Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 412-374-5005
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP/NRC2209

July 18, 2008

Subject: AP1000 Response to Request for Additional Information (SRP6)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 6. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

A response is provided for RAI-SRP6.0-SPCV-01 through -03, RAI-SRP6.2.1.2-SPCV-01,-02,-04 and -05, and RAI-SRP6.2.2-SPCV-01 and -02 as sent in an email from Billy Gleaves to Sam Adams dated May 6, 2008. This response completes nine of twelve requests received to date for SRP Section 6.

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

for/ John J. DeBlasio

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 6

D063
NRO

cc:	D. Jaffe	-	U.S. NRC	1E
	E. McKenna	-	U.S. NRC	1E
	B. Gleaves	-	U.S. NRC	1E
	P. Ray	-	TVA	1E
	P. Hastings	-	Duke Power	1E
	R. Kitchen	-	Progress Energy	1E
	A. Monroe	-	SCANA	1E
	J. Wilkinson	-	Florida Power & Light	1E
	C. Pierce	-	Southern Company	1E
	E. Schmiech	-	Westinghouse	1E
	G. Zinke	-	NuStart/Entergy	1E
	R. Grumbir	-	NuStart	1E
	P. Greco	-	Westinghouse	1E

ENCLOSURE 1

Response to Request for Additional Information on SRP Section 6

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI–SRP6.0–SPCV–01
Revision: 0

Question:

DCD Rev. 16, Figure 6.2.2-1 Note 11 was changed from, "Tank Volume Contained Between the Termination Points of Lines L064 and L069 shall provide for the minimum fire water volume." TO "L069, and L205 are designed to withstand a safe shutdown earthquake. L064 and L069 shall provide for the minimum fire water volume." Explain the significance of this change.

Westinghouse Response:

Note 11 in Figure 6.2.2-1 (Sheet 2 of 2) is improperly transposed. Note 11 should say, "Tank volume contained between the termination points of lines L064 and L069 shall provide for the minimum fire water volume." A DCD Revision is required.

Design Control Document (DCD) Revision:

Figure 6.2.2-1 (Sheet 2 of 2) is revised to correct Note 11 as discussed above.

PRA Revision:
None

Technical Report (TR) Revision:
None

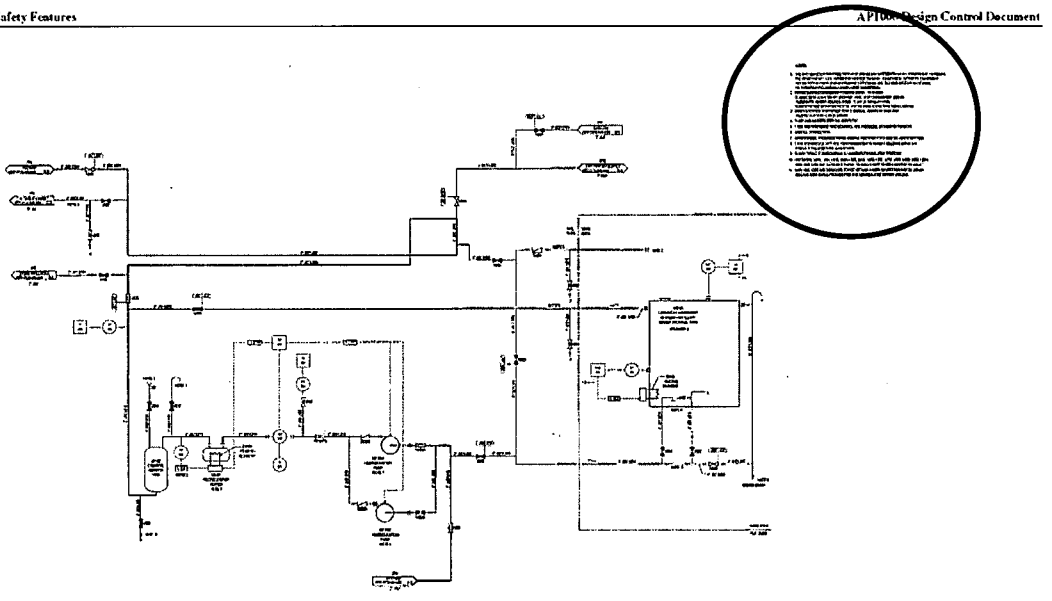


Figure 6.2.2-1 (Sheet 2 of 2)

Passive Containment Cooling System
Piping and Instrumentation Diagram
(REF) PCS 002

Circled portion shows area to be marked up. See next page for enlargement.

1. THE SYSTEM LOCATOR CODE "APP-PCS" HAS BEEN OMITTED FROM ALL COMPONENT NUMBERS. THE COMPONENT CODE HAS BEEN OMITTED FROM ALL COMPONENTS EXCEPT EQUIPMENT. REFER TO THE P&ID LEGEND DRAWING APP-GW-M6-001, 002 AND 003 FOR ADDITIONAL INFORMATION REGARDING COMPONENT NUMBERING.

2. PIPING SLOPES DOWNWARD TOWARD DRAIN. FLANGED CONNECTION LOCATED AT GROUND LEVEL FOR CONVENIENT USE OF ALTERNATE WATER SOURCE (POST 72 HOUR MAKEUP) AND, FLANGE FITTED WITH FIRE NOZZEL FITTING PER LOCAL FIRE REGULATIONS.

3. DRAIN LOCATED TO PROVIDE FOR CHEMICAL ADDITION TANK AND RECIRCULATION HEATER DRAIN.

4. PUMP AND HEATER TRIP ON LOW FLOW.

5. TANK AND THERMOSTATIC CONTROL ARE PROVIDED BY HEATER VENDOR.

6. SAMPLE CONNECTION.

7. OPEN FUNNEL PROVIDES FOR CHEMICAL ADDITION TO CHEMICAL ADDITION TANK.

8. TANK AND VALVES V037 AND V048 INSULATED TO AVOID FREEZING WITH OUT POWER TO HEATER FOR SEVEN DAYS.

9. SLOPE PIPING TOWARD DRAIN TO AVOID POTENTIAL FOR FREEZING.

10. LINES L014, L015, L019, L016, L020, L026, L046, L053, L057, L058, L059, L060, L063, L064, L069, AND L205 ARE DESIGNED TO WITHSTAND A SAFE SHUTDOWN EARTH QUAKE.

11. TANK VOLUME CONTAINED BETWEEN THE TERMINATION POINTS OF LINES L064 AND L069 SHALL PROVIDE FOR THE MINIMUM FIRE WATER VOLUME.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI–SRP6.0–SPCV–02
Revision: 0

Question:

DCD Section 6.5.2.1 describes the containment spray system, "as shown in Figure 9.5.1-1, sheets 1 through 3." The 6.5.2.1 text was not altered in the DCD Amendment, but Figure 9.5.1-1 was changed as described in APP-GW-GLN-131 (TR 131) Rev. 1. As a result of this change, a) 6.5.2.1 text states that the source of containment spray water is the secondary fire protection system water tank, but Figure 9.5.1-1 shows source is "PCS TK/YARD MAIN", b) 6.5.2.1.1 text describes V701 as a normally closed remotely-operated valve, but Figure 9.5.1-1 shows it as normally open, and c) 6.5.2.1.2 text states ring header elevations are 260 ft and 275 ft and Tier 1 Table 2.3.4-2 Item 6 states containment spray nozzle elevations are at least 260 ft and 275 ft but Figure 9.5.1-1 shows 250 ft and 235 ft. For each item a) – c), explain the discrepancy.

Westinghouse Response:
Please see the following responses to a) – c).

a) The source of containment spray water IS the secondary fire protection system water tank. The flag labeled "PCS TK/YARD MAIN" only indicates that the flow path it marks can receive flow from either the PCS tank or the Yard Water Main. This is consistent with the above statement because both the PCS Tank and the secondary fire protection water tank feed the yard main, therefore it is necessary to isolate the PCS tank from the yard main so the secondary fire protection water tank will feed the containment spray headers. As indicated in Section 6.5.2.1 the secondary fire water storage tank is the source for containment spray NOT the PCCWST. The locked closed manual valve V050 isolates the containment spray ring during normal operation.
b) The valve should be normally open as shown in Figure 9.5.1-1 (Sheet 3 of 3), the text in 6.5.2.1 will be changed to reflect this.
c) The spray ring headers are located at elevation 260 ft and 275 ft as discussed in the ITAAC and the text of 6.5.2.1.2. The Figure 9.5.1-1 (Sheet 3 of 3) will be changed to reflect this.

Design Control Document (DCD) Revision:
The text in 6.5.2.1 will be changed to indicate that valve V701 is a normally open valve. The Figure 9.5.1-1 (Sheet 3 of 3) will be changed to reflect the correct elevation of the spray rings. The mark-ups are provided below.

PRA Revision:
None

Technical Report (TR) Revision:
None

DCD MARKUPS

6.5.2.1.1 Valves

The containment spray flow path from the fire main header contains one normally open manual valve (FPS-V048), one normally closed manual valve (FPS-V101), one locked closed manual containment isolation valve outside containment (FPS-V050), a containment isolation check valve inside containment (FPS-V052), a normally open manual isolation valve in the spray riser (FPS-V700), and a normally ~~closed~~ open remotely-operated valve (FPS-V701) downstream of the manual isolation valve in the spray riser.

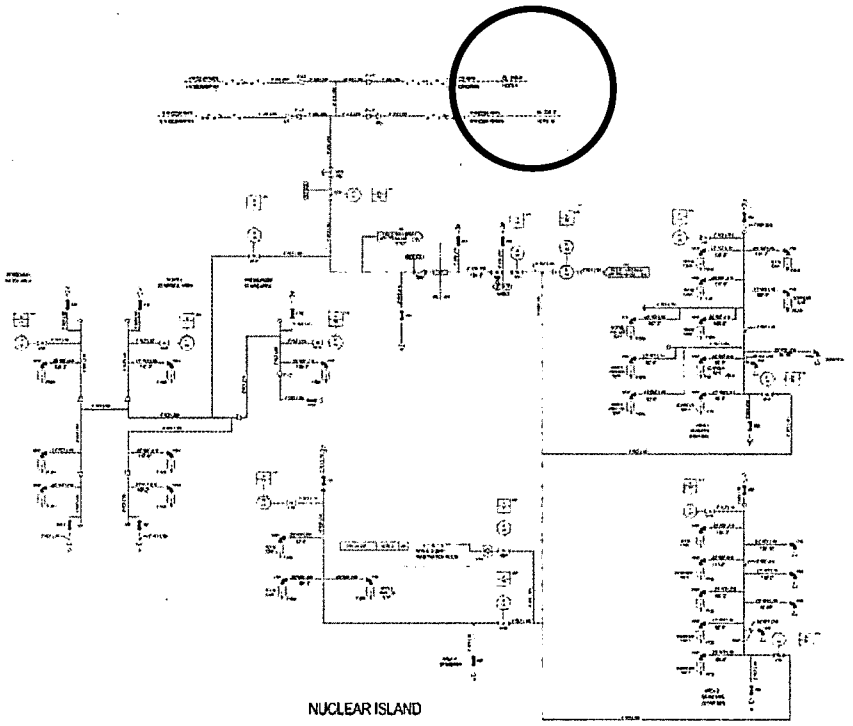
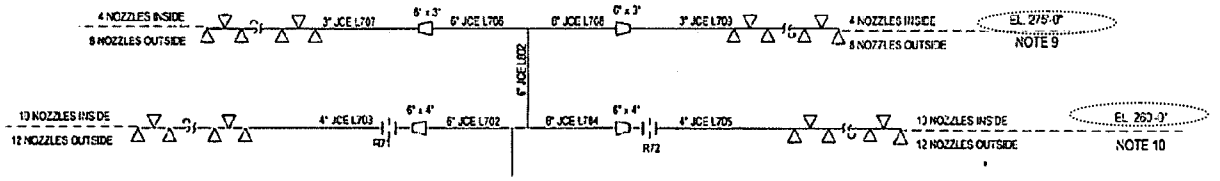


Figure 9.5.1-1 (Sheet 3 of 3)

Fire Protection System
Piping and Instrumentation Diagram
(REF FPS 004)

See next page for enlargement of affected area in Figure 9.5.1-1 (Sheet 3 of 3)



Enlargement of markup of Figure 9.5.1-1 (Sheet 3 of 3)

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP6.0-SPCV-03
Revision: 0

Question:

Westinghouse submitted a request to modify the DCD to incorporate the ability to inject a small quantity of zinc acetate into the reactor coolant system. The description of this proposed change is in APP-GW-GLN-002 (TR-32). The modification results in changing the outside containment isolation valve, CVS-V092, from normally closed, failed closed (NC/FC) to normally open, failed closed (NO/FC). This change is indicated in DCD, Rev. 16, Tier 2, Table 6.2.3-1, "Containment Mechanical Penetrations and Isolation Valves" and shown in Figure 9.3.6-1, sheet 1 of 2. However, DCD, Rev 16, section 9.3.6, "Hydrogen Addition Containment Isolation Valve", should indicate that the valve is normally open and fails closed. Also, Table 9.3.1-1, "Safety-Related Air Operated Valves", CVS-PL-V092 position should read NO/FC. Describe the correct configuration.

Westinghouse Response:

The change described within TR-32 (APP-GW-GLN-002) is correct, and DCD Table 6.2.3-1 and Figure 9.3.6-1 were updated appropriately to reflect valve CVS-PL-V092 as normally open and to fail closed. The valve should be normally open to permit a continuous addition of zinc acetate solution into the Reactor Coolant System.

The paragraph titled "Hydrogen Addition Containment Isolation Valve" in subsection 9.3.6.3.7 and the row within Table 9.3.1-1 are currently incorrect and were not updated appropriately during the last revision of the DCD. These inconsistencies shall be addressed in the next revision by changing subsection 9.3.6.3.7 and Table 9.3.1-1 to reflect the valve as NO/FC.

Design Control Document (DCD) Revision:
Revise Subsection 9.3.6.3.7 as follows:

Hydrogen Addition Containment Isolation Valve

This normally ~~closed~~open, fail closed, air-operated globe valve is located outside containment in the hydrogen addition line. The valve automatically closes on a containment isolation signal from the protection and safety monitoring system. Manual control is provided in the main control room and at the remote shutdown workstation.

Revise Table 9.3.1-1 as follows:

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	~~NC~~NO/FC	Hydrogen Addition Containment Isolation
CVS-PL-V136A	NO/FC	Demineralized Water System Isolation
CVS-PL-V136B	NO/FC	Demineralized Water System Isolation

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP6.2.1.2-SPCV-01
Revision: 0

Question:

In DCD 6.2.1.2, the TMD computer code and models described in WCAP-15965-P were used to calculate the differential pressure across subcompartment walls. However, as described in APP-GW-GLR-016 (TR 36) Rev. 0, changes were later made to the pressurizer diameter and height and to the wall height of the pressurizer compartment. Describe the impact of these dimensional changes on the subcompartment model input and analysis results for the pressurizer compartment.

Westinghouse Response:

The pressurizer diameter increased and the height was reduced for the revised pressurizer design. The increased pressurizer diameter reduced the cross-sectional area of the free volume between the pressurizer (PZR) and the cubical walls. The reduced cross-sectional area between the PZR and the cubicle walls would tend to cause transient differential pressure to increase across the sub-compartments walls. Reducing the cross-sectional area will result in an increased local pressure to handle the same flow through the cross-sectional area. The changes made to the pressurizer design also reduced the compressible volume between the PZR and the cubicle walls which would also tend to cause differential pressure to increase. In order to determine the impact of these changes Westinghouse performed a conservative calculation that resulted in a maximum differential pressure still below the 5.00 psid structural threshold for the PZR cubicle.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP6.2.1.2-SPCV-02
Revision: 0

Question:

DCD Rev. 16, Section 6.2.1.2.3.2 identifies the pressurizer compartment elevations assumed for a pressurizer spray break. APP-GW-GLR-134 (TR 134) Rev. 4 changed the upper elevation to be consistent with changes made to the pressurizer structure in APP-GW-GLR-016 (TR 36) Rev. 0. The revised height of the pressurizer wall is 160 feet, but the upper elevation of pressurizer compartment was changed to 163 feet. Explain the differences between the 160 and 163 foot heights.

Westinghouse Response:

The revised height of the pressurizer wall is correctly identified as 160ft in APP-GW-GLR-016 (TR36) and is consistent with the Design Change Proposal as documented in APP-GW-GEE-040 Revision 3. Section 6.2.1.2.3.2 of the DCD describes the analysis of the pressurizer compartment due to a double-ended guillotine break in the 4-inch pressurizer spray line. The elevations identified in APP-GW-GLR-134 (TR134) represent the approximate locations of the postulated breaks within the 4-inch spray line, which are the enveloping breaks for the subcompartment pressurization evaluation of the pressurizer compartment. The nozzle location of the pressurizer spray line is approximately 3 feet above the top of the pressurizer compartment wall.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI–SRP6.2.2–SPCV–04
Revision: 0

Question:

In DCD Tier 1 Table 2.2.2-2, the Line Numbers identified for the last two rows are not consistent with the changes made to Figure 6.2.2-1. Describe any corrections, if necessary, to Table 2.2.2-2.

Westinghouse Response:

The line number for PCS makeup to the spent fuel pool is incorrectly numbered as shown in Figure 6.2.2-1 (Sheet 1 of 2). A DCD revision is required to replace the line PCS-PL-L018 with PCS-PL-L017 in Figure 6.2.2-1 (Sheet 1 of 2). The physical line itself remains the same only the numbering changes. The revision to the DCD is occurring in Tier 2 information NOT Tier 1 information.

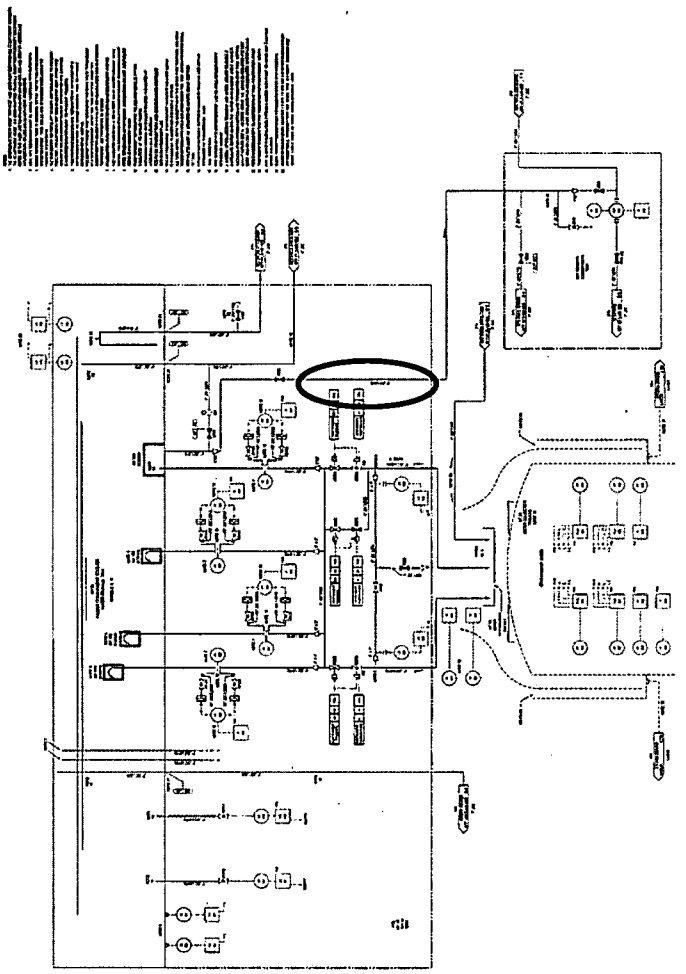
Design Control Document (DCD) Revision:

PCS-PL-L018 will be replaced by PCS-PL-L017

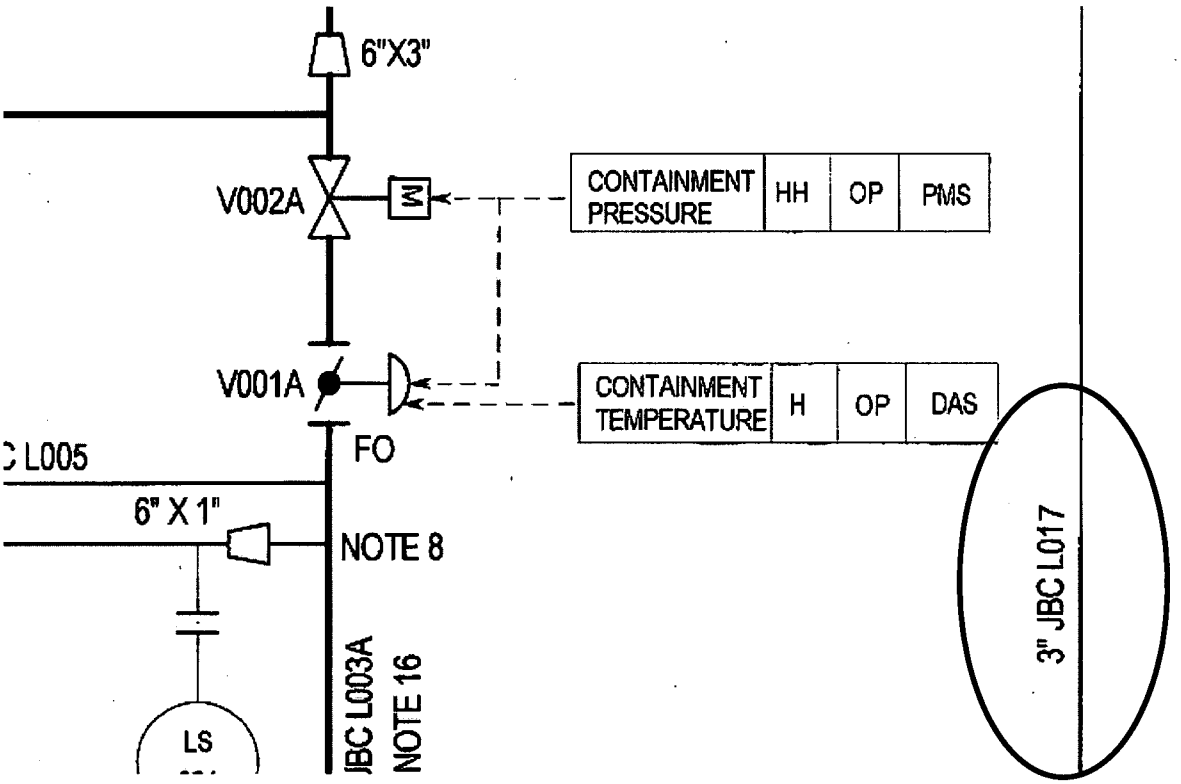
PRA Revision:
None

Technical Report (TR) Revision:
None

Figure 6.2.2-1 (Sheet 1 of 2)
Passive Containment Cooling System
Piping and Instrumentation Diagram
(REF) PCS 001



See next page for enlargement of markup.



Circled area shows the markup to occur on Figure 6.2.2-1 (Sheet 1 of 2).

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI–SRP6.2.2–SPCV–05
Revision: 0

Question:

In Westinghouse's response to RAI-TR127-SPCV-01, dated November 9, 2007, it is stated that the safety related SFP spray header isolation valve, PCS-PL-052, will be added to Table 3.2-3 of the DCD as an ASME Class III component. This change has yet to be made to DC Amendment. Describe how and when this change will be made.

Westinghouse Response:

This change was added to the DCD Table 3.2-3 by Technical Report 134 Revision 5.

Design Control Document (DCD) Revision:

PCS-PL-V052 is added to Table 3.2-3. See Technical Report 134 Revision 5.

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI–SRP6.2.2–SPCV–01
Revision: 0

Question:

In DCD Rev. 16, Figure 6.2.2-1, the 2 inch L017 and 1 inch L001A were combined into a single 3 inch L001A. APP-GW-GLN-019 (TR 103) Rev. 2 states the change was made in order to achieve flow rates required for adequate containment cooling. Confirm that the design flow rates identified in Table 6.2.2-1 are unaffected and explain how the single 3 inch line will achieve these flow rates.

Westinghouse Response:

The flow rates identified in Table 6.2.2-1 are unaffected by this change. The three inch line (one of four standpipes) is expected to pass (nominally) 190 gpm at the initiation of PCS and, as Table 6.2.2-1, shows approximately 113 gpm with 4 feet of water in the tank. Considering this minimum elevation head calculation shows that a 3 inch line which flows into a 6 inch header (as shown on DCD Figure 6.2.2-1 Sheet 1 of 2) will achieve these flow rates.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI–SRP6.2.2–SPCV–02
Revision: 0

Question:
In DCD Rev. 16, Figure 6.2.2-1, a spray system was added to the spent fuel pool. As a result, the line leading from the PCCWST to the spent fuel pool was moved to a lower tank connection and increased from 2 inch to 3 inch. Describe the impact these changes have on the PCCWST performance parameters specified in Table 6.2.2-1. Confirm that the parameters in this table related to the spent fuel pool include the supply to the new spent fuel pool spray header. Describe the way in which this change impacts the maximum flow for PCCWST long-term makeup to spent fuel pool.

In response to RAI-TR127-SPCV-01, Westinghouse stated "The use of the spent fuel pool spray is not anticipated during design basis postulated accidents." Describe the consequence of unanticipated use of spent fuel pool spray during design basis postulated accidents. Describe the use and how the valves are controlled to ensure water is not distributed to the spent fuel pool cooling system when it is also needed for containment cooling and or passive residual heat removal systems.

Westinghouse Response:
There are no impacts on the parameters identified in Table 6.2.2-1. The use of the spray headers are controlled by procedure and is NOT allowed during a Design Basis Accident (DBA). The parameters identified in Table 6.2.2-1 do NOT reflect the supply to the spent fuel pool spray header. Table 6.2.2-1 does not need to be revised to include this information because the spent fuel spray system is NOT a design basis function of the PCS. Because this is not a design basis of the system it will not be captured in Table 6.2.2-1 as this table only reports design basis parameters for PCS. The change has not increased the likelihood of a malfunction in the system. This change does not affect the flow for PCCWST makeup to the spent fuel pool because the two features, (makeup and spray) would not be used at the same time. Therefore the makeup flow rate from PCCWST to the spent fuel pool is not affected. The use of the spent fuel spray system is controlled by procedure and shall not be used during design basis accidents. The DCD currently describes how the PCS can supply the SFS makeup and passive containment cooling simultaneously. The manual valves are controlled by procedure. In the unlikely event that the manual valve was opened inadvertently, alarms would begin clearing in the MCR (spent fuel pool level Low-2 and Low-1), however because the water has inadvertently ended up in the spent fuel pool the safety mission of PCS is maintained.

Design Control Document (DCD) Revision: None

PRA Revision: None

Technical Report (TR) Revision: None