ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Friday, February 22, 2013 3:50 PM
To: Snyder, Amy
Cc: Gleaves, Bill; DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); WILLS Tiffany (AREVA); KOWALSKI David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 6
Attachments: RAI 462 Supplement 6 Response US EPR DC.pdf

Amy,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the ten questions in RAI No. 462 on February 25, 2011. Supplement 1 and Supplement 2 responses to RAI No. 462 were sent on April 14, 2011 and May 19, 2011, respectively, to provide a revised schedule. Supplement 3 response to RAI No. 462 was sent on June 29, 2011 to provide a technically correct and complete final response to Question 06.04-5 and a revised schedule for responses to the remaining questions. Supplement 4 response to RAI No. 462 was sent on July 22, 2011 to provide technically correct and complete final responses to the remaining nine questions. Supplement 5 response to RAI No. 462 was sent on August 2, 2012 to provide a technically correct and complete revised final response to Question 06.04-7.

The attached file, "RAI 462 Supplement 6 Response US EPR DC.pdf" provides a technically correct and complete revised final response to Question 06.02.03-8, which supersedes the response to this question that was provided in Supplement 4. The response to this question has been revised to reflect the implementation of a design change that removes valve stem leak-off collection capability from components (valves and hatch seals) whose leakage is collected and drained to the Reactor Building Annulus. This response also supersedes in its entirety the response provided in RAI 89, Supplement 1, Question 06.02.03-5.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 462 Question 06.02.03-8.

The following table indicates the respective pages in the response document, "RAI 462 Supplement 6 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 462 — 06.02.03-8	2	3

This concludes the formal AREVA NP response to RAI 462, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, August 02, 2012 12:10 PM

To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 5

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the ten questions in RAI No. 462 on February 25, 2011. Supplement 1 and Supplement 2 responses to RAI No. 462 were sent on April 14, 2011 and May 19, 2011, respectively, to provide a revised schedule. Supplement 3 response to RAI No. 462 was sent on June 29, 2011 to provide a technically correct and complete final response to Question 06.04-5 and a revised schedule for responses to the remaining questions. Supplement 4 response to RAI No. 462 was sent on July 22, 2011 to provide technically correct and complete final responses to the remaining nine questions.

The attached file, "RAI 462 Supplement 5 Response US EPR DC.pdf" provides a technically correct and complete revised final response to Question 06.04-7, which supersedes the response to this question that was provided in Supplement 4. An additional location in the FSAR (the first line of the first paragraph in Chapter 16, Technical Specification Bases in B 3.7.10) was revised in this response to place the term "toxic gas" within brackets.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 462 Question 06.04-7.

The following table indicates the respective pages in the response document, "RAI 462 Supplement 5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 462 — 06.04-7	2	4

This concludes the formal AREVA NP response to RAI 462, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WELLS Russell (RS/NB)
Sent: Friday, July 22, 2011 10:30 AM
To: 'Tesfaye, Getachew'
Cc: KOWALSKI David (RS/NB); WILLIFORD Dennis (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 4

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the ten questions in RAI No. 462 on February 25, 2011. Supplement 1 and Supplement 2 responses to RAI No. 462 were sent on April

14, 2011 and May 19, 2011, respectively, to provide a revised schedule. Supplement 3 response to RAI No. 462 was sent on June 29, 2011 to provide a technically correct and complete FINAL response to Question 06.04-5 and a revised schedule for responses to the remaining nine questions.

The attached file, "RAI 462 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete FINAL responses to the remaining nine questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the responses to RAI 462 Questions 06.02.03-8, 06.04-6, 06.04-7, 06.04-8, 06.05.01-2, 06.05.01-3 and 06.05.01-4.

The following table indicates the respective pages in the response document, "RAI 462 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 462 — 06.02.03-7	2	2
RAI 462 — 06.02.03-8	3	3
RAI 462 — 06.04-6	4	5
RAI 462 — 06.04-7	6	8
RAI 462 — 06.04-8	9	10
RAI 462 — 06.05.01-2	11	11
RAI 462 — 06.05.01-3	12	13
RAI 462 — 06.05.01-4	14	17
RAI 462 — 06.05.01-5	18	20

The GOTHIC input decks referenced in this RAI response will be provided on a compact disc under a separate submittal and
are considered proprietary information.

This concludes the formal AREVA NP response to RAI 462, and there are no questions from this RAI for which AREVA NP has not provided responses.

Russ Wells for
Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, June 29, 2011 3:16 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 3
Importance: High

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the ten questions in RAI No. 462 on February 25, 2011. Supplement 1 and Supplement 2 responses to RAI No. 462 were sent on April 14, 2011 and May 19, 2011, respectively, to provide a revised schedule.

The attached file, "RAI 462 Supplement 3 Response US EPR DC.pdf" provides a technically correct and complete FINAL response to Question 06.04-5.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 462 Question 06.04-5.

The following table indicates the respective pages in the response document, "RAI 462 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 462 — 06.04-5	2	3

The schedule for technically correct and complete responses to the remaining nine questions has changed and is provided below:

Question #	Response Date
RAI 462 — 06.02.03-7	**July 21, 2011**
RAI 462 — 06.02.03-8	**July 21, 2011**
RAI 462 — 06.04-6	**July 21, 2011**
RAI 462 — 06.04-7	**July 21, 2011**
RAI 462 — 06.04-8	**July 21, 2011**
RAI 462 — 06.05.01-2	**July 21, 2011**
RAI 462 — 06.05.01-3	**July 21, 2011**
RAI 462 — 06.05.01-4	**July 21, 2011**
RAI 462 — 06.05.01-5	**July 21, 2011**

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WELLS Russell (RS/NB)
Sent: Thursday, May 19, 2011 7:19 AM
To: Tesfaye, Getachew
Cc: WILLIFORD Dennis (RS/NB); KOWALSKI David (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the ten questions in RAI No. 462 on February 25, 2011. Supplement 1 response to RAI No. 462 was sent on April 14, 2011 to provide a revised schedule.

A revised schedule for technically correct and complete responses to the ten questions is provided below.

Question #	Response Date
RAI 462 — 06.02.03-7	June 30, 2011
RAI 462 — 06.02.03-8	June 30, 2011
RAI 462 — 06.04-5	June 30, 2011
RAI 462 — 06.04-6	June 30, 2011
RAI 462 — 06.04-7	June 30, 2011
RAI 462 — 06.04-8	June 30, 2011
RAI 462 — 06.05.01-2	June 30, 2011
RAI 462 — 06.05.01-3	June 30, 2011
RAI 462 — 06.05.01-4	June 30, 2011
RAI 462 — 06.05.01-5	June 30, 2011

Sincerely,

Russ Wells
U.S. EPR Design Certification Licensing Manager
AREVA NP, Inc.
3315 Old Forest Road, P.O. Box 10935
Mail Stop OF-57
Lynchburg, VA 24506-0935
Phone: 434-832-3884 (work)
434-942-6375 (cell)
Fax: 434-382-3884
Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)
Sent: Thursday, April 14, 2011 6:23 AM
To: 'Tesfaye, Getachew'
Cc: KOWALSKI David (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the ten questions in RAI No. 462 on February 25, 2011.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the ten questions is provided below.

Question #	Response Date
RAI 462 — 06.02.03-7	May 19, 2011
RAI 462 — 06.02.03-8	May 19, 2011
RAI 462 — 06.04-5	May 19, 2011
RAI 462 — 06.04-6	May 19, 2011
RAI 462 — 06.04-7	May 19, 2011
RAI 462 — 06.04-8	May 19, 2011
RAI 462 — 06.05.01-2	May 19, 2011
RAI 462 — 06.05.01-3	May 19, 2011

RAI 462 — 06.05.01-4	May 19, 2011
RAI 462 — 06.05.01-5	May 19, 2011

Sincerely,

Russ Wells
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Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)
Sent: Friday, February 25, 2011 2:57 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); BRYAN Martin (External RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 462 Response US EPR DC," provides a schedule since technically correct and complete responses to the ten questions are not provided.

The following table indicates the respective pages in the response document, "RAI 462 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 462 — 06.02.03-7	2	2
RAI 462 — 06.02.03-8	3	3
RAI 462 — 06.04-5	4	5
RAI 462 — 06.04-6	6	6
RAI 462 — 06.04-7	7	7
RAI 462 — 06.04-8	8	8
RAI 462 — 06.05.01-2	9	9
RAI 462 — 06.05.01-3	10	10
RAI 462 — 06.05.01-4	11	11
RAI 462 — 06.05.01-5	12	14

The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 462 — 06.02.03-7	April 14, 2011
RAI 462 — 06.02.03-8	April 14, 2011
RAI 462 — 06.04-5	April 14, 2011
RAI 462 — 06.04-6	April 14, 2011

RAI 462 — 06.04-7	April 14, 2011
RAI 462 — 06.04-8	April 14, 2011
RAI 462 — 06.05.01-2	April 14, 2011
RAI 462 — 06.05.01-3	April 14, 2011
RAI 462 — 06.05.01-4	April 14, 2011
RAI 462 — 06.05.01-5	April 14, 2011

Sincerely,

Russ Wells
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434-942-6375 (cell)
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Russell.Wells@Areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, January 26, 2011 3:04 PM
To: ZZ-DL-A-USEPR-DL
Cc: ODriscoll, James; Jackson, Christopher; McKirgan, John; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No.462(5258_5259_5260), FSAR Ch. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on December 8, 2010, and on January 20, 2011, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 4229

Mail Envelope Properties (554210743EFE354B8D5741BEB695E6560E55C2)

Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 6
Sent Date: 2/22/2013 3:50:26 PM
Received Date: 2/22/2013 3:50:40 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
"Gleaves, Bill" <Bill.Gleaves@nrc.gov>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"LEIGHLITER John (AREVA)" <John.Leighliter@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"WILLS Tiffany (AREVA)" <Tiffany.Wills@areva.com>
Tracking Status: None
"KOWALSKI David (AREVA)" <David.Kowalski@areva.com>
Tracking Status: None
"Snyder, Amy" <Amy.Snyder@nrc.gov>
Tracking Status: None

Post Office: FUSLYNCMX03.fdom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	15450	2/22/2013 3:50:40 PM
RAI 462 Supplement 6 Response US EPR DC.pdf	179233	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Response to

Request for Additional Information No. 462, Supplement 6

1/26/2011

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.03 - Secondary Containment Functional Design
SRP Section: 06.04 - Control Room Habitability System
SRP Section: 06.05.01 - ESF Atmosphere Cleanup Systems

Application Section: 6.2.3

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

Question 06.02.03-8:

In RAI 89, Questions 6.2.3-5, the staff requested details of the Containment Leak-off system along with an explanation on how it will capture bypass leakage. The staff requires the information in the RAI response to In order for the staff to review the EPR secondary containment design against SRP 6.2.3 Acceptance Criterion 4 Therefore include the RAI response in FSAR section 6.2.3.2.3.

Response to Question 06.02.03-8:

The response to this question has been revised to reflect the implementation of a design change that removes valve stem leak-off collection capability from components (valves and hatch seals) whose leakage is collected and drained to the Reactor Building Annulus. Valves in the Reactor Building are designed to contain live loading packing, thereby eliminating the need for the collection and removal of valve stem leakage.

This response supersedes in its entirety the response to Question 06.02.03-8 provided in RAI 462, Supplement 4. This response also supersedes in its entirety the response provided in RAI 89, Supplement 1, Question 06.02.03-5.

The leak-off system is located in the Fuel Building, Reactor Building, Annulus, and Safeguard Buildings 2 and 3 and consists of valves, sensors, and piping. It is composed of three main sub-systems: the containment leakage exhaust subsystem (CLES), the containment inflating/deflating subsystem (CIDS), and the containment leak-tightness test subsystem (CLTS). The CLES collects leaks from various systems and components inside the Reactor Building, Fuel Building, and Safeguard Buildings, and then transports the leaks to the Annulus. The CIDS is used for pressurizing, depressurizing, and evacuation of the Reactor Building to test the structural integrity and leak-tightness of the containment structure. The CLTS uses sensors in the Reactor Building, Fuel Building, Annulus, and the environment to estimate the leak-tightness of the containment structure.

The CLES contains piping to collect leakage from a number of different components located at containment penetrations (i.e., at the interface boundary between the primary containment and the annulus, between the annulus and the external environment, and at the interfaces with the Fuel Building and Safeguard Building 3). During normal operation, the CLES collects leakage in leak-off lines and routes the leakage to the Annulus. The sub-atmospheric pressure in the Annulus provided by the annulus ventilation system creates a pressure differential that drains the CLES leakage to the Annulus. Discharge piping from the CLES is routed to a floor drain of the Nuclear Island drain and vent system.

During design basis accidents, all valves in the CLES are open. Leaks from the devices are collected and drained to the Annulus by the pressure differential created by the accident trains of the annulus ventilation system.

U.S. EPR FSAR Tier 2, Sections 5.2.5.5.1, 6.2.3.2.3, 9.3.3.2.3, and 14.2.12.9.1 will be revised to reflect this updated information. Note that some of the changes to U.S EPR FSAR Tier 2, Section 6.2.3.2.3 were incorporated as part of U.S. EPR FSAR, Revision 3.

FSAR Impact:

U.S. EPR FSAR Tier 2, Sections 5.2.5.5.1, 6.2.3.2.3, 9.3.3.2.3 and 14.2.12.9.1 will be revised as described in the response and indicated on the enclosed markup.

Some of the changes to U.S. EPR FSAR Tier 2, Section 6.2.3.2.3 were incorporated as part of Revision 3 as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

develop procedures in accordance with RG 1.45, Revision 1.

5.2.5.5.1 RCDT Indications

The RCDT collects continuous flow during operation from PZR degassing and the RCP seals' leakoff. This flow is quantified from tank level and pump run time indications and a baseline normal in-leakage rate is established. Changes in this rate indicate leakage from additional components whose discharge is routed to the RCDT. Such leakage can be identified through indications from these components and, once quantified, can be monitored as identified leakage.

The additional monitored leakage connections that discharge to the RCDT include the PSRV valve body drains, the reactor vessel O-ring seal leakoff, RCP static seal (main flange) leakoff, ~~valve stem packing leakage,~~ and safety valve discharge lines from the combined RCP #1 seal return line, the four RCP thermal barrier return lines, the CVCS letdown line, and the CVCS charging line. Additional equipment and component drain connections to the RCDT are used only during shutdown or during startup operations and are isolated from the RCDT by a closed manual valve, or are disconnected and flanged, during power operation and are not expected to affect RCPB leakage monitoring efforts.

5.2.5.5.2 Reactor Building Sump Level

During normal operation the Reactor Building sump collects water from the reactor building floor drains and the Reactor Building annular space floor drain sump. Sump level and automatic pump operation for both sumps are indicated in the MCR to allow prompt identification of any unidentified leakage in the Reactor Building.

5.2.5.5.3 Containment Atmosphere Particulate Radiation Monitoring

Containment atmosphere particulate radioactivity monitoring is one of the systems used in the US EPR design for RCS leakage detection. The particulate monitor is a low range monitor capable of detecting 3E-10 to 1E-6µCi/cc. The monitor sensitivity requirement is to be able to detect a leakage increase of one gpm within one hour (see U.S. EPR FSAR, Tier 2, Chapter 16, TS 16.3.4.12 and corresponding Bases, RG 1.45 and RIS-2009-02), based on a realistic RCS source term, as described in Section 11.5.4.8. The particulate radiation monitoring system continuously monitors airborne radioactivity in the containment equipment area. Radiation levels are indicated in theMCR. Alarms alert the operators of elevated levels of radioactivity to allow for prompt identification of RCS leakage into the equipment area. The monitor is located in the service area of the containment, which is accessible during normal operation. It draws air from the containment building ventilation system which filters airborne radioactivity within the equipment area. The monitoring system will be designed to function properly in the containment environment.

6.2.3.2.2.3 System Operation

The normal operation filtration train is in service during normal plant operation, including cold shutdown and outages. During normal operation, the isolation dampers are in the open position and the annulus is continuously vented. The subatmospheric pressure inside the annulus is maintained by regulating the control damper located on the supply side of the normal operation filtration train. The supply air from the AVS maintains the annulus temperature between 45°F and 113°F.

A failure of the normal operation filtration train leads to the loss of supply and exhaust air to the annulus. In this case, one of the accident filtration trains is started, and the two isolation dampers on the supply and exhaust side of the normal filtration train are closed to isolate the normal operation filtration train and maintain the leak tightness of the annulus.

In case of a postulated accident, a containment isolation signal causes the normal filtration train to automatically stop. The normal filtration train supply air isolation dampers close immediately and the exhaust isolation dampers close with a delay, to maintain the annulus negative pressure during the switchover to the accident filtration trains. Both accident filtration trains start on receipt of a containment isolation signal and an alarm is issued in the MCR.

At the start of an accident, full power of the two stage electric heater is switched on when the fans start and filter bank isolation dampers open. As the negative pressure is drawn down in the annulus, and when the temperature downstream of the heater increases to 158°F, the first step of heater power is switched off automatically. As the temperature downstream of the heater reaches 176°F, the second step of the heater is also switched off automatically.

6.2.3.2.3 Bypass Leakage

Certain containment penetrations introduce the potential for primary containment leakage to bypass the filtered annulus and escape directly to the environment. Potential bypass leakage paths exist through the double seals of the equipment hatch, personnel airlocks, fuel transfer tube, and containment ventilation system isolation valves.

The leak-off system provides a means to capture bypass leakage and route it to the annulus to be processed. The leak-off system is located in the Reactor Containment Building, Reactor Building Annulus, Fuel Building, and Safegurard Buildings 2 and 3, and consists of valves, sensors and piping. It is composed of three main subsystems: containment leakage exhaust subsystem (CLES), containment inflating/deflating subsystem (CIDS), and containment leak-tightness test subsystem (CLTS). The CLES collects leaks from various systems and components in the Reactor Containment

Building, Fuel Building, and Safegurard Buildings, and transports the leakage to the Reactor Building Annulus. The CIDS is used for the pressurization, depressurization, and evacuation of the Reactor Containment Building in order to test the structural integrity and leak-tightness of the Reactor Containment Building. The CLTS uses sensors in the Reactor Containment Building, Fuel Building, and Reactor Building Annulus and the environment to estimate the leak-tightness of the Reactor Containment Building.

The CLES contains piping to collect leakage from components located at containment penetrations at the interface boundary between the Reactor Containment Building and Reactor Building Annulus, the Reactor Building Annulus and the environment, and the Fuel Building and Safegurard Building 3. During normal operation, the CLES collects leakage in leak-off lines and routes the leakage to the Reactor Building Annulus. Subatmospheric pressure in the Reactor Building Annulus, provided by the annulus ventilation system (AVS), creates a pressure differential, which drains the CLES leakage. Discharge piping from the CLES is routed to a floor drain in the nuclear island drain and vent system located in the Reactor Building Annulus.

The leak-off system is functional during normal operation and postulated accidents. During design basis accidents, valves in the CLES are open. Leaks from components ~~(valves, hatch seals)~~ are collected and drained to the Reactor Building Annulus by the pressure differential created by the AVS. Leak-off system component classifications are presented in Section 3.2.

Containment penetrations that are paths for potential bypass leakage terminate in areas of the surrounding buildings that are filtered during a postulated accident. Section 6.2.6.5 addresses the treatment of bypass leakage for containment leakage rate testing.

6.2.3.3 Safety Evaluation

The AVS system components are located inside the Fuel Building, which is a Seismic Category I structure. The two AVS accident filtration trains are designed to withstand the safe shutdown earthquake and are classified as Seismic Category I.

The safety-related components of the AVS system remain functional and perform their intended function following a postulated internal hazard (e.g., fire, flood, internal missiles, pipe breaks). The two accident filtration trains are physically separated from each other to prevent common mode failures. Since the accident filtration trains are completely redundant and are both full capacity, one train alone can collect and process radioactive material that may leak from the primary containment following an accident. The supply and exhaust trains of the normal filtration train can be isolated with two redundant dampers in series.

- Vent and rinse collection inside NAB.

Type 1 Floor Drains Subsystem

This subsystem includes Type 1 floor drains, which are located in the radiologically controlled area and contain low boron-10 concentrations. It is further divided into five portions:

- RB floor drains.
- SBs floor drains.
- FB floor drains.
- NAB floor drains.
- Radioactive Waste Processing Building floor drains.

Type 2 Floor Drains Subsystem

This subsystem includes Type 2 floor drains, which are located in the radiologically controlled area and contain no boron-10 but may have some chemical contamination. It is further divided into three portions:

- Low contamination RB drains.
- Low contamination NAB drains.
- Low contamination Access Building drains.

Type 3 Floor Drains Subsystem

This subsystem includes Type 3 floor drains, which are located in the non-radiologically controlled area. It is further divided into two portions:

- SBs non-radiologically controlled area floor drains.
- NAB non-radiologically controlled area floor drains.

9.3.3.2.3 System Operation

During normal plant operation, the NIDVS collects different categories of liquid and gaseous effluents. Liquid leakages or discharges drain by gravity to sumps. Sump pumps automatically or manually transfer their contents to storage tanks. Sump discharge lines in each of the SB and FB are routed individually to their destination in the NAB.

Boron-containing reactor coolant leakage from primary vents, drains, pump seal, and ~~valve stem leakage, and~~ safety valve discharges~~,~~ is collected and stored for further

3.0 TEST METHOD

3.1 Verify the bypass leakage flow path from the personnel air locks to the annulus sump.

3.2 Verify the bypass leakage flow path from fuel transfer tube to the annulus sump.

3.3 Verify the equipment hatch bypass flow path to the annulus sump.

3.4 Verify the containment ventilation system isolation valve bypass flow path to the annulus sump.

3.5 Measure response of power operated valves (e.g. stroke time, developed thrust).

4.0 DATA REQUIRED

4.1 System flow path data.

5.0 ACCEPTANCE CRITERIA

5.1 The LOS routes ~~bypass packing~~ leakage to the annulus sump per design, refer to Section 6.2.3.2.3.

5.2 The containment ILRT inflating/deflating sub system meets design requirements.

5.3 The containment ILRT leak tightness sub system meets design requirements.

14.2.12.9.2 Sampling Activity Monitoring System (Test #092)

1.0 OBJECTIVE

1.1 To verify that the sampling activity monitoring system (SAMS) can detect and record specific radiation levels in the sampling stream.

1.2 To verify SAMS alarms and interlocks.

1.3 To verify that radiation monitors respond as designed to check sources.

1.4 To verify that radiation sample points provide representative samples of the SAMS.

2.0 PREREQUISITES

2.1 Construction activities on the SAMS have been completed.

2.2 SAMS instrumentation, including radiation monitors, has been calibrated and is operating satisfactorily prior to performing the following test.

2.3 Support systems required for operation of the SAMS is completed and functional.

2.4 Test instrumentation is available and calibrated.