Active' to 'Active-to-Failed'), and add CVS-PL-V098 and requirements, including "Thermal Relief" under "Valve/Actuator Type" column

[2] "Pressure" relief valve and "thermal" relief valve may be used interchangeably in this LAR, because the valve will lift on thermal initiated overpressure conditions. In tables, the valve designator remains the same (e.g., CVS-PL-V098) while either the term "Thermal" or "Pressure" may be used in the valve name to be consistent with other similar entries in the respective tables. This footnote is applicable to each of the tables listed here.

Plant-Specific Changes	Description of Proposed Change
UFSAR Table 3.11-1	Under Active Valves - Revise CVS-PL-V094 from, 'Hydrogen Addition Containment Isolation' to 'Zinc Injection Containment Isolation IRC,' and add Limit Switch CVS-PL-V094-L and Solenoid Valve CVS-PL-V094-S, and requirements, and add CVS-PL-V098, and requirements
UFSAR Table 3I.6-2	Add CVS-PL-V094 and add Limit Switch CVS-PL-V094-L and Solenoid Valve CVS-PL-V094-S
UFSAR Table 3I.6-3	Under Active Valves - Add CVS-PL-V098 and requirements and delete redundant information for CVS-PL-V092 and CVS-PL-V094
UFSAR Table 6.2.3-1	Revise the line description from 'H2 injection to RCS' to 'Zinc injection to RCS,' revise requirements for CVS-PL-V094 from those applicable to a check valve to those applicable to an AOV, and add CVS-PL-V098, and requirements
UFSAR Figure 7.2-1	Add text to logic box 'Purification Line Isolation' to 'Purification Line and Zinc and Hydrogen Addition Lines Isolation Valve Isolation' to provide isolation function for new IRC AOV CVS-PL-V094 on Low Pressurizer Water Level signal
UFSAR Table 7.3-2	Revise both P12 Pressurizer level below & above setpoint Functions (c) change to "... purification line isolation, and zinc/hydrogen addition IRC isolation valve isolation on low pressurizer..."(NOTE: see Enclosure 1 Table 2.3-1 for additional changes)
UFSAR Table 9.3.1-1	Add CVS-PL-V094 and requirements
UFSAR Figure 9.3.6-1	Change CVS-PL-V094 from check valve to AOV, add thermal relief valve CVS-PL-V098
UFSAR Subsection 9.3.6.3.7	Add new subtitle for "Zinc Addition Containment Isolation Valves" and text to describe existing AOV CVS-PL-V092 and new AOV CVS-PL-V094 requirements, including that CVS-PL-V094 closes on PMS low-1 pressurizer signal to be consistent with the logic; add new Subtitle "Zinc Addition Line Relief Valve" and text to describe new relief valve CVS-PL-V098 function and criteria
UFSAR Subsection 9.3.6.7	Add under "Purification isolation" the text "..., the zinc addition line valve inside containment, and the hydrogen addition line valve outside containment ..." to address the isolation control function for these valves
UFSAR Table 9A-2	For Fire Area/Fire Zone 1000 AF 01 / 1100 AF 11300B, add

Plant-Specific Changes	Description of Proposed Change
	'Zinc Injection Cont. Isolation Valve,' – 'V094' for Class 1E Division A

Technical Evaluation

The CVS zinc addition inboard containment isolation lift check valve replacement with an air-operated globe valve (CVS-PL-V094) is a fail close valve that continues to meet the containment isolation design function, because it is designed, analyzed, tested and qualified, including seismic qualification, to ASME Code Section III requirements. These characteristics are identical to the outboard AOV (CVS-PL-V092) on the same line. Valve closure logic associated with containment isolation or Low-1 pressurizer level is added, consistent with that already provided for the outboard valve, to isolate this CVS addition path to the RCS, and would continue to satisfy the applicable criteria of IEEE-603 "Criteria for Protection Systems for Nuclear Power Generating Stations." The AOV normally would be open and can be opened or closed via PLS soft level controls, from the MCR or RSR, and it would close automatically upon a PMS Low-1 pressurizer level or containment isolation signal. Administrative opening of the AOV cannot occur while the isolation signal exists. As with CVS-PL-V001, CVS-PL-V002, and CVS-PL-V003, CVS-PL-V094 is interlocked to close automatically via the PMS upon a CVS isolation signal or by a purification line isolation signal.

The new thermal relief valve (CVS-PL-V098), added inside the containment between the inboard and outboard zinc isolation valves, provides the overpressure protection previously provided by the check valve (CVS-PL-V094). CVS-PL-V098 would discharge into the containment atmosphere. This discharge is considered negligible because of the small trapped volume available in this 1-inch line.

Replacing check valve CVS-PL-V094 with an AOV and adding a new thermal relief valve (CVS-PL-V098) would continue to allow zinc addition to the RCS, and accordingly would not affect the zinc addition design function of reducing radiation fields and reducing the potential for crud-induced power shift (CIPS) within the RCS (UFSAR Subsection 9.3.6.2.3.3). The CVS-PL-V094 change from a lift type check valve to an AOV for flow isolation does not affect the design function because the AOV, including the added automatic valve controls, will continue to be capable of performing the flow isolation function, and is identical in valve type and function to the outboard isolation valve (CVS-PL-V092), including the automatic valve controls, which performs flow isolation on this same line.

The AOV that will replace the lift check valve as the inboard containment isolation valve for the zinc injection line is a consistent valve type to those already described in the UFSAR, so the proposed change introduces no new failure modes or equipment failure initiators. Similarly, the thermal relief valve that will provide overpressure protection for this section of piping is consistent with other thermal relief valves used in similar containment penetration lines (such as the C02 penetration discussed below), and does not introduce any new failure modes or equipment failure initiators.

Further, the proposed changes to the zinc injection containment isolation piping configuration will continue to support the intended operational functions of the CVS zinc injection line, and therefore, does not create any new malfunctions, failure mechanisms, or accident initiators.

Because of the high closure cycles, low process flow conditions, this engineering design improvement addresses potential check valve flutter concerns. With the proposed replacement of the check valve, which also provided thermal pressure relief for this penetration, a common thermal pressure relief valve (CVS-PL-V098) design configuration would be added. This common containment isolation valve and penetration configuration with a thermal relief valve does not introduce any new failure concerns, because the isolation valve failure modes of open, close and leakage remain consistent with other similar configurations, such as the CVS letdown line penetration (CVS containment penetration, C02) depicted on Figure 9.3.6-1 (Sheet 1 of 2). This small (1-inch) process line configuration does not require reevaluation for risk impact, because it is below the 2-inch line threshold for probabilistic risk assessment (PRA) reevaluation significance (Reference APP-GW-GL-022, Section 24.5 (Westinghouse Proprietary document – not publicly available)). Relief valve CVS-PL-V098 does not contain any electrical components required to be designated as "Qualified for a Harsh Environment" in Tier 1 Table 2.3.2-1.

The CVS equipment continues to be designed to the existing CVS design criteria, including seismic qualification of the AOV and thermal relief valve, as well as the containment isolation logics. Because the CVS changes would use ASME Code Section III qualified components for containment isolation and thermal pressure relief, they would continue to meet the quality requirements and support an extremely high probability of accomplishing their safety functions.

The CVS does not share components with other units.

These changes have no effect on the CVS purification subsystem, which removes radioactive effluents that are then transferred to the radwaste system for processing, because they are not part of the purification subsystem. Likewise, there is no effect on the quantity of these effluents or any related personnel operational exposure. The proposed change does not impact any accident source term parameter or fission product barrier and, by maintaining the containment isolation safety functions, the proposed change does not impact the radiological dose consequence analysis. Because these changes have no effect on the CVS makeup capacity, there is no effect on the existing system small break makeup performance.

Therefore, the proposed valve change and valve addition would continue to meet the CVS design functions of containment isolation and overpressure protection with ASME Code Section III designed and qualified valves, including seismic requirements. These proposed changes satisfy the regulatory requirements of 10 CFR 50, Appendix A, General Design Criteria (GDC) 1, 2, 5, 14, 29, 33, 55, 60, and 61.

2.3. Separate Zinc and Hydrogen Injection Paths

Detailed Description

Under the current design, hydrogen and zinc are injected through the same line. The proposed change would provide separate control and injection of the hydrogen and zinc additives. The separate control and injection capability would facilitate "continuous injection" of additives over "batch injection." Continuous injection allows the achievement of the historically identified benefits of corrosion reduction, pipe cracking mitigation, and dose reduction. Maintaining a steady-state concentration of zinc and hydrogen is the better practice. The variation of concentration resulting from batch injections does not have the benefits of continuous injection. The benefits of continuous injection improve safety by supporting long-term integrity of the fission product barriers and lower plant personnel radiation exposure. The hydrogen injection (the terms hydrogen "addition" and "injection" are used interchangeably in this application) design function is to control the RCS oxygen concentration, which is produced by radiolysis in the core. Addition of hydrogen minimizes corrosion of the fuel cladding and primary surfaces, and during power operation eliminates free oxygen and prevents ammonia formation. The zinc injection (or addition) design functions are to reduce the radiation fields and the potential for crud-induced power shift (CIPS) within the RCS (UFSAR Subsection 9.3.6.2.3.3).

Under the current design, injecting zinc into the purification return line downstream (hotter location) of the RHX could lead to precipitation of the zinc, stress corrosion cracking at the injection point, and potential blockages of the injection line. The proposed change would also relocate the zinc injection point to a cooler location upstream of the RHX to reduce these effects. Hydrogen would continue to be injected at the existing higher temperature injection point.

The CVS provides the safety-related containment isolation functions because portions of these hydrogen and zinc subsystems have equipment outside the containment. Prior to the proposed change, containment isolation for the hydrogen and zinc subsystems was provided by the normally open, fail close outboard isolation valve (CVS-PL-V092, 1" ASME Code Section III Class 2 globe valve) and inboard check valve (CVS-PL-V094, 1" ASME Code Section III Class 2 check valve). After the proposed change, there would be separate sets of containment boundary isolation valves, one set for zinc (CVS-PL-V092, globe valve, and CVS-PL-V094, globe valve) and the other set for hydrogen (CVS-PL-V219, 1/2" ASME Code Section III Class 2, globe valve, and CVS-PL-V217, 1/2" ASME Code Section III Class 2, check valve), each meeting the same requirements as the current common zinc/hydrogen configuration. The new hydrogen injection penetration (1" ASME Code Section III Class 2, with 1/2" x 1" line reducers in the line on each side) would meet the existing containment boundary requirements, including containment isolation and in-service testing, as well as preserving the RCS pressure boundary safety functions using ASME Code Section III qualified valves and piping. This new hydrogen injection penetration is identified by the CVS designation as CVS-PY-C05 (or simply C05), and by the Containment System (CNS) penetration

number as CNS-P09 (or simply P09). The cross-reference of CNS to process system specific penetration identification is contained in a proprietary Westinghouse system specification.

The proposed new hydrogen injection line containment penetration test valves (CVS-PL-V215, 1/2" ASME Code Section III Class 3 globe valve, Hydrogen Addition – IRC Shutoff Valve, and CVS-PL-V216, 1/2" ASME Code Section III Class 3 globe valve, Hydrogen Addition Containment Isolation Test Connection), would be added for testing on the new hydrogen injection line (UFSAR Figure 9.3.6-1, Sheet 1 of 2).

The table below details the licensing basis changes sought with regard to the change to separate the zinc and hydrogen injection paths.

Note: In the table below some of the descriptions of proposed changes are based on the changes described in Table 2.2-1, as if the changes had already modified the plant licensing basis.

Enclosure 1 Table 2.3-1

Plant-Specific Change	**Description of Proposed Change**
Tier 1 and COL App. C Figure 2.2.1-1	Rename the function of CNS containment penetration P08 from 'CVS - H2 Injections' to 'CVS - Zinc Injection,' and add CNS containment penetration P09 for CVS H2 Injection, with check valve CVS-PL-V217 inside containment and globe valve CVS-PL-V219 outside containment
Tier 1 and COL App. C Figure 2.3.2-1	Rename (from "H2 Addition" to "Zinc Addition") the input to CVS-PL-V092 and CVS-PL-V094, and connect the output from CVS-PL-V094 to the shell side inlet line of the Regenerative Heat Exchanger (RHX). Add new hydrogen "H2 Addition" through globe valve CVS-PL-V219, then the containment penetration, then check valve CVS-PL-V217, and then connect to the RHX shell side output between CVS-PL-V080 and CVS-PL-V084, which is the same injection point of the previous zinc/hydrogen injection line
Tier 1 and COL App. C Table 2.3.2-1	Change CVS-PL-V092 from 'Hydrogen Addition Line Containment Isolation Valve' to 'Zinc Injection Containment Isolation Valve ORC' Change CVS-PL-V094 from 'Hydrogen Addition Line Containment Isolation Check Valve' to 'Zinc Injection Containment Isolation Valve IRC'

Plant-Specific Change	Description of Proposed Change
	Change CVS-PL-V098 from 'Zinc/Hydrogen Addition Line Ctmt Isol Thermal Relief Valve'[3] to 'Zinc Addition Line Ctmt Isol Thermal Relief Valve'
	Add CVS-PL-V217, 'Hydrogen Injection Containment Isolation Check Valve IRC,' and check valve requirements, and add CVS-PL-V219, 'Hydrogen Injection Containment Isolation Valve ORC,' and globe valve requirements
Tier 1 and COL App. C Table 2.3.2-2	Add CVS Hydrogen Injection Containment Penetration Lines L213, L214, and L217 and requirements and change the description for Line L061 to 'CVS Zinc Injection Containment Penetration Line'
UFSAR Table 3.2-3	Revise CVS-PL-V092 to Zinc Injection Containment Isolation ORC, revise CVS-PL-V094 to Zinc Injection Containment Isolation IRC, revise CVS-PL-V096 to Zinc Injection Containment Isolation Test Connection, and revise CVS-PL-V098, to Zinc Addition Line Containment Isolation Thermal Relief Valve; and add CVS-PL-V215, Hydrogen Injection – IRC Shutoff, and requirements, add CVS-PL-V216, Hydrogen Injection Containment Isolation Test Connection, and requirements, add CVS-PL-V217, Hydrogen Injection Containment Isolation Check IRC, and requirements; add CVS-PL-V218, Hydrogen Injection Containment Isolation Test Connection, and requirements; add CVS-PL-V219, Hydrogen Injection Containment Isolation ORC, and requirements; Rename CVS-PY-C04 to be CVS-PY-C05, Hydrogen Add Line Containment Penetration, and add CVS-PY-C04, Zinc Add Line Containment Penetration, and requirements
UFSAR Table 3.6-3	Room Number 11209 Chase, for PWR-SGS004, revise 'CVS hydrogen supply piping (L062)' to 'CVS hydrogen supply piping (L215),' for PWR-SGS008 revise 'CVS hydrogen supply piping (L062)' to 'CVS hydrogen supply piping (L215)'; Room Number 11300 for PWR-CVS047 A/B, revise 'CVS hydrogen supply valves (CVS-V065, V094, V095, and V096)' to 'CVS hydrogen supply valves (CVS-V215, V216, V217, and V218)'
UFSAR Table 3.9-12	Revise CVS-PL-V092 from 'Hydrogen Add Containment

[3] "Pressure" relief valve and "thermal" relief valve may be used interchangeably in this LAR, because the valve will lift on thermal initiated overpressure conditions. In tables, the valve designator remains the same (e.g., CVS-PL-V098) while either the term "Thermal" or "Pressure" may be used in the valve name to be consistent with other similar entries in the respective tables. This footnote is applicable to each of the tables listed here.

Plant-Specific Change	Description of Proposed Change
	Isolation' to 'Zinc Injection Containment Isolation Valve ORC'; revise CVS-PL-V094 from 'Hydrogen Add IRC Isolation Check Valve' to 'Zinc Injection Containment Isolation Valve IRC'; revise CVS-PL-098 to 'Zinc Addition Line Containment Isolation Thermal Relief Valve', and add CVS-PL-V217, 'Hydrogen Injection Containment Isolation Check Valve IRC,' and requirements; and CVS-PL-V219 'Hydrogen Injection Containment Isolation Valve ORC,' and requirements
UFSAR Table 3.9-16	Revise CVS-PL-V092 from 'Hydrogen Addition Containment Isolation' to 'Zinc Injection Containment Isolation ORC'; revise CVS-PL-V094 from 'Hydrogen Addition IRC Isolation' to 'Zinc Injection Containment Isolation IRC'; revise CVS-PL-V098 to 'Zinc Addition Line Containment Isolation Thermal Relief Valve'; add CVS-PL-V217, 'Hydrogen Injection Containment Isolation Check IRC,' and requirements; and add CVS-PL-V219, 'Hydrogen Injection Containment Isolation ORC,' and requirements
UFSAR Table 3.11-1	Under Active Valves, revise CVS-PL-V092 from 'Hydrogen Addition Containment Isolation' to 'Zinc Injection Containment Isolation'; revise CVS-PL-V098 from 'Zinc/Hydrogen Addition Line Containment Isolation Thermal Relief Valve' to 'Zinc Injection Containment Isolation Thermal Overpressurization Relief Valve'; add CVS-PL-V217 'Hydrogen Injection Cont Isolation Check IRC' and requirements; and CVS-PL-V219 'Hydrogen Injection Containment Isolation' including Limit Switch and Solenoid Valve requirements. Under 'Miscellaneous – Non-Active Valves,' add CVS-PL-V215, 'Hydrogen Injection – IRC Shutoff,' and requirements; add CVS-PL-V216 'Hydrogen Add Cont Isolation Test Connection,' and requirements; add CVS-PL-V218, 'Hydrogen Add Cont Isolation Test Connection,' and requirements; revise CVS-PL-V065 from 'H2 Mkup Containment Isolation Thermal Relief Valve' to 'Zinc Addition – IRC Shutoff;' revise CVS-PL-V095 from 'Hydrogen Add Cont Isolation Test Connection' to 'Zinc Add Cont Isolation Test Connection'; and revise CVS-PL-V096 from 'Hydrogen Addition Containment Isolation Test Connection' to 'Zinc Addition Containment Isolation Test Connection'.
UFSAR Table 3I.6-2	Revise CVS-PL-V092 from 'Hydrogen Addition Containment Isolation' to 'Zinc Addition Containment Isolation'; revise CVS-PL-V094 from 'Hydrogen Addition IRC Isolation Valve' to 'Zinc Addition IRC Isolation Valve,' and add CVS-PL-V219 'Hydrogen Injection Containment Isolation' identification of Limit Switch CVS-PL-V219-L and Solenoid Valve CVS-PL-V219-S
UFSAR Table 3I.6-3	Under Active Valves - Revise CVS-PL-V092 from 'Hydrogen

Plant-Specific Change	Description of Proposed Change
	Addition Containment Isolation' to 'Zinc Addition Containment Isolation'; revise CVS-PL-V094 from 'Hydrogen Addition Containment Isolation' to 'Zinc Addition Containment Isolation'; add CVS-PL-V217, 'Hydrogen Injection Containment Isolation Check Valve,' and requirements; add CVS-PL-V218, 'Hydrogen Injection Containment Isolation Test Connection Valve and requirements; add CVS-PL-V219, 'Hydrogen Injection Containment Isolation' and requirement Under Nonactive Valves - revise CVS-PL-V065 from 'H2 Mkup Containment Isolation Thermal Relief Valve' to 'Zinc Addition – IRC Shutoff'; revise CVS-PL-V095 from 'Hydrogen Add Cont Isolation Test Connection' to 'Zinc Add Cont Isolation Test Connection;' revise CVS-PL-V096 from 'Hydrogen Addition Containment Isolation Test Connection' to 'Zinc Addition Containment Isolation Test Connection'
UFSAR Table 6.2.3-1	Revise CVS-PL-V092, CVS-PL-V094 and CVS-PL-V098 from 'H2 injection to RCS' to 'Zinc injection to RCS' and requirements; and add CVS-PL-V217 and CVS-PL-V219, 'Hydrogen injection to RCS' and requirements
UFSAR Figure 7.2-1	Revise text in logic box "Purification Line and Zinc/Hydrogen Addition IRC Isolation Valve Isolation" to "Purification Line and Zinc and Hydrogen Addition Lines Isolation Valve Isolation" to provide isolation function for both zinc and hydrogen containment isolation valves (except hydrogen IRC check valve CVS-PL-V217) on Low Pressurizer Water Level signal
UFSAR Table 7.3-2	Revise both P12 Pressurizer level below setpoint and Pressurizer level above setpoint Functions (c) from "... and zinc/hydrogen addition IRC isolation valve isolation ... " to "... and zinc and hydrogen addition isolation valves isolation ... "
UFSAR Table 9.3.1-1	Revise CVS-PL-V092 from 'Hydrogen Addition Containment Isolation' to 'Zinc Injection Containment Isolation ORC'; add CVS-PL-V219, 'Hydrogen Injection Containment Isolation' and requirements
UFSAR Figure 9.3.6-1	Rename (from "H2/Zinc Add" to "Zinc Addition") the input to CVS-PL-V092 and CVS-PL-V094, and connecting the output from CVS-PL-V094 to the shell side inlet line of the Regenerative Heat Exchanger (RHX); add new hydrogen "H2 Addition" through new CVS-PL-V219, then the new containment penetration CVS-PY-C05, then new CVS-PL-V217, and then connecting to the RHX shell side output between CVS-PL-V080 and CVS-PL-V084, which is the same injection point of the previous zinc/hydrogen injection line

Plant-Specific Change	Description of Proposed Change
UFSAR Subsection 9.3.6.3.7	Revise subtitle for "Hydrogen Addition Containment Isolation Valve" to be "... Valves" and describe the CVS-PL-V219 globe valve outside containment isolation and the CVS-PL-V217 check valve inside containment isolation functions, as well as the PMS controls for closure of the outside containment isolation valve, including the low-1 pressurizer level signal for closure.
UFSAR Subsection 9.3.6.7	Under the "Containment isolation" header, revise the text, "... and the hydrogen addition line." to read, "... and the hydrogen and zinc addition lines."
UFSAR Table 9A-2	For Fire Area/Fire Zone 1201 AF 05, revise 'Hydrogen Addition Cont. Isolation Valve' - 'V092' to 'Zinc Injection Cont. Isolation Valve,' and add 'Hydrogen Addition Cont. Isolation Valve' - 'V219' for Class 1E Division D

Technical Evaluation

The proposed change to provide separate control and injection capability for hydrogen and zinc addition would meet the existing containment boundary requirements, including containment isolation and in-service testing, as well as preserving the RCS pressure boundary safety functions using ASME Code Section III designed and qualified valves, penetration and piping. These requirements would be satisfied consistent with the existing zinc/hydrogen injection line, including the containment isolation logics, which would continue to satisfy the applicable criteria of IEEE-603, "Criteria for Protection Systems for Nuclear Power Generating Stations."

This proposed change provides separate routing and improved control of the hydrogen and zinc additives within CVS, which are then separately injected into the CVS makeup flow path to the RCS. The hydrogen addition continues to satisfy the design function of controlling the RCS oxygen concentration within a predictable range of RCS chemistry profiles. Likewise, the zinc addition still satisfies the design functions of reducing radiation fields and reducing the potential for CIPS within the RCS. These changes represent an improvement, because the makeup flow temperature for each additive at the injection point better suits each additive and controlling each separately allows continuous or batch injection with additive usage within projected quantities, which better addresses industry guidelines. The zinc injection point at a cooler location within the CVS makeup loop improves conditions related to zinc precipitation, injection point stress corrosion cracking, and potential injection line blockages, and satisfies industry guidelines pertaining to RCS chemistry (i.e., EPRI Report NP-5960-SR, Primary Water Chemistry Guidelines (EPRI Proprietary document – not available to the public)).

Separation of the injection lines for the zinc and hydrogen additives and the use of continuous injection mode would not increase operational radiation exposure, because the incorporation of zinc into oxide films on the wetted RCS surfaces has been credited with a reduction in plant dose rate and shutdown radiation fields with subsequent reduction in occupational radiation exposure. This CVS change would not affect current shielding requirements and the facility's ability to satisfy ALARA practices.

Although an additional separate containment penetration is provided for hydrogen, this small (1/2-inch) process line is provided with isolation valves meeting the same design requirements as the existing injection path (zinc/hydrogen). The proposed hydrogen injection line containment penetration is similar in form, fit, and function to the existing CVS combined zinc/hydrogen containment penetration and, therefore, does not affect containment or its ability to perform its design function. This small process line configuration does not require reevaluation for risk impact, because it is below the 2-inch line threshold for PRA reevaluation significance (Reference APP-GW-GL-022, Section 24.5 (Westinghouse Proprietary document – not available to the public)). The proposed hydrogen penetration piping (1-inch) size is identical to the existing zinc/hydrogen 1-inch penetration because a reducer (½" x 1") is used in the line on either side of the penetration.

The addition of a CVS penetration and test isolation valves would not adversely affect the containment vessel's design functions. The configuration of the new penetration will be designed to comply with applicable regulations, including 10 CFR 50 Appendix A, GDC-55, *Reactor coolant pressure boundary penetrating containment.* Because the design requirements for the penetration are consistent with the current zinc/hydrogen penetration and have been found to be an acceptable method to protect containment integrity, this activity does not affect the containment vessel's ability to prevent the containment from exceeding its design pressure following postulated design basis accidents and therefore does not affect the containment vessel's ability to contain the release of airborne radioactivity and provide shielding for the reactor core and the reactor coolant system during normal operations. The design requirements for the additional penetration are consistent with the current zinc/hydrogen penetration, and therefore, do not affect the containment vessel's ability to protect against postulated missiles. The new penetration will be tested to maintain compliance with the containment leakage testing requirements in 10 CFR 50 Appendix J, *Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors.* The additional containment penetration is properly reinforced to the rules of ASME Code Section III, Subsection NE, consistent with the current penetrations, such that the containment vessel would continue to withstand the loads and load combinations provided in UFSAR Table 3.8.2-1. This additional small penetration is not explicitly modeled, consistent with the current structural model approach (UFSAR Subsection 3.8.2.4.1.2).

The additional penetration is small in comparison to the overall structural model used to evaluate the forces and moments in the shield and auxiliary buildings. This additional small penetration is not explicitly modeled, consistent with the

current structural model approach. In general, small penetrations in reinforced concrete are addressed by replacing the amount of reinforcement 'lost' at the penetration on each side of the penetration. In the case of the CVS penetration, the details on the drawings provide for continuity of the reinforcement around the openings. The overall effect on the finite element analysis is small, as the openings do not significantly impact the overall stiffness of the model. Therefore, the shield and auxiliary buildings' design functions would not be adversely affected by the addition of the proposed penetration.

The proposed CVS hydrogen penetration would be provided consistent with the existing design requirements for mechanical penetrations identified in UFSAR Subsection 3.8.2.1.5. Because the CVS changes use valve types, piping and a containment penetration consistent with those already described in the UFSAR (Figure 9.3.6-1, Sheet 1), there are no new failure modes, equipment failure initiators, or accident initiators introduced by these changes.

Potential consequences from hydrogen line failure are not changed from the existing UFSAR design. Therefore, there is no change in the ability to meet the design functions, as described in the UFSAR.

While there would be changes to the operational method of control with the additional hydrogen isolation valves, these are considered to be standard, common controls that do not represent an adverse effect on operation or performance of the design functions. Expansion of operational controls to both continuous and batch injection methodologies would require less demanding operator control because continuous injection would be the preferred operating mode, although slightly different operational procedures would be used. These changes would continue to meet containment isolation design functions and would improve the performance of the design functions to meet industry chemistry guidelines.

Because the CVS changes would use ASME Code Section III qualified components for RCS isolation, containment isolation, penetration and piping they would continue to meet the quality requirements and support an extremely high probability of accomplishing their safety functions. The CVS equipment continues to be designed to the existing CVS design criteria, including seismic qualification of the RCS isolation, containment isolation, penetration and piping, as well as the containment isolation logics. Check valve CVS-PL-V217 does not contain any electrical components required to be designated as "Qualified for a Harsh Environment" in Tier 1 Table 2.3.2-1.

The CVS does not share components with other units.

These changes have no effect on the CVS purification subsystem which removes radioactive effluents that are then transferred to the radwaste system for processing because they are not part of the purification subsystem. Likewise, there is no effect on the quantity of these effluents or any related personnel operational exposure. Furthermore, the proposed changes neither impact any accident source term parameters or fission product barriers nor affect radiological dose consequence analysis.

Because these changes have no effect on the CVS makeup capacity, there is no effect on the existing system small break makeup performance.

To perform in-service testing and maintain system pressure boundary the proposed new hydrogen injection line would have ASME Section III designed and qualified test valves (CVS-PL-V215 and CVS-PL-V216) located inside containment. These new valves perform the same test functions as the in-containment test valves (CVS-PL-V065 and CVS-PL-V095) in the existing zinc/hydrogen containment injection line.

Therefore, the proposed separate control and injection capability for hydrogen and zinc addition would continue to meet the CVS design functions of controlling the RCS oxygen concentration, reducing radiation fields and CIPS in the RCS, of containment isolation and overpressure protection with ASME Code Section III designed and qualified, including seismic requirements, valves, penetration and piping. These proposed changes would satisfy regulatory requirements of 10 CFR 50 Appendix A General Design Criteria (GDC) 1, 2, 5, 14, 16, 29, 33, 55, 60, and 61.

3. Technical Evaluation (Included in Section 2, above)

4. Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50, Appendix A, General Design Criterion (GDC) 1, *Quality standards and records.* "Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed." Because the proposed CVS changes would use ASME Code Section III qualified components they would continue to meet the commensurate quality requirements and satisfy this criterion.

10 CFR 50, Appendix A, GDC 2, *Design bases for protection against natural phenomena.* "Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions." The CVS changes maintain compliance with GDC 2 through seismic qualification of the RCS isolation valves, containment isolation valves, penetration and piping, as well as the containment isolation logics. Because the proposed CVS changes would use components which are seismically qualified for their application, this criterion would continue to be satisfied.

10 CFR 50, Appendix A, GDC 5, *Sharing of structures, systems, and components.* "Structures, systems, and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and

cooldown of the remaining units." Because the CVS does not share components with other units this criterion continues to be satisfied.

10 CFR 50, Appendix A, GDC 14, *Reactor coolant pressure boundary*, states that "reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture." The CVS changes maintain compliance with GDC 14 through application of ASME Code Section III valves and piping for flow isolation, pressure relief, thermal pressure relief and containment isolation and pressure retention paths for hydrogen and zinc injection (i.e., Article NB-7120).

The CVS has alternative classification criteria, which are applicable to the non-safety portions of the system.

UFSAR Subsection 5.2.1.3, Alternate Classification

"... A portion of the chemical and volume control system inside containment is not classified as safety-related. The classification of the AP1000 reactor coolant pressure boundary deviates from the requirement that the reactor coolant pressure boundary be classified as safety related and be constructed using the ASME Code, Section III as provided in 10 CFR 50.55a. The safety-related classification of the AP1000 reactor coolant pressure boundary ends at the third isolation valve between the reactor coolant system and the chemical and volume control system ...."

The CVS changes maintain compliance with this alternative classification through application of ASME Code Section III valves through the third isolation valve between the RCS and the CVS.

10 CFR 50, Appendix A, GDC 16, *Containment design*, requires that reactor containment and associated systems be provided to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require. Because the additional CVS components, including the containment isolation valves, the additional CVS containment penetration, and the associated piping are similar to the existing CVS combined zinc/hydrogen injection path components in form, fit, and function, the proposed change does not affect compliance with GDC 16.

10 CFR 50, Appendix A, GDC 29, *Protection against anticipated operational occurrences.* "The protection and reactivity control systems shall be designed to assure an extremely high probability of accomplishing their safety functions in the event of anticipated operational occurrences." Because the CVS changes would use ASME Code Section III qualified components for RCS isolation, containment isolation, penetration, thermal pressure relief and piping they would continue to support an extremely high probability of accomplishing their safety functions and satisfying this criterion.

10 CFR 50, Appendix A, GDC 33, *Reactor coolant makeup.* "A system to supply reactor coolant makeup for protection against small breaks in the reactor coolant pressure boundary shall be provided." Because the CVS changes

would use ASME Code Section III qualified components for flow isolation and thermal pressure relief there would be no effect on the existing CVS makeup capacity for small breaks of the RCPB and this criterion would continue to be satisfied.

10 CFR 50, Appendix A, GDC 55, *Reactor coolant pressure boundary penetrating containment*, states that "each line that is part of the reactor coolant pressure boundary and that penetrates primary reactor containment shall be provided with containment isolation valves as follows, ... (4) One automatic isolation valve inside and one automatic isolation valve outside containment. A simple check valve may not be used as the automatic isolation valve outside containment." The CVS changes maintain compliance with GDC 55 by having two automatic isolation valves, one inside and one outside containment.

10 CFR 50, Appendix A, GDC 60, *Control of releases of radioactive materials to the environment.* "The nuclear power unit design shall include means to control suitably the release of radioactive materials in gaseous and liquid effluents and to handle radioactive solid wastes produced during normal reactor operation, including anticipated operational occurrences." Because the CVS changes only affect RCS isolation, containment isolation, penetration, thermal pressure relief and piping, while using ASME Code Section III qualified components, there is no effect on the purification subsystem radioactive effluents or solid waste processed by other systems, so this criterion would continue to be satisfied.

10 CFR 50, Appendix A, GDC 61, *Fuel storage and handling and radioactivity control.* "The fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed to adequate safety under normal and postulated accident conditions." Because the CVS changes only affect RCS isolation, containment isolation, penetration, thermal pressure relief, and piping while using ASME Code Section III qualified components, there is no effect on the purification subsystem radioactive waste processed by other systems, so this criterion would continue to be satisfied.

10 CFR 50, Appendix J, *Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors,* specifies the containment leakage test requirements to confirm the leak-tight integrity of the primary reactor containment and systems and components that penetrate containment and establishment of acceptance criteria for these tests. Because the CVS piping penetrating containment, including the new CVS hydrogen injection line, will be included in the facility's Containment Leak Rate Program, the requirements of 10 CFR 50, Appendix J, will continue to be satisfied.

10 CFR 52, Appendix D, Section VIII, requires NRC approval for Tier 1 information departures. This departure involves departures from Tier 1 information; therefore, NRC approval is required prior to implementing the Tier 1 changes addressed in this departure.

4.2 Precedent

This proposed change is consistent and identical in technical content with Southern Nuclear Operating Company License Amendment Requests LAR-13-002, identified as reference 1 of this letter, and LAR-13-002S, a supplement to the associated License Amendment Request, identified as Reference 2 to this letter.

Southern Nuclear Operating Company License Amendment Request LAR-13-002 was accepted for review by the Nuclear Regulatory Commission on February 13, 2013 (Adams Accession Number ML13037A116).

4.3 Significant Hazards Consideration

The proposed changes would revise the Combined Licenses (COLs) for the Licensee in regard to the Chemical and Volume Control System (CVS) by: (1) providing a spring-assisted check valve around the air-operated Reactor Coolant System (RCS) purification return line stop check valve, (2) replacing the CVS zinc addition inboard containment isolation lift check valve with an air-operated globe valve and adding a thermal relief valve, and (3) separating the zinc and hydrogen injection paths and relocating the zinc injection point.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The changes to provide a spring-assisted check valve located in the bypass line around the makeup stop check valve would continue to meet the existing design functions because the ASME Boiler and Pressure Vessel Code (ASME Code) Section III valves will maintain the flow isolation design function and preserve the Reactor Coolant System (RCS) pressure boundary safety function. The replacement of the Chemical and Volume Control System (CVS) zinc addition inboard containment isolation lift check valve with an air operated globe valve and addition of a pressure relief valve would continue to meet the containment isolation and RCS pressure boundary design functions because the replacement valves will be designed, analyzed, tested and qualified, including seismic qualification, to ASME Code Section III requirements. Separating the zinc and hydrogen injection paths and relocating the zinc injection point would continue to meet containment boundary requirements, including containment isolation and in-service testing, and preserve the RCS pressure boundary safety functions because the revised containment isolation configuration is consistent with those described in 10 CFR 50, Appendix A, General Design Criterion (GDC) 55, and the additional valves and piping will be qualified to ASME Code Section III. Because the proposed CVS changes would preserve the CVS safety-related design

functions, the probability of an accident previously evaluated is not affected.

- The CVS safety functions have been preserved, because the proposed CVS configuration changes, including revised valve types, will perform the same safety functions as the current design. The proposed CVS configuration changes would neither impact any accident source term parameter or fission product barrier nor affect radiological dose consequence analysis.

Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The additional containment penetration is similar in form, fit, and function to the CVS combined zinc/hydrogen containment penetration that is currently described in the Updated Final Safety Analysis Report. Because the CVS changes use valve types, piping, and a containment penetration consistent with those already described in the Updated Final Safety Analysis Report, no new failure modes or equipment failure initiators are introduced by these changes. Accordingly, the proposed changes do not create any new malfunctions, failure mechanisms, or accident initiators.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.3.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The containment isolation and pressure relief functions would not be changed by this activity and are consistent with the existing design. The proposed CVS containment penetration is similar in form, fit, and function to existing CVS combined zinc/hydrogen containment penetration and, therefore, does not affect containment or its ability to perform its design function. The addition of these CVS components, including piping, a spring-assisted check valve, an air-operated containment isolation valve, a thermal relief valve and the additional CVS containment penetration do not impact a design basis or safety limit. Because the CVS design functions of controlling the RCS oxygen concentration, reducing radiation fields, containment isolation and overpressure protection within existing limits are not changed by this activity and are bounded by the existing design, there is no change to any current margin of safety.

Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public would not be endangered by operation in the proposed manner, (2) such activities would be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment would not be inimical to the common defense and security or to the health and safety of the public. The above evaluations demonstrate that the requested changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determines that the requested change does not involve a Significant Hazards Consideration.

5. Environmental Consideration

As discussed in Section 2 above, the proposed amendment: (1) provides a spring-assisted check valve around the air-operated Reactor Coolant System (RCS) purification return line stop check valve, (2) replaces the CVS zinc addition inboard containment isolation lift check valve with an air-operated globe valve and adds a thermal relief valve, and (3) separates the zinc and hydrogen injection paths and relocates the zinc injection point.

A review of these changes has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, facility construction and operation following implementation of the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the Licensee evaluation of the proposed amendment has determined that the proposal meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment." The Significant Hazards Consideration determined that (1) the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the

proposed amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed CVS changes improve the system functions and control to deliver zinc and hydrogen to the Reactor Coolant System (RCS) while maintaining the containment isolation and system pressure relief and control functions. These changes will maintain the quantities of non-radiological chemicals (zinc and hydrogen) added to the RCS and maintain or improve the effectiveness of these chemicals resulting in maintaining the same level of radiological effluent quantity releases to the waste system. These CVS changes are unrelated to any aspects of plant construction or operation that would introduce any changes to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents) or affect negatively any plant radiological or non-radiological effluent release quantities. Furthermore, because these changes only affect the means of adding zinc and hydrogen to the RCS and do not affect elements of the RCS related to discharges from this system, these changes do not diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the proposed amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed CVS changes provide remote operation for diversion of CVS flow into the Passive Core Cooling System, instead of manual operator action inside the containment. Other CVS operations, such as RCS and containment isolation, are controlled from remote locations, while CVS purification operations are unchanged. Separation of the injections lines for the non-radiological zinc and hydrogen additives and the use of continuous injection mode would not increase operational radiation exposure, because the incorporation of zinc into oxide films on the wetted RCS surfaces has been credited with a reduction in plant dose rate and shutdown radiation fields with subsequent reduction in occupational radiation exposure. The proposed CVS changes maintain existing shielding and satisfaction of ALARA requirements. These changes would reduce plant operator exposures by eliminating certain manual operator actions that would be performed from inside containment. Further, the administrative controls of 10 CFR Part 20 would be followed. Therefore, it is concluded that the proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the proposed amendment, the Licensee has determined that the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility

criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental impact statement or environmental assessment of the proposed amendment is not required.

6. References

1.) Virgil C. Summer Units 2 & 3 Updated Final Safety Analysis Report (UFSAR), Revision 0, June 2012.

2.) APP-GW-GL-022, Revision 5, "AP1000 Probabilistic Risk Assessment," Westinghouse Electric Company, December 2003 (Westinghouse Proprietary document– not publicly available).

3.) EPRI ALWR Utility Requirements Document, Volume III, Chapter 3: Reactor Coolant System and Reactor Non-Safety Auxiliary Systems (Section 3.3.3.1 References EPRI Report NP-5960-SR, Primary Water Chemistry Guidelines) (EPRI Proprietary document – not publicly available)

4.) NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design."

South Carolina Electric and Gas Company

NND-13-0085

Enclosure 2

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

Request for Exemption Regarding
Changes to the Chemical and Volume Control System (CVS)

1.0 Purpose

South Carolina Electric & Gas requests a permanent exemption from the provisions of 10 CFR 52, Appendix D, Section III.B, "Design Certification Rule for the AP1000 Design, Scope and Contents," to allow a departure from elements of the certification information in Tier 1 of the generic AP1000 Design Control Document (DCD). The regulation, 10 CFR 52, Appendix D, Section III.B, requires an applicant or licensee referencing Appendix D to 10 CFR Part 52 to incorporate by reference and comply with the requirements of Appendix D, including certified information in DCD Tier 1. Tier 1 includes Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) that must be satisfactorily performed prior to fuel load. The design details to be verified by these ITAAC are specified in the text, tables, and figures that are referenced in each individual ITAAC. The Tier 1 departure includes changes to detailed information that supports existing ITAAC, such as changes to valve type designations, line configurations for the Chemical and Volume Control System (CVS), an additional containment penetration, and similar supporting information. This request for exemption would apply the requirements of 10 CFR 52, Appendix D, Section VIII.A.4 to allow changes to Tier 1 information due to the following proposed changes to the system-based design descriptions and ITAAC figures and tables:

- Figure 2.2.1-1, Containment System (CNS),
  - Rename the function of CNS containment penetration P08 from 'CVS - H2 Injection' to 'CVS - Zinc Injection,' and add CNS containment penetration P09 for CVS H2 Injection, with check valve CVS-PL-V217 inside containment and globe valve CVS-PL-V219 outside containment
  - Revise CVS-PL-V094 inboard containment isolation lift check valve type to AOV and add CVS-PL-V098 pressure relief valve
- Table 2.3.2-1
  - Add CVS-PL-V067 'Makeup Return Line Bypass Check Valve', and requirements
  - Change CVS-PL-V092 from 'Hydrogen Addition Line Containment Isolation Check Valve' to 'Zinc Injection Containment Isolation Valve ORC'
  - Change CVS-PL-V094 from 'Hydrogen Addition Line Containment Isolation Valve' to 'Zinc Injection Containment Isolation Valve IRC', and requirements for an AOV
  - Add CVS-PL-V098 Zinc Addition Line Ctmt Isol Thermal Relief Valve', and pressure relief valve requirements
  - Add CVS-PL-V217, Hydrogen Injection Containment Isolation Check Valve IRC, and check valve requirements, and add CVS-PL-V219, Hydrogen Injection Containment Isolation Valve ORC, and globe valve requirements
- Table 2.3.2-2
  - Add CVS Hydrogen Injection Containment Penetration Lines L213, L214, and L217 and requirements and change the description for Line L061 to 'CVS Zinc Injection Containment Penetration Line'
- Figure 2.3.2-1
  - Rename (from "H2 Addition" to "Zinc Addition") the input to CVS-PL-V092 and CVS-PL-V094, and connect the output from CVS-PL-V094 to the shell side inlet line of the Regenerative Heat Exchanger (RHX)
  - Add new hydrogen addition injection through globe valve CVS-PL-V219, then the containment penetration, then check valve CVS-PL-V217, and then connect to the RHX shell side output between CVS-PL-V080 and CVS-PL-V084

- Revise CVS-PL-V094 inboard containment isolation lift check valve type to AOV and add CVS-PL-V098 pressure relief valve

This request addresses the requirements for granting exemptions from design certification information, as specified in 10 CFR Part 52, Appendix D, Section VIII.A.4, and 10 CFR §§ 50.12, 52.7, and 52.63.

2.0 Background

SCE&G is the holder of Combined License (COL) Nos. NPF-93 and NPF-94, which authorize construction and operation of two Westinghouse Electric Company AP1000 nuclear plants, named Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3, respectively, hereafter identified as the Licensee. During the detailed design phase of the Chemical and Volume Control System (CVS), departures from AP1000 generic DCD Tier 2 information were determined necessary to improve the functionality of the system to accommodate effective use of zinc and hydrogen injection. Specifically, a change is proposed to revise the CVS by: (1) providing a spring-assisted check valve around the air-operated Reactor Coolant System (RCS) purification return line stop check valve, (2) replacing the CVS zinc addition inboard containment isolation lift check valve with an air-operated globe valve and adding a thermal relief valve, and (3) separating the zinc and hydrogen injection paths and relocating the zinc injection point. This activity requests exemption from the generic DCD Tier 1 tables and figures that support the system-based ITAAC to allow an accurate reflection of the proposed departures from the associated Tier 2 material.

An exemption from elements of the AP1000 certification (Tier 1) design information to allow a departure to tables and figures referenced in the containment system and chemical and volume control system system-based design descriptions and ITAAC is requested to maintain a consistent level of detail with that currently provided in Tier 1 of the plant-specific DCD.

3.0 Technical Justification of Acceptability

CVS Overpressure Protection

The CVS overpressure protection changes would provide a pressure relief valve in the bypass line around the air-operated RCS purification return line stop check valve. This change would credit two ASME Code Section III valves to maintain the flow isolation design function (UFSAR Subsection 9.3.6.3.7) and preserve the RCS pressure boundary safety function (UFSAR Subsection 5.2.1.3), as well as provide the engineering design function of regenerative heat exchanger (RHX) overpressure protection.

Isolation Valve Type change

The CVS isolation valve type change would replace the CVS zinc addition inboard containment isolation lift check valve with an air-operated globe valve (CVS-PL-V094) and add a thermal relief valve (CVS-PL-V098). This change will continue to allow zinc addition to the RCS, while supporting maintaining the ability to perform the flow isolation and containment isolation functions required of this configuration.

Separate Zinc and Hydrogen Injection Paths

This CVS change to separate the zinc and hydrogen injection paths and relocate the zinc injection point, including adding a new containment penetration for the hydrogen injection

path, provides a separate control and injection capability for hydrogen and zinc addition to better enable the achievement of historically identified benefits associated with zinc injection, such as corrosion reduction, pipe cracking mitigation, and dose reduction. This change will allow both batch and continuous injection methodologies for zinc and hydrogen at locations that are optimum for these additives, while maintaining the containment isolation function for both the current zinc injection path and the new hydrogen path.

As described in the Technical Evaluation in Section 2 of the associated License Amendment Request provided in Enclosure 1, the proposed departures to the CVS represent an enhancement in the nonsafety-related functions of zinc and hydrogen addition, while maintaining the safety-related functions associated with these portions of the CVS.

4.0 Justification of Exemption

10 CFR Part 52, Appendix D, Section VIII.A.4 and 10 CFR 52.63(b)(1) govern the issuance of exemptions from elements of the certified design information for AP1000 nuclear power plants. Because the Licensee has identified a need for plant-specific departures from the Tier 1 information related to the Chemical and Volume Control System (CVS) as a result of design finalization activities, an exemption to the certified design information in Tier 1 is needed.

10 CFR Part 52, Appendix D, and 10 CFR §§50.12, 52.7, and 52.63 state that the NRC may grant exemptions from the requirements of the regulations provided six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)(ii)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, App. D, VIII.A.4].

The requested exemption to change the design of the Chemical and Volume Control System (CVS) satisfies the criteria for granting specific exemptions, as described below.

1. **This exemption is authorized by law**

   The NRC has authority under 10 CFR §§50.12, 52.7, and 52.63 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR §§50.12 and 52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

   Accordingly, this requested exemption is "authorized by law," as required by 10 CFR 50.12(a)(1).

2. **This exemption will not present an undue risk to the health and safety of the public**

   The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the AP1000 certified (Tier 1) design information. The plant-specific Tier 1 DCD would continue to reflect the approved licensing basis for the Licensee and would maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the

plant-specific DCD. Because the changes to the CVS design do not represent any adverse impact to the containment design function, the containment would continue to protect the health and safety of the public in the same manner. Therefore, no adverse safety impact which would present any additional risk to the health and safety of the public is present. The affected ITAAC in the plant-specific Tier 1 DCD would also continue to provide the detail necessary to support their performance.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. **The exemption is consistent with the common defense and security**

   The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific Tier 1 DCD by departing from the AP1000 certified (Tier 1) design information. The exemption does not change the design, function, or operation of any plant equipment that is necessary to maintain a safe and secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures, systems, or equipment.

   Therefore, the requested exemption is consistent with the common defense and security.

4. **Special circumstances are present**

   10 CFR 50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, it is necessary for one of these special circumstances to be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR 50.12(a)(2)(ii). That subsection defines special circumstances as when "[a]pplication of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

   The rule under consideration in this request for exemption is 10 CFR 52, Appendix D, Section III.B, which requires that a licensee referencing the AP1000 Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The Licensee's COLs reference the AP1000 Design Certification Rule and incorporate by reference the requirements of 10 CFR Part 52, Appendix D.

   The proposed changes to the Chemical and Volume Control System facilitate operation by improving operability, reliability, and maintainability of the non-safety related functions while maintaining safety-related functions. Accordingly, this exemption from the certification information would continue to enable the Licensee to safely construct, maintain, and operate the AP1000 facility consistent with the underlying purpose of the design certified by the NRC in 10 CFR Part 52, Appendix D.

   Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. **The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption**

Based on the nature of the changes to the plant-specific Tier 1 information and the understanding that these changes are needed to support effective and reliable operation of the CVS, it is likely that this exemption would be requested by other AP1000 licensees. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the CVS and the Containment System (CNS) associated with this request would continue to be maintained. This exemption request and the associated marked-up tables and figure demonstrate that there is a minimal change from the generic AP1000 DCD, minimizing the reduction in standardization and consequently the safety impact from the reduction.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption.

6. **The design change will not result in a significant decrease in the level of safety.**

   The Licensee requests an exemption from the requirements of the generic DCD Tier 1 information, as incorporated into 10 CFR Part 52, Appendix D, by depicting the CVS design changes including an additional containment penetration in the appropriate Tier 1 figures and presenting these CVS changes and their key attributes in the applicable Tier 1 tables. The containment penetration and associated piping and valves are consistent in design and application with containment penetrations already approved as part of the DCD as documented in NUREG-1793 Section 6.2.4. A review of these design changes has determined that they will not have an adverse impact on the design functions associated with the CVS or CNS. Because there is no adverse impact on the design function of these structures, systems, or components, there is no reduction in the level of safety.

   Therefore, the design change will not result in a significant decrease in the level of safety.

5.0 Risk Assessment

A risk assessment was determined to be not applicable to address the acceptability of this request.

6.0 Precedent

This proposed change is consistent and identical in technical content with Southern Nuclear Operating Company License Amendment Requests LAR-13-002, identified as reference 1 of this letter, and LAR-13-002S, a supplement to the associated License Amendment Request, identified as Reference 2 to this letter.

Southern Nuclear Operating Company License Amendment Request LAR-13-002 was accepted for review by the Nuclear Regulatory Commission on February 13, 2013 (Adams Accession Number ML13037A116).

7.0 Environmental Consideration

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed exemption does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Specific justification is provided in Section 5 of the corresponding license amendment request provided in Enclosure 1. Accordingly, the proposed exemption meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed exemption.

8.0 Conclusion

The proposed changes to Tier 1 are necessary to revise the ITAAC referenced tables, and figures in the plant-specific Tier 1 DCD. The license amendment request associated with this proposed exemption revises the plant-specific DCD Tier 1 information by: (1) providing a pressure relief valve in the bypass line around the air-operated RCS purification return line stop check valve, (2) replacing the CVS zinc addition inboard containment isolation lift check valve with an air-operated globe valve and adding a thermal relief valve, and (3) separating the zinc and hydrogen injection paths and relocating the zinc injection point. The exemption request meets the requirements of 10 CFR 52.63, "Finality of design certifications," 10 CFR 52.7, "Specific exemptions," 10 CFR 50.12, "Specific exemptions," and 10 CFR 52 Appendix D, "Design Certification Rule for the AP1000." Specifically, the exemption request meets the criteria of 10 CFR 50.12(a)(1) in that the request is authorized by law, presents no undue risk to public health and safety, and is consistent with the common defense and security. Furthermore, approval of this request does not result in a significant decrease in the level of safety, presents special circumstances, does not present a significant decrease in safety as a result of a reduction in standardization, and meets the eligibility requirements for categorical exclusion.

9.0 References

1.) Westinghouse Electric Company, "AP1000 Design Control Document," Revision 19, June 2011.

2.) NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design."

South Carolina Electric & Gas Company

NND-13-0085

Enclosure 3

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3

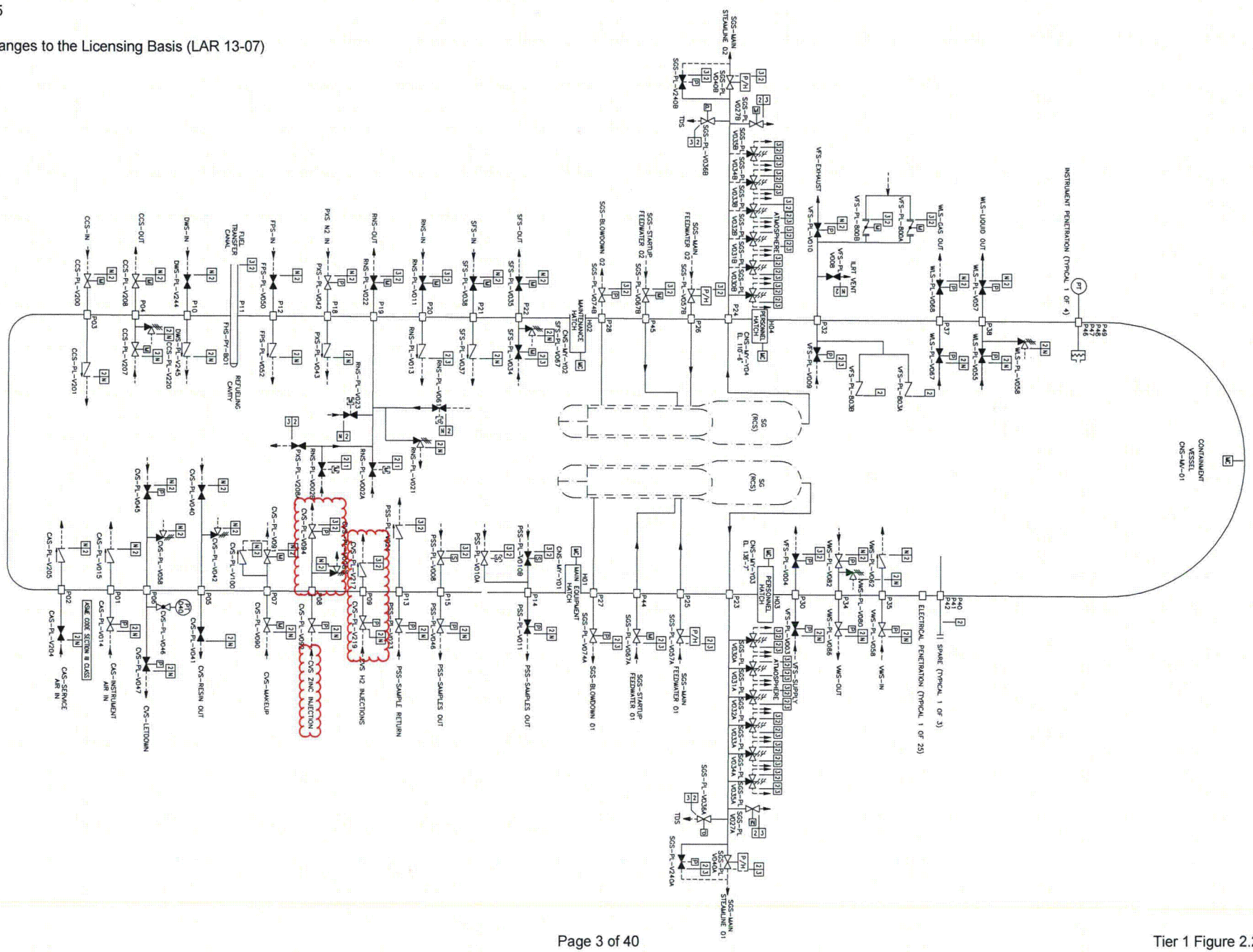
Proposed Changes to Licensing Basis Documents
(LAR 13-07)

(Note that the sheet numbers and the total number of sheets for the marked-up Tables provided in this Enclosure may be changed by the incorporation of this and other departures. These changes are considered editorial and do not require evaluation in this submittal.)

Tier 1 Figure 2.2.1-1

Containment System

See next page



NOTE: PENETRATION CONNECTIONS: TEST, DRAIN OR VENT ARE NOT WITHIN THE SCOPE OF THIS FIGURE.

Tier 1 Figure 2.2.1-1

Tier 1 Table 2.3.2-1

(This change also incorporated into VCSNS Units 2 and 3 COLs, Appendix C)

[Plant-specific DCD Tier 1, pg. 2.3.2-4]

[VCSNS Unit 2 COL, Appendix C, pg. C-189]

[VCSNS Unit 3 COL, Appendix C, pg. C-189]

Table 2.3.2-1 (cont.)

Equipment Name	Tag No.	ASME Code Section III	Seismic Cat. I	Remotely Operated Valve	Class 1E/ Qual. for Harsh Envir.	Safety-Related Display	Control PMS	Active Function	Loss of Motive Power Position
CVS Letdown Line Containment Isolation Thermal Relief Valve	CVS-PL-V058	Yes	Yes	No	- / -	-	-	Transfer Open/ Transfer Closed	-
CVS Makeup Return Line Bypass Check Valve	CVS-PL-V067	Yes	Yes	No	-/-	-	-	Transfer Open Transfer Closed	-
CVS Purification Return Line Pressure Boundary Check Valve	CVS-PL-V080	Yes	Yes	No	- / -	-	-	Transfer Closed	-
***									

Note: Dash (-) indicates not applicable.

Tier 1 Table 2.3.2-1

(This change also incorporated into VCSNS Units 2 and 3 COLs, Appendix C)

[Plant-specific DCD Tier 1, pg. 2.3.2-5]

[VCSNS Unit 2 COL, Appendix C, pg. C-189 and 190]

[VCSNS Unit 3 COL, Appendix C, pg. C-189 and 190]

Table 2.3.2-1 (cont.)									
Equipment Name	**Tag No.**	**ASME Code Section III**	**Seismic Cat. I**	**Remotely Operated Valve**	**Class 1E/ Qual. for Harsh Envir.**	**Safety-Related Display**	**Control PMS**	**Active Function**	**Loss of Motive Power Position**
CVS Makeup Line Containment Isolation Motor-operated Valve	CVS-PL-V091	Yes	Yes	Yes	Yes/Yes	Yes (Valve Position)	Yes	Transfer Closed	As Is
CVS ~~Hydrogen Addition Line~~ Zinc Injection Containment Isolation Valve ORC	CVS-PL-V092	Yes	Yes	Yes	Yes/No	Yes (Valve Position)	Yes	Transfer Closed	Closed
CVS ~~Hydrogen Addition Line~~ Zinc Injection Containment Isolation ~~Check~~ Valve IRC	CVS-PL-V094	Yes	Yes	~~No~~ Yes	~~-/-~~ Yes/Yes	- Yes (Valve Position)	- Yes	Transfer Closed	- Closed
CVS Zinc~~/Hydrogen~~ Addition Line Ctmt Isol Thermal Relief Valve	CVS-PL-V098	Yes	Yes	No	-/-	-	-	Transfer Open/ Transfer Closed	-
***									
CVS Demineralized Water Isolation Valve	CVS-PL-V136B	Yes	Yes	Yes	Yes/No	Yes (Valve Position)	Yes	Transfer Closed	Closed

Note: Dash (-) indicates not applicable.

Tier 1 Table 2.3.2-1

(This change also incorporated into VCSNS Units 2 and 3 COLs, Appendix C)

[Plant-specific DCD Tier 1, pg. 2.3.2-6]

[VCSNS Unit 2 COL, Appendix C, pg. C-190]

[VCSNS Unit 3 COL, Appendix C, pg. C-190]

Table 2.3.2-1 (cont.)

Equipment Name	Tag No.	ASME Code Section III	Seismic Cat. I	Remotely Operated Valve	Class 1E/ Qual. for Harsh Envir.	Safety-Related Display	Control PMS	Active Function	Loss of Motive Power Position
CVS Hydrogen Injection Containment Isolation Check Valve IRC	CVS-PL-V217	Yes	Yes	No	-/-	-	-	Transfer Closed	-
CVS Hydrogen Injection Containment Isolation Valve ORC	CVS-PL-V219	Yes	Yes	Yes	Yes/No	Yes (Valve Position)	Yes	Transfer Closed	Closed

Note: Dash (-) indicates not applicable.

Tier 1 Table 2.3.2-2

(This change is also incorporated into VCSNS Unit 2 and Unit 3 COLs, Appendix C)

[Plant-specific DCD Tier 1, pg. 2.3.2-6]

[VCSNS Unit 2 COL, Appendix C, pg. C-191]

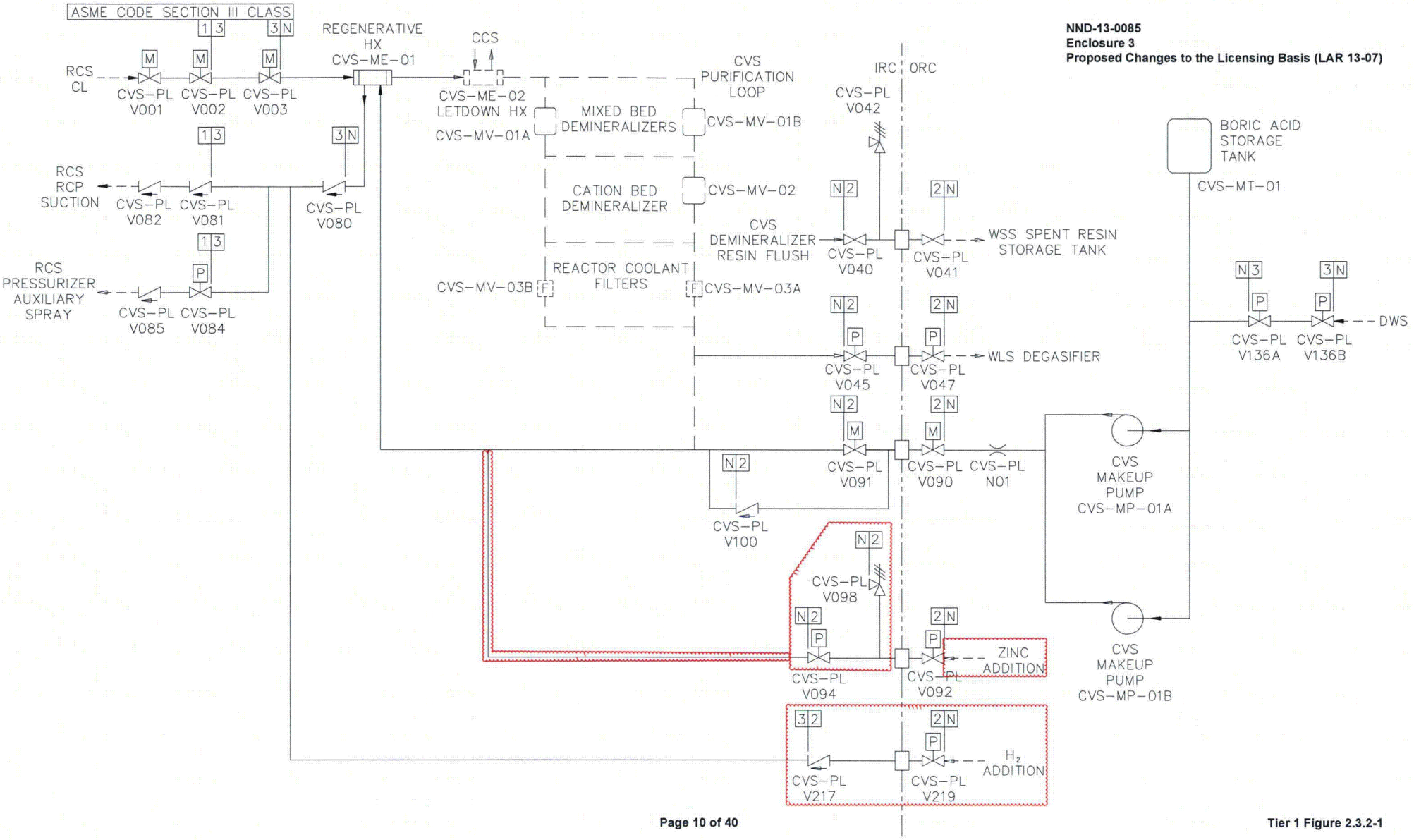
[VCSNS Unit 3 COL, Appendix C, pg. C-191]

Table 2.3.2-2		
Line Name	**Line Number**	**ASME Code Section III**
CVS Purification Line	L001 L040	Yes Yes
CVS Resin Flush Containment Penetration Line	L026	Yes
CVS Purification Line Return	L038	Yes
CVS Pressurizer Auxiliary Spray Connection	L070 L071	Yes Yes
CVS Letdown Containment Penetration Line	L051	Yes
CVS Makeup Containment Penetration Line	L053	Yes
CVS Hydrogen Injection Containment Penetration Line	L213 L214 L217	Yes
CVS Zinc Injection ~~Hydrogen Addition~~ Containment Penetration Line	L061	Yes
CVS Supply Line to Regenerative Heat Exchanger	L002	No
CVS Return Line from Regenerative Heat Exchanger	L018 L036 L073	No Yes No
CVS Line from Regenerative Heat Exchanger to Letdown Heat Exchanger	L003	No
CVS Lines from Letdown Heat Exchanger to Demin. Tanks	L004 L005 L072	No No No
***		

Tier 1 Figure 2.3.2-1

Chemical and Volume Control System

See next page



Tier 1 Figure 2.3.2-1

UFSAR Table 3.2-3 (Sheet 4 of 75)
AP1000 Classification of Mechanical and Fluid Systems, Components, and Equipment

Tag Number	Description	AP1000 Class	Seismic Category	Principal Con-struction Code	Comments
Chemical and Volume Control System (Continued)					
CVS-PL-V067	Makeup Return Line Bypass Check Valve	A	I	ASME III-1	
CVS-PL-V080	RCS Purification Return Line Check Valve	C	I	ASME III-3	
CVS-PL-V081	RCS Purification Return Line Stop Valve	A	I	ASME III-1	
CVS-PL-V082	RCS Purification Return Line Check Valve	A	I	ASME III-1	
CVS-PL-V084	Auxiliary Pressurizer Spray Line Isolation	A	I	ASME III-1	
CVS-PL-V085	Auxiliary Pressurizer Spray Line	A	I	ASME III-1	
CVS-PL-V090	Makeup Line Containment Isolation	B	I	ASME III-2	
CVS-PL-V091	Makeup Line Containment Isolation	B	I	ASME III-2	
CVS-PL-V092	~~Hydrogen Add~~ Zinc Injection Containment Isolation ORC	B	I	ASME III-2	
CVS-PL-V094	~~Hydrogen Add IRC Isolation~~ Zinc Injection Containment Isolation IRC	B	I	ASME III-2	
CVS-PL-V096	~~Hydrogen Add~~ Zinc Injection Containment Isolation Test Connection	B	I	ASME III-2	
CVS-PL-V098	Zinc~~/Hydrogen~~ Addition Line Containment Isolation Thermal Relief Valve	B	I	ASME III-2	
***					
Balance of system components are Class D or E					

UFSAR Table 3.2-3 (sheet 4 of 75)
AP1000 Classification of Mechanical and Fluid Systems, Components, and Equipment

Tag Number	Description	AP1000 Class	Seismic Category	Principal Con-struction Code	Comments
Chemical and Volume Control System (Continued)					
***					
CVS-PL-V100	Makeup Line Containment Isolation Relief	B	I	ASME III-2	
CVS-PL-V136A	Demineralized Water System Isolation	C	I	ASME III-3	
CVS-PL-V136B	Demineralized Water System Isolation	C	I	ASME III-3	
CVS-PL-V215	Hydrogen Injection – IRC Shutoff	C	I	ASME III-3	
CVS-PL-V216	Hydrogen Injection Containment Isolation Test Connection	C	I	ASME III-3	
CVS-PL-V217	Hydrogen Injection Containment Isolation Check IRC	B	I	ASME III-2	
CVS-PL-V218	Hydrogen Injection Containment Isolation Test Connection	B	I	ASME III-2	
CVS-PL-V219	Hydrogen Injection Containment Isolation ORC	B	I	ASME III-2	
CVS-PY-C01	Demineralizer Resin Flush Line Containment Penetration	B	I	ASME III, MC	
CVS-PY-C02	Letdown Line Containment Penetration	B	I	ASME III, 2	
CVS-PY-C03	Makeup Line Containment Penetration	B	I	ASME III, MC	
CVS-PY-C04	Zinc Add Line Containment Penetration	B	I	ASME III, 2	
CVS-PY-C045	Hydrogen Add Line Containment Penetration	B	I	ASME III, 2	
Balance of system components are Class D or E					

UFSAR Table 3.6-3 (Sheet 1 of 7)
NI Rooms with Pipe Whip Restraints and Corresponding Hazard Sources and Essential Targets

Room Number	Room Description	Pipe Whip Restraint	Hazard Source/Room	Essential Target Description/Room
11201	Steam Generator Compartment-01, Below the Lower Manway	PWR-RCS002	Reactor Coolant System (RCS)-Pressurizer Spray Line, 4" L110A: Terminal End Break at RCS Cold Leg L002A.	Raceways and cables. Passive Core Cooling System (PXS) containment level instrumentation. Steam Generator System (SGS) level instrumentation. RCS pressurizer instrumentation. Reactor coolant loop (RCL) (steam generator, pumps, hot leg, and cold legs) and branch line piping/valves.
		PWR-RCS003	RCS-Pressurizer Spray Line, 4" L106: Terminal End Break at RCS Cold Leg L002B.	Raceways and cables. PXS containment level instrumentation. SGS level instrumentation. RCS pressurizer instrumentation. RCL branch line piping/valves.
***				
11209 Chase	Pipe Chase to CVS Equipment Room	PWR-SGS004	SGS-Blowdown Line, 4" L009A: Terminal End Break at Containment Penetration P27.	SGS blowdown piping (L009B). CVS makeup piping (L056). CVS letdown piping (L049). CVS hydrogen supply piping (L~~062~~215). Liquid Radwaste System (WLS) containment sump piping (L072).

UFSAR Table 3.6-3 (Sheet 2 of 7)
NI Rooms with Pipe Whip Restraints and Corresponding Hazard Sources and Essential Targets

Room Number	Room Description	Pipe Whip Restraint	Hazard Source/Room	Essential Target Description/Room
		PWR-SGS008	SGS-Blowdown Line, 4" L009B: Terminal End Break at Containment Penetration P28.	CVS makeup piping (L056). CVS letdown piping (L049). CVS hydrogen supply piping (L~~062~~215).
		PWR-CVS056	CVS-Makeup Line, 3" L056: Terminal End Break at In-Line Anchor.	SGS blowdown piping (L009B). CVS makeup valve (CVS-V091), (Room 11300).
11300	Maintenance Floor	PWR CVS047 A/B	CVS-Letdown Line, 2" L049: Terminal End Break at inlet to Valve V059.	Raceways and cables (Rooms 11300 and 11400). SGS MB01 level instrumentation piping (Room 11400). CVS makeup valves (CVS-V091 and V100). CVS hydrogen supply valves (CVS-~~V065~~V215, ~~V094~~V216, ~~V095~~V217, and ~~V096~~V218). WLS containment sump valve (WLS-V055). RCS pressurizer instrumentation.
11301	Steam Generator Compartment-01, Lower Manway Area	PWR-RCS001 A/B	CVS-Makeup Line, 3" RCS L112, Terminal End Break at Steam Generator MB01.	Steam generator MB01 support. RCS Passive Residual Heat Removal (PRHR) Heat Exchanger (HX) return piping (L113).
		PWR-SGS003	SGS-SG Blowdown 4" SGS-L009A (Room 11401)	Raceways and cables (Room 11201). PXS containment level instrumentation (Room 11201). SGS level instrumentation (Room 11201). RCS pressurizer instrumentation (Room 11201). RCL (steam generator, pumps, hot leg, and cold legs) and branch line piping/valves (Room 11201). Steam generator MB01 support. RCS PRHR return piping (L113).

UFSAR Table 3.9-12 (Sheet 1 of 7)
List of ASME Class 1, 2, and 3 Active Valves

Valve No.	Description	Function[(a)]
Compressed Air System		
CAS-PL-V014	Instrument Air Supply Outside Containment Isolation	2
CAS-PL-V015	Instrument Air Supply Inside Containment Isolation Check Valve	2
CAS-PL-V205	Service Air Supply Inside Containment Isolation Check Valve	2
Component Cooling Water System		
CCS-PL-V200	Containment Isolation Valve – Inlet Line Isolation	2, 3
CCS-PL-V201	Containment Isolation Valve – Inlet Line Check Valve	2, 3
CCS-PL-V207	Containment Isolation Valve – Outlet Line Isolation	2, 3
CCS-PL-V208	Containment Isolation Valve – Outlet Line Isolation	2, 3
CCS-PL-V220	Containment Isolation Thermal Relief Valve	2
CCS-PL-V270	CCS IRC Relief Valve	3
CCS-PL-V271	CCS IRC Relief Valve	3
Chemical and Volume Control System		
CVS-PL-V001	Reactor Coolant System Purification Stop	1
***	***	***
CVS-PL-V045	Letdown Containment Isolation IRC	2
CVS-PL-V047	Letdown Containment Isolation ORC	2
CVS-PL-V058	Letdown Line Containment Isolation Relief	2
CVS-PL-V067	Makeup Return Line Bypass Check Valve	1
CVS-PL-V080	Reactor Coolant System Purification Return Line Check Valve	1
CVS-PL-V081	Reactor Coolant System Purification Return Line Stop Valve	1
CVS-PL-V082	Reactor Coolant System Purification Return Line Check Valve	1
CVS-PL-V084	Auxiliary Pressurizer Spray Line Isolation	1
CVS-PL-V085	Auxiliary Pressurizer Spray Line Check Valve	1
CVS-PL-V090	Makeup Line Containment Isolation	2
CVS-PL-V091	Makeup Line Containment Isolation	2
CVS-PL-V092	~~Hydrogen Add~~ Zinc Injection Containment Isolation Valve ORC	2
CVS-PL-V094	~~Hydrogen Add IRC Isolation Check~~ Zinc Injection Containment Isolation Valve IRC	2
CVS-PL-V098	Zinc~~/Hydrogen~~ Addition Line Containment Isolation Thermal Relief Valve	2
CVS-PL-V100	Makeup Line Containment Isolation Thermal Relief Check Valve	2
CVS-PL-V136A	Demineralized Water System Isolation	3
CVS-PL-V136B	Demineralized Water System Isolation	3
CVS-PL-V217	Hydrogen Injection Containment Isolation Check Valve IRC	2
CVS-PL-V219	Hydrogen Injection Containment Isolation Valve ORC	2

UFSAR Table 3.9-16 (Sheet 2 of 26)
Valve Inservice Test Requirements

Valve Tag Number	Description[1]	Valve/Actuator Type	Safety-Related Missions	Safety Functions[2]	ASME Class/ IST Category	Inservice Testing Type and Frequency	IST Notes
CVS-PL-V001	RCS Purification Stop	Remote MO GATE	Maintain Close Transfer Close	Active Safety Seat Leakage Remote Position	Class 1 Category B	Remote Position Indication, Exercise/2 Years RCS Isolation Leak Test/Refueling Exercise Full Stroke/Cold Shutdown Operability Test	6, 31, 32
CVS-PL-V002	RCS Purification Stop	Remote MO GATE	Maintain Close Transfer Close	Active Safety Seat Leakage Remote Position	Class 1 Category B	Remote Position Indication, Exercise/2 Years RCS Isolation Leak Test/Refueling Exercise Full Stroke/Cold Shutdown Operability Test	6, 31, 32
***							
CVS-PL-V041	Resin Flush ORC Isolation	Manual	Maintain Close	Containment Isolation Safety Seat Leakage	Class 2 Category A	Containment Isolation Leak Test	27
CVS-PL-V042	Flush Line Containment Isolation Relief	Relief	Maintain Close Transfer Open Transfer Close	Active Containment Isolation Safety Seat Leakage	Class 2 Category AC	Containment Isolation Leak Test Class 2/3 Relief Valve Tests/10 Years and 20% in 4 Years	27
CVS-PL-V045	Letdown Containment Isolation IRC	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test Exercise Full Stroke/Quarterly Failsafe Test/Quarterly Operability Test	27, 31
CVS-PL-V047	Letdown Containment Isolation ORC	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test Exercise Full Stroke/Quarterly Failsafe Test/Quarterly Operability Test	27, 31
CVS-PL-V058	Letdown Line Containment Isolation Relief	Relief	Maintain Close Transfer Open Transfer Close	Active Containment Isolation Safety Seat Leakage	AC	Containment Isolation Leak Test Class 2/3 Relief Valve Tests/ 10 Years and 20% in 4 years	27
CVS-PL-V067	Makeup Return Line Bypass Check Valve	Check	Maintain Close Transfer Open Transfer Close	Active Safety Seat Leakage	Class 1 Category C	Check Exercise/Cold Shutdown RCS Isolation Leak Test/Refueling	6, 32
CVS-PL-V080	RCS Purification Return Line Check Valve	Check	Maintain Close Transfer Close	Active Safety Seat Leakage	Class 3 Category C	Check Exercise/Cold Shutdown RCS Isolation Leak Test/Refueling	6, 32

UFSAR Table 3.9-16 (Sheet 3 of 26)
Valve Inservice Test Requirements

Valve Tag Number	Description[1]	Valve/Actuator Type	Safety-Related Missions	Safety Functions[2]	ASME Class/ IST Category	Inservice Testing Type and Frequency	IST Notes
CVS-PL-V081	RCS Purification Return Line Stop Valve	AO Stop Check	Maintain Close Transfer Close	Active Safety Seat Leakage	Class 1 Category C	Check Exercise/Cold Shutdown RCS Isolation Leak Test/Refueling	6, 8, 32
CVS-PL-V082	RCS Purification Return Line Check Valve	Check	Maintain Close Transfer Close	Active Safety Seat Leakage	Class 1 Category C	Check Exercise/Cold Shutdown RCS Isolation Leak Test/Refueling	6, 32
***							
CVS-PL-V085	Auxiliary Pressurizer Spray Line	Check	Maintain Close Transfer Close	Active Safety Seat Leakage	Class 1 Category C	Check Exercise/Cold Shutdown RCS Isolation Leak Test/Refueling	22, 32
CVS-PL-V090	Makeup Line Containment Isolation	Remote MO GATE	Maintain Close Transfer Close	Active Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test Exercise Full Stroke/Quarterly Operability Test	27, 31
CVS-PL-V091	Makeup Line Containment Isolation	Remote MO GATE	Maintain Close Transfer Close	Active Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test Exercise Full Stroke/Quarterly Operability Test	27, 31
CVS-PL-V092	~~Hydrogen Addition~~ Zinc Injection Containment Isolation ORC	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test Exercise Full Stroke/Quarterly Operation Failsafe Test/Quarterly Operation Operability Test	27, 31
CVS-PL-V094	~~Hydrogen Addition IRC~~ Zinc Injection Containment Isolation IRC	~~Check~~ Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A~~C~~	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test ~~Check Exercise/Quarterly Operation~~ Exercise Full Stroke /Quarterly Operation Operability Test Failsafe Test/Quarterly	27, 31
CVS-PL-V098	Zinc~~/Hydrogen~~ Addition Line Containment Isolation Thermal Relief Valve	Thermal Relief	Maintain Close Transfer Close Transfer Open	Active Containment Isolation Safety Seat Leakage	Class 2 Category AC	Containment Isolation Leak Test Class 2/3 Relief Valve Tests/10 Years and 20% in 4 years	27
CVS-PL-V100	Makeup Line Containment Isolation Relief	Check	Maintain Close Transfer Close Transfer Open	Active Containment Isolation Safety Seat Leakage	Class 2 Category AC	Containment Isolation Leak Test/2 Years Check Exercise/Refueling Shutdown	23, 27
CVS-PL-V136A	Demineralized Water System Isolation	Remote AO Butterfly	Maintain Close Transfer Close	Active-to-Failed Remote Position	Class 3 Category B	Remote Position Indication, Exercise/2 Years Exercise Full Stroke/Quarterly Failsafe Test/Quarterly Operability Test	31

UFSAR Table 3.9-16 (Sheet 4 of 26)
Valve Inservice Test Requirements

Valve Tag Number	Description[1]	Valve/Actuator Type	Safety-Related Missions	Safety Functions[2]	ASME Class/ IST Category	Inservice Testing Type and Frequency	IST Notes
CVS-PL-V136B	Demineralized Water System Isolation	Remote AO Butterfly	Maintain Close Transfer Close	Active-to-Failed Remote Position	Class 3 Category B	Remote Position Indication, Exercise/2 Years Exercise Full Stroke/Quarterly Failsafe Test/Quarterly Operability Test	31
CVS-PL-V217	Hydrogen Injection Containment Isolation Check IRC	Check	Maintain Close Transfer Close	Active Containment Isolation Safety Seat Leakage	Class 2 Category AC	Containment Isolation Leak Test Check Exercise/Quarterly Operation	27
CVS-PL-V219	Hydrogen Injection Containment Isolation ORC	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Containment Isolation Safety Seat Leakage Remote Position	Class 2 Category A	Remote Position Indication, Exercise/2 Years Containment Isolation Leak Test Exercise Full Stroke/Quarterly Operation Operability Test Failsafe Test/Quarterly	27, 31
DWS-PL-V244	Demineralized Water Supply Containment Isolation - Outside	Manual	Maintain Close	Containment Isolation Safety Seat Leakage	Class 2 Category A	Containment Isolation Leak Test	27
DWS-PL-V245	Demineralized Water Supply Containment Isolation - Inside	Check	Maintain Close Transfer Close	Active Containment Isolation Safety Seat Leakage	Class 2 Category AC	Containment Isolation Leak Test Exercise Full Stroke/Refueling Shutdown	27, 37
***							
MSS-PL-V002	Turbine Bypass Control Valve	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Remote Position	Non Code Category B	Remote Position Indication, Exercise/2 Years Exercise Full Stroke/Cold Shutdown Failsafe Test/Cold Shutdown Operability Test	29, 31, 34
MSS-PL-V003	Turbine Bypass Control Valve	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Remote Position	Non Code Category B	Remote Position Indication, Exercise/2 Years Exercise Full Stroke/Cold Shutdown Failsafe Test/Cold Shutdown Operability Test	29, 31, 34
MSS-PL-V004	Turbine Bypass Control Valve	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Remote Position	Non Code Category B	Remote Position Indication, Exercise/2 Years Exercise Full Stroke/Cold Shutdown Failsafe Test/Cold Shutdown Operability Test	29, 31, 34
MSS-PL-V005	Turbine Bypass Control Valve	Remote AO GLOBE	Maintain Close Transfer Close	Active-to-Failed Remote Position	Non Code Category B	Remote Position Indication, Exercise/2 Years Exercise Full Stroke/Cold Shutdown Failsafe Test/Cold Shutdown Operability Test	29, 31, 34

Notes:

1. Acronyms:

ADS	automatic depressurization system
CAS	compressed and instrument air system
CCS	component cooling water system
CVS	chemical and volume control system
DWS	demineralized water transfer and storage system
FPS	fire protection system
IRC	inside reactor containment
IRWST	in-containment refueling water storage tank
MSS	main steam system
MTS	main turbine system
ORC	outside reactor containment
PCCWST	passive containment cooling water storage tank
PCS	passive containment cooling system
PSS	primary sampling system
PWS	potable water system
PXS	passive core cooling system
RCS	reactor coolant system
RNS	normal residual heat removal system
SDS	sanitary drainage system
SFS	spent fuel pool cooling system
SGS	steam generator system
VBS	nuclear island nonradioactive ventilation system
VES	main control room emergency habitability system
VFS	containment air filtration system
VWS	central chilled water system
WLS	liquid radwaste system
AO	air operated
MO	motor operated
SO	solenoid operated

2. Valves listed as having an active or an active-to-failed safety-related function provide the safety-related valve transfer capabilities identified in the safety-related mission column. Valves having an active-to-failed function will transfer to the position identified in the safety-related mission column on loss of motive power. Valves with an active-to-failed function shall be tested by observing the operation of the actuator upon loss of valve actuating power. This "fail-safe" requirement is not otherwise shown and is performed during exercise testing.

3. This note applies to the ADS stage 1/2/3 valves (RCS-V001A/B, V002A/B, V003A/B, V011A/B, V012A/B, V013A/B). These valves are normally closed to maintain the RCS pressure boundary. These valves have a safety-related function to open following LOCAs to allow safety injection from lower pressure water supplies (accumulators and IRWST). These valves also have beyond design basis functions to depressurize the RCS. These valves have the same design pressure as the RCS and are AP1000 equipment class A. Downstream of the second valve is a lower design pressure and is equipment class C. The discharge of these valves is open to the containment through the IRWST.

   Both ADS valves in each line are normally closed during normal reactor operation in accordance with 10 CFR 50.2 and ANS/ANSI 51.1. If one of these valves is opened, for example for testing, the RCS pressure boundary is not maintained in accordance with the criteria contained in these two documents. In addition, the ADS valve configuration is similar to the normal residual heat removal system suction valve configuration. Even though the RNS suction valve configuration includes a third valve in the high pressure portion of the line, and the first two RNS valves have safety related functions to transfer closed, they are not stroke tested during normal reactor operation to avoid a plant configuration where the mispositioning of one valve would cause a LOCA. Note 15 describes the justification for testing the RNS valves during cold shutdown.

   These ADS valves are tested during cold shutdowns when the RCS pressure is reduced to atmospheric pressure so that mispositioning of a single valve during this IST will not cause a LOCA.

4. This note applies to the reactor vessel head vent solenoid valves (RCS-V150A/B/C/D). Exercise testing of these valves at power represents a risk of loss of reactor coolant and depressurization of the RCS if the proper test sequence is not followed. Such testing may also result in the valves developing through seal leaks. Exercise testing of these valves will be performed at cold shutdown.

5. This note applies to squib valves in the RCS and the PXS. The squib valve charge is removed and test fired outside of valve. Squib valves are not exercised for inservice testing. Their position indication sensors will be tested by local inspection.

6. This note applies to the CVS isolation valves (CVS-V001, V002, V003, V067, V080, V081, V082). Closing these valves at power will result in an undesirable temperature transient on the RCS due to the interruption of purification flow. Therefore, quarterly exercise testing will not be performed. Exercise testing will be performed at cold shutdown.

7. This note applies to the pressurizer safety valves (RCS-V005A/B) and to the main steam safety valves (SGS-V030A/B, V031A/B, V032A/B, V033A/B, V034A/B and V035A/B). Since these valves are not exercised for inservice testing, their position indication sensors are tested by local inspection without valve exercise.

8. This note applies to CVS valve (CVS-V081). The safety functions are satisfied by the check valve function of the valve.

9. This note applies to the PXS accumulator check valves (PXS-V028A/B, V029A/B). To exercise these valves, flow must be provided through these valves to the RCS. These valves are not exercised during power operations because the accumulators cannot provide flow to the RCS since they are at a lower pressure. In addition, providing flow to the RCS during power operation would cause undesirable thermal transients on the RCS. During cold shutdowns, a full flow stroke test is impractical because of the potential of adding significant water to the RCS, and lifting the RNS relief valve. There is also a risk of injecting nitrogen into the RCS. A partial stroke test is practical during longer cold shutdowns (≥48 hours in Mode 5). In this test, flow is provided from test connections, through the check valves and into the RCS. Sufficient flow is not available to provide a detectable obturator movement. Full stroke exercise testing of these valves is conducted during refueling shutdowns.

10. This note applies to the PXS CMT check valves (PXS-V016A/B, V017A/B). These check valves are biased open valves and are fully open during normal operation. In order to exercise these check valves, significant reverse flow must be provided from the DVI line to the CMT. These valves are not tested during power operations because the test would cause undesirable thermal transients on the portion of the line at ambient temperatures and change the CMT boron concentration These valves are not exercised during cold shutdowns because of changes that would result in the CMT boron concentration. Because this parameter is controlled by Technical Specifications, this testing is impractical. These valves are exercised during refueling when the RCS boron concentration is nearly equal to the CMT concentration and the plant is in a mode where the CMTs are not required to be available by the Technical Specifications.

11. This note applies to the PXS containment recirculation check valves (PXS-V119A/B). Squib valves in line with the check valves prevent the use of IRWST water to test the valves. To exercise these check valves an operator must enter the containment, remove a cover from the recirculation screens, and insert a test device (a mechanical exerciser) into the recirculation pipe to push open the check valve. The test device is made to interface with the valve without causing valve damage. The test device incorporates loads measuring sensors to measure the initial opening and full open force. These valves are not exercised during power operations because of the need to enter highly radioactive areas and because during this test the recirculation screen is bypassed. These valves are not exercised during cold shutdown operations for the same reasons. These valves are exercised during refueling conditions when the recirculation lines are not required to be available by Technical Specifications LCOs 3.5.7 and 3.5.8 and the radiation levels are reduced.

12. This note applies to the PXS IRWST injection check valves (PXS-V122A/B, V124A/B). To exercise these check valves a test cart must be moved into containment and temporary connections made to these check valves. In addition, the IRWST injection line isolation valves must have power restored and be closed. These valves are not exercised during power operations because closing the IRWST injection valve is not permitted by the Technical Specifications and the need to perform significant work inside containment. Testing is not performed during cold shutdown for the same reasons. These valves are exercised during refueling conditions when the IRWST injection lines are not required to be available by Technical Specifications and the radiation levels are reduced.

13. Deleted.

14. Component cooling water system containment isolation motor-operated valves CCS-V200, V207, V208 and check valve CCS-V201 are not exercised during power operation. Exercising these valves would stop cooling water flow to the reactor coolant pumps and letdown heat exchanger. Loss of cooling water may result in damage to equipment or reactor trip. These valves are exercised during cold shutdowns when these components do not require cooling water.

15. Normal residual heat removal system reactor coolant isolation motor-operated valves (RNS-V001A/B, V002A/B) are not exercised during power operation. These valves isolate the high pressure RCS from the low pressure RNS and passive core cooling system (PXS). Opening during normal operation may result in damage to equipment or reactor trip. These valves are exercised during cold shutdowns when the RNS is aligned to remove the core decay heat.

16. Normal residual heat removal system containment isolation motor-operated valves (RNS-V002A/B) are not containment isolation leak tested. The basis for the exception is:

    - The valve is submerged during post-accident operations which prevents the release of the containment atmosphere radiogas or aerosol.

    - The RNS is a closed, seismically-designed safety class 3 system outside containment

    - The valves are closed when the plant is in modes above hot shutdown

17. Not Used.

18. This note applies to the CAS instrument air containment isolation valves (CAS-V014, V015). It is not practical to exercise these valves during power operation or cold shutdowns. Exercising the valves during these conditions may result in some air-operated valves inadvertently opening or closing, resulting in plant or system transients. These valves are exercised during refueling conditions when system and plant transients would not occur.

19. Primary sampling system containment isolation check valve (PSS-V024) is located inside containment and considerable effort is required to install test equipment and cap the discharge line. Exercise testing is not performed during cold shutdown operations for the same reasons. These valves are exercised during refueling conditions when the radiation levels are reduced.

20. This note applies to the main steam isolation valves and main feedwater isolation valves (SGS-V040A/B, V057A/B). The valves are not full stroke tested quarterly at power since full valve stroking will result in a plant transient during normal power operation. Therefore, these valves will be full stroke tested on a cold shutdown frequency basis. The full stroke testing will be a full "slow" closure operation. The large size and fast stroking nature of the valve makes it advantageous to limit the number of fast closure operations which the valve experiences. The timed slow closure supports the continued operability status of the valves in the intervals between fast closure tests and ensures that the valve is not mechanically bound.

21. Post-72 hour check valves that require temporary connections for inservice-testing are exercised every refueling outage. These valves require transport and installation of temporary test equipment and pressure/fluid supplies. Since the valves are normally used very infrequently, constructed of stainless steel, maintained in controlled environments, and of a simple design, there is little benefit in testing them more frequently. For example, valve PCS-V039 is a simple valve that is opened to provide the addition of water to the PCS post-72 hour from a temporary water supply. To exercise the valve, a temporary pump and water supply is connected using temporary pipe and fittings, and the flowrate is observed using a temporary flow measuring device to confirm valve operation.

22. Exercise testing of the auxiliary spray isolation valve (CVS-V084, V085) will result in an undesirable temperature transient on the pressurizer due to the actuation of auxiliary spray flow. Therefore, quarterly exercise testing will not be performed. Exercise testing will be performed during cold shutdowns.

23. Thermal relief check valves in the normal residual heat removal suction line (RNS-V003A/B) and the Chemical and Volume Control System makeup line (CVS-V100) are located inside containment. To exercise test these valves, entry to the containment is required and temporary connections made to gas supplies. Because of the radiation exposure and effort required, this test is not conducted during power operation or during cold shutdowns. Exercise testing is performed during refueling shutdowns.

24. Normal residual heat removal system reactor coolant isolation check valves (RNS-V015A/B, V017A/B) are not exercise tested quarterly. During normal power operation these valves isolate the high pressure RCS from the low pressure RNS. Opening during normal operation would require a pressure greater than the RCS normal pressure, which is not available. It would also subject the RCS connection to undesirable transients. These valves will be exercised during cold shutdowns.

25. This note applies to the main feedwater control valves (SGS-V250A/B), moisture separator reheater 2nd stage steam isolation valve (MSS-V015A/B), turbine control valves (MTS-V002A/B, V004A/B). The valves are not quarterly stroke tested since full stroke testing would result in a plant transient during power operation. Normal feedwater and turbine control operation provides a partial stroke confirmation of valve operability. The valves will be full stroke tested during cold shutdowns.

26. This note applies to containment compartment drain line check valves (SFS-V071, SFS-V072, WLS-V071A/B/C, WLS-V072A/B/C). These check valves are located inside containment and require temporary connections for

exercise testing. Because of the radiation exposure and effort required, these valves are not exercised during power operation or during cold shutdowns. The valves will be exercised during refuelings.

27. Containment isolation valves leakage test frequency will be conducted in accordance with the "Primary Containment Leakage Rate Test Program" in accordance with 10 CFR 50 Appendix J. Refer to SSAR subsection 6.2.5.

28. This note applies to the chilled water system containment isolation valves (VWS-V058, V062, V082 and V086). Closing any of these valves stops the water flow to the containment fan coolers. This water flow may be necessary to maintain the containment air temperature within Technical Specification limits. As a result, quarterly exercise testing will be deferred when plant operating conditions and site climatic conditions would cause the containment air temperature to exceed this limit during testing.

29. Exercise testing of the turbine bypass control valves (MSS-V001, V002, V003, V004, V005 and V006) will result in an undesirable temperature transient on the turbine, condenser and other portions of the turbine bypass due to the actuation of bypass flow. Therefore, quarterly exercise testing will not be performed. Exercise testing will be performed during cold shutdowns.

30. This note applies to the passive residual heat removal heat exchanger discharge valves (PXS-V108A and V108B). Exercise and fail safe testing these valves on a 3-month frequency is not in the interest of plant safety due to the cooler water in the system line possibly creating a reactor transient. Opening these valves to the suction of the reactor coolant pumps aligns cold water to direct injection into the reactor core. Also, the thermal transient expected during this testing, on the discharge line, is expected to be severe due to the large temperature difference across the discharge valves. Quarterly IST will aggravate the thermal transient due to the operating temperature during the valve exercise testing and the number of times this thermal transient takes place. These valves will be full stroke exercise and fail safe tested during cold shutdown periods.

31. These valves are subject to operability testing per the requirements of 10 CFR 50.55a. The test frequencies are to be established in accordance with the results of the Joint Owners Group (JOG) program for periodic verification of design-basis capability of safety-related motor-operated valves (MOVs). Based on the composition of power-operated valves (POVs) in this table, the JOG approach shall be applied to all actuator types. POV risk ranking and functional margin are used to establish the recommended maximum periodic verification test (Operability) interval.

    These POVs (motor-operated, air-operated, solenoid-operated, and hydraulically-operated) shall be addressed in the owner's POV respective program-specific documents. Attributes of these programs shall include lessons learned as delineated in the NRC's Regulatory Issue Summary (RIS) 2000-3, "Resolution of Generic Safety Issue 158: Performance of Safety-Related Power-Operated Valves Under Design Basis Conditions." See subsection 3.9.6.2.2 for the factors to be considered in the evaluation of operability testing and subsection 3.9.8.4 for the Combined License information item.

32. These valves are subject to leak testing to support the nonsafety-related classification of the CVS purification subsystem inside containment. These valves are not included in the PIV integrity Technical Specification 3.4.16. The leakage through valves CVS-V001, CVS-V002, and CVS-V080 will be tested separately with a leakage limit of 1.5 gpm for each valve. The leakage through valves CVS-V067, ~~CVS-~~V081, V082, V084, and V085 will be tested at the same time as a group with a leakage limit of 1 gpm for the group. The leak tests will be performed at reduced RCS pressures. The observed leakage at lower pressures can be assumed to be the leakage at the maximum pressure as long as the valve leakage is verified to diminish with increasing pressure differential. Verification that the valves have the characteristic of decreasing leakage with pressure may be provided with two tests at different test pressures. The test requirements including the minimum test pressure and the difference between the test pressures will be defined by the Combined License applicant in the inservice test program as discussed in subsection 3.9.8.

33. This note applies to valve FHS-V001. This valve closes one end of the fuel transfer tube. The fuel transfer tube is normally closed by a flange except during refuelings. This valve has an active safety function to close when the fuel transfer tube flange is removed and normal shutdown cooling is lost. Closing this valve, along with other actions, provides containment closure which allows long term core cooling to be provided by the PXS. As a result this valve is only required to be operable during refueling operations.

34. This note applies to the moisture separator reheater 2nd stage steam isolation valve (MSS-V015A/B), turbine control valves (MTS-V002A/B, V004A/B), main turbine stop valves (MTS-V001A/B, V003A/B), the turbine bypass control valves (MSS-V001, V002, V003, V004, V005, V006). These valves are not ASME Code Class 1, 2, or 3, and the ASME 1ST Category is indicated based on the valve functions listed. These valves are relied on in the safety analyses for those cases in which the vent

UFSAR Table 3.11-1 (Sheet 18 of 51)
Environmentally Qualified Electrical and Mechanical Equipment

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Containment Isolation – Outlet	CCS-PL-V208	2	ESF	5 min	M S
Limit Switch	CCS-PL-V208-L	2	PAMS	2 wks	E
Motor Operator	CCS-PL-V208-M	2	ESF	5 min	E
CCS Containment Isolation Relief	CCS-PL-V220	1	ESF	24 hr	M *
CCS IRC Relief Valve	CCS-PL-V270	1	ESF	24 hr	M*
CCS IRC Relief Valve	CCS-PL-V271	1	ESF	24 hr	M*
RCS Purification Stop Valve	CVS-PL-V001	1	ESF	5 min	M *
Limit Switch	CVS-PL-V001-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V001-M	1	ESF	5 min	E *
RCS Purification Stop Valve	CVS-PL-V002	1	ESF	5 min	M *
Limit Switch	CVS-PL-V002-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V002-M	1	ESF	5 min	E *
RCS Letdown Stop Valve	CVS-PL-V003	1	ESF	5 min	M *
Limit Switch	CVS-PL-V003-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V003-M	1	ESF	5 min	E *
Demineralizer Flush Line Relief Valve	CVS-PL-V042	1	ESF	24 hr	M *
WLS Letdown IRC Isolation	CVS-PL-V045	1	ESF	5 min	M *
Limit Switch	CVS-PL-V045-L	1	PAMS	1 yr	E *
Solenoid Valve	CVS-PL-V045-S1	1	ESF	5 min	E *
Letdown Flow ORC Isolation	CVS-PL-V047	7	ESF	5 min	M S **
Limit Switch	CVS-PL-V047-L	7	PAMS	2 wks	E **
Solenoid Valve	CVS-PL-V047-S1	7	ESF	5 min	E **
Letdown Line Thermal Relief Valve	CVS-PL-V058	1	ESF	24 hr	M **
CVS Makeup Line Bypass Check Valve	CVS-PL-V067	1	ESF	5 min	M*
RCS Purification Check Valve	CVS-PL-V080	1	ESF	5 min	M *
RCS Purification Stop Valve	CVS-PL-V081	1	ESF	5 min	M *
RCS Purification Check Valve	CVS-PL-V082	1	ESF	5 min	M *
Auxiliary PZR Spray Isolation	CVS-PL-V084	1	ESF	5 min	M *
Limit Switch	CVS-PL-V084-L	1	PAMS	1 yr	E *
Solenoid Valve	CVS-PL-V084-S	1	ESF	5 min	E *
Auxiliary PZR Spray Isolation	CVS-PL-V085	1	ESF	5 min	M *
Makeup Line Containment Isolation	CVS-PL-V090	7	ESF	5 min	M S **
Limit Switch	CVS-PL-V090-L	7	PAMS	2 wks	E **
Motor Operator	CVS-PL-V090-M	7	ESF	5 min	E **

UFSAR Table 3.11-1
Environmentally Qualified Electrical and Mechanical Equipment

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Makeup Line Containment Isolation	CVS-PL-V091	1	ESF	5 min	M *
Limit Switch	CVS-PL-V091-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V091-M	1	ESF	5 min	E *
~~Hydrogen Addition~~ Zinc Injection Containment Isolation	CVS-PL-V092	10	ESF	5 min	M *
Limit Switch	CVS-PL-V092-L	10	PAMS	2 wks	E *
Solenoid Valve	CVS-PL-V092-S	10	ESF	5 min	E *
~~Hydrogen Addition~~ Zinc Injection Containment Isolation IRC	CVS-PL-V094	1	ESF	5 min	M *
Limit Switch	CVS-PL-V094-L	1	PAMS	1 yr	E*
Solenoid Valve	CVS-PL-V094-S	1	ESF	5 min	E*
Zinc~~/Hydrogen Addition Line~~ Injection Containment Isolation Thermal Overpressurization Relief Valve	CVS-PL-V098	1	ESF	24 hrs	M*
Makeup Containment Isolation	CVS-PL-V100	1	ESF	24 hrs	M *
***					
Demineralized Water System Isolation	CVS-PL-V136B	7	ESF	5 min	M **
Limit Switch	CVS-PL-V136B-L	7	PAMS	2 wks	E **
Solenoid Valve	CVS-PL-V136B-S	7	ESF	5 min	E **
Hydrogen Injection Cont Isolation Check IRC	CVS-PL-V217	1	PB	1 yr	M
Hydrogen Injection Containment Isolation	CVS-PL-V219	10	ESF	5 min	M*
Limit Switch	CVS-PL-V219-L	10	PAMS	2 wks	E*
Solenoid Valve	CVS-PL-V219-S	10	ESF	5 min	E*
Demin Water Supply Containment Isolation – Inside	DWS-PL-V245	1	PB	1 yr	M *
***					
Fire Water Containment Supply Isolation – Inside	FPS-PL-V052	1	PB	1 yr	M *

UFSAR Table 3.11-1 (Sheet 32 of 51)
Environmentally Qualified Electrical and Mechanical Equipment

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
PXS B To Sump	WLS-PL-V071 C	1	ESF	2 wks	M *
CVS To Sump	WLS-PL-V072 A	1	ESF	2 wks	M *
PXS A To Sump	WLS-PL-V072 B	1	ESF	2 wks	M *
PXS B To Sump	WLS-PL-V072 C	1	ESF	2 wks	M *
MISCELLANEOUS					
Non-Active Valves					
Containment Penetration Test Connection Isolation	CAS-PL-V027	1	PB	1 yr	M*
***					
Letdown PZR Instrument Root	CVS-PL-V046	7	PB	1 yr	M **
~~H2 Mkup Containment Isolation Thermal Relief Valve~~ Zinc Addition – IRC Shutoff	CVS-PL-V065	1	PB	1 yr	M *
~~Hydrogen~~ Zinc Add Cont Isolation Test Connection	CVS-PL-V095	1	PB	1 yr	M *
~~Hydrogen~~ Zinc Addition Containment Isolation Test Connection	CVS-PL-V096	1	PB	1 yr	M *
Hydrogen Injection – IRC Shutoff	CVS-PL-V215	1	PB	1 yr	M
Hydrogen Add Cont Isolation Test Connection	CVS-PL-V216	1	PB	1 yr	M
Hydrogen Add Cont Isolation Test Connection	CVS-PL-V218	1	PB	1 yr	M
Demin Water Supply Containment Isolation – Outside	DWS-PL-V244	10	PB	1 yr	M *
***					

UFSAR Table 3I.6-2 (Sheet 13 of 28)
List of Potential High Frequency Sensitive AP1000 Safety-Related Electrical and Electro-Mechanical Equipment

Description	AP1000 Tag Number
~~Hydrogen~~Zinc Addition Containment Isolation	
Limit Switch	CVS-PL-V092-L
Solenoid Valve	CVS-PL-V092-S
~~Hydrogen~~Zinc Addition IRC Isolation Valve	
Limit Switch	CVS-PL-V094-L
Solenoid Valve	CVS-PL-V094-S
Demineralizer Water System Isolation	
Limit Switch	CVS-PL-V136A-L
Solenoid Valve	CVS-PL-V136A-S
Demineralized Water System Isolation	
Limit Switch	CVS-PL-V136B-L
Solenoid Valve	CVS-PL-V136B-S
Hydrogen Injection Containment Isolation	
Limit Switch	CVS-PL-V219-L
Solenoid Valve	CVS-PL-V219-S
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V001A-L
Solenoid Valve	PCS-PL-V001A-S1
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V002B-L
Motor Operator	PCS-PL-V002B-M
***	

UFSAR Table 3I.6-3 (Sheet 3 of 32)
List of AP1000 Safety-Related Electrical and Mechanical Equipment Not High Frequency Sensitive

Description	AP1000 Tag Number	Comment
Penetrations		
Penetrations (Mechanical)		1
Penetrations (Electrical)		1
Active Valves		
Containment Isolation – Air Out	CAS-PL-V014	2
Containment Isolation – Air In	CAS-PL-V015	2
Containment Isolation – Inlet	CCS-PL-V200	2
Service Air Supply Inside Containment Isolation	CAS-PL-V205	2
***	***	***
CCS IRC Relief Valve	CCS-PL-V270	2
CCS IRC Relief Valve	CCS-PL-V271	2
RCS Purification Stop Valve	CVS-PL-V001	2
RCS Purification Stop Valve	CVS-PL-V002	2
RCS Letdown Stop Valve	CVS-PL-V003	2
Demineralizer Flush Line Relief Valve	CVS-PL-V042	2
WLS Letdown IRC Isolation	CVS-PL-V045	2
Letdown Flow ORC Isolation	CVS-PL-V047	2
CVS Makeup Line Bypass Check Valve	CVS-PL-V067	2
RCS Purification Check Valve	CVS-PL-V080	2
***	***	***
Auxiliary PZR Spray Isolation	CVS-PL-V085	2
Makeup Line Containment Isolation	CVS-PL-V090	2
Makeup Line Containment Isolation	CVS-PL-V091	2

UFSAR Table 3I.6-3 (Sheet 4 of 32)
List of AP1000 Safety-Related Electrical and Mechanical Equipment Not High Frequency Sensitive

Description	AP1000 Tag Number	Comment
~~Hydrogen~~Zinc Addition Containment Isolation	CVS-PL-V092	2
~~Hydrogen~~Zinc Addition Containment Isolation	CVS-PL-V094	2
~~Hydrogen Addition Containment Isolation~~	~~CVS-PL-V092~~	~~2~~
~~Hydrogen Addition Containment Isolation~~	~~CVS-PL-V094~~	~~2~~
Zinc Injection Containment Isolation Thermal Overpressurization Relief Valve	CVS-PL-V098	2
Makeup Containment Isolation	CVS-PL-V100	2
Demineralizer Water System Isolation	CVS-PL-V136A	2
Demineralized Water System Isolation	CVS-PL-V136B	2
Hydrogen Injection Containment Isolation Check Valve	CVS-PL-V217	2
Hydrogen Injection Containment Isolation	CVS-PL-V219	2
Demin Water Supply Containment Isolation – Inside	DWS-PL-V245	2
Fuel Transfer Tube Gate Valve	FHS-PL-V001	2
Fire Water Containment Supply Isolation – Inside	FPS-PL-V052	2
PCCWST Isolation Valve	PCS-PL-V001A	2
PCCWST Isolation Valve	PCS-PL-V001B	2
PCCWST Isolation Valve	PCS-PL-V001C	2
PCCWST Isolation Valve	PCS-PL-V002A	2
PCCWST Isolation Valve	PCS-PL-V002B	2
***		
Water Bucket Makeup Line Isolation Valve	PCS-PL-V020	2
PCS Recirculation Isolation	PCS-PL-V023	2
PCCWST Long-Term Makeup Check Valve	PCS-PL-V039	2
PCCWST Long Term Makeup Isolation Drain Valve	PCS-PL-V042	2
PCCWST Long Term Makeup Isolation Valve	PCS-PL-V044	2
Emergency Makeup to the Spent Fuel Pool Isolation Valve	PCS-PL-V045	2

UFSAR Table 3I.6-3 (12 of 32)
List of AP1000 Safety-Related Electrical and Mechanical Equipment Not High Frequency Sensitive

Description	AP1000 Tag Number	Comment
PXS B To Sump	WLS-PL-V071 C	2
CVS To Sump	WLS-PL-V072 A	2
PXS A To Sump	WLS-PL-V072 B	2
PXS B To Sump	WLS-PL-V072 C	2
Miscellaneous		
Nonactive Valves		
Containment Penetration Test Connection Isolation	CAS-PL-V027	2
Service Air Supply Outside Containment Isolation	CAS-PL-V204	2
***		
Resin Flush IRC Isolation	CVS-PL-V040	2
Resin Flush ORC Isolation	CVS-PL-V041	2
Letdown PZR Instrument Root	CVS-PL-V046	2
~~H2 Mkup Containment Isolation Thermal Relief Valve~~ Zinc Addition – IRC Shutoff	CVS-PL-V065	2
~~Hydrogen~~ Zinc Add Cont Isolation Test Connection	CVS-PL-V095	2
~~Hydrogen~~ Zinc Addition Containment Isolation Test Connection	CVS-PL-V096	2
Hydrogen Injection Containment Isolation Test Connection Valve	CVS-PL-V218	2
Demin Water Supply Containment Isolation – Outside	DWS-PL-V244	2
Containment Penetration Test Connection Isolation	DWS-PL-V248	2
Fire Water Containment Test Connection Isolation	FPS-PL-V049	2
Fire Water Containment Supply Isolation	FPS-PL-V050	2

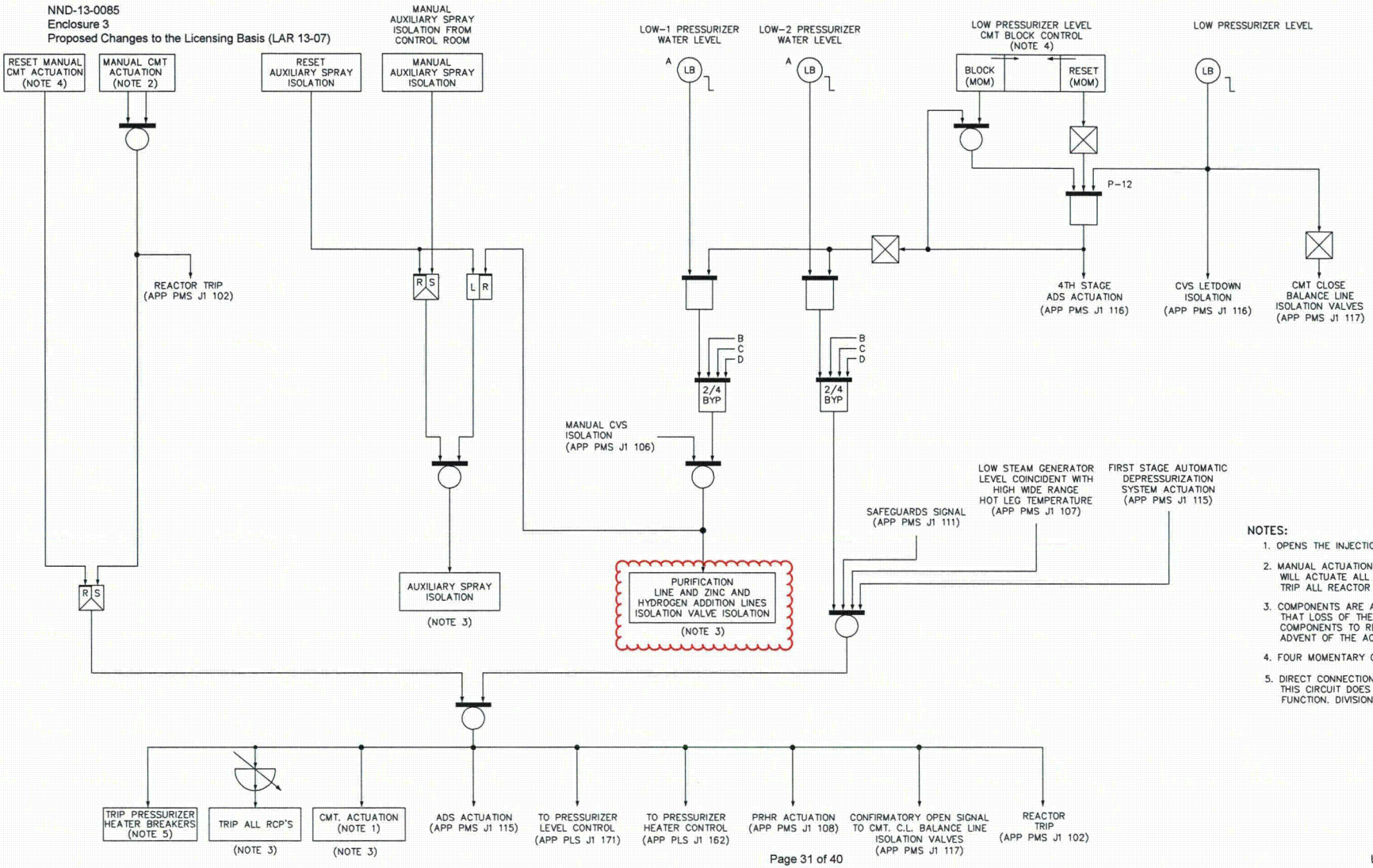
UFSAR Table 6.2.3-1 (Sheet 1 of 4)
Containment Mechanical Penetrations and Isolation Valves

System	Containment Penetration			Isolation Device						Test		
	Line	Flow	Closed Sys IRC	Valve/Hatch Identification	Pipe Length	DCD Subsection	Position N-S-A	Signal	Closure Times	Type[1] & Note	Medium	Direction
CAS	Service air in	In	No	CAS-PL-V204 CAS-PL-V205	9 -	9.3.1	C-O-C C-O-C	None None	N/A N/A	C,5	Air	Forward
	Instrument air in	In	No	CAS-PL-V014 CAS-PL-V015	9 -	9.3.1	O-O-C O-O-C	T None	d. N/A	C,5	Air	Forward
***												
CVS	Spent resin flush out	Out	No	CVS-PL-V041 CVS-PL-V040 CVS-PL-V042	19 - 21	9.3.6	C-C-C C-C-C C-C-C	None None None	N/A N/A N/A	C	Air	Forward
	Letdown	Out	No	CVS-PL-V047 CVS-PL-V045 CVS-PL-V058	36 - -	9.3.6	C-O-C C-O-C C-C-C	T T None	std. std. N/A	C	Air	Forward Forward Reverse
	Charging	In	No	CVS-PL-V090 CVS-PL-V091 CVS-PL-V100	31 - -	9.3.6	C-O-C C-O-C C-C-C	HR, PL2, S+PL1, SGL HR, PL2, S+PL1, SGL None	std. std. N/A	C	Air	Forward
	~~H2~~ Zinc injection to RCS	In	No	CVS-PL-V092 CVS-PL-V094 CVS-PL-V098	2~~2~~8 -	9.3.6	O-C-C ~~C~~O-C-C C-C-C	T ~~None~~ T, S None	std. ~~N/A~~ std, N/A	C	Air	Forward
	Hydrogen injection to RCS	In	No	CVS-PL-V219 CVS-PL-V217	22	9.3.6	O-C-C O-C-C	T None	std, N/A	C	Air	Forward
DWS	Demin. water supply	In	No	DWS-PL-V244 DWS-PL-V245	28 -	9.2.4	C-O-C C-O-C	None None	N/A N/A	C,5	Air	Forward
***												
PSS	RCS/PSX/CVS samples out	Out	No	PSS-PL-V011 PSS-PL-V010A,B	13 -, -	9.3.3	C-C-C C-C-C	T T	std. std.	C	Air	Forward
	Cont. air samples out	Out	No	PSS-PL-V046 PSS-PL-V008	13 -	9.3.3	O-C-C O-C-C	T T	std. std.	C	Air	Forward
	RCS/Cont. air sample return	In	No	PSS-PL-V023 PSS-PL-V024	16 -	9.3.3	O-C-C O-C-C	T None	std. N/A	C	Air	Forward

UFSAR Figure 7.2-1 (Sheet 12 of 21)

Functional Diagram
Core Makeup Tank Actuation

See next page



NOTES:

1. OPENS THE INJECTION ISOLATION VALVES.
2. MANUAL ACTUATION OF EITHER OF TWO MOMENTARY CONTROLS WILL ACTUATE ALL DIVISIONS OF CORE MAKEUP TANKS AND TRIP ALL REACTOR COOLANT PUMPS.
3. COMPONENTS ARE ALL INDIVIDUALLY SEALED IN (LATCHED), SO THAT LOSS OF THE ACTUATION SIGNAL WILL NOT CAUSE THESE COMPONENTS TO RETURN TO THE CONDITION HELD PRIOR TO THE ADVENT OF THE ACTUATION SIGNAL.
4. FOUR MOMENTARY CONTROLS, ONE FOR EACH DIVISION.
5. DIRECT CONNECTION TO PRESSURIZER HEATER BREAKERS. THIS CIRCUIT DOES NOT PERFORM A SAFETY RELATED FUNCTION. DIVISION A ONLY.

UFSAR Figure 7.2-1 (Sheet 12 of 21)

UFSAR Table 7.3-2 (Sheet 3 of 4)
Interlocks for Engineered Safety Features Actuation System

Designation	Derivation	Function
P-12	Pressurizer level below setpoint	(a) Permits manual block of core makeup tank actuation on low pressurizer level to allow mid-loop operation (b) Permits manual block of reactor coolant pump trip on low pressurizer level to allow mid-loop operation (c) Permits manual block of auxiliary spray and purification line isolation, and zinc~~/hydrogen~~ and hydrogen addition ~~IRC~~ isolation valves isolation on low pressurizer level to allow mid-loop operation (d) Coincident with manual action of (a), automatically unblocks fourth stage automatic depressurization system initiation on low hot leg level to provide protection during mid-loop operation. (e) Automatically unblocks chemical and volume control system letdown isolation on Low-1 hot leg level
$\overline{\text{P-12}}$	Pressurizer level above setpoint	(a) Prevents manual block of core makeup tank actuation on low pressurizer level (b) Prevents manual block of reactor coolant pump trip on low pressurizer level (c) Prevents manual block of auxiliary spray and purification line isolation, and zinc~~/hydrogen~~ and hydrogen addition ~~IRC~~ isolation valves isolation on low pressurizer level (d) Provides confirmatory open signal to the core makeup tank cold leg balance lines (e) Automatically blocks fourth stage automatic depressurization system initiation on low hot leg level to reduce the probability of spurious actuation. (f) Permits manual block of chemical and volume control system letdown isolation on Low-1 hot leg level

UFSAR Section 9.3.6.3.7, Chemical and Volume Control System Valves

(Page 9.3-28)

Hydrogen Addition Containment Isolation Valve

***

Makeup Line Containment Isolation Valves

These normally open, motor-operated globe valves provide containment isolation of the chemical and volume control system makeup line and automatically close on a high-2 pressurizer level, high steam generator level, or high-2 containment radiation signal from the protection and safety monitoring system. The valves close on a source range flux doubling signal to terminate possible unplanned boron dilution events. The valves also close on a safeguards actuation signal coincident with high-1 pressurizer level. This allows the chemical and volume control system to continue providing reactor coolant system makeup flow, if the makeup pumps are operating following a safeguards actuation signal. These valves are also controlled by the reactor makeup control system and close when makeup to other systems is provided. Manual control is provided in the main control room and at the remote shutdown workstation.

Hydrogen Addition Containment Isolation Valves

~~This~~ The outside reactor containment valve is a normally open, fail closed, air-operated globe valve, which provides ~~is located outside~~ containment isolation of ~~in~~ the hydrogen addition line. The inside reactor containment valve is a check valve that supports containment isolation but has no control function. The air-operated valve automatically closes on a containment isolation signal from the protection and safety monitoring system. The air-operated valve also automatically closes on a low-1 pressurizer level signal from the protection and safety monitoring system to preserve the reactor coolant pressure boundary and to prevent uncovering of the heater elements in the pressurizer. Manual control is provided in the main control room and at the remote shutdown workstation.

Zinc Addition Containment Isolation Valves

The normally open, fail closed, air-operated globe valves provide containment isolation of the zinc addition line. The valves automatically close on a containment isolation signal from the protection and safety monitoring system. The valve located inside containment also automatically closes on a low-1 pressurizer level signal from the protection and safety monitoring system to preserve the reactor coolant pressure boundary and to prevent uncovering of the heater elements in the pressurizer. Manual control for both valves is provided in the main control room and at the remote shutdown workstation.

Demineralized Water System Isolation Valves

These normally open, air-operated butterfly valves are located outside containment in the line from the demineralized water storage and transfer system. These valves close on a signal from the protection and safety monitoring system derived by either a reactor trip signal, a source range flux doubling signal, low input voltage (loss of ac power) to the 1E dc and uninterruptable power supply system battery chargers, or a safety injection signal, isolating the demineralized water source to prevent inadvertent boron dilution events. Manual control for these valves is provided from the main control room and at the remote shutdown workstation.

***

UFSAR Section 9.3.6.3.7, Chemical and Volume Control System Valves

New Paragraph

(Page 9.3-29)

Hydrogen Addition Line Relief Valve

***

Resin Sluice Line Relief Valve

A relief valve is provided to prevent overpressurization of the line that is used to sluice resin from the mixed bed and cation bed demineralizers to the waste processing system. The set pressure of this relief valve is equal to the design pressure of the line it is connected to which is equal to the design pressure of the CVS purification equipment inside containment. The relief capacity is sufficient to accommodate thermal expansion of the water that is trapped between the two containment isolation valves that might occur following an accident that results in heatup of the containment.

Zinc Addition Line Relief Valve

A relief valve is provided to prevent overpressurization of the zinc addition line. The set pressure of this relief valve is equal to the design pressure of the line it is connected to, which is equal to the design pressure of the chemical and volume control system purification equipment inside containment. The relief capacity is sufficient to accommodate thermal expansion of the water that is trapped between the two containment isolation valves, which might occur following an accident that results in heatup of the containment.

***

UFSAR Section 9.3.6.7, Instrumentation Requirements

(Page 9.3-35)

***

The instrumentation also supplies input signals for control purposes to maintain proper system operation and to prevent equipment damage. Some specific control functions are listed below:

- **Purification isolation** – To preserve the reactor coolant pressure boundary in the event of a break in the chemical and volume control system loop piping. The purification stop valves, the zinc addition line valve inside containment, and the hydrogen addition line valve outside containment close automatically on a signal from the protection and safety monitoring system generated by a low-1 pressurizer level signal. This isolation also serves as an equipment protection function to prevent uncovering of the heater elements in the pressurizer. One of these valves also closes on high temperature downstream of the letdown heat exchanger, to protect the resin in the mixed bed and cation demineralizers from being exposed to temperatures that could damage the resins.

- **Containment isolation** – To preserve the containment boundary, containment isolation valves are provided in the letdown line to the liquid radwaste system, the chemical and volume control system makeup line, and the hydrogen and zinc addition lines. These valves are opened or closed manually from the main control room and the remote shutdown workstation. Interlocks are provided to close these valves automatically upon receipt of a containment isolation signal from the protection and safety monitoring system and require operator action to reopen.

***

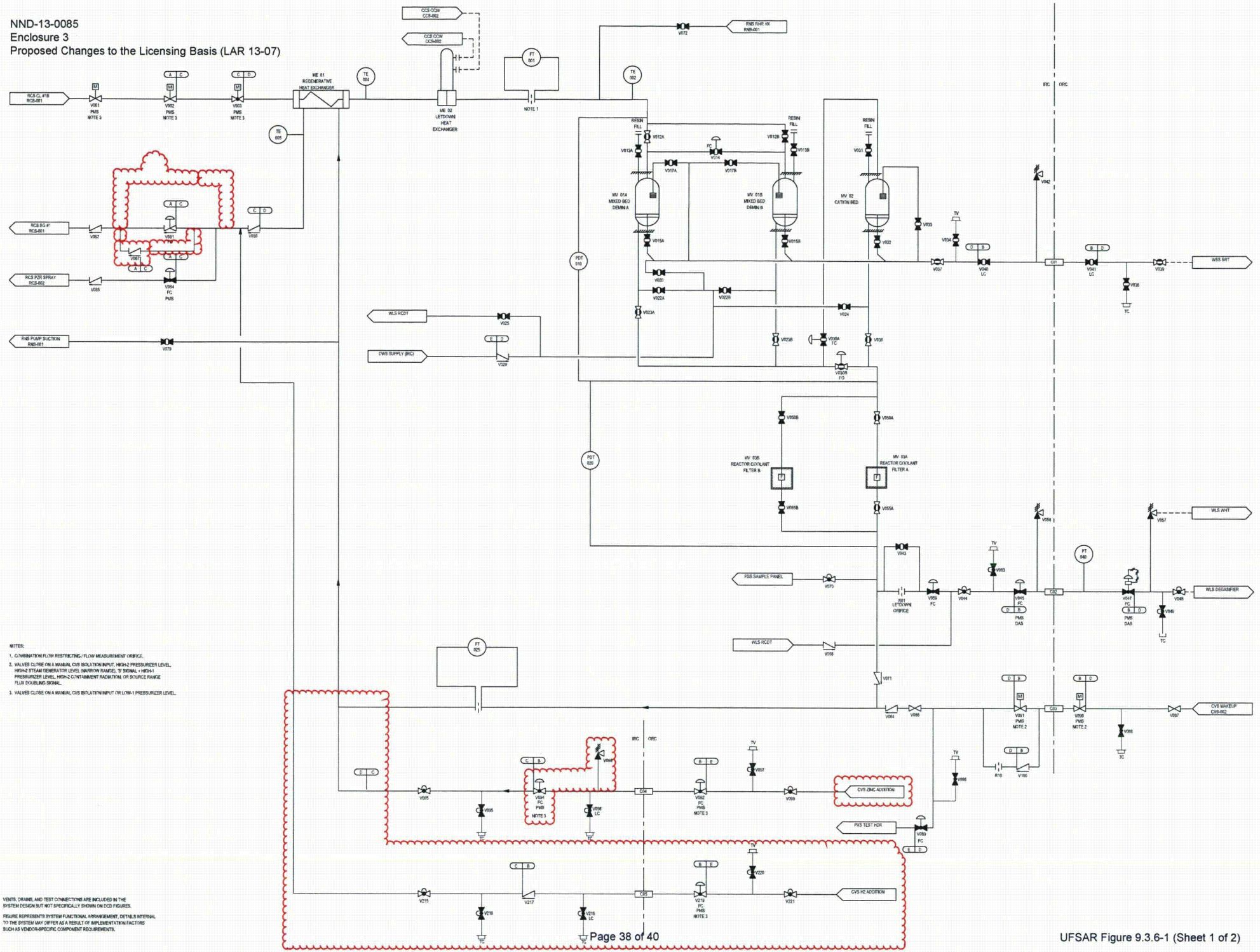
UFSAR Table 9.3.1-1 (Sheet 1 of 2)
Safety-Related Air-Operated Valves

Valve Number	Normal/Failure Position	Function
Compressed and Instrument Air System (CAS)		
CAS-PL-V014	NO/FC	Instrument Air Supply Outside Containment Isolation
Chemical and Volume Control System (CVS)		
CVS-PL-V045	NC/FC	Letdown Containment Isolation IRC
CVS-PL-V047	NC/FC	Letdown Containment Isolation ORC
CVS-PL-V084	NC/FC	Auxiliary Pressurizer Spray Line Isolation
CVS-PL-V092	NO/FC	~~Hydrogen Addition~~ Zinc Injection Containment Isolation ORC
CVS-PL-V094	NO/FC	Zinc Injection Containment Isolation Valve IRC
CVS-PL-V136A	NO/FC	Demineralized Water System Isolation
CVS-PL-V136B	NO/FC	Demineralized Water System Isolation
CVS-PL-V219	NO/FC	Hydrogen Injection Containment Isolation
Passive Containment Cooling System (PCS)		
PCS-PL-V001A	NC/FO	Passive Containment Cooling Water Storage Tank Isolation
PCS-PL-V001B	NC/FO	Passive Containment Cooling Water Storage Tank Isolation
***		
Passive Core Cooling System (PXS)		
PXS-PL-V014A	NC/FO	Core Makeup Tank A Discharge Isolation
PXS-PL-V014B	NC/FO	Core Makeup Tank B Discharge Isolation
PXS-PL-V015A	NC/FO	Core Makeup Tank A Discharge Isolation
PXS-PL-V015B	NC/FO	Core Makeup Tank B Discharge Isolation
PXS-PL-V042	NO/FC	Nitrogen Supply Containment Isolation ORC
PXS-PL-V108A	NC/FO	Passive Residual Heat Removal Heat Exchanger Control
PXS-PL-V108B	NC/FO	Passive Residual Heat Removal Heat Exchanger Control
PXS-PL-V130A	NO/FC	In-Containment Refueling Water Storage Tank Gutter Isolation
PXS-PL-V130B	NO/FC	In-Containment Refueling Water Storage Tank Gutter Isolation

UFSAR Figure 9.3.6-1 (Sheet 1 of 2)

Simplified Chemical and Volume Control System Piping and Instrumentation (REF) CVS 001

See next Page



NOTES:

1. COMBINATION FLOW RESTRICTING / FLOW MEASUREMENT ORIFICE.
2. VALVES CLOSE ON A MANUAL CVS ISOLATION INPUT, HIGH-2 PRESSURIZER LEVEL, HIGH-2 STEAM GENERATOR LEVEL (NARROW RANGE), 'S' SIGNAL + HIGH-1 PRESSURIZER LEVEL, HIGH-2 CONTAINMENT RADIATION, OR SOURCE RANGE FLUX DOUBLING SIGNAL.
3. VALVES CLOSE ON A MANUAL CVS ISOLATION INPUT OR LOW-1 PRESSURIZER LEVEL.

VENTS, DRAINS, AND TEST CONNECTIONS ARE INCLUDED IN THE SYSTEM DESIGN BUT NOT SPECIFICALLY SHOWN ON DCD FIGURES.

FIGURE REPRESENTS SYSTEM FUNCTIONAL ARRANGEMENT. DETAILS INTERNAL TO THE SYSTEM MAY DIFFER AS A RESULT OF IMPLEMENTATION FACTORS SUCH AS VENDOR-SPECIFIC COMPONENT REQUIREMENTS.

UFSAR Figure 9.3.6-1 (Sheet 1 of 2)

UFSAR Table 9A-2 (Sheet 2 of 14)
Safe Shutdown Components

Fire Area/ Fire Zone	System	Description	Class 1E Division			
			A	C	B	D
1000 AF 01/ 1100 AF 11300A	PSS	Containment Air Sample Cont. Isolation Valve			V008	
		Liquid Sample Line Cont. Isolation Valve			V010A	V010B
	RCS	Hot Leg 2 Flow			FT-102B	FT-102D
	VFS	Containment Purge Discharge Cont. Isolation Valve				V009
	VFS	Containment Purge Inlet Cont. Isolation Valve				V004
	PXS	IRWST Level			LT-046	LT-048
		IRWST Gutter Isolation Valve			V130A	V130B
		Core Makeup Tank (MT-02A)				
	SGS	Steam Generator 2 Wide Range Level			LT-014	LT-018
1000 AF 01/ 1100 AF 11300B	CCS	Outlet Line Cont. Isolation Valve	V207			
	CVS	Letdown Containment Isolation Valve	V045			
		Makeup Line Cont. Isolation Valve	V091			
		RCS Purification Stop Valve (RCPB)	V001	V002		
		Zinc Injection Cont. Isolation Valve	V094			

UFSAR Table 9A-2 (Sheet 10 of 14)
Safe Shutdown Components

Fire Area/ Fire Zone	System	Description	Class 1E Division			
			A	C	B	D
1201 AF 03	IDSD	250 Vdc MCC				DK-1
		Electrical Penetration				EY-P14Z
		Electrical Penetration				EY-P15Y
		Electrical Penetration				EY-P16Z
1201 AF 04	IDS	Class 1E Cable Trays				Note 1
	CAS	Instrument Air Supply Cont. Isolation Valve				V014
	CCS	Inlet Line Cont. Isolation Valve				V200
	CCS	Outlet Line Cont. Isolation Valve				V208
	PXS	Nitrogen Supply Cont. Isolation Valve				V042
		***				
	SGS	SG 1 Steam Line Pressure			PT-031	PT-033
		SG 1 Startup Feedwater Flow			FT-055A	FT-055B
		SG 2 Steam Line Pressure			PT-035	PT-037
		SG 2 Startup Feedwater Flow			FT-056A	FT-056B
1201 AF 05	CVS	Hydrogen Addition Cont. Isolation Valve				~~V092~~V219
		~~Hydrogen Addition~~Zinc Injection Cont. Isolation Valve				V092
	SGS	Steam Gen. Blowdown Cont. Isolation Valve			V075A	V074A
		Steam Gen. Blowdown Cont. Isolation Valve			V074B	V075B