ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Tuesday, June 25, 2013 2:23 PM
To: Snyder, Amy
Cc: Gleaves, Bill; ANDERSON Katherine (EXTERNAL AREVA); DELANO Karen (AREVA); LEIGHLITER John (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); KOWALSKI David (AREVA); BALLARD Bob (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 7
Attachments: RAI 233 Supplement 7 US EPR DC.pdf

Importance: High

Amy,

AREVA NP Inc. provided responses to portions of two of the four questions of RAI No. 233 on July 10, 2009. Supplement 1 response was sent on September 1, 2009 to provide responses for the remaining portions of these two Questions 06.05.01-1 and 06.05.03-1. Supplement 2 and Supplement 3 responses were sent on December 18, 2009 and April 22, 2010, respectively, to provide a revised schedule for the remaining two Questions 06.02.02-29 and 06.02.02-30. Supplement 4 response was sent on May 20, 2010 to provide technically correct and complete final responses to Questions 06.02.02-29 and 06.02.02-30. Supplement 5 response was sent on April 25, 2013 to provide a technically correct and complete revised response to Question 06.05.03-1. Supplement 6 response was sent on June 19, 2013 to provide a schedule for a revised final response to Question 06.05.03-1, as discussed with NRC staff during a conference call on June 3, 2013..

The attached file, "RAI 233 Supplement 7 Response US EPR DC.pdf," provides a technically correct and complete revised final response to Question 06.05.03-1. This response supersedes, in its entirety, the response to Question 06.05.03-1 provided in RAI 233, Supplement 5.

The following table indicates the respective pages in the response document, "RAI 233 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 233 — 06.05.03-1	2	3

This concludes the formal AREVA NP response to RAI 233, 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: KOWALSKI David (RS/NB)
Sent: Wednesday, June 19, 2013 5:39 PM
To: Amy.Snyder@nrc.gov
Cc: Bill.Gleaves@nrc.gov; ANDERSON Katherine (External AREVA NP INC.); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); LEWIS Ray (External RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); SHEPHERD Tracey (RS/NB); VANCE

Brian (RS/NB); GUCWA Len (External RS/NB); KOWALSKI David (RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 6
Importance: High

Amy,

AREVA NP Inc. provided responses to portions of two of the four questions of RAI No. 233 on July 10, 2009. Supplement 1 response was sent on September 1, 2009 to provide responses for the remaining portions of these two Questions 06.05.01-1 and 06.05.03-1. Supplement 2 and Supplement 3 responses were sent on December 18, 2009 and April 22, 2010, respectively, to provide a revised schedule for the remaining two Questions 06.02.02-29 and 06.02.02-30. Supplement 4 response was sent on May 20, 2010 to provide technically correct and complete final responses to Questions 06.02.02-29 and 06.02.02-30.

Supplement 5 response was sent on April 25, 2013 to provide a technically correct and complete revised response to Question 06.05.03-1. This response superseded in its entirety the response to Question 06.05.03-1 provided in RAI 233, and RAI 233, Supplement 1. The response to Question 06.05.03-1 had been updated to address RAI 511, Question 06.04-9, Item d, and was revised to consider both the Safeguard Buildings and Fuel Building.

As discussed with the NRC staff during a conference call on June 3, 2013, AREVA NP committed to provide the NRC with a schedule for submitting a revised final response to Question 06.05.03-1, which incorporates NRC review comments on the RAI 233 Supplement 5 response.

The schedule for a technically correct and complete final response to Question 06.05.03-1 is provided below.

Question #	Final Response Date
RAI 233 — 06.05.03-1	June 28, 2013

Sincerely,

David J. Kowalski 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: Thursday, April 25, 2013 5:14 PM
To: Amy.Snyder@nrc.gov
Cc: bill.gleaves@nrc.gov; ANDERSON Katherine (External AREVA NP INC.); DELANO Karen (RS/NB); LEIGHLITER John (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); HONMA George (EXT); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 5

Amy,

AREVA NP Inc. provided responses to portions of two of the four questions of RAI No. 233 on July 10, 2009. Supplement 1 response was sent on September 1, 2009 to provide responses for the remaining portions of these two questions (06.05.01-1 and 06.05.03-1). Supplement 2 and Supplement 3 responses were sent on December 18, 2009 and April 22, 2010, respectively, to provide a revised schedule for the remaining two

questions (06.02.02-29 and 06.02.02-30). Supplement 4 response was sent on May 20, 2010 to provide technically correct and complete final responses to Questions 06.02.02-29 and 06.02.02-30.

The attached file, "RAI 233 Supplement 5 Response US EPR DC.pdf," provides a technically correct and complete revised response to Question 06.05.03-1. This response supersedes in its entirety the response to Question 06.05.03-1 provided in RAI 233, and RAI 233, Supplement 1. The response to Question 06.05.03-1 is being revised to address NRC staff comments on RAI 511, Question 06.04-9, Item d. The response has been updated to consider both the Safeguard Buildings and Fuel Building.

The following table indicates the respective pages in the response document, "RAI 233 Supplement 5 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 233 — 06.05.03-1	2	3

This concludes the formal AREVA NP response to RAI 233, 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: BRYAN Martin (EXT)
Sent: Thursday, May 20, 2010 3:37 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to portions of 2 of the 4 questions of RAI No. 233 on July 10, 2009. Responses to portions of the 2 remaining questions were provided by AREVA NP on September 1, 2009. AREVA NP submitted Supplement 2 to the response on December 18, 2009 to provide a revised response schedule. AREVA NP submitted Supplement 3 to the response on April 22, 2010 to provide a revised response schedule.

The attached file, "RAI 233 Supplement 4 Response US EPR DC.pdf," provides a technically correct and complete response to the 2 remaining questions.

The following table indicates the respective pages in the response document, "RAI 233 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 233 — 06.02.02-29	2	3
RAI 233 — 06.02.02-30	4	6

This concludes the formal AREVA NP response to RAI 233, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Thursday, April 22, 2010 6:18 PM
To: 'Getachew.Tesfaye@nrc.gov'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to portions of 2 of the 4 questions of RAI No. 233 on July 10, 2009. Responses to portions of the 2 remaining questions were provided by AREVA NP on September 1, 2009. AREVA NP submitted Supplement 2 to the response on December 18, 2009 to provide a revised response schedule.

Responses to the remaining RAI 233 questions are dependent upon the results of ongoing GSI-191 evaluations for demonstrating sump strainer performance. Because of these ongoing activities, AREVA NP is not providing a response at this time.

The schedule for providing technically correct and complete responses to the remaining 2 questions has been revised and is provided below:

Question #	Response Date
RAI 233 — 06.02.02-29	May 20, 2010
RAI 233 — 06.02.02-30	May 20, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, December 18, 2009 3:27 PM
To: 'Tesfaye, Getachew'

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to portions of 2 of the 4 questions of RAI No. 233 on July 10, 2009. Responses to portions of the 2 remaining questions were provided by AREVA NP on September 1, 2009.

Responses to the remaining RAI 233 questions are dependent upon the results of ongoing GSI-191 head loss testing, which will demonstrate sump strainer performance. Because additional testing is planned, AREVA NP is not providing a response at this time.

The schedule for providing technically correct and complete responses to the remaining 2 questions has been revised and is provided below:

Question #	Response Date
RAI 233 — 06.02.02-29	April 22, 2010
RAI 233 — 06.02.02-30	April 22, 2010

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: WELLS Russell D (AREVA NP INC)
Sent: Tuesday, September 01, 2009 10:44 AM
To: 'Getachew Tesfaye'
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to portions of 2 of the 4 questions of RAI No. 233 on July 10, 2009. The attached file, "RAI 233 Supplement 1 Response US EPR DC.pdf" provides technically correct responses to portions of 2 of the remaining 4 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 233 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 233 — 06.05.01-1	2	4
RAI 233 — 06.05.03-1	5	5

The schedule for providing technically correct and complete responses to the remaining 2 questions is unchanged and is provided below:

Question #	Response Date
RAI 233 — 06.02.02-29	December 18, 2009
RAI 233 — 06.02.02-30	December 18, 2009

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
New Plants Deployment
AREVA NP, Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, July 10, 2009 9:54 AM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch. 6

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 233 Response US EPR DC.pdf" provides responses to portions of 2 of the 4 questions.

The following table indicates the respective pages in the response document, "RAI 233 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 233 — 06.02.02-29	2	2
RAI 233 — 06.02.02-30	3	5
RAI 233 — 06.05.01-1	6	7
RAI 233 — 06.05.03-1	8	8

A complete answer is not provided for the 4 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 233 — 06.02.02-29	December 18, 2009
RAI 233 — 06.02.02-30	December 18, 2009
RAI 233 — 06.05.01-1 (Parts 2, 4, and 5)	September 3, 2009
RAI 233 — 06.05.03-1 (Part d)	September 3, 2009

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, June 12, 2009 5:18 PM
To: ZZ-DL-A-USEPR-DL
Cc: Ashley, Clinton; ODriscoll, James; Jackson, Christopher; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 233 (2857, 2872,2873), FSAR Ch. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on May 19, 2009, and on June 12, 2009, 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. Per your request, we support future interaction to give you an opportunity to clarify your design regarding Question 06.05.03-1 part d . 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: 4565

Mail Envelope Properties (554210743EFE354B8D5741BEB695E6561A55DC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 233, FSAR Ch 6, Supplement 7
Sent Date: 6/25/2013 2:22:48 PM
Received Date: 6/25/2013 2:22:57 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
"Gleaves, Bill" <Bill.Gleaves@nrc.gov>
Tracking Status: None
"ANDERSON Katherine (EXTERNAL AREVA)" <katherine.anderson.ext@areva.com>
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
"KOWALSKI David (AREVA)" <David.Kowalski@areva.com>
Tracking Status: None
"BALLARD Bob (AREVA)" <Robert.Ballard@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	15579	6/25/2013 2:22:57 PM
RAI 233 Supplement 7 US EPR DC.pdf	153205	

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

Response to

Request for Additional Information No. 233, Supplement 7

6/12/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.02 - Containment Heat Removal Systems
SRP Section: 06.05.01 - ESF Atmosphere Cleanup Systems
SRP Section: 06.05.03 - Fission Product Control Systems and Structures
Application Section: FSAR Ch. 6

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

Question 06.05.03-1:

Per SRP 6.5.3, Acceptance Criteria 2, in order to be classified as a secondary containment for the purpose of fission product control, a structure or structures should completely surround the primary containment, and at least should be held at a pressure of 0.6 cm (0.25 in) (water) below adjacent regions under all wind conditions up to the wind speed at which diffusion becomes great enough to ensure site boundary exposures less than those calculated for the design basis accidents, even if exfiltration occurs.

a. During the DBA LOCA, the AVS ESF accident operation maintains a negative pressure in the annulus and the assumed in-leakage to the annulus is based only on the 0.25% allowable primary containment leakage. What is the allowed secondary containment in-leakage from the safeguards and fuel buildings that surround the shield building?

b. What programs are in place to test for secondary containment in-leakage?

c. What is the applicable mixing fraction to be applied to the annulus area?

d. What is the maximum wind speed at which annulus negative pressure can be maintained?

Response to Question 06.05.03-1:

This response supersedes, in its entirety, the response to Question 06.05.03-1 provided in RAI 233, Supplement 5. The response has been revised to consider both the Safeguard Buildings and Fuel Building, and contains corresponding changes to the U.S. EPR FSAR.

a. The in-leakage from the surroundings, including the Safeguard Buildings and Fuel Building, is 0.2 percent of the total primary containment volume per day. This is conservative as the secondary containment (Shield Building) wall is approximately 1.5 feet thicker than the primary containment wall, is not subject to the expansion during a loss of coolant accident that the primary containment wall may experience, and includes the total containment volume as opposed to the containment free volume.

   The bypass leakage from the primary containment into the Safeguard Buildings and Fuel Building is assumed to be 9.8 cfm. This is the same in-leakage assumed into the annulus from the primary containment and is 0.2 percent of the total primary containment volume per day. The in-leakage into the Safeguard Building hot mechanical area from adjacent areas is 6 cfm per division. The in-leakage into the Fuel Building from the environment is assumed to be 30 cfm.

b. 10 CFR Part 50, Appendix J in paragraph IV.B, “Special Testing Requirements,” states that structures of multiple barrier containments (such as secondary containments/shield buildings for pressurized water reactors) shall be subject to individual tests in accordance with the procedures outlined in the Technical Specifications, or associated Bases. U.S. EPR FSAR Tier 2, Chapter 16, “Technical Specifications, Surveillance Requirement (SR) 3.6.6,” specifies testing to fulfill this requirement for the Shield Building.

   U.S. EPR FSAR Tier 2, Chapter 16, “Technical Specifications SR 3.7.12,” specifies testing to fulfill this requirement for the Safeguard Building Controlled Area Ventilation System.

c. No mixing is assumed to occur within the annulus volume.

No mixing is assumed to occur in the Safeguard Building and Fuel Building.

d. The U.S. EPR Shield Building (secondary containment) is a tightly-fitted, axisymmetric, reinforced concrete structure completely surrounding the Reactor Building (primary containment) with no penetrations exposed to the environment. The Shield Building is further surrounded by the Nuclear Island (NI) buildings. Such a structure is not subject to the wind- and buoyancy-driven exchanges with the environment of the kind envisioned by RG 1.183, Regulatory Position 4.3. The NI configuration is shown in U.S. EPR FSAR Tier 2, Figure 1.2-1—3-Dimensional Conceptual Configuration of U.S. EPR Buildings and Figure 1.2-2—U.S. EPR Cutaway.

   The hot mechanical rooms in the Safeguard Buildings are below grade and adjacent to the annulus and Safeguard Building electrical rooms. The hot mechanical rooms have no direct contact with the environment. During normal operation, the hot mechanical rooms are maintained at a negative pressure less than or equal to negative 0.25 inches water gauge relative to atmosphere by control valves in the supply ducts from the safeguard building electrical division ventilation system (SBVSE) in each of the safeguard buildings. During normal operation, the Fuel Building is maintained at a negative pressure less than or equal to a negative 0.25 inches water gauge relative to the environment by control valves in the supply duct from the nuclear auxiliary building ventilation system. The effect of wind is accounted for in the pressure measurement, which controls the supply valves to maintain the negative pressure.

U.S. EPR FSAR Tier 2, Sections 6.2.3.2.1 and 6.2.3.3, and Table 6.2.3-2—Secondary Containment Response Analysis will be revised to reflect this updated information, which includes both the Safeguard Buildings and Fuel Building.

FSAR Impact:

U.S. EPR FSAR Tier 2, Sections 6.2.3.2.1 and 6.2.3.3, and Table 6.2.3-2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

uncontrolled release of radioactivity to the environment. The design description and performance criteria of the RSB are presented in Section 3.8.4.

The annulus ventilation system collects and filters airborne radioactive material that may leak from the primary containment by maintaining a subatmospheric pressure in the annulus.

By maintaining a subatmospheric pressure in the Fuel Building and Safeguard Building controlled-area, the fuel building ventilation system (FBVS) and safeguard building controlled-area ventilation system (SBVS) collect and filter airborne radioactive material that may leak from the primary containment. A description of the FBVS and SBVS is given in Sections 9.4.2 and 9.4.5, respectively.

6.2.3.2.2 Annulus Ventilation System

The AVS is designed to contain leakage from the primary containment by maintaining a subatmospheric pressure in the annulus. The AVS consists of three trains: one train is used during normal plant operation; two trains are used to mitigate potential accidents. AVS design and performance parameters are presented in Table 6.2.3-1.

Table 3.2.2-1 provides the seismic and other design classifications of the components in the AVS.

Refer to Section 12.3.6.5.6 for ventilation system design features which demonstrate compliance with the requirements of 10 CFR 20.1406.

6.2.3.2.2.1 AVS Normal Operation Train

The normal operation filtration train is shown in Figure 6.2.3-1. The full capacity normal operation filtration train is designed to maintain a subatmospheric pressure in the annulus, to maintain the annulus temperature above 45°F to prevent boron precipitation in the extra borating system piping, and to provide conditioned air in the annulus for personnel accessibility.

During normal operation, the conditioned air is drawn from the Nuclear Auxiliary Building ventilation supply shaft (See Section 9.4.3) through a fire damper, a motor-operated control damper, and two motor-operated isolation dampers. The supply air is distributed in the bottom of the annulus to four different locations. A subatmospheric pressure of less than or equal to -0.8 inches water gauge is maintained in the annulus during normal operation by regulating the control damper with two redundant pressure sensors located in the annulus.

The exhaust air is drawn from the top of annulus by the Nuclear Auxiliary Building ventilation system exhaust fans through two motor-operated isolation dampers and a

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.

Guard pipes surround high energy lines passing through the annulus to protect against pipe failures that could compromise the integrity of the secondary containment. Design criteria for guard pipes are presented in Section 3.6.2.2. Containment penetrations are listed in Section 6.2.4. Doors and hatches leading to the annulus are maintained under administrative control.

If a fire is detected in the annulus during normal operation, the continuous ventilation of the annulus is stopped manually from the MCR by closing the isolation~~fire~~ dampers ~~located at the wall penetration between the Fuel Building and Nuclear Auxiliary Building ventilation supply and exhaust shafts~~ to reduce the possibility for fire propagation.

Analyses have demonstrated the ability of the AVS to depressurize and maintain a subatmospheric pressure in the annulus during normal operation and following a design basis LOCA. The LOCA is assumed to occur concurrent with a loss of off-site power, and a loss of one of the accident trains. The total thermal and pressure expansion of the primary containment structure is assumed to occur prior to the start of the remaining accident train, resulting in a starting pressure of 14.712 psia. The drawdown of the annulus is started 60 seconds after the start of the postulated accident. Analytical results indicate that the pressure in the annulus reaches a subatmospheric pressure sufficient for the AVS to perform its safety function with substantial margin. Analytical specifications and results are presented in Table 6.2.3-2.

The components that make up the FBVS and SBVS are located inside the annulus, Fuel Building and Safeguard Buildings, which are classified Seismic Category I structures.

Analyses have demonstrated the ability of the SBVS to depressurize and maintain a subatmospheric pressure in the Fuel Building and controlled-area of the Safeguard Building following a design basis LOCA. The LOCA is assumed to occur concurrent with a loss of off-site power and a loss of one of the accident trains. The drawdown of the Fuel Building (FB) and controlled-area of the Safeguard Building (SB) is started 60 seconds after the start of the postulated accident. Analytical results indicate that the pressure in the FB and SB reaches a subatmospheric pressure sufficient for the SBVS to perform its safety function. Analytical specifications and results are presented in Table 6.2.3-2.

Table 6.2.3-2—Secondary Containment Response Analysis
Sheet 1 of 2

Design Feature [3]	Value	
Annulus Analysis		
Annulus temperature	Initial	86.5~~6~~°F
	After 24 hours	< 92°F
Annulus pressure	Start of drawdown	0.44 inches water gauge
	At 305 seconds	≤ -0.25 inches water gauge
	After 565 seconds	≤~~≥~~ -0.25~~2.5~~ inches water gauge
Annulus volume	Initial	706,293~~9~~ ft^3
	After compression and at start of drawdown analysis	704,737 ft^3
Heat transfer coefficients [1, 2]	N/A [4]	
Conductive heat transfer [1]	N/A [4]	
Radiant heat transfer [1]	N/A [4]	
Compressive effect of primary containment [1]	Volume reduction of 1556 ft^3	
Secondary containment in-leakage assumed [1]	0.25% of containment free volume per day	
Secondary containment out-leakage assumed [1]	Zero leakage out of ~~-~~the secondary containment	
Heat loads generated within annulus [1]	Negligible	
Safeguard Building Controlled Area and Fuel Building Analysis		
Safeguard Building temperature	Normal Operation	65°F to 86°F
	Initial [5]	113°F
Safeguard Building pressure	Start of drawdown	0.4 inches water gauge
	At 265 seconds	≤ -0.25 inches water gauge
	After 400 seconds	≤ -0.25 inches water gauge
Safeguard Building volume [6]	5.28x10^5 ft^3 (all four divisions)	
Secondary Containment in-leakage assumed from primary containment[1]	9.8 cfm	
Secondary Containment in-leakage assumed from the environment[1]	6 cfm per division	
Heat loads generated within the Safeguard Building	49.8 Btu/sec	
Fuel Building temperature	Normal Operation	65°F to 86°F
	Initial [5]	113°F

Next File

Table 6.2.3-2—Secondary Containment Response Analysis

Sheet 2 of 2

Design Feature [3]	Value	
Fuel Building pressure	Start of drawdown	0.6 inches water gauge
	At 289 seconds	≤ -0.25 inches water gauge
	After 400 seconds	≤ -0.25 inches water gauge
Fuel Building volume[6]	1.13×10^6 ft^3	
Secondary Containment in-leakage assumed from primary containment[1]	9.8 cfm	
Secondary Containment in-leakage assumed from the environment[1]	30 cfm	
Heat loads generated within the Fuel Building	120.3 Btu/sec	
Heat transfer coefficients (Safeguard Building and Fuel Building)	N/A	
Conductive heat transfer (Safeguard Building and Fuel Building)	N/A	
Radiant heat transfer (Safeguard Building and Fuel Building)	N/A	
Compressive effect of primary containment (Safeguard Building and Fuel Building)	N/A [6]	

Notes:

1. During postulated accident in primary containment.
2. Heat transfer calculated by methods provided in BTP 6-2.
3. Secondary containment response analysis based on worst single failure.
4. An infinite heat transfer coefficient was assumed such that the surface temperature in contact with primary containment is at the design maximum value from time zero.
5. Analysis of drawdown of the Fuel Building and controlled-area of the Safeguard Buildings was run for 1000 seconds.
6. The Fuel Building and Safeguard Buildings are not adjacent to the primary containment; therefore, they are not subject to compression from the expansion of the primary containment.