

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Monday, October 03, 2011 10:16 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); GUCWA Len (EXTERNAL AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSAR Ch. 6, Supplement 8
Attachments: RAI 437 Supplement 8 Response US EPR DC.pdf

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. Supplement 1 response to RAI 437 was provided on February 24, 2011 to revise the schedule for responding to Question 06.02.01-98. Supplement 2 response to RAI 437 was provided on March 16, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97, 06.02.01-98, 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 3 response to RAI 437 was provided on April 14, 2011 to revise the schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 4 response to RAI 437 was provided on April 28, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98. Supplement 5 response to RAI 437 was provided on May 25, 2011 to revise the schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 6 response to RAI 437 was sent on June 15, 2011 to provide complete and accurate responses for 3 of the 6 questions and revise the schedule for the 3 remaining questions. Supplement 7 response to RAI 437 was sent on August 10, 2011 to provide complete and accurate responses to 2 of the remaining 3 questions.

The attached file, "RAI 437 Supplement 8 Response US EPR DC.pdf" provides a technically correct and complete response to the one remaining question.

The following table indicates the respective pages in the response document, "RAI 437 Supplement 8 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 437 — 06.02.01-99	2	21

This concludes the formal AREVA NP response to RAI No. 437, 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: Wednesday, August 10, 2011 5:34 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); GUCWA Len

(External RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSAR Ch. 6, Supplement 7

Getachew,

AREVA NP Inc. letter NRC:11:088 dated August 10, 2011 provides a technically correct and complete response to 2 of the remaining 3 questions in RAI 437. AREVA NP considers some of the material contained in the response to be proprietary information. As required by 10 CFR 2.390(b), an affidavit is provided to support the withholding of the proprietary information from public disclosure. Proprietary and non-proprietary versions of the enclosure to this letter are provided separately.

The following table indicates the respective pages in the enclosure that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 437 — 06.02.01-100	2	22
RAI 437 — 06.02.01-101	23	24

The schedule for a technically correct and complete response to the one remaining question of RAI No. 437 has been changed as provided below.

Question #	Schedule
RAI 437 — 06.02.01-99	October 5, 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: RYAN Tom (RS/NB)

Sent: Wednesday, June 15, 2011 7:49 AM

To: 'Tesfaye, Getachew'

Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); GUCWA Len (External RS/NB); WILLIFORD Dennis (RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSARCh. 6, Supplement 6

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. Supplement 1 response to RAI 437 was provided on February 24, 2011 to revise the schedule for responding to Question 06.02.01-98. Supplement 2 response to RAI 437 was provided on March 16, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97, 06.02.01-98, 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 3 response to RAI 437 was provided on April 14, 2011 to revise the schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 4 response to RAI 437 was provided on April 28, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98. Supplement 5 response to RAI 437 was provided on May 25, 2011 to revise the schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101.

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI) for Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98. The attached file, "RAI 437 Supplement 6 Response US EPR DC.pdf" provides a technically correct and complete FINAL response to 3 of the 6 questions.

The following table indicates the respective pages in the response document, "RAI 437 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 437 — 06.02.01-96	2	3
RAI 437 — 06.02.01-97	4	7
RAI 437 — 06.02.01-98	8	9

AREVA NP is providing a revised schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101. The schedule for a technically correct and complete response to these questions is listed below.

Question #	Response Date
RAI 437 — 06.02.01-99	August 10, 2011
RAI 437 — 06.02.01-100	August 10, 2011
RAI 437 — 06.02.01-101	August 10, 2011

Sincerely,

**Tom Ryan 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, May 25, 2011 5:16 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSARCh. 6, Supplement 5

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. Supplement 1 response to RAI 437 was provided on February 24, 2011 to revise the schedule for responding to Question 06.02.01-98. Supplement 2 response to RAI 437 was provided on March 16, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97, 06.02.01-98, 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 3 response to RAI 437 was provided on April 14, 2011 to revise the schedule for responding to Questions 06.02.01-99, 06.02.01-100

and 06.02.01-101. Supplement 4 response to RAI 437 was provided on April 28, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98.

AREVA NP is providing a revised schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101. The schedule for a technically correct and complete response to these questions is listed in bold below. The schedule for Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98, also provided below, is unchanged.

Question #	Response Date
RAI 437 — 06.02.01-96	June 15, 2011
RAI 437 — 06.02.01-97	June 29, 2011
RAI 437 — 06.02.01-98	June 15, 2011
RAI 437 — 06.02.01-99	June 22, 2011
RAI 437 — 06.02.01-100	June 22, 2011
RAI 437 — 06.02.01-101	June 22, 2011

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 BM Drive, Mail Code CLT 2B
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Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WELLS Russell (RS/NB)
Sent: Thursday, April 28, 2011 2:05 PM
To: Tesfaye, Getachew
Cc: GUCWA Len (External 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. 437, FSARCh. 6, Supplement 4

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. Supplement 1 response to RAI 437 was provided on February 24, 2011 to revise the schedule for responding to Question 06.02.01-98. Supplement 2 response to RAI 437 was provided on March 16, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97, 06.02.01-98, 06.02.01-99, 06.02.01-100 and 06.02.01-101. Supplement 3 response to RAI 437 was provided on April 14, 2011 to revise the schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101.

To provide an opportunity for additional interaction with the NRC staff, AREVA NP is providing a revised schedule for responding to Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98 as provided below. The schedule for Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101 is unchanged.

Question #	Response Date
RAI 437 — 06.02.01-96	June 15, 2011
RAI 437 — 06.02.01-97	June 29, 2011

RAI 437 — 06.02.01-98	June 15, 2011
RAI 437 — 06.02.01-99	May 25, 2011
RAI 437 — 06.02.01-100	May 25, 2011
RAI 437 — 06.02.01-101	May 25, 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

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Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)

Sent: Thursday, April 14, 2011 1:30 PM

To: 'Tesfaye, Getachew'

Cc: GUCWA Len (External 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. 437, FSARCh. 6, Supplement 3

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. Supplement 1 response to RAI 437 was provided on February 24, 2011 to revise the schedule for responding to Question 06.02.01-98. Supplement 2 response to RAI 437 was provided on March 16, 2011 to revise the schedule for responding to Questions 06.02.01-96, 06.02.01-97, 06.02.01-98, 06.02.01-99, 06.02.01-100 and 06.02.01-101.

To provide an opportunity for additional interaction with the NRC staff, AREVA NP is providing a revised schedule for responding to Questions 06.02.01-99, 06.02.01-100 and 06.02.01-101 as provided below. The schedule for Questions 06.02.01-96, 06.02.01-97 and 06.02.01-98 is unchanged.

Question #	Response Date
RAI 437 — 06.02.01-96	April 28, 2011
RAI 437 — 06.02.01-97	April 28, 2011
RAI 437 — 06.02.01-98	April 28, 2011
RAI 437 — 06.02.01-99	May 25, 2011
RAI 437 — 06.02.01-100	May 25, 2011
RAI 437 — 06.02.01-101	May 25, 2011

Sincerely,

Russ Wells

U.S. EPR Design Certification Licensing Manager

AREVA NP, Inc.

3315 Old Forest Road, P.O. Box 10935

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Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)

Sent: Wednesday, March 16, 2011 4:34 PM

To: 'Tesfaye, Getachew'

Cc: GUCWA Len (External 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. 437, FSARCh. 6, Supplement 2

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. Supplement 1 response to RAI 437 was provided on February 24, 2011 to revise the schedule for responding to Question 06.02.01-98.

To provide an opportunity for additional interaction with the NRC staff, AREVA NP is providing a revised schedule for responding to Questions 06.02.01-96, 06.02.01-97, 06.02.01-98, 06.02.01-99, 06.02.01-100 and 06.02.01-101.

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

Question #	Response Date
RAI 437 — 06.02.01-96	April 28, 2011
RAI 437 — 06.02.01-97	April 28, 2011
RAI 437 — 06.02.01-98	April 28, 2011
RAI 437 — 06.02.01-99	April 14, 2011
RAI 437 — 06.02.01-100	April 14, 2011
RAI 437 — 06.02.01-101	April 14, 2011

Sincerely,

Russ Wells

U.S. EPR Design Certification Licensing Manager

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Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)

Sent: Thursday, February 24, 2011 4:51 PM

To: 'Tesfaye, Getachew'

Cc: BRYAN Martin (External RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSARCh. 6, Supplement 1

Getachew,

On November 19, 2010, AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to the 6 questions in RAI 437. To provide an opportunity for additional interaction with the NRC staff, AREVA NP is providing a revised schedule for responding to Question 06.02.01-98. The schedule for the remaining questions is unchanged.

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

Question #	Response Date
RAI 437 — 06.02.01-96	March 31, 2011
RAI 437 — 06.02.01-97	March 31, 2011
RAI 437 — 06.02.01-98	April 14, 2011
RAI 437 — 06.02.01-99	March 16, 2011
RAI 437 — 06.02.01-100	March 16, 2011
RAI 437 — 06.02.01-101	March 16, 2011

Sincerely,

Russ Wells

U.S. EPR Design Certification Licensing Manager

AREVA NP, Inc.

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Russell.Wells@Areva.com

From: BRYAN Martin (External RS/NB)

Sent: Friday, November 19, 2010 2:49 PM

To: 'Tesfaye, Getachew'

Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB); 'Miernicki, Michael'

Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSARCh. 6

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 437 Response US EPR DC.pdf" provides a schedule since a technically correct and complete response to the 6 questions is not provided.

The following table indicates the respective pages in the response document, "RAI 437 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 437 — 06.02.01-96	2	2

RAI 437 — 06.02.01-97	3	3
RAI 437 — 06.02.01-98	4	4
RAI 437 — 06.02.01-99	5	5
RAI 437 — 06.02.01-100	6	6
RAI 437 — 06.02.01-101	7	7

A complete answer is not provided for 6 of the 6 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 437 — 06.02.01-96	March 31, 2011
RAI 437 — 06.02.01-97	March 31, 2011
RAI 437 — 06.02.01-98	March 16, 2011
RAI 437 — 06.02.01-99	March 16, 2011
RAI 437 — 06.02.01-100	March 16, 2011
RAI 437 — 06.02.01-101	March 16, 2011

Sincerely

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

From: Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]
Sent: Wednesday, October 20, 2010 7:18 AM
To: ZZ-DL-A-USEPR-DL
Cc: Jensen, Walton; Jackson, Christopher; McKirgan, John; Carneal, Jason; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 437 (4953), FSARCh. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 18, 2010, and discussed with your staff on September 30, 2010. Draft RAI Questions 06.02.01-97 and 06.02.01-98 were modified as a result of that discussion. 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: 3451

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D48E8B0C)

Subject: Response to U.S. EPR Design Certification Application RAI No. 437, FSAR Ch. 6, Supplement 8
Sent Date: 10/3/2011 10:15:49 PM
Received Date: 10/3/2011 10:16:22 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:

"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@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
"GUCWA Len (EXTERNAL AREVA)" <Len.Gucwa.ext@areva.com>
Tracking Status: None
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Files	Size	Date & Time
MESSAGE	18316	10/3/2011 10:16:22 PM
RAI 437 Supplement 8 Response US EPR DC.pdf		4469765

Options

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

Response to

Request for Additional Information No. 437, Supplement 8

10/20/2010

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 06.02.01 - Containment Functional Design

Application Section: 6.02.01, 14.03

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

Question 06.02.01-99:**Follow-up to RAI 221, Question 06.02.01-23**

Supplement 8 response lists compartments that are isolated from the main containment by doors but are connected by vents, drains and penetrations for piping and cable. The volume of these rooms is stated to be included in the calculations for bulk containment pressure.

- a. Provide justification that the vents, drains and penetration openings connecting each of these compartments to the bulk containment are adequate to sufficiently equalize before the peak containment pressure is reached for design basis accidents.
- b. The "Net Room Volumes" provided in Table 06.02.01-23-1 differs from the values for the compartments provided to the staff in the response to RAI 40. Provide a comparison between the volumes in the two responses. Identify which values are correct and discuss the reasons for which different values were given.

Response to Question 06.02.01-99:

- a. Several compartments are isolated from the main containment by doors as identified in Table 06.02.01-23-1 of the response to RAI 221, Question 06.02.01-23, Supplement 8. Some of these compartments serve as access rooms; others house equipment for auxiliary systems.

The configuration of the compartments is such that some have no vents while others are dead-ended. The dead-ended rooms are connected to surrounding rooms by vents, drains, or penetrations (for piping and cables).

The compartments that have no vents are referred to in the ensuing discussion as "isolated" rooms; dead-ended rooms with vents, drains, or penetrations are referred to as "closed" rooms. The closed rooms are characterized by inadequate circulation; as a result, they are likely to have higher air concentrations than fully circulated rooms. The isolated rooms have practically no circulation.

The rooms listed in Table 06.02.01-23-1 of the response to RAI 221, Question 06.02.01-23, Supplement 8 are divided by common system function and/or proximity into the following groups:

1. Nuclear island drain and vent system (NIDVS) sump room (UJA04004, per U.S. EPR general arrangement drawings, spanning the -20ft and -8ft elevations).
2. Chemical volume and control system (CVCS) valve (UJA07028, UJA07029, UJA110022, and UJA11023) and heat exchanger (UJA07026, UJA07027, and UJA11024) rooms; and NIDVS heat exchanger room (UJA07021).
3. Fuel pool purification system (FPPS) valve rooms, UJA11021 and UJA15025.
4. Pumped emergency core cooling system (low head safety injection and medium head safety injection) valve rooms for RCS loops 1 and 2 (UJA11025, UJA11026, and UJA11031) and for loops 3 and 4 (UJA11027, UJA11028, and UJA11032).

5. Access room to transfer tube compartment, UJA15020.
6. Access room to reactor cavity, UJA15024.
7. Corridor adjacent to south staircase, UJA18020, per U.S. EPR general arrangement drawing.
8. Vessel instrumentation rooms, UJA23041 and UJA23042.
9. Containment ventilation equipment room, UJA29022.
10. Access room to emergency airlock, UJA29023.
11. Access room to pressurizer (PZR) head and valves room, UJA34022, per U.S. EPR general arrangement drawing.

The groups of rooms designated above are examined below to clarify their configuration, whether isolated or closed, and extent of communication of the closed rooms with the rest of containment. Conclusions are made regarding the impact of including these rooms in the GOTHIC multi-node containment model used for calculation of bulk containment pressure during design basis accidents.

Isolated Compartments

Based on their configuration, the following rooms will be shown in this section to be isolated rooms:

- UJA04004—NIDVS sump room.
- UJA11031—access to pumped Emergency Core Cooling System (ECCS) valve rooms for loop 1 and 2.
- UJA11032—access to pumped ECCS valve rooms for loop 3 and 4.
- UJA18020—corridor adjacent to south staircase, per general arrangement drawing.
- UJA15024—access to reactor cavity.
- UJA15025—FPPS valve room.
- UJA23041— Vessel instrumentation room.

The free volume of the isolated rooms included in the multi-node model constitutes a negligible fraction (0.271 percent) of the total containment free volume, as seen in Table 06.02.01-99-1. Therefore, the affect of these rooms not pressurizing is minimal. It follows inclusion of these rooms in the multi-node model has a negligible impact on the calculation of bulk containment pressure.

UJA04004—NIDVS Sump Room

The NIDVS sump region spans the -20ft and -8ft elevations. General arrangement drawings designate the sump region at both elevations as room UJA04004. In the

COCOSYS nomenclature, separate room names are given to the -20ft (UJA04004) and -8ft (UJA07019) elevations.

The room name of the NIDVS sump room in Table 06.02.01-23-1 of the response to RAI 221, Question 06.02.01-23, Supplement 8 is modified in Table 06.02.01-99-1 to "UJA04004" to be consistent with general arrangement drawings. Note the free volume value for room UJA04004 is listed in Table 06.02.01-99-1 as 1491 ft³ as it includes the free volume of the sump region at both the -20 ft and -8ft elevations. The free volume value of the sump region listed in Table 06.02.01-23-1 includes only the volume at the -8 ft elevation. The free volume of the sump region is larger than COCOSYS because of deeper sump at the -20ft elevation and significantly larger size sump at the -8ft elevation.

There is a free opening connecting the -20ft to the -8ft sump per the COCOSYS database (primary vent path #21 from Table 2 of COCOSYS).

General arrangement drawings and COCOSYS define the sump region as isolated room as there is a door between UJA04004 and the adjacent SG blowdown system HX room (UJA07018), and there are no vents from UJA04004 to the neighboring rooms.

UJA11031 and UJA11032—Access to Pumped ECCS Valve Rooms for Loops 1-4

Rooms UJA11031 and UJA11032 are symmetric with the former serving as access room to pumped ECCS valve rooms for loops 1 and 2 and the latter serving as access room to pumped ECCS valve rooms for loops 3 and 4.

The COCOSYS primary vent paths updated to the U.S. EPR design (Table 06.02.01-100-3 of the response to RAI 437, Question 06.02.01-100) and general arrangement drawing show doors between UJA11031 and its respective valve compartments UJA11025 (+5 ft Door 21) and UJA11026 (+5 ft Door 20). Similarly there are doors between UJA11032 and its respective valve compartments UJA11027 (+5 ft Door 22) and UJA11028 (+5 ft Door 23). In addition there are no vents from UJA11031 and UJA11032 to the neighboring rooms. Therefore, UJA11031 and UJA11032 are considered isolated rooms.

UJA18020—Corridor Adjacent to South Staircase, per General Arrangement Drawing

Geometric data were not given for room UJA18020 in the COCOSYS database. Since the multi-node model was based on COCOSYS, this room was not included in the model.

General arrangement drawing shows doors between UJA18020 and its adjacent rooms (i.e., accessible space room (UJA18013) and RCP room for loop 1 (UJA18002)). In addition, there are no vents from UJA18020 to the neighboring rooms. Therefore, UJA18020 is considered an isolated room.

UJA15024—Access to Reactor Cavity

General arrangement drawing and COCOSYS show doors between UJA15024 and its adjacent rooms (i.e., reactor cavity (UJA15001) and spray lines area room (UJA15018)).

In addition, there are no vents from UJA15024 to the neighboring rooms. Therefore, UJA15024 is considered an isolated room.

UJA15025—FPPS Valve Room

The general arrangement drawing and COCOSYS show doors between UJA15025 and its adjacent rooms, i.e., service area room (UJA15013) and RCP room for loop 1 (UJA15002). In addition there are no vents from UJA15025 to the neighboring rooms. Therefore, UJA15025 is considered isolated room.

UJA23041—Vessel Instrumentation Room

The general arrangement drawing and COCOSYS show a door between UJA23041 and the adjacent instrumentation room (UJA23042). In addition there are no vents from UJA23041 to the neighboring rooms. Therefore, UJA23041 is considered isolated room.

Closed Compartments

Based on their configuration, the following rooms will be shown in this section to be closed rooms:

- UJA07021, UJA07026, UJA07027, UJA07028, UJA07029, UJA11022, UJA11023 and UJA11024—CVCS and NIDVS valve and HX Rooms.
- UJA11025, UJA11026—Pumped ECCS valve rooms for loop 1 and 2.
- UJA11027, UJA11028—Pumped ECCS valve rooms for loop 3 and 4.
- UJA15020—Access to transfer tube compartment.
- UJA11021—FPPS valve room.
- UJA23042— Vessel instrumentation room.
- UJA29022—Containment ventilation equipment room.
- UJA34022—Access to PZR head & valves room, per general arrangement drawing.
- UJA29023—Access to emergency airlock.

In general, peak containment pressure is calculated to occur over the long term as a consequence of design basis accidents. Condensation heat transfer to the heat sinks and structure conduction, specifically, the physical properties of concrete, control the pressure response in the long term rather than free volume, which is of importance early in the transient during blowdown. These long term phenomena are significantly affected by heat sink area input.

The closed rooms that were lumped into the larger accessible space control volumes (V21, V22 and V24) are shown below to add up to less than 3 percent of the total heat sinks area inside containment. Therefore, the impact of including these rooms in the multi-node model calculating peak containment pressure is insignificant based on the importance of the above long term phenomena.

It should also be noted that the circulation flow patterns involving the closed rooms, however imperfect, are likely to have enough time to pressurize these rooms before the occurrence of the peak pressure over the long term.

Finally, the free volume of the closed rooms included in the multi-node model is less than 2 percent of the total containment free volume, which is within the reduced free volume conservative margin of close to 3 percent relative to nominal that is applied to the multi-node model.

UJA07021, UJA07026, UJA07027, UJA07028, UJA07029, UJA11022, UJA11023 and UJA11024—CVCS and NIDVS Valve and HX Rooms

The description below will show these rooms to be closed rooms and to be logically lumped into GOTHIC control volume V17, based on common system function, and with restrictive communication paths to the other control volumes in the GOTHIC multi-node containment model; provide a realistic flow representation to and from this cluster of CVCS and NIDVS rooms.

As shown in Figure 06.02.01-99-1 and Figure 06.02.01-99-2, there are multiple vents/penetrations interconnecting the NIDVS and CVCS rooms UJA07021, UJA07026, UJA07027, UJA07028, and UJA07029. The vents/penetrations from these rooms to neighboring rooms can also be seen in these 3D pictorials.

As can be seen in Figure 06.02.01-99-3, there are multiple vents/penetrations interconnecting the CVCS rooms UJA11022, UJA11023, and UJA11024. In addition, this 3D pictorial shows multiple drains from UJA11023 to the rooms below it, (i.e. rooms UJA07027, UJA07028, UJA07029.)

From the governing paths modeled in the GOTHIC multi-node containment model, rooms UJA11022, UJA11023, and UJA11024 are dead-ended at the top with closed ceiling. However, the vents/penetrations and drains described above guarantee communication amongst the rooms of interest and with the neighboring rooms.

The multi-node model lumped the rooms of interest, described above, with the neighboring NIDVS rooms UJA07020, UJA07022, UJA07023, and UJA07024 (in addition to flooding device rooms, UJA04005 and UJA04006) to form lumped control volume V17.

From the COCOSYS database, and the GOTHIC input, there are restrictive openings connecting the CVCS/NIDVS control volume (V17) to the in-containment refueling water storage tank (IRWST) control volume (V2) only. These openings are comprised of four paths (primary vent path #'s 13-16 from Table 2 of the COCOSYS database) each with an area of 4.3 ft². These paths were combined into lumped GOTHIC flow path, FP4, as the only free opening flow path connecting V17 to another control volume (V2) in the multi-node containment model.

UJA11025, UJA11026, UJA11027 and UJA11028—Pumped ECCS Valve Rooms for Loops 1-4

Rooms UJA11025 and UJA11026 are symmetric with rooms UJA11027 and UJA11028 with the former serving as pumped ECCS valve rooms for loops 1 and 2 respectively, and the latter serving as pumped ECCS valve rooms for loops 3 and 4 respectively.

Because of the drain paths in rooms UJA11025 and UJA11026 (shown in Figure 06.02.01-99-4) to the large accessible space room below them (UJA07014), these rooms are considered closed rooms rather than isolated rooms.

Similar drain paths exist in symmetric rooms UJA11027 and UJA11028 to the large accessible space room below them (UJA07015); therefore, these rooms are also considered closed rooms rather than isolated rooms.

These small rooms have been lumped into the control volumes representing the large accessible middle annulus spaces (V21 and V22) based on proximity of these rooms to these accessible spaces; where UJA11025 and UJA11026 were lumped into V21 and UJA11027 and UJA11028 were lumped into V22.

As mentioned briefly above, in the isolated compartments section (refer to access to pumped ECCS valve rooms for loops 1-4 subsection), there was a design change from COCOSYS to U.S. EPR design whereby primary vent paths #'s 100, 101, 103, and 104 were converted from free openings to doors between UJA11031 and UJA11032 and their respective valve compartments UJA11025 (+5 ft Door 21), UJA11026 (+5 ft Door 20), UJA11027 (+5 ft Door 22) and UJA11028 (+5 ft Door 23). This revision to vent path #'s 100, 101, 103, and 104 is shown among the list of other pathway revisions made to reconcile COCOSYS to U.S. EPR design in Table 06.02.01-100-3 of the response to RAI 437, Question 06.02.01-100.

The concrete heat sinks area associated with rooms UJA11025, UJA11026, UJA11027, and UJA11028, (7,568 ft²), is 1 percent of the total heat sinks area inside containment.

UJA15020—Access to Transfer Tube Compartment

Room UJA15020 communicates with room UJA15021 (through primary vent path # 150, from Table 2 of COCOSYS), which communicates through a large open path with the room above it in the dome region (i.e., room UJA29016 (through primary vent path #151)). Therefore, these communication paths characterize room UJA15020 as closed room rather than isolated room.

This small room (i.e., UJA15020) has been lumped into the control volume representing the large accessible middle annulus space (V21) based on proximity of this room to this accessible space.

The concrete heat sinks area associated with room UJA15020 (2,248 ft²) is 0.31 percent of the total heat sinks area inside containment.

UJA11021—FPPS Valve Room

Because of the drain path in room UJA11021 and vents to surrounding areas (shown in Figure 06.02.01-99-5), this room is considered a closed room rather than an isolated room.

This small room (i.e., UJA11021) has been lumped into the control volume representing the large accessible middle annulus space (V21) based on proximity of this room to this accessible space.

There was a design change from COCOSYS to U.S. EPR whereby primary vent path #95 was converted from free opening to door between room UJA11021 and annulus space UJA11013 (+5 ft Door 12). Room UJA11013 was also lumped into V21. This revision to vent path #95 is shown among the list of other pathway revisions made to reconcile COCOSYS to U.S. EPR design; in Table 06.02.01-100-3 of the response to RAI 437, Question 06.02.01-100. However, there are vents from UJA11021 to surrounding areas that in effect bypass this door, as shown in Figure 06.02.01-99-5 and described above.

The concrete heat sinks area associated with room UJA11021 (1,495 ft²) is 0.21 percent of the total heat sinks area inside containment.

UJA23042—Vessel Instrumentation Room

Compartment UJA23042 contains two safety-related doors, +45 ft Door 2 and +45 ft Door 15. Door 2 connects UJA23042 with UJA23019 and will open when there is a 2.90 psi pressure differential from room UJA23019 to UJA23042. Door 15 connects UJA23042 with UJA23014 and will open when there is a 1.45 psi pressure differential from room UJA23014 to UJA23042. During a pressurization of the containment, this compartment will have open vent paths to the annulus area (UJA23014) and/or the pressurizer compartment (UJA23019). Therefore, this room is considered a closed room rather than an isolated room.

This small room (i.e., UJA23042) has been lumped into the control volume representing the large accessible middle annulus space (V21) based on proximity of this room to this accessible space. Note there was a design change from COCOSYS to U.S. EPR design whereby primary vent path #243 was converted from free opening to door between room UJA23042 and annulus space UJA23014 (+45 ft Door 15). Room UJA23014 being itself also lumped into V21. This revision to vent path #243 is shown among the list of other pathway revisions made to reconcile COCOSYS to U.S. EPR design; in Table 06.02.01-100-3 of the response to RAI 437, Question 06.02.01-100.

The concrete heat sinks area associated with room UJA23042 (2063 ft²) is 0.28 percent of the total heat sinks area inside containment.

UJA29022, UJA34022—Containment Ventilation Equipment and Access to PZR Head and Valves Rooms

A snapshot of the penetrations in room UJA29022, which permit venting to the surrounding areas, is shown in Figure 06.02.01-99-6. Because of these communication paths, this room is considered a closed room rather than an isolated room.

Similar venting is applicable to room UJA34022, which is modeled to be situated above UJA29022 consistent with COCOSYS and OL3. Therefore, this room is modeled as a closed room rather than an isolated room.

The U.S. EPR design made a design change, which relocated UJA34022 next to the north staircase room (UJA34011) to be the access to the PZR head and valves room (UJA34019). The multi-node model represented this room prior to the design change as described above. The free volume prior to the design change was given in COCOSYS as 7698 ft³. The free volume of this room was reduced as a result of the design change to 2805 ft³ as given in Table 06.02.01-23-1 of the response to RAI 221, Question 06.02.01-23, Supplement 8.

These small rooms (i.e., UJA29022 and UJA34022) have been lumped into the control volume representing the large accessible upper annulus space (V24) based on proximity of these rooms to this accessible space. Note there was a design change from COCOSYS to U.S. EPR whereby primary vent path #278 was converted from free opening to door between room UJA29022 and annulus space UJA29015 (+64 ft Door 5). Room UJA29015 being itself also lumped into V24. This revision to vent path #278 is shown among the list of other pathway revisions made to reconcile COCOSYS to U.S. EPR design; in Table 06.02.01-100-3 of the response to RAI 437, Question 06.02.01-100.

The concrete heat sinks area associated with rooms UJA29022 and UJA34022, (4879 ft²) is 0.67 percent of the total heat sinks area inside containment.

UJA29023—Access to Emergency Airlock

Room UJA29023 at elevation +64 ft communicates with the south staircase rooms below it all the way down to elevation +5 ft. This straight through communication path characterizes this room as a closed room rather than an isolated room.

Room UJA29023 and the south staircase rooms below it (i.e., rooms UJA11010, UJA15010, UJA18010, UJA23010) were logically lumped into the same control volume (V27) given the configuration of these rooms alluded to above.

- b. The rooms and volumes shown in Table 06.02.01-23-1 were derived from a RB compartment model created to support subcompartment pressurization analysis. The free volume was calculated using dimensional data obtained from the RB general arrangement drawings. The free volumes of each compartment account for the space occupied by any major equipment and include an occupancy factor of 0.98 to account for the volume taken up by pipes, raceways, structural members, and other unknown equipment.

The rooms and volumes given in the Response to RAI 40, Question 06.02.01-11, were taken from a multi-node model of the RB based on the COCOSYS containment model for OL3. The U.S. EPR GOTHIC multi-node model is based on these values. The GOTHIC multi-node model applies an uncertainty factor of ≈ 0.977 to the net free volumes of the COCOSYS control volumes. The free volume values presented in the Response to RAI 40, Question 06.02.01-11 were based on the values from the COCOSYS model without the uncertainty applied.

Table 06.02.01-99-2 lists the values provided in the Response to RAI 40, Question 06.02.01-11 and the values used in the U.S. EPR GOTHIC multi-node model compared to the free volumes from the subcompartment model. The totals are taken excluding the IRWST free volume because the free volume of the IRWST fluctuates depending on water level. A comparison between the models shows some differences in volumes in room-to-room comparisons. However, the total free volume of the RB is nearly identical.

Because of the different methodologies used to derive free volume inputs, there are slight room-to-room volume differences between the models. However, because the total free volume is conserved between the models provides a validation of the methodologies used.

Different models are used for different purposes. One model was used for subcompartment analysis; the other model was used to conduct design basis accident calculations. The purpose of the multi-node GOTHIC model is to perform design basis accident calculations to determine bulk containment pressure. The bulk containment pressure is dependent on integrated free volume to a much larger degree than variations in local room volumes. The integrated free volume is captured by both models as described above. Therefore, the multi-node GOTHIC model is adequate for the purpose for which it is used.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Table 06.02.01-99-1—Isolated Compartments

Room Name	Description	Volume ^a (ft³)	Percentage of Total Volume
UJA04004	KT (NIDVS) Sump Room	1491	0.055
UJA11031	Access to Loop 1 & 2 Area	896	0.033
UJA11032	Access to Loop 3 & 4 Area	896	0.033
UJA15024	Access to Reactor Cavity	511	0.019
UJA15025	FAL (FPPS) Room	1505	0.056
UJA18020	Corridor	1811	N/A ^b
UJA23041	Instrumentation Measuring Table	2055	0.075
Total		9165	0.271

- a. room free volume data from the RB compartment model which is used for subcompartment analysis
- b. volume of room UJA18020 was not included in the GOTHIC multi-node model used to calculate containment pressure response to design basis accidents

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft ³)	GOTHIC CV Free Volume (ft ³)	Room Name	Room Free Volume (ft ³)
V1 - Spreading Rooms	UJA04002	17655.37	19594.30	UJA04002	23766.48
	UJA07017	2401.13		UJA04003	704.74
V2 - IRWST	UJA04003	53637.01	103396.90	UJA04004	686.38
V3 - Lower Equipment Rooms L1	UJA11002	6899.72	25593.30	UJA04005	1660.14
	UJA11003	7768.36		UJA04006	1660.14
	UJA15002	3548.73		UJA04012	504.19
	UJA15003	7980.23		UJA04013	2598.22
	UJA11004	7768.36	24299.70	UJA07001	2137.39
V4 - Lower Equipment Rooms L2	UJA11005	5840.40		UJA07003	23739.28
	UJA15004	7980.23		UJA07004	804.84
	UJA15005	3283.90		UJA07012	683.02
	UJA18002	9004.24	39785.30	UJA07013	11463.99
V5 - Middle Equipment Rooms L1	UJA18003	8792.37		UJA07014	21126.87
	UJA23002	6754.94		UJA07015	21506.19
	UJA23003	7824.86		UJA07016	21501.54
	UJA23017	6355.93		UJA07017	890.34
	UJA23020	1991.53		UJA07018	9209.97
	UJA18004	8792.37	38464.10	UJA07020	3085.47
V6 - Middle Equipment Rooms L2	UJA18005	8474.58		UJA07021	1172.33
	UJA23004	11052.26		UJA07022	3254.92
	UJA23005	11052.26		UJA07023	2629.15
	UJA29003	5261.30	37032.50	UJA07024	2783.10
V7 Upper Equipment Rooms L1 & L2	UJA29004	5261.30		UJA07026	1542.49
	UJA29005	4237.29		UJA07027	1471.09
	UJA34003	9869.35		UJA07028	1584.23
	UJA34004	9869.35		UJA07029	1259.74
	UJA34005	3407.49		UJA11001	207.30
V8 - RPV Pit	UJA11001	3001.41	2932.20	UJA11002	8339.55

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft ³)	GOTHIC CV Free Volume (ft ³)	Room Name	Room Free Volume (ft ³)
V9 - Reactor Cavity	UJA15001	29943.50	50948.56	UJA11003	8654.32
	UJA15017	21751.41		UJA11004	8654.32
	UJA15024	455.51		UJA11005	7376.11
V10 - Lower Equipment Rooms L3	UJA11006	5840.40	24299.70	UJA11006	7250.57
	UJA11007	7768.36		UJA11007	8654.32
	UJA15006	3283.90		UJA11008	8654.32
	UJA15007	7980.23		UJA11009	9070.31
	UJA11008	7768.36		UJA11010	971.74
V11 - Lower Equipment Rooms L4	UJA11009	6899.72	25541.60	UJA11012	653.58
	UJA15008	7980.23		UJA11013	15762.82
	UJA15009	3495.76		UJA11014	10677.04
	UJA18006	8474.58		UJA11015	12062.92
	UJA18007	8792.37		UJA11016	16195.85
V12 - Middle Equipment Rooms L3	UJA23006	7824.86	35311.10	UJA11017	1220.90
	UJA23007	11052.26		UJA11018	9234.26
	UJA18008	8792.37		UJA11019	5127.41
	UJA18009	7627.12		UJA11020	10469.97
	UJA23008	11052.26		UJA11021	1255.54
V13 - Middle Equipment Rooms L4	UJA23009	6754.94	41082.40	UJA11022	2052.60
	UJA23018	6355.93		UJA11023	4471.22
	UJA23031	1468.93		UJA11024	2020.49
	UJA29006	4237.29		UJA11025	1985.70
	UJA29007	5261.30		UJA11026	1589.87
V14 - Upper Equipment Rooms L3 & L4	UJA29008	5261.30	37032.50	UJA11027	1589.87
	UJA34006	3407.49		UJA11028	1985.70
	UJA34007	9869.35		UJA11031	895.68
	UJA34008	9869.35		UJA11032	895.68

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft³)	GOTHIC C V Free Volume (ft³)	Room Name	Room Free Volume (ft³)	
V15 - Surge Line and Below	UJA11018	9110.17	40696.10	UJA15001	5275.47	
	UJA11019	4908.19		UJA15002	3644.82	
	UJA15018	4731.64		UJA15003	3630.55	
	UJA15019	5568.50		UJA15004	3753.70	
	UJA18018	8757.06		UJA15005	4481.12	
	UJA18019	8580.51		UJA15006	4481.12	
	UJA23019	6762.01		18921.60	UJA15007	3753.70
	UJA23041	2612.99			UJA15008	3630.55
	UJA29019	5473.16			UJA15009	3644.82
V17 - Components	UJA34019	4519.77	28387.50	UJA15010	1352.87	
	UJA04005	441.38		UJA15011	2144.52	
	UJA04006	441.38		UJA15012	501.96	
	UJA07020	3495.76		UJA15013	16101.23	
	UJA07021	1221.75		UJA15014	16827.92	
	UJA07022	3142.66		UJA15015	17960.66	
	UJA07023	2789.55		UJA15016	20755.09	
	UJA07024	3319.21		UJA15017	2061.76	
	UJA07026	1765.54		UJA15018	4254.68	
	UJA07027	1800.85		UJA15019	4934.18	
	UJA07028	1553.67		UJA15020	2082.07	
	UJA07029	1377.12		UJA15021	2239.40	
V18 - SG Blowdown	UJA11022	2012.71	12346.50	UJA15023	1161.06	
	UJA11023	3495.76		UJA15024	511.15	
	UJA11024	2199.86		UJA15025	1505.49	
	UJA04004	321.33		UJA15026	1389.79	
	UJA07018	12040.96		UJA15027	1389.79	
V19 - Lower Annulus Rooms L1 & L2	UJA07019	275.42	22423.00	UJA18001	9848.76	
	UJA07014	22951.98		UJA18002	5455.91	

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft³)	GOTHIC CV Free Volume (ft³)	Room Name	Room Free Volume (ft³)
V20 - Lower Annulus Rooms L3 & L4	UJA07015	22951.98	22423.00	UJA18003	6437.21
V21 - Middle Annulus Rooms L1 & L2	UJA11013	10911.02	182406.10	UJA18004	6628.09
	UJA11014	16207.63		UJA18005	6572.70
	UJA11021	1447.74		UJA18006	6572.70
	UJA11025	1945.62		UJA18007	6628.09
	UJA11026	1677.26		UJA18008	6437.21
	UJA11031	741.53		UJA18009	5461.59
	UJA15013	15148.31		UJA18010	1943.56
	UJA15014	17584.75		UJA18011	3143.51
	UJA15020	2330.51		UJA18012	677.29
	UJA15021	9427.97		UJA18013	27636.54
	UJA15025	1666.67		UJA18014	23839.36
	UJA18013	27259.89		UJA18015	26046.39
	UJA18014	27718.93		UJA18016	32767.17
	UJA23013	23658.19		UJA18017	7892.52
UJA23014	24392.66	UJA18018	7563.91		
UJA23042	4590.40	UJA18019	7563.91		
V22 - Middle Annulus Rooms L3 & L4	UJA11015	17196.33	176396.70	UJA18020	1811.43
	UJA11016	11970.34		UJA18021	2077.84
	UJA11027	1677.26		UJA18023	2957.49
	UJA11028	1945.62		UJA18026	1929.70
	UJA11032	741.53		UJA18027	1929.70
	UJA15015	18820.62		UJA23001	11467.89
	UJA15016	18926.55		UJA23002	6213.33
	UJA18015	28707.63		UJA23003	7194.53
	UJA18016	29378.53		UJA23004	7407.87
	UJA23015	25105.93		UJA23005	8573.60
	UJA23016	26087.57		UJA23006	8878.33

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft ³)	GOTHIC CV Free Volume (ft ³)	Room Name	Room Free Volume (ft ³)
V23 - Upper Annulus Rooms L1 & L2	UJA29014	31250.00	80170.90	UJA23007	7407.87
	UJA29018	6850.28		UJA23008	7194.53
	UJA34014	34957.63		UJA23009	6213.33
	UJA34018	9004.24		UJA23010	2387.88
V24 - Upper Annulus Rooms L3 & L4	UJA29015	25070.62	63922.90	UJA23011	3577.45
	UJA29022	8121.47		UJA23012	756.97
	UJA34015	24540.96		UJA23013	22312.28
	UJA34022	7697.74		UJA23014	24143.36
V25 - Lower & Upper Dome L1, L2, L3 & L4	UJA15023	278.95	1579198.00	UJA23015	25605.54
	UJA29013	96186.44		UJA23016	24261.49
	UJA29016	106991.50		UJA23017	12696.18
	UJA34104	11052.26		UJA23018	5497.67
	UJA34108	11052.26		UJA23019	6450.34
	UJA40001	1390890.00		UJA23020	1554.97
V26 – Access	UJA07013	9745.76	18662.90	UJA23021	2271.79
	UJA11020	9357.35		UJA23023	3189.21
V27 - Staircase (South)	UJA11010	1550.14	13981.60	UJA23026	775.61
	UJA15010	1504.24		UJA23027	775.61
	UJA18010	2161.02		UJA23031	1410.07
	UJA23010	1998.59		UJA23041	2055.30
	UJA29023	7097.46		UJA23042	3272.71
V28 - Staircase (North)	UJA15011	2182.20	12532.70	UJA29003	4992.17
	UJA18011	3135.59		UJA29004	5004.07
	UJA23011	3495.76		UJA29005	3336.12
	UJA29011	2814.27		UJA29006	3514.89
	UJA34011	1200.57		UJA29007	5004.07

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft³)	GOTHIC CV Free Volume (ft³)	Room Name	Room Free Volume (ft³)		
V29 – Elevator	UJA04012	233.05	5153.80	UJA29008	4992.17		
	UJA07012	628.53		UJA29011	2937.68		
	UJA11012	603.81		UJA29012	778.43		
	UJA15012	586.16		UJA29013	64373.85		
	UJA18012	843.93		UJA29014	25407.59		
	UJA23012	942.80		UJA29015	14451.06		
	UJA29012	759.18		UJA29016	47590.36		
	UJA34012	677.97		UJA29018	7641.44		
	V30 - Hot Piping Penetrations	UJA07016		22810.73	22285.00	UJA29019	5508.67
						UJA29022	7865.15
			UJA29023	7373.14			
			UJA29025	573.52			
			UJA29026	573.52			
			UJA34003	11163.55			
			UJA34004	11176.91			
			UJA34005	3340.73			
			UJA34006	3478.50			
			UJA34007	11176.91			
			UJA34008	11163.55			
			UJA34011	2437.74			
			UJA34012	755.91			
			UJA34013	100328.08			
			UJA34014	37699.46			
		UJA34015	29874.34				
		UJA34018	9967.05				
		UJA34019	3168.14				
		UJA34022	2804.55				
		UJA34025	603.41				

Table 06.02.01-99-2—Comparison of Volumes

Gothic Control Volume Number and Description	Room Name	Room Free Volume (ft³)	GOTHIC CV Free Volume (ft³)	Room Name	Room Free Volume (ft³)
				UJA34026	603.41
				UJA41003	5905.18
				UJA41004	5911.22
				UJA41007	5911.22
				UJA41008	5905.18
				UJA41013	141403.98
				UJA41014	81332.49
				UJA41015	76515.37
				UJA40001	1061879.82
Total		2819198.61	2805222.46		2724668.50
Total without IRWST		2765561.60	2701825.56		2700224.48

Figure 06.02.01-99-1—Room UJA07026 Vent Paths

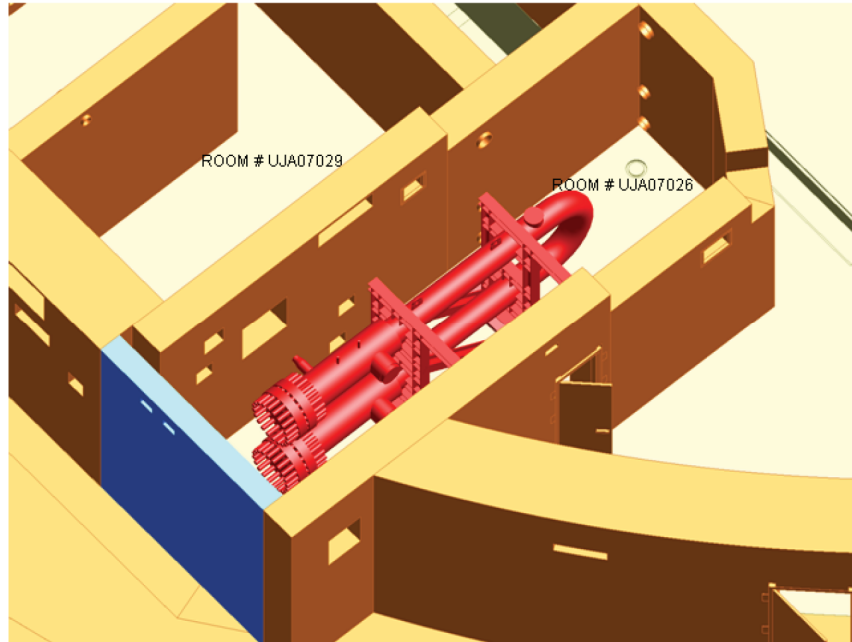


Figure 06.02.01-99-2—Vent Paths for Rooms UJA07028 and UJA07029

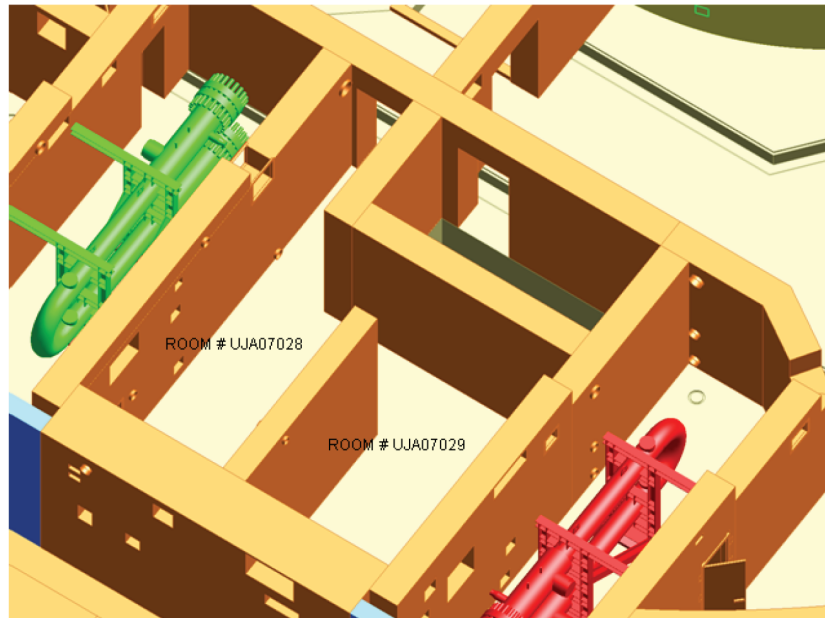


Figure 06.02.01-99-3—Room UJA11023 Vent Paths



Figure 06.02.01-99-4—Vent Paths for Rooms UJA11025 and UJA11026

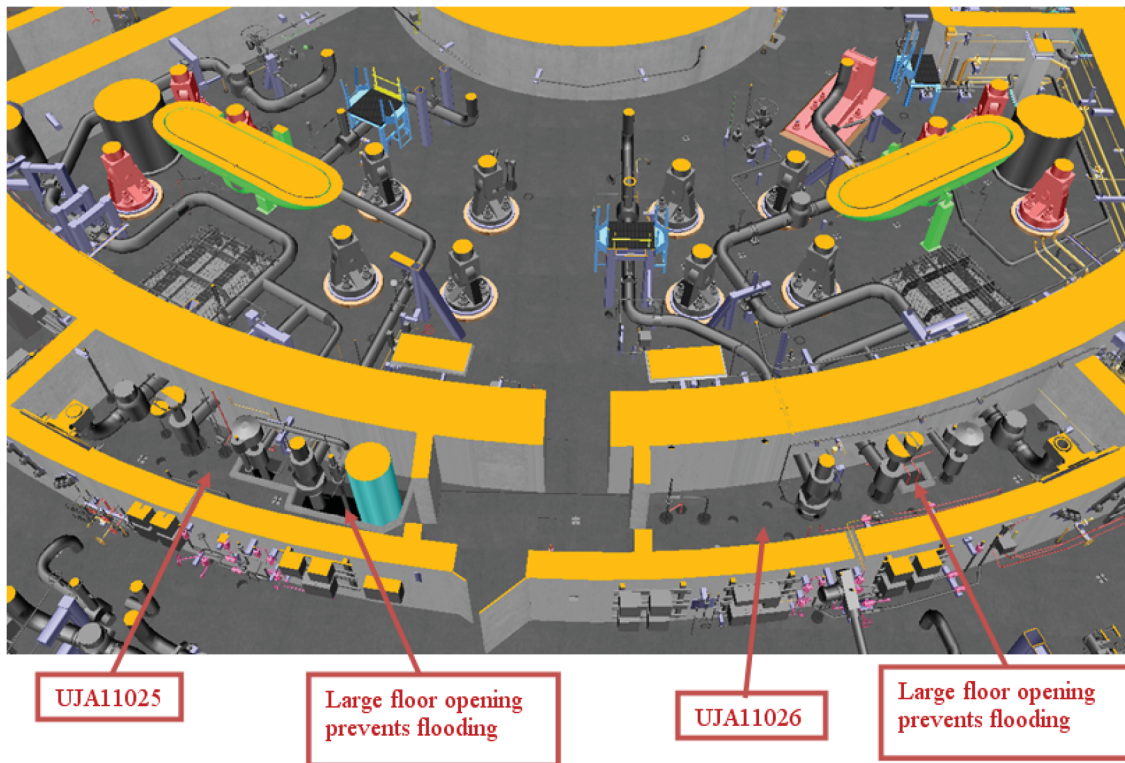


Figure 06.02.01-99-5—Vent Paths for Room UJA11021

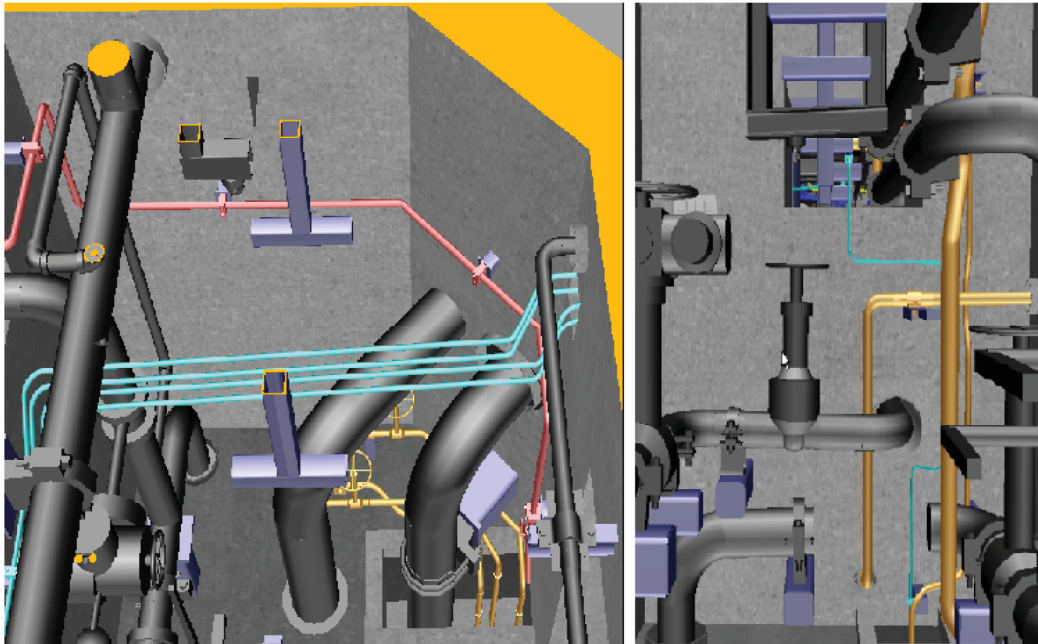


Figure 06.02.01-99-6—Vent Path in Room UJA29022

