ArevaEPRDCPEm Resource

From:	WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent:	Thursday, August 02, 2012 12:10 PM
To:	Tesfaye, Getachew
Cc:	BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); KOWALSKI David (AREVA)
Subject:	Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 5
Attachments:	RAI 462 Supplement 5 Response US EPR DC.pdf

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
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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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AREVA NP, Inc.
3315 Old Forest Road, P.O. Box 10935
Mail Stop OF-57
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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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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: 3982

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D4D7EB2C)

Subject: Response to U.S. EPR Design Certification Application RAI No.462, FSAR Ch. 6, Supplement 5
Sent Date: 8/2/2012 12:09:51 PM
Received Date: 8/2/2012 12:09:59 PM
From: WILLIFORD Dennis (AREVA)

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Files	**Size**	**Date & Time**
MESSAGE	12790	8/2/2012 12:09:59 PM
RAI 462 Supplement 5 Response US EPR DC.pdf		512068

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

Response to

Request for Additional Information No. 462 (5258, 5259, 5260), Supplement 5

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 06.04-7:

Because toxic gas is site-specific, hardware associated with detection, measurement, and isolation are usually designated the responsibility of the COL and based on the specific toxic gas threat. The EPR design chooses to include some of the design information in the FSAR. Although this approach is not prohibited, addressing all possible toxic gas threat in the FSAR can be a challenge. In Tier 2 Section 6.4.2.4, the revised CRE design was changed to prescribe manual as opposed to automatic isolation of the CRE upon detection of toxic gas. If you choose to address toxic gas in the standard design FSAR, clarification of the following information in the FSAR is needed to make a regulatory finding.

a. Please clarify if or how the standard design, as described in FSAR Revision 2, conforms to RG 6.4 guidance for a "Type iii" (SRP 6.4 Section III.3.E.iii) system. Add a paragraph to FSAR section 6.4 that details this conformance in FSAR section 6.4. Also See #7 below.

b. Note that RG 1.78 Section 4.2 says the following with respect to a MCR isolation system:

   "Upon detection of a toxic chemical, a detector should initiate complete closure of isolation dampers to the control room with minimal delay. The isolation time is a function of the control room design, in particular, the inleakage characteristics. If the detectors are upstream from the isolation dampers, credit will be allowed for the travel time between the detectors and the dampers."

   Please clarify the inconsistency between this RG 1.78 guidance and the design of the CRE as described in FSAR Revision 2.

c. Clarify this change with respect to Tier 1 Table 2.6.1-3 Main Control Room ITAAC number 6.3 which tests automatic isolation of the CRE upon detection of toxic gas from a toxic gas sensor.

d. Clarify this FSAR change with respect to the description of the response of the CRE to an external or internal smoke event as described in FSAR section 9.5.1.2.1

e. Clarify this FSAR change with respect to FSAR Tier 2 Section 14.2 (test abstract #082), Section 3.4.2

f. Clarify this FSAR change with respect to FSAR Tier 2 Chapter 16. B 3.7.10, which state that a toxic gas signal switches CREF to an isolation alignment.

g. FSAR section 6.4 does not define or discuss zone isolation as covered in SRP 6.4 Section III.3.E.i, ii, iii, and iv. Provide a discussion in FSAR section 6.4 on how the EPR CRE addresses this guidance as it relates to the ventilation system types iii and iv and the method of operation for radiological and toxic gas events.

Response to Question 06.04-7:

<u>Parts a thru g</u>

The U.S. EPR FSAR has been revised to reflect that a toxic gas event is a site-specific event. The equipment used for the detection, measurement and isolation associated with a toxic gas release are the responsibility of the COL applicant. The specific toxic gas design, which is currently part of the design of the control room air conditioning system (CRACS) in the U.S. EPR standard design, has been removed from the CRACS, and applicable U.S. EPR FSAR Tier 1 and Tier 2 sections will be revised to reflect this change.

The following existing COL information item 6.4-1 was deleted in U.S. EPR FSAR Tier 2, Revision 3:

> "A COL applicant that references the U.S. EPR design certification will identify the type(s) of Seismic Category I Class IE toxic gas sensors (i.e., the toxic chemical(s) of concern) necessary for control room operator protection."

U.S. EPR FSAR Tier 2, Table 1.8-2—U.S. EPR Combined License Information Items and Section 6.4.6 were revised in Revision 3 to reflect the deletion of this COL information item.

The following existing COL information item 6.4-3 was revised in U.S. EPR FSAR Tier 2, Revision 3 to state:

> "A COL applicant that references the U.S. EPR design certification will evaluate the results of the toxic chemical accidents from Section 2.2.3, address their impact on control room habitability in accordance with RG 1.78, and if necessary, identify the types of sensors and automatic control functions required for control room operator protection."

U.S. EPR FSAR Tier 2, Table 1.8-2 and Sections 6.4.1 and 6.4.3 were revised in Revision 3 to reflect the revision of this COL information item.

The following U.S. EPR FSAR Tier 1 sections were revised in Revision 3 to reflect the removal of the toxic gas design from the U.S. EPR standard CRACS design:

- Section 2.6.1.
- Table 2.6.1-1—Main Control Room Air Conditioning System Equipment Mechanical Design.
- Table 2.6.1-3—Main Control Room Air Conditioning System ITAAC.

The following U.S. EPR FSAR Tier 2 sections were revised in Revision 3 to reflect the removal of the toxic gas design from the U.S. EPR standard CRACS design:

- Sections 6.4, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.4.6, 9.4.1, 9.4.1.1, 9.4.1.2, 9.5.1.2.1 and 14.2.12.8.10.
- Chapter 16, Technical Specifications 3.6.6, 3.6.7, 3.7.10, 3.7.11 and 3.7.12 and Associated Bases.
- Table 1.8-2—U.S. EPR Combined License Information Items.
- Table 3.2.2-1—Classification Summary.
- Table 3.11-1—List of Environmentally Qualified Electrical/I&C Equipment.

- Figure 9.4.1-1—Control Room Air Intake and CREF (Iodine Filtration) Train Subsystem).

U.S EPR FSAR Tier 2, Chapter 16, Technical Specification 3.7.10 Bases will be revised to reflect the removal of the toxic gas design from the U.S. EPR standard CRACS design.

FSAR Impact:

U.S EPR FSAR Tier 2, Chapter 16, Technical Specification 3.7.10 Bases will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 1, Section 2.6.1 and Tables 2.6.1-1 and 2.6.1-3 were revised in Revision 3 as described in the response and indicated on the enclosed markup.

U.S. EPR FSAR Tier 2, Sections 6.4, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.4.6, 9.4.1, 9.4.1.1, 9.4.1.2, 9.5.1.2.1, 14.2.12.8.10, and Chapter 16, Technical Specifications 3.6.6, 3.6.7, 3.7.10, 3.7.11 and 3.7.12 and Associated Bases; Tables 1.8-2, 3.2.2-1 and 3.11-1; and Figure 9.4.1-1 were revised in Revision 3 as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

All indicated changes are in response to RAI 462, Question 06.04-7

Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 19 of 41

Item No.	Description	Section
6.1-1	A COL applicant that references the U.S. EPR design certification will review the fabrication and welding procedures and other QA methods of ESF component vendors to verify conformance with RGs 1.44 and 1.31.	6.1.1.1
6.1-2	~~If components cannot be procured with DBA-qualified coatings applied by the component manufacturer, a COL applicant that references the U.S. EPR design certification must do one of the following: procure the component as uncoated and apply a DBA-qualified coating system in accordance with 10 CFR 50 Appendix B, Criterion IX; confirm that the DBA-unqualified coating is removed and the component is recoated with DBA-qualified coatings in accordance with 10 CFR 50 Appendix B, Criterion IX; or add the quantity of DBA-unqualified coatings to a list that documents those DBA-unqualified coatings already existing within containment.~~ A COL applicant that references the U.S. EPR design certification will define a coating application and maintenance program for components that cannot be procured with DBA qualified coatings in accordance with 10 CFR 50 Appendix B, Criterion IX.	6.1.2.3.2
6.1-3	A COL applicant that references the U.S. EPR design certification will define the coatings program and its implementation, including maintenance and repair of coatings.	6.1.2.2.2
6.1-4	A COL applicant that references the U.S. EPR design certification will limit the amount of aluminum inside containment that can potentially be submerged to less than 3000ft^2.	6.1.1.2
6.2-1	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones for the CLRT program described under 10 CFR 50, Appendix J.	6.2.6
6.3-1	A COL applicant that references the U.S. EPR design certification will describe the containment cleanliness program which limits debris within containment.	6.3.2.2.2
6.4-1	Deleted.	Deleted
6.4-2	A COL applicant that references the U.S. EPR design certification will provide written emergency planning and procedures in the event of a radiological or a hazardous chemical release within or near the plant, and will provide training of control room personnel.	6.4.3

**Table 1.8-2—U.S. EPR Combined License Information Items
Sheet 20 of 41**

Item No.	Description	Section
6.4-3	A COL applicant that references the U.S. EPR design certification will evaluate the results of the toxic chemical accidents from Section 2.2.3, address their impact on control room habitability in accordance with RG 1.78, and if necessary, identify the types of sensors and automatic control functions required for control room operator protection.	6.4.1
6.4-4	A COL applicant that references the U.S. EPR design certification will confirm that the radiation exposure of main control room occupants resulting from a design basis accident at a nearby unit on a multi-unit site is bounded by the radiation exposure from the postulated design basis accidents analyzed for the U.S. EPR; or confirm that the limits of GDC-19 are met.	6.4.4
6.6-1	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones for the site-specific ASME Section XI preservice and inservice inspection program for the Class 2 and Class 3 components, consistent with the requirements of 10 CFR 50.55a (g). The program will identify the applicable edition and addenda of the ASME Code Section XI, and will identify additional relief requests and alternatives to Code requirements.	6.6
7.1-1	Deleted.~~A COL applicant that references the U.S. EPR design certification will confirm the inventory list of PAM variables in Table 7.5-1—Inventory of Post-Accident Monitoring Variables upon completion of the emergency operating and abnormal operating procedures prior to fuel loading.~~	Deleted.~~7.5.2.2.1~~
7.1-2	A COL applicant that references the U.S. EPR design certification will, following selection of the actual plant operating instrumentation and calculation of the instrumentation uncertainties of the operating plant parameters, prior to fuel load, calculate the primary power calorimetric uncertainty. The calculations will be completed using an NRC acceptable method and confirm that the safety analysis primary power calorimetric uncertainty bounds the calculated values.	7.7.2.3.5
7.1-3	A COL applicant that references the U.S. EPR design certification will identify the need for any site-specific PAM variables.	7.5.2.2.1
7.1-4	A COL applicant that references the U.S. EPR design certification will establish a plan to address the site-specific implementation of the limitations and conditions identified in Section 4 of the NRC Safety Evaluation for Topical Report ANP-10272A, "Software Program Manual for TELEPERM XS Safety Systems."	7.1.1.2.2

2.6 HVAC Systems

2.6.1 Main Control Room Air Conditioning System

1.0 Description

The main control room air conditioning system (CRACS) supplies air to the control room envelope (CRE) area which includes the main control room (MCR) and associated rooms.

The CRACS controls the CRE area temperature and air change rate for personnel comfort, personnel safety, and equipment protection during normal plant operation. The CRACS provides cooling, heating, and ventilation for the CRE area to remove equipment heat, and heat generated from other sources. The CRACS also provides heat to maintain a minimum temperature in the CRE area. The CRACS provides a minimal air change rate for the CRE area and controls building pressurization to reduce spreading of contamination.

The CRACS maintains habitability of the CRE area in case of radioactive or toxic gas contamination of the environment. The CRACS also maintains a positive pressure in the CRE area to prevent infiltration of contaminated outside air. The CRACS operates in recirculation mode with fresh air makeup.

The CRACS provides the following safety-related functions:

- Maintains ambient temperature conditions inside the CRE area.
- Provides carbon filtration of outside air and recirculated air from within the CRE area.
- Maintains a positive pressure in the CRE area relative to the adjacent areas to prevent unfiltered in-leakage, upon receipt of a containment isolation signal (CIS) or high radiation alarm signal in the air intake ducts.

2.0 Arrangement

2.1 The functional arrangement of the CRACS is as shown on the following figures:

- Figure 2.6.1-1—Control Room Air Intake and CREF (Iodine Filtration) Train Subsystem Functional Arrangement.
- Figure 2.6.1-2—Control Room Air Conditioning and Recirculation Air Handling Subsystem Functional Arrangement.
- Figure 2.6.1-3—CRE Air Supply and Recirculation Subsystem Functional Arrangement.

2.2 The location of the CRACS equipment is as listed in Table 2.6.1-1—Main Control Room Air Conditioning System Equipment Mechanical Design.

train, a minimum recirculation flowrate is established from the CRE area to the iodine filtration train, and a positive pressure is maintained in the CRE area relative to the adjacent areas.

6.3 Deleted.

6.4 The CRE area ventilation unfiltered air in-leakage is minimized in order to maintain the MCR habitability.

6.5 The CRACS provides cooling and heating to maintain the design temperatures in the CRE area, while operating in a design basis accident alignment.

6.6 The CREF heaters protect the carbon adsorber from high humidity during operation of the CREF unit.

6.7 Upon receipt of a high radiation alarm signal in the air intake ducts, the iodine filtration train will start automatically, the outside air supply to the CRE area is diverted through the iodine filtration train, a minimum CRE recirculation flowrate is established from the CRE area to the iodine filtration train, and a positive pressure is maintained in the CRE area relative to the adjacent areas.

7.0 Inspections, Tests, Analyses and Acceptance Criteria

Table 2.6.1-3 lists the CRACS ITAAC.

Table 2.6.1-1—Main Control Room Air Conditioning System Equipment Mechanical Design (6 Sheets)

Description	Tag Number [1]	Location	ASME AG-1 Code	Function	Seismic Category
Fresh Air Intake Trains 30SAB01 and 30SAB04					
Motor Operated Dampers	30SAB01AA002 30SAB04AA002 30SAB11AA001 30SAB11AA003 30SAB11AA004 30SAB14AA001 30SAB14AA003 30SAB14AA004	Safeguard Building 2 Safeguard Building 3	Yes	Open	I
Electric Heaters	30SAB01AH001 30SAB04AH001	Safeguard Building 2 Safeguard Building 3	Yes	On / Off (based on ambient conditions)	I
Motor Operated Dampers	30SAB01AA003 30SAB04AA003 30SAB01AA004 30SAB04AA004	Safeguard Building 2 Safeguard Building 3	Yes	Close	I
Prefilters	30SAB01AT001 30SAB04AT001	Safeguard Building 2 Safeguard Building 3	Yes	N/A	I
Manual Dampers	30SAB01AA006 30SAB04AA006	Safeguard Building 2 Safeguard Building 3	Yes	N/A	I
Motor Operated Dampers	30SAB01AA012 30SAB04AA012	Safeguard Building 2 Safeguard Building 3	Yes	Open	I

Table 2.6.1-3—Main Control Room Air Conditioning System ITAAC (7 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
6.2	Upon receipt of a containment isolation signal, the iodine filtration train will start automatically, outside air supply to the CRE area is diverted through the iodine filtration train, a minimum recirculation flowrate is established from the CRE area to the iodine filtration train and a positive pressure is maintained in the CRE area relative to the adjacent areas.	a. A test will be performed ~~to verify, upon receipt of a containment isolation test signal, that the iodine filtration train will start automatically; and the outside air supply to the CRE area is diverted through the iodine filtration train. A test will be performed~~ separately for each iodine filtration train using test signals. b. A test will be performed ~~to verify, upon receipt of a containment isolation test signal, that a minimum recirculation flowrate is established from the CRE area to the iodine filtration train. A test will be performed~~ separately for each iodine filtration train using test signals. c. A test will be performed using test signals~~to verify, upon receipt of a containment isolation test signal, that the CRACS maintains a positive pressure in the CRE area relative to the adjacent areas~~.	a. A separate test for each iodine filtration train confirms, upon receipt of a containment isolation ~~test~~ signal, that the iodine filtration train will start automatically within 60 seconds after receipt of a test signal; and the outside air supply to the CRE area is diverted through the iodine filtration train. b. A separate test for each iodine filtration train confirms, upon receipt of a containment isolation ~~test~~ signal, that a recirculation flowrate of greater than or equal to 3000 scfm is established from the CRE area to the iodine filtration train. c. A test confirms, upon receipt of a containment isolation ~~test~~ signal, that the CRACS maintains the pressure greater than or equal to 0.125 inches water gauge in the CRE area relative to the adjacent areas.
6.3	Deleted.	Deleted.	Deleted.
6.4	The CRE area ventilation unfiltered air in-leakage is minimized in order to maintain the MCR habitability.	A test will be performed~~ to measure the unfiltered air in-leakage inside the CRE area boundary~~.	The ~~test confirms that the~~ unfiltered air in-leakage inside the CRE area boundary is less than or equal to 40 scfm.

6.4 Habitability Systems

The main control room (MCR) habitability systems are designed to allow control room operators to remain in the MCR to operate the plant safely under normal conditions and to maintain the plant in a safe state under accident conditions.

The habitability systems protect the control room operators from the effects of accidental releases of radioactive gases. The systems also provide the necessary support for the Technical Support Center (TSC) personnel in case of an accident or abnormal event. The TSC is contained within the control room envelope (CRE).

The term "habitability systems" refers to equipment, supplies, and procedures. The habitability equipment is defined in Section 6.4.2.1.

Control room habitability system objectives include:

- Missile protection and radiation shielding (Section 3.8).
- Air filtration (Section 6.5.1, Section 9.4.1).
- Pressurization and air conditioning (Section 9.4.1).
- Fire protection (Section 9.5.1).
- Radiation monitoring (Section 12.3.4).
- Detection of smoke (Section 9.4.1).
- Lighting (Section 9.5.3).
- Personnel support.

6.4.1 Design Basis

Control room habitability is provided, so that the plant can be operated safely under normal conditions, and maintained safely under accident conditions or abnormal events. These design bases relate to MCR habitability:

- Habitability systems are designed to accommodate the effects of environmental conditions associated with normal operation, maintenance, testing, and postulated accidents and are protected against dynamic effects that may result from equipment failures and from events and conditions outside the nuclear power unit (GDC 4).
- The MCR habitability systems are not shared among multiple nuclear power units (GDC 5).
- The CRE is protected from radiological releases and outside fire or smoke events to permit access and occupancy of the MCR.

- The MCR air conditioning system (CRACS) provides the capability to isolate the CRE from the surrounding areas, pressurize the CRE to prevent in-leakage, and filter supply air to remove radioactive halogens (10 CFR 50.34(f)(2)(xxviii)).
- The air intake structures are physically located away from potential radiological sources, (10 CFR 50.34(f) (2) (xxviii)).
- The TSC is designed in accordance with NUREG-0696 (Reference 6). A space of at least 1875 ft^2, within the integrated operations area, is allocated to the TSC. Therefore, the TSC is large enough to provide space for 25 personnel at 75 ft^2 per person.
- The CRE design permits periodic testing and in-service inspection to confirm integrity.
- The volume of the CRE is approximately 200,000 ft^3. With the CRE operating in a full recirculation alignment, the air inside the CRE can support five persons in the MCR and twenty-five persons in the TSC (Integrated Support Center) for at least one and one-half days.

The CRACS design bases are presented in Section 9.4.1.

The evaluation of potential toxic chemical accidents is addressed by the COL applicant in Section 2.2.3 and includes the identification of toxic chemicals. A COL applicant that references the U.S. EPR design certification will evaluate the results of the toxic chemical accidents from Section 2.2.3, address their impact on control room habitability in accordance with RG 1.78, and if necessary, identify the types of sensors and automatic control functions required for control room operator protection.

6.4.2 System Design

6.4.2.1 Definition of Control Room Envelope

The MCR contains the equipment necessary to monitor and control the plant during all operating conditions and to bring the plant to a safe shutdown state.

The CRE comprises these areas:

- Main control room.
- Shift supervisor's office.
- Integrated operations area including:
  - Technical support center.
  - NRC office area.
  - Break area.

- Restroom facilities.
- Instrumentation and controls (I&C) service center.
- Service corridors.
- Computer rooms.
- Equipment rooms that contain MCR ventilation supply, filtration, and air conditioning systems.

The CRE is housed within Safeguard Buildings 2 and 3. The CRE is shown in Figure 6.4-1—Control Room Envelope Plan View 1, Figure 6.4-2—Control Room Envelope Plan View 2, and Figure 6.4-3—Control Room Envelope Elevation View. The total free-air volume of the CRE is approximately 200,000 ft^3.

These personnel support items are maintained within the confines of CRE in sufficient quantities for required operational personnel:

- Non-perishable food supply and drinking water.
- Emergency medical supply kits.
- SCBA units, air supply equipment and protective clothing for protection from smoke in accordance with RG 1.189.

Food, water, and medical needs of the control room personnel are met using the site emergency preparedness process for providing these services to emergency centers, following the guidance of NUREG-0654 (Reference 1). Emergency planning is addressed in Section 13.3.

6.4.2.2 Ventilation System Design

The CRACS design is described in Section 9.4.1, which identifies and describes major components, design parameters and classifications, instrumentation and controls, and provides a system schematic. Figure 15.0-4 presents airflows through the system for post-accident filtration. Section 6.5.1 describes the engineered safety features (ESF) filter systems and fission product removal capability for the CRACS.

Section 3.8.4 contains elevation and plan views of the Safeguard Buildings. Figure 2.3-1 provides the relative locations of potential radiological release points and the CRACS air intakes. Figure 6.4-1 through Figure 6.4-3 illustrate the CRE layout, including surrounding corridors, doors, stairwells and shielded walls.

One outside air intake for the CRACS is located in Safeguard Building 2 and the other is located at a separate location on Safeguard Building 3, to prevent intrusion of radiological contamination.

The CRACS intakes are located on the roof of Safeguard Buildings 2 and 3. The two intakes are physically separated and are removed from potential radiological release points, including the main steam relief exhaust, the Safeguard Building depressurization shafts, and the vent stack, in both lateral and vertical directions. Section 15.0.3 identifies the bounding atmospheric release point used in the radiological analyses.

Radiation monitors (R-29 and R-30, Table 11.5-1) in the CRACS supply air duct continuously measure the concentration of radioactive materials in the supply air. The control room airborne radioactivity monitoring system is addressed in Section 12.3.4 and Section 11.5.3.1.11.

The main features related to control room habitability of the CRACS design are:

- Under normal operating conditions:
  - The ventilation system operates in the recycling mode with fresh air makeup.
  - The air makeup rate corresponds to the exhausts from the kitchen and restrooms and leakage out of the area.
- The ventilation system maintains an ambient condition for comfort and safety of control room occupants and to support operability of the MCR components during normal operation, anticipated operational occurrences (AOO), and design bases accidents (DBA).
- The ventilation system maintains a positive pressure of 0.125 inches water gauge as a minimum within the CRE areas with respect to adjacent environmental zones to prevent uncontrolled, unfiltered in-leakage during normal and accident conditions. The filtered outside air supply rate during accident conditions corresponds to 0.3 volume changes per hour.
- During a site radiological contamination event, the air intake is redirected through the ESF filter system trains.
- The ventilation system can be operated in full recirculation mode without outside air makeup during DBAs. The recirculated airflow rate is 3,000 cfm to the CREF unit.
- The ventilation system provides adequate capacity for proper temperature within the CRE.
  - Redundancy for air cooling and filtration is provided by having two independent trains for critical functions.
  - Redundancy is provided for proper operation of the system when one active component is out of service.

The CRE area is isolated in the event of an outside fire or smoke.

Upon detection of a smoke alarm from the smoke detector located in the outside air inlet ducts for the CRACS, the operator in the MCR will close the outside inlet isolation dampers at the location of the alarm and place both CREF (iodine filtration) trains in the filtered alignment.

Fire barriers with a three hour fire rating enclose the MCR. Openings penetrating the fire barrier are furnished with both fire doors and fire dampers or approved fire rate seals meeting the associated barrier fire duration rating. In case of a fire within the CRE area, the room supply and exhaust are isolated by fire dampers and monitoring and control of the plant can be performed from the remote shutdown station (RSS). The RSS is located in a different fire zone and is on a different elevation than the MCR, and is not contained within the CRE boundary. The RSS is described in Section 7.4.

The CRACS does not interact with air conditioning equipment serving adjacent zones, minimizing the possibility of transferring radioactive gases into the CRE. Piping not connected or related to the equipment within the CRE boundary is routed outside the pressurized boundary of the CRE.

The MCR is not located near pressure-containing tanks, equipment, or piping, such as CO_2 tanks or steam lines, which upon failure could transfer dangerous or hazardous material to the CRE. However, portable self-contained breathing apparatus (SCBA) are available for use by the control room operators.

6.4.2.5 Shielding Design

Massive concrete structures separate the MCR from the reactor containment atmosphere and the external environment, as described in Section 3.8. The thick concrete walls prevent any significant direct radiation shine from outside the Safeguard Buildings. The MCR is protected against direct shine from the MCR charcoal filtration system by a 19 inch concrete floor. Radiation sources and shielding requirements are identified in Section 12.2 and Section 15.0.3. The MCR dose calculations that are presented in these sections identify the contribution from direct radiation shine and demonstrate that the total MCR dose under accident conditions is within regulatory limits.

6.4.3 System Operational Procedures

During normal plant operation, the CRACS maintains acceptable environmental conditions within the CRE boundary. Upon receipt of a high radiation signal in the air intakes or a primary containment isolation signal, the system is automatically switched so that the intake is routed through the CREF (iodine filtration) trains. The operating modes of the CRACS are described in Section 9.4.1.

Upon detection of a smoke alarm from the smoke detector located in the outside air inlet ducts for the CRACS, the operator in the MCR will close the outside inlet isolation dampers at the location of the alarm and place both CREF (iodine filtration) trains in the filtered alignment.

A COL applicant that references the U.S. EPR design certification will provide written emergency planning and procedures in the event of a radiological or a hazardous chemical release within or near the plant, and will provide training of control room personnel.

6.4.4 Design Evaluations

Section 9.4.1 contains the design evaluation of the CRACS. Fire protection inside and outside the CRE boundary is addressed in Section 9.5.1.

The total effective dose equivalent (TEDE) for the MCR occupants throughout the duration of any postulated DBA does not exceed the limits of GDC 19. The evaluation of radiological exposure to control room operators and the dose calculation model for the MCR is described in Section 15.0.3.

The CRE is designed, maintained and tested in accordance with RG 1.196 and RG 1.197. Habitability systems provide the capability to detect and protect personnel within the CRE boundaries from external fires, smoke, and airborne radioactivity.

A COL applicant that references the U.S. EPR design certification will confirm that the radiation exposure of MCR occupants resulting from a DBA at a nearby unit on a multi-unit site is bounded by the radiation exposure from the postulated design basis accidents analyzed for the U.S. EPR; or confirm that the limits of GDC 19 are met.

6.4.5 Testing and Inspection

Testing and inspection of the CRACS are described in Section 9.4.1. Refer to Section 14.2 (test abstract #082) for initial plant testing.

Periodic testing to confirm CRE integrity is performed using testing methods and at testing frequencies consistent with RG 1.197. The air in-leakage test (tracer gas test) of the CRE boundary is performed in accordance with ASTM E741 (Reference 3). Air quality testing is performed in accordance with ANSI/ASHRAE 52.2 (Reference 4) and ASME N510 (Reference 5).

The control room envelope habitability program in Technical Specifications Section 5.5.17 defines testing requirements.

9.4 Air Conditioning, Heating, Cooling and Ventilation Systems

The heating, ventilation, and air-conditioning (HVAC) system for each major building or area is provided in the following subsections.

9.4.1 Main Control Room Air Conditioning System

The main control room air conditioning system (CRACS) is designed to maintain a controlled environment in the control room envelope (CRE) area for the comfort and safety of control room personnel and to support operability of the control room components during normal operation, anticipated operational occurrences and design basis accidents. CRACS is also relied upon to cope with and recover from a station blackout (SBO) event.

Under normal operating conditions, the control room air conditioning system operates with fresh outside air (bypasses the control room emergency filtration (CREF) trains. The inlet air is pulled into the common recirculation plenum and mixes with air recirculated back from the rooms within the CRE. This mixture of outside air and recirculated air is pulled into the CRACS cooling units where it is filtered and cooled. The conditioned air is then supplied to CRE rooms. During a site radiological contamination event, the fresh air intake is redirected through the CREF iodine filtration trains. During an outside fire or smoke event, the fresh air intake at the location of the alarm is manually isolated.

The main control room (MCR) habitability system, including the definition of the CRE area, is addressed in Section 6.4.

9.4.1.1 Design Bases

The CRACS is primarily a safety-related system with portions serving non-safety-related functions.

The safety-related portions are designed to Seismic Category I criteria requirements.

The non-safety-related portions of the CRACS are the restroom/kitchen exhaust fan, and smoke detectors.

The U.S. EPR meets:

- GDC 2, as it relates to meeting the guidance of RG 1.29 (position C.1 for the safety-related portions of the CRACS and position C.2 for those non-safety-related portions of which failure could reduce the functioning of any safety-related or Seismic Category I system components to an unacceptable safety level). The CRACS components are located inside the Safeguard Building (SB) divisions two and three. These buildings are designed to withstand the effect of natural phenomena, such as earthquake, tornados, hurricanes, floods, and external missiles

- GDC 4, as it relates to the CRACS by design, to protect against adverse environmental conditions and dynamic effects. The CRACS accommodates the effects of, and is compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents.

- GDC 5, as it relates to the CRACS system because safety-related components are not shared with any other nuclear power units.

- GDC 19, as it relates to the CRACS system to provide adequate protection against radiation releases and outside fire or smoke events to permit access to and occupancy of the control room under accident conditions. The control room occupancy protection requirements meet the guidance of RG 1.78. RG 1.52 and 1.140 (GDC 60). In case of an alarm from the inlet air radiation monitors (refer to Section 11.5.3.1.1 and Table 11.5-1, Monitors R-29 and R-30), the CRACS directs the air intake automatically through activated carbon filtration beds. The air from CRE areas can also be recirculated through the same activated carbon filtration beds. The evaluation of potential toxic chemical accidents is addressed by the COL applicant in Section 2.2.3 and includes the identification of toxic chemicals. As described in Section 6.4.1, the COL applicant evaluates the impact of toxic chemical accidents on control room habitability in accordance with RG 1.78.

- GDC 60, as it relates to the release of radioactive materials to the environment.

Consideration of the environmental and dynamic effects of internal and external missiles and postulated piping failures on the CRACS is addressed in Section 3.5.1.1, Section 3.5.2, and Section 3.6.1.

Capability for withstanding or coping with a SBO event is provided to comply with the requirements of 10CFR 50.63. Acceptance is based on meeting the applicable guidance of RG 1.155, including position C.3.2.4. Refer to Section 8.4 for a description of the design features to cope with the SBO event.

The CRACS maintains habitability of the CRE areas during a site radiological event (Refer to Section 6.4).

During a postulated event, the control room is maintained at a minimum positive pressure of 0.125 inches water gauge relative to the surrounding environment to prevent uncontrolled incoming leakage.

During normal operation, the control room is maintained at a pressure above ambient.

The CRACS maintains system performance in the event of failure of a single active safety-related component.

The CRACS outside air intake is capable of detecting radiation (see Section 6.4.2.4), and smoke. Associated monitors actuate alarms in the MCR. Upon receipt of a containment isolation signal, or high radiation alarm signal in the outside air intake duct (Monitors R-29 and R-30, Table 11.5-1), the CREF (iodine filtration) train starts

9.4.1.2 System Description

9.4.1.2.1 General Description

The CRACS is designed to maintain acceptable ambient conditions inside the CRE areas to provide for proper operation of equipment and for personnel access to conduct inspection, testing and maintenance. The CRE area is shown in Figures 6.4-1 through 6.4-3.

The CRACS consists of following subsystems:

- Air intake.
- CREF (iodine filtration) train.
- Air conditioning and recirculation air handling.
- CRE air supply and recirculation.
- Kitchen and restroom exhaust.

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

Air Intake Subsystem

The air intake subsystem is illustrated in Figure 9.4.1-1—Control Room Air Intake and CREF (Iodine Filtration) Train Subsystem.

The CRACS has two outside air intakes. The train 1 intake is located in Safeguard Building 2 and the train 4 intake is located in Safeguard Building 3. Outside air is supplied by each outside air intake through a wire mesh grille. Each outside air intake is equipped with an electrically heated, weather protected grille to prevent ice formation. Smoke detectors and radiation monitors (refer to Section 11.5.3.1.11 and Table 11.5-1, Monitors R-29 and R-30) are installed in the outside air intake ducting.

Outside air intakes on each train are interconnected through ducting to allow the outside inlet air to travel through a CREF iodine filtration unit (filtered alignment), or the outside air can bypass the CREF iodine filtration unit (unfiltered bypass alignment).

Trains 1 and 4 outside air intakes each are equipped with a motor-operated isolation damper. These isolation dampers are normally open but they can be manually closed as necessary to isolate the outside air intake from the control room.

The operation of CRACS creates an minimum pressure of 0.125 inches of water gauge inside the CRE area with respect to the surrounding area. This limits unfiltered incoming air leakage into these areas.

Operation During External Fire or Smoke Release

In the event of external fire or smoke, the outside inlet isolation damper (at the inlet location where smoke is detected) is closed manually from the control room. The CREF (iodine filtration) trains are placed in the filtered alignment manually from the control room.

9.4.1.3 Safety Evaluation

The CRACS is designed to maintain ambient conditions inside the CRE area for personnel comfort and to allow safe operation of the equipment during normal plant operation, outages, and under all anticipated occurrences including postulated accidental events (refer to Section 15.0.3 for a discussion of radiological consequences).

The CRACS keeps the CRE area at a positive pressure of 0.125 inches water gauge at a minimum with respect to the surrounding area to provide habitability in the event of radioactive contamination of the environment, and to prevent uncontrolled incoming air leakage.

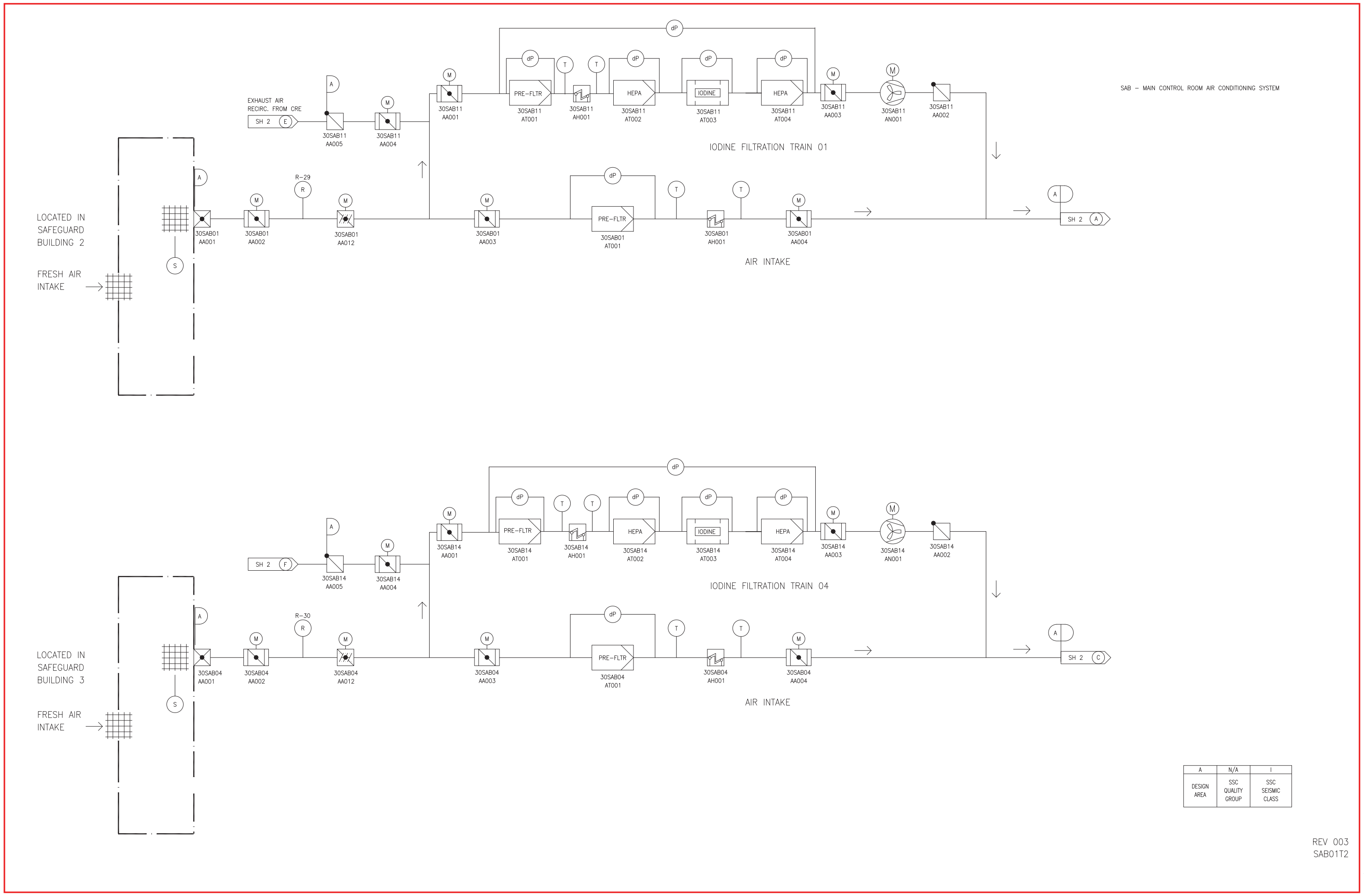
During a site radiological contamination event, the fresh air intake is redirected through the CREF (iodine filtration) trains. The CRACS also can be operated in full recirculation mode without fresh air during abnormal operation or postulated accident events.

Redundancy for air cooling and iodine filtration is provided by multiple independent trains for critical functions. Sufficient redundancy is provided for proper operation of the system when one active component is out of service.

In case of fire in any room within the CRE area, the room air supply and exhaust are isolated by fire dampers and, if necessary, the plant is controlled by the remote shutdown station (RSS). The four air conditioning trains are installed in four different fire zones. Two of these zones contain the two CREF (iodine filtration) trains.

Capability for withstanding or coping with an SBO event is met by the design of the AAC power source satisfying the ten minutes criteria; that is, the AAC power source can be started from the MCR within ten minutes after the onset of an SBO event. The SBODGs are designed to operate for a minimum of twenty-four hours with available onsite fuel supplies.

Figure 9.4.1-1—Control Room Air Intake and CREF (Iodine Filtration) Train Subsystem



Ventilation System Design Considerations

The design of the heating, ventilation and air conditioning (HVAC) systems are in accordance with SRP 9.5.1 (Reference 37) and RG 1.189. Safety-related HVAC systems are also designed in accordance with NFPA 90A (Reference 16). The HVAC design provides reasonable assurance that smoke, hot gases, or fire suppression agents (e.g., gaseous suppression agents) will not migrate into other fire areas and adversely affect safe shutdown capabilities, including operator actions.

The HVAC systems ventilate, exhaust, or isolate fire areas under fire conditions so that products of combustion do not spread to other fire areas. Ducts penetrating through fire area boundaries are provided with automatic fire dampers that have a fire rating equivalent to the rating of the barrier, or the ducts have a fire rating equivalent to the rating of the barrier and have no openings. Dampers are designed and tested to provide reasonable assurance of their operability under airflow conditions. Where practical, ventilation power and control cables for mechanical ventilation systems are located outside of the fire area served by the systems. Fresh air supply intakes to areas containing equipment or systems important to safety are located remote from the exhaust outlets and smoke vents of other fire areas to minimize the possibility of contaminating the intake air with products of combustion.

The release of smoke and gases, containing radioactive materials, to the environment is monitored in accordance with RG 1.101. Where possible, isolation is provided where the release of smoke and gases could contain radioactive materials in a fire condition. However, where venting is required, filtration equipment used to reduce doses is designed or protected to withstand the smoke and heat resulting from the fire. Ventilation systems designed to exhaust potentially radioactive smoke or gases have been evaluated to make sure that inadvertent operation or single failures do not violate the radiologically controlled areas.

Plant operations staff is protected from the effects of fire and fire suppression (e.g., gaseous suppression agents) to provide reasonable assurance of safe shutdown of the plant including operator manual actions. The arrangement of the MCR, egress pathways and the RSS provides habitability in these areas. During normal operation and for a radiological event, the MCR is maintained at positive pressure with respect to adjacent areas. Upon receipt of a smoke detection alarm (detector located in the outside air inlet), the outside air inlet isolation damper located at the detector is placed in the closed position so that any fires in these outside and adjacent areas will not affect the habitability of the MCR. Upon receipt of a smoke detection alarm (detector located at the discharge of one of the CRACS recirculation cooling units), the respective CRACS recirculation cooling unit is shut down from the MCR and the fire dampers automatically close (fuse link) to provide isolation. Smoke and heat removal throughout the facility is provided by portable systems or by manual operation of the non-safety-related HVAC systems.

A smoke confinement system (SCS) Nuclear Island (NI) is provided to maintain habitability of the select egress paths between the MCR and RSS. See Section 9.4.13 for a detail description and operation of the SCS. The design of the smoke confinement systems complies with NFPA 92A (Reference 17) and NFPA 204 (Reference 19). Egress pathways are maintained at higher pressure than adjacent areas to minimize smoke infiltration during a fire.

The smoke confinement system is normally in a standby mode and is automatically actuated by the fire alarm system or manually actuated as required. The smoke confinement system consists of the SBs 2 and 3 interconnecting passageway supply and exhaust air subsystem, which provides outside air to pressurize the SBs 2 and 3 interconnecting passageway and the safeguard escape ladder shaft. The primary purpose of this system is to prevent in-leakage of smoke from adjacent areas.

Portable smoke exhaust fan systems (i.e., smoke ejectors) are also available for the controlled removal of heat, smoke, and other products of combustion from these and other areas of the plant.

Control of Smoke, Hot Gases, and Fire Suppressant

RG 1.189, Section 8.2 stipulates that new reactor designs should ensure that smoke, hot gases or fire suppressant will not migrate into other fire areas to the extent that they could adversely affect safe-shutdown capabilities, including operator actions. To confirm that these objectives are satisfied for the U.S. EPR, a smoke effects analysis is performed. The analysis considers the location of redundant safe shutdown (SSD) equipment and components, the proximity of fire area boundaries, ventilation system operation, potential effluent types and quantities resulting from a fire, potential effluent migration paths, and the sensitivity of redundant SSD equipment and components to potential effluents.

For most areas of the plant, standard fire barriers and associated components (e.g., fire doors, fire dampers and penetration seals) provide the primary means to prevent migration of smoke, hot gas and fire suppressant between fire areas. Fire doors and fire dampers are in accordance with NPFA 80 (Reference 14). Penetration seals in fire barriers are qualified for an F-rating equivalent to the hourly fire rating of the associated barrier. Penetration seal F-ratings will be determined by testing in accordance with the requirements of ASTM E814 (Reference 31), UL 1479 (Reference 36) or IEEE Std. 634 (Reference 33).

Where more robust fire barriers are deemed necessary to achieve these objectives, enhanced fire barrier features are used, as necessary, to control smoke, hot gas and fire suppressant migration. Enhanced fire barrier features may include smoke doors and smoke dampers to limit smoke propagation. Smoke doors are in accordance with NFPA 105 (Reference 43). Ventilation penetrations in enhanced fire barriers are

3.5 Verify the HEPA filter efficiency, carbon adsorber efficiency, and filter bank air flow capacity.

3.6 Verify that operation of protective devices, controls, interlocks, instrumentation, and alarms using actual or simulated inputs meets design requirements.

3.7 Verify that the system maintains the CRE at the required positive pressure relative to the outside atmosphere during system operation.

3.8 Demonstrate the operation of the battery room exhaust fans.

3.9 Verify the CRE air in-leakage rate when aligned in the emergency mode.

3.10 Verify that operation of CRACS in response to radiation monitors meets design requirements (refer to Table 11.5-1, Monitors R-29 and R-30).

3.11 Check electrical independence and redundancy of power supplies for safety-related functions by selectively removing power and determining loss of function.

3.12 Verify that duct/housing leakage requirements are met.

4.0 DATA REQUIRED

4.1 Air balancing verification.

4.2 Fan and damper operating data.

4.3 Temperature data in the CRE.

4.4 Response to radioactivity and smoke.

4.5 Setpoints of alarms, interlocks, and controls.

4.6 Pressurization data for the CRE.

4.7 Filter and carbon adsorber data.

4.8 CRE in-leakage rate when aligned in the emergency mode.

4.9 The CRACS response to radiation monitors.

5.0 ACCEPTANCE CRITERIA

5.1 The CRACS operates as designed (refer to Section 9.4.1).

5.1.1 CRACS alarms, interlocks, and controls (manual and automatic) function as designed.

5.1.2 CRACS valves and dampers function as design.

5.1.3 CRACS responds as designed to a simulated smoke signal.

5.1.4 CRACS recirculation flow rate meets design requirements.

- Table 14.3-2 Item 2-7.

5.1.5 CRACS unfiltered air in-leakage rate while in recirculation mode meets design requirements.

3.6 CONTAINMENT SYSTEMS

3.6.6 Shield Building

LCO 3.6.6 The Shield Building shall be OPERABLE.

--NOTE--
The Shield Building envelope may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Shield Building inoperable.	A.1 Restore Shield Building to OPERABLE status.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.6.1	Verify annulus pressure is ≤ -0.25 inches water gauge.	12 hours

All indicated changes are in response to RAI 462, Question 06.04-7

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.6.2	Verify each Shield Building access door is closed, except when the access opening is being used for entry and exit.	31 days
SR 3.6.6.3	Verify the annulus pressure can be drawn down to ≤ -0.25 inches water gauge using one Annulus Ventilation System (AVS) train in ≤ 305 seconds after a start signal.	24 months on a STAGGERED TEST BASIS for each AVS train
SR 3.6.6.4	Verify the annulus pressure can be maintained at ≤ -0.25 inches water gauge by one AVS train at a flow rate of ≤ 1295 cfm.	24 months on a STAGGERED TEST BASIS for each AVS train
SR 3.6.6.5	Verify Shield Building structural integrity by performing a visual inspection of the exposed interior and exterior surfaces of the Shield Building.	During shutdown for SR 3.6.1.1 Type A tests

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.7.1	Operate each AVS accident filtration train for ≥ 15 minutes with heaters energized.	31 days
SR 3.6.7.2	Perform required AVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.7.3	Verify each AVS accident filtration train actuates on an actual or simulated actuation signal.	24 months
SR 3.6.7.4	Verify that the normal operation train motor operated isolation dampers close on an actual or simulated isolation signal.	24 months

B 3.7 PLANT SYSTEMS

B 3.7.10 Control Room Emergency Filtration (CREF)

BASES

BACKGROUND

The CREF provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, [toxic gases], or smoke.

The CREF consists of two independent, redundant trains that recirculate and filter air in the control room envelope (CRE) and a CRE boundary that limits the in-leakage of unfiltered air. Each CREF train consists of a moisture separator, electric heating coil, prefilter a high efficiency particulate air (HEPA) filter, an activated carbon adsorber section for removal of gaseous activity (principally iodines), a post-filter, and a fan. Ductwork, dampers, doors, barriers, and instrumentation also form part of the system. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provides backup in case of failure of the main HEPA filter bank.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit for normal and accident conditions. This area encompasses the control room, and may encompass other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The CRE is protected during normal operation, natural events and accident conditions. The CRE boundary is the combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the in-leakage of unfiltered air into the CRE will not exceed the in-leakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

BACKGROUND (continued)

The CREF is an emergency system, parts of which may also operate during normal unit operations in the standby mode of operation. Upon receipt of the actuating signal(s), normal air supply to the CRE is isolated, and the stream of ventilation air is recirculated through the system filter trains. The prefilters remove large particles in the air to prevent excessive loading of the HEPA filters and carbon adsorbers.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

Actuation of the CREF places the system in [either of two separate states (emergency radiation state or toxic gas isolation state) of] the emergency mode of operation[, depending on the initiation signal]. Actuation of [the system to the emergency radiation state of] the emergency mode of operation closes the unfiltered outside air intake and unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE through the redundant trains of HEPA and carbon filters, and initiates control room pressurization and filtered ventilation of the air supply to the CRE.

Outside air is mixed with recirculated air from the CRE. This air flows through the CREF unit into a common recirculation plenum where it mixes with air pulled from the CRE rooms. Pressurization of the CRE minimizes infiltration of unfiltered air through the CRE boundary from all the surrounding areas adjacent to the CRE boundary. [The actions taken in the toxic gas isolation state are the same, except that the control room operator switches the CREF to a filtration alignment to minimize any outside air from entering the CRE through the CRE boundary.]

The outside air entering the CRE is continuously monitored by radiation [and toxic gas] detectors. One detector output above the setpoint will cause actuation of the emergency mode [, either the emergency radiation state or toxic gas isolation state, as required]. [The actions of the toxic gas isolation state are more restrictive, and will override the actions of the emergency radiation state.]

BACKGROUND (continued)

One CREF train operating in a filtered alignment at a flow rate of ≤ 4000 cfm (≤ 1000 cfm outside air and 3000 cfm of CRE recirculation air), will pressurize the CRE to ≥ 0.125 inches water gauge relative to all external areas adjacent to the CRE boundary. The CREF operation in maintaining the CRE habitability is discussed in FSAR Section 9.4.1 (Ref. 1).

Redundant supply and recirculation trains provide the required filtration should an excessive pressure drop develop across the other filter train. Isolation dampers are arranged in series so the failure of one damper to shut will not result in a breach of isolation. The CREF is designed in accordance with Seismic Category I requirements.

The CREF is designed to maintain a habitable environment in the CRE for 30 days of continuous occupancy after a design basis accident (DBA) without exceeding a 5 rem whole body dose or its equivalent to any part of the body (5 rem total effective dose equivalent (TEDE)).

APPLICABLE SAFETY ANALYSES

The CREF components are arranged in redundant, safety-related ventilation trains. The location of components and ducting within the CRE ensures an adequate supply of filtered air to all areas requiring access. The CREF provides airborne radiological protection for the CRE occupants, as demonstrated by the CRE occupant dose analyses for the most limiting design basis loss of coolant accident, fission product release presented in FSAR Chapter 15 (Ref. 2).

The CREF consists of two 100% capacity trains. Each CREF train can be aligned with one of the four air conditioning and recirculation trains. There are only two CREF trains since only slow failure modes are assumed and filtration efficiency is checked periodically. Both CREF trains with two of the four of the associated air conditioning and recirculation trains are required to be OPERABLE. One CREF train is assumed to be lost to a single failure. The other train provides 100% of the ventilation to the CRE boundary.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

APPLICABLE SAFETY ANALYSES (continued)

The CREF provides protection from radiological hazards [, toxic gases,] and smoke to the CRE occupants. ~~Reference 3 discusses protection of CRE occupants following a hazardous chemical release.~~ Reference 4 discusses protection of the CRE occupants and their ability to control the reactor from the control room or from the remote shutdown panels in the event of a smoke challenge.

The worst case single active failure of a component of the CREF, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The CREF satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

In the event of a postulated accident, one CREF train is required to provide an adequate supply of filtered air to the CRE. To ensure that this requirement is met, both CREF trains must be OPERABLE. The basis for this approach is that two trains are required to satisfy all design requirements (i.e., one train is needed to mitigate the event and other train is assumed to have a single active failure). The failure of both CREF trains could result in exceeding a dose of 5 rem whole body or its equivalent to any part of the body 5 rem TEDE in the event of a large radioactive release.

Each CREF train is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A CREF train is OPERABLE when the associated:

a. Fan is OPERABLE;

b. Prefilters, HEPA filters, and carbon adsorbers, and post-filters are not excessively restricting flow, and are capable of performing their filtration functions; and

c. Heater, ductwork, and dampers are OPERABLE, and air circulation can be maintained.

In order for the CREF trains to be considered OPERABLE, the CRE boundary must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analyses for postulated accidents, and that CRE occupants are protected from [toxic gases and] smoke.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The LCO is modified by a Note allowing the CRE boundary to be opened intermittently under administrative controls. This Note only applies to openings in the CRE boundary that can be rapidly restored to the design conditions, such as doors, hatches, floor plugs, and access panels. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls should be procedurelized, and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, and during movement of irradiated fuel assemblies, the CREF trains must be OPERABLE to ensure that the CRE will remain habitable during and following a postulated accident (i.e., LOCA, main steam line break, rod ejection, and fuel handling accident).

In MODE 5 or 6, the CREF is also required to cope with a failure of the Gaseous Waste Processing System.

During movement of irradiated fuel assemblies, the CREF trains must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

With one CREF train inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the OPERABLE CREF train is adequate to perform the CRE occupant protection function. However, the overall system reliability is reduced. The 7 day Completion Time is based on the low probability of a postulated accident occurring during this time period, and ability of the remaining train to provide the required capability.

ACTIONS (continued)

B.1, B.2, and B.3

-----------------------------------REVIEWER'S NOTE-----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of postulated accident consequences (allowed to be up to 5 rem whole body or its equivalent to any part of the body 5 rem TEDE), or inadequate protection of CRE occupants from [toxic gases or] smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 60 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or [toxic gas] event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a postulated accident, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of postulated accident consequences, and that CRE occupants are protected from radiological hazards [, toxic gas] and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a postulated accident occurring during this time period, and the use of mitigating actions. The 60 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a postulated accident. In addition, the 60 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

ACTIONS (continued)

C.1 and C.2

In MODE 1, 2, 3, or 4, if any Required Action and Completion Time of Condition A or B cannot be met, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1 and D.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies, if the inoperable CREF train cannot be restored to OPERABLE status within the required Completion Time, action must be taken to immediately place the OPERABLE CREF train in the emergency mode. This action ensures that the other train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.

An alternative to Required Action D.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

[Required Action D.1 is modified by a Note indicating to place the system in the toxic gas isolation state.]

BASES

ACTIONS (continued)

E.1

In MODE 5 or 6, or during movement of irradiated fuel assemblies, with two CREF trains inoperable, or with the CRE boundary inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might enter the CRE. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

F.1

With both CREF trains inoperable in MODE 1, 2, 3, or 4, the CREF may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. Monthly heater operations which dry out any moisture accumulated in the carbon adsorber beds from humidity in the ambient air should be performed. Each CREF train must be operated for ≥ 15 minutes with the heaters energized. The 31 day Frequency is based on the reliability of the equipment and the two train redundancy. The heater energization time and 31 day Frequency are consistent with Reference 8.

SR 3.7.10.2

This SR verifies that the required CREF filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing the performance of the HEPA filter, carbon adsorber efficiency, minimum flow rate, and the physical properties of the activated carbon. Specific test Frequencies and additional information are discussed in detail in the VFTP.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.10.3

This SR verifies that each CREF train starts and operates on an actual or simulated actuation signal. The Frequency of 24 months is based on industry operating experience and is consistent with the typical refueling cycle.

SR 3.7.10.4

This SR verifies the OPERABILITY of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE. The details of the testing are specified in the Control Room Envelope Habitability Program.

The CRE is considered habitable when the radiological dose to CRE occupants calculated in the licensing basis analyses of postulated accident consequences is no more than 5 rem whole body or its equivalent to any part of the body 5 rem TEDE and the CRE occupants are protected from [toxic gases] and smoke. This SR verifies that the unfiltered air inleakage into the CRE is no greater than the flow rate assumed in the licensing basis analyses of postulated accident consequences. When unfiltered air inleakage is greater than the assumed flow rate, Condition B must be entered. Required Action B.3 allows time to restore the CRE boundary to OPERABLE status provided mitigating actions can ensure that the CRE remains within the licensing basis habitability limits for the occupants following an accident. Mitigating actions, or compensatory measures, are discussed in Regulatory Guide 1.196, Section 2.7.3, (Ref. 5) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 6). These compensatory measures may also be used as mitigating measures as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures (Ref. 7). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis postulated accident consequence analysis, repairing the CRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the CRE boundary has been restored to OPERABLE status.

All indicated changes are in response to RAI 462, Question 06.04-7

BASES

REFERENCES

1. FSAR Section 9.4.
2. FSAR Section 15.6.
3. Deleted.
4. FSAR Section 9.5.
5. Regulatory Guide 1.196, Rev. 1, January 2007.
6. NEI 99-03, "Control Room Habitability Assessment," June 2001.
7. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2005, "NEI Draft White Paper, Use of Generic Letter 91-18 Process and Alternative Source Terms in the Context of Control Room Habitability" (ADAMS Accession No. ML040300694).
8. Regulatory Guide 1.52, Rev. 3, June 2001.

B 3.7 PLANT SYSTEMS

B 3.7.11 Control Room Air Conditioning System (CRACS)

BASES

BACKGROUND

The CRACS provides temperature control for the control room envelope (CRE) following isolation of the control room.

The CRACS operates in the recycling mode with fresh outside air makeup. There are two 100% capacity identical fresh air intake trains. Train 1 is located in Safeguard Building 2 and train 4 is located in Safeguard Building 3. For each intake train, the fresh air is taken from outside environment through a motor-operated inlet isolation damper, and a pressure control damper. If operating in the unfiltered bypass alignment (intake air bypasses the CREF), outside air flows through a prefilter and duct heater. The fresh outside air then goes to the common recirculation plenum and mixes with CRE recycled air. The mixed air is then directed through two of the four air conditioning trains.

During normal and emergency operation each CRACS cooling unit provides 50% of the cooling for the rooms within the CRE. Each CRACS air handling unit is capable of cooling up to 50% of the normal and emergency cooling load to allow two CRACS air handling units to cool the CRE rooms during a station blackout (SBO) event. During an SBO event, the CRACS air handling units will prevent the CRE room temperature from exceeding 78°F.

Each air conditioning train consists of a final filter, cooling coil, moisture separator, fan suction and discharge silencers, supply air fan, and backdraft damper. The conditioned air is supplied to the control room envelope (CRE) areas. Electric heaters are installed in the supply air ducts to maintain individual room temperature. The air is pulled from the CRE areas into a common recirculation air plenum and then recycled through the air conditioning units for each train. Upon receipt of a high radiation alarm or upon receipt of a containment isolation alarm, the CREF unit operates in the filtered alignment. Operation of either CREF unit or closure of either outside inlet air isolation damper will shut down the normal kitchen or restroom exhaust fan and close isolation dampers in ducting routed to the safeguard building ventilation system (SBVS) where it is exhausted to the outside environment.

During normal operation, the CREF units operate in the bypass alignment (air bypasses the iodine filtration unit). CRE room exhaust from clean areas continues to recycle back to the recirculation plenum and CRACS air conditioning units.

BASES

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of irradiated fuel assemblies, the CRACS must be OPERABLE to ensure that the control room temperature will not exceed equipment operational requirements following isolation of the control room.

ACTIONS

A.1

With one CRACS train inoperable, the inoperable train must be returned to OPERABLE status within 120 days. The 120 day Completion Time is based on the assumption that the one CRACS train is out of service for maintenance and is consistent with the dose analysis assumptions in FSAR Chapter 15.

B.1

With two CRACS trains inoperable, action must be taken to restore one CRACS train to OPERABLE status within 30 days. In this Condition, the remaining OPERABLE CRACS trains are adequate to maintain the control room temperature within limits. However, the overall reliability is reduced because a single failure in one of the OPERABLE CRACS trains could result in loss of CRACS function. The 30 day Completion Time is based on the low probability of an event requiring control room isolation, the consideration that the remaining train can provide the required protection, and that alternate safety or non-safety related cooling means are available.

C.1 and C.2

If any Required Action and Associated Completion Time of Condition A or B is not met in MODE 1, 2, 3, or 4, the unit must be placed in a MODE that minimizes the risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

ACTIONS (continued)

D.1 and D.2

In MODE 5 or 6, or during movement of irradiated fuel, if the inoperable CRACS train(s) cannot be restored to OPERABLE status within the required Completion Time, an OPERABLE CRACS train must be placed in operation immediately. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that active failures will be readily detected.

An alternative to Required Action D.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

E.1

In MODE 5 or 6, or during movement of irradiated fuel assemblies, with three or more CRACS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

F.1

If three or more CRACS trains are inoperable in MODE 1, 2, 3, or 4, the CRACS may not be capable of performing its intended function. Therefore, LCO 3.0.3 must be entered immediately.

ACTIONS

A.1

With one SBVS Accident Exhaust Filtration train inoperable, action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the SBVS function. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable SBVS train, and the remaining SBVS train providing the required protection.

B.1

----------------------------------REVIEWER'S NOTE----------------------------------
Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

If the safeguard building controlled areas or fuel building boundary is inoperable in MODE 1, 2, 3, or 4, the SBVS trains may not be able to perform their intended functions. Actions must be taken to restore an OPERABLE safeguard building controlled areas and fuel building boundaries within 24 hours. During the period that the safeguard building controlled areas or fuel building boundary is inoperable, appropriate compensatory measures consistent with the intent, as applicable, of GDC 19 and 10 CFR Part 100 should be utilized to protect plant personnel from potential hazards such as radioactive contamination, [toxic gases,] smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a postulated accident occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the safeguard building controlled areas or fuel building boundary.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.12.6 and 3.7.12.7

The SBVS exhausts the safeguard building controlled areas and fuel building atmosphere to the environment through appropriate treatment equipment. Each safety SBVS train is designed to draw down the safeguard building controlled areas and fuel building to a pressure of ≤ -0.25 inches of water gauge (wg) in ≤ 305 seconds and maintain the safeguard building controlled areas and fuel building at a pressure of ≤ -0.25 inches wg at a flow rate ≤ 2,640 cfm from the safeguard building controlled areas and fuel building. To ensure that all fission products released to the safeguard building controlled areas and fuel building are treated, SR 3.7.12.6 and SR 3.7.12.7 verify that a pressure in the safeguard building controlled areas and fuel building that is less than the lowest postulated pressure external to the safeguard building controlled areas and fuel building boundaries can be established and maintained. When the SBVS is operating as designed, the establishment and maintenance of safeguard building controlled areas and fuel building pressure cannot be accomplished if the safeguard building controlled areas or fuel building boundaries is not intact. Establishment of this pressure is confirmed by SR 3.7.12.6. SR 3.7.12.7 demonstrates that the safeguard building controlled areas and fuel building can be maintained at a pressure of ≤ -0.25 inches wg. The primary purpose of these SRs is to ensure safeguard building controlled areas and fuel building boundary integrity. The secondary purpose of these SRs is to ensure that the SBVS train being tested functions as designed. These SRs need not be performed with each safety SBVS train. The SBVS train used for these Surveillances is staggered to ensure that in addition to the requirements of LCO 3.7.12, either safety SBVS train will perform this test. The inoperability of the SBVS does not necessarily constitute a failure of these Surveillances relative to the safeguard building controlled areas and fuel building OPERABILITY. Operating experience has shown the safeguard building controlled areas and fuel building boundaries usually pass these Surveillances when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.7.12.8

This SR verifies that the SBVS recirculation coolers that cool the hot mechanical areas are capable of removing the design heat load assumed in the safeguards building heat load calculation. This SR consists of a combination of testing and calculations. The 24-month Frequency is appropriate since significant degradation of the SBVS is slow and is not expected over this time period.

All indicated changes are in response to RAI 462, Question 06.04-7

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Filtration (CREF)

LCO 3.7.10 Two CREF trains shall be OPERABLE.

---NOTE---
The control room envelope (CRE) may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One CREF train inoperable.	A.1	Restore CREF train to OPERABLE status.	7 days
B. The CRE boundary is inoperable in MODE 1, 2, 3, or 4.	B.1	Initiate action to implement mitigating actions.	Immediately
	<u>AND</u>		
	B.2	-----REVIEWER'S NOTE---- The need for the mitigating action for toxic gas isolation state will be determined by the COL applicant. ------------------------------------- Verify mitigating actions ensure CRE occupant exposures to radiological, [toxic gas,] and smoke hazards will not exceed limits.	24 hours
	<u>AND</u>		

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
	B.3	Restore CRE boundary to OPERABLE status.	60 days
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4.	C.1	Be in MODE 3.	6 hours
	AND		
	C.2	Be in MODE 5.	36 hours
D. Required Action and associated Completion Time of Condition A or B not met in MODE 5 or 6, or during movement of irradiated fuel assemblies.	D.1	-----REVIEWER'S NOTE---- The need for toxic gas isolation state will be determined by the COL applicant. ------------------------------------- [--------------NOTE------------- Place CREF train in toxic gas isolation state if automatic transfer to toxic gas isolation state is inoperable. ------------------------------------] Place OPERABLE CREF train in emergency mode.	Immediately
	OR		
	D.2	Suspend movement of irradiated fuel assemblies.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two CREF trains inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies. <u>OR</u> The CRE boundary is inoperable in MODE 5 or 6, or during movement of irradiated fuel assemblies.	E.1 Suspend movement of irradiated fuel assemblies.	Immediately
F. Two CREF trains inoperable in MODE 1, 2, 3, or 4.	F.1 Enter LCO 3.0.3.	Immediately

All indicated changes are in response to RAI 462, Question 06.04-7

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Operate each CREF train for ≥ 15 minutes with the heaters energized.	31 days
SR 3.7.10.2	Perform required CREF filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.10.3	Verify each CREF train actuates on an actual or simulated actuation signal.	24 months
SR 3.7.10.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program.	In accordance with the Control Room Envelope Habitability Program

All indicated changes are in response to RAI 462, Question 06.04-7

3.7 PLANT SYSTEMS

3.7.11 Main Control Room Air Conditioning System (CRACS)

LCO 3.7.11 Four CRACS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6,
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CRACS train inoperable.	A.1 Restore CRACS train to OPERABLE status.	120 days
B. Two CRACS trains inoperable.	B.1 Restore one inoperable CRACS train to OPERABLE status.	30 days
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 5.	6 hours 36 hours
D. Required Action and associated Completion Time of Condition A or B not met in MODE 5 or 6, or during movement of irradiated fuel assemblies.	D.1 Place an OPERABLE CRACS train in operation. <u>OR</u> D.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately

All indicated changes are in response to RAI 462, Question 06.04-7

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.12.1	Verify Safeguard Building controlled areas and Fuel Building pressure is ≤ -0.25 inches water gauge.	12 hours
SR 3.7.12.2	Verify each Safeguard Building controlled areas and Fuel Building access door is closed, except when the access opening is being used for entry and exit.	31 days
SR 3.7.12.3	Operate each SBVS accident exhaust filtration train for ≥ 15 minutes with the heaters energized.	31 days
SR 3.7.12.4	Perform required SBVS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.12.5	Verify each SBVS accident exhaust filtration train actuates on an actual or simulated actuation signal.	24 months
SR 3.7.12.6	Verify Safeguard Building controlled areas and Fuel Building pressure can be drawn down to ≤ -0.25 inches water gauge in ≤ 305 seconds after an actual or simulated actuation signal using one SBVS accident exhaust filtration train.	24 months on a STAGGERED TEST BASIS for each SBVS accident exhaust filtration train
SR 3.7.12.7	Verify Safeguard Building controlled areas and Fuel Building pressure can be maintained at ≤ -0.25 inches water gauge using one SBVS accident exhaust filtration train at a flow rate of ≤ 2640 cfm.	24 months on a STAGGERED TEST BASIS for each SBVS accident exhaust filtration train
SR 3.7.12.8	Verify each SBVS recirculation cooler has the capability to remove the design heat load.	24 months

ACTIONS (continued)

B.1 and B.2

If the shield building cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.6.1

Verifying that shield building annulus negative pressure is within limit ensures that operation remains within the limit assumed in the containment analysis. The 12 hour Frequency of this SR was developed considering operating experience related to shield building annulus pressure variations and pressure instrument drift during the applicable MODES.

SR 3.6.6.2

Maintaining shield building OPERABILITY requires verifying each access opening door is closed. However, all shield building access doors are normally kept closed, except when the access opening is being used for entry and exit or when maintenance is being performed on an access opening. The 31 day Frequency of this SR is based on engineering judgment and is considered adequate in view of the other indications of door status that are available to the operator.

SR 3.6.6.3 and 3.6.6.4

The Annulus Ventilation System (AVS) exhausts the annulus atmosphere to the environment through appropriate treatment equipment. Each safety AVS train is designed to draw down the annulus to a pressure of ≤ -0.25 inches of water gauge (wg) in ≤ 305 seconds and maintain the annulus at a pressure ≤ -0.25 inches wg. To ensure

BASES

SURVEILLANCE REQUIREMENTS (continued)

that all fission products released to the annulus are treated, SR 3.6.6.3 and SR 3.6.6.4 verify that a pressure in the annulus that is less than the lowest postulated pressure external to the shield building boundary can be established and maintained. When the AVS System is operating as designed, the establishment and maintenance of annulus pressure cannot be accomplished if the shield building boundary is not intact. Establishment of this pressure is confirmed by SR 3.6.6.3, which demonstrates that the annulus can be drawn down to a pressure of ≤ -0.25 inches wg using one AVS train. SR 3.6.6.4 demonstrates that the annulus can be maintained at a pressure of ≤ -0.25 inches wg using one AVS train at a flow rate ≤ 1295 cfm. The primary purpose of these SRs is to ensure annulus boundary integrity. The secondary purpose of these SRs is to ensure that the AVS train being tested functions as designed. There is a separate LCO with Surveillance Requirements which serves the primary purpose of ensuring OPERABILITY of the AVS System. These SRs need not be performed with each AVS train. The AVS train used for these Surveillances is staggered to ensure that in addition to the requirements of LCO 3.6.7, either safety AVS train will perform this test. The inoperability of the AVS System does not necessarily constitute a failure of these Surveillances relative to the shield building OPERABILITY. Operating experience has shown the shield building boundary usually passes these Surveillances when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.6.5

This SR would give advance indication of gross deterioration of the concrete structural integrity of the Shield Building. The Frequency of this SR is the same as that of SR 3.6.1.1. The verification is done during shutdown.

REFERENCES None.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.7 Annulus Ventilation System (AVS)

BASES

BACKGROUND

The AVS is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1), to ensure that radioactive materials that leak from the Containment Building into the shield building (secondary containment) following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment.

The Containment Building is surrounded by a secondary containment called the shield building, which is a concrete structure. Between the Containment Building and the shield building inner wall is an annular space that collects any containment leakage that may occur following a loss of coolant accident (LOCA). This space also allows for periodic inspection of the outer surface of the Containment Building.

The AVS maintains a negative pressure in the annulus between the shield building and the Containment Building during operation. Filters in the system control the release of radioactive contaminants to the environment. Shield building OPERABILITY is required to ensure retention of primary containment leakage and proper operation of the AVS. The AVS is designed to permit appropriate periodic pressure and functional testing to assure component integrity, OPERABILITY of active components, and operational performance of the system as required by GDC-43 "Testing of Containment Atmosphere Cleanup Systems" (Ref. 2).

The AVS consists of one normal operation filtration train (non-safety related), and two independent and redundant accident filtration trains (safety related). The normal filtration train operates during normal plant operation, including cold shutdown and outages. The normal operations filtration train maintains a pressure of ≤ -0.25 inches wg in the annulus during normal operation. During normal plant operation, the accident filtration trains are not required to be in operation, however they are both available for back-up if the normal filtration train is not able to maintain sufficient negative pressure in the annulus.

BACKGROUND (continued)

During normal operation, the conditioned air is drawn from the Nuclear Auxiliary Building Ventilation supply shaft to the bottom of annulus through a fire damper, manual regulated control damper, and two motor operated isolation dampers. The exhaust air is drawn through a vent at the top of annulus through two motor operated isolation dampers and fire dampers to the Nuclear Auxiliary Building Ventilation System exhaust fans via air shaft cell 3. See FSAR Section 9.4.3 (Ref. 3). The exhaust air from cell 3 is monitored for radiation. If clean, the air is filtered by the pre-filter and HEPA filter and then discharged through the vent stack. If in alarm, the air is filtered by a prefilter, HEPA filter, carbon adsorber and a post-filter, and discharged through the vent stack. The annulus air inlet and exhaust motor operated isolation dampers of the normal filtration train are the only components which are safety related. The four safety-related class motor operated air tight dampers will isolate the annulus from the non-safety normal operation train in case of a design basis accident. The two isolation dampers in both the supply and exhaust train are powered by separate divisions and are supplied by the emergency diesel generators. Each isolation damper can be operated either automatically or manually from the Main Control Room.

In normal operation mode, if there is a loss of negative pressure in the annulus, failure of the Nuclear Auxiliary Ventilation System, or Loss of Offsite Power, the normal operation filtration train is considered lost and one of the accident filtration trains is switched on. The two isolation dampers on both the normal supply and exhaust trains are closed and one of the two accident filtration trains is switched on. The other accident filtration train is available for backup.

The AVS accident filtration trains are used during a design basis event to contain leaks from the primary containment by maintaining a negative pressure in the annulus. During a design basis event, the annulus air is filtered before releasing to the environment. There are two independent 100% accident trains. Each train consists of an upstream air-tight motor controlled damper, electrical heater, pre-filter, upstream HEPA filter, an activated carbon adsorber for removal of radioiodines, downstream HEPA filter, downstream air-tight motor controlled damper, fan, and backdraft damper. The upstream HEPA filter removes the fine discrete particulate matter from the air stream. The downstream HEPA filter following the carbon adsorber collects carbon particles and provides backup in case of failure of the upstream HEPA filter. Only the upstream HEPA filter and the carbon adsorber section are credited in the analysis.

BASES

BACKGROUND (continued)

The system initiates and maintains a negative air pressure in the annulus by means of filtered exhaust ventilation of the Shield Building following receipt of a containment isolation signal. The system is described in Reference 4.

The prefilters remove large particles in the air to prevent excessive loading of the HEPA filters and carbon absorbers. Heaters reduce the relative humidity of the airstream to 70 percent or less. Monthly operation of each train, for ≥ 15 minutes, with heaters on, reduces moisture buildup on the HEPA filters and adsorbers. The heater operation time and monthly Frequency are consistent with Reference 6.

During normal operation, the AVS normal operation filtration train (non-safety related) maintains a negative pressure in the annulus and processes the air through HEPA filters.

The isolation dampers on the normal operation filtration train and the accident filtration trains can be operated either automatically or manually from the Main Control Room.

The AVS accident filtration train reduces the radioactive content in the shield building atmosphere following a DBA. Loss of the AVS could cause site boundary doses, in the event of a DBA, to exceed the values given in the licensing basis.

APPLICABLE SAFETY ANALYSES

The AVS design basis is to mitigate the consequences of the limiting DBA, which is a LOCA. The accident analysis (Ref. 5) assumes that only one train of the AVS is OPERABLE due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the remaining one train of this filtration system. The amount of fission products available for release from containment is determined for a LOCA. For all events analyzed, the AVS is assumed to be automatically initiated to reduce via filtration and adsorption, the radioactive material released to the environment.

The modeled AVS actuation in the safety analyses is based upon a worst case response time following a containment isolation initiated at the limiting setpoint. The total response time, from exceeding the signal setpoint to attaining a pressure of ≤ -0.25 inches wg in the annulus, is ≤ 305 seconds. This response time is composed of signal delay, diesel generator startup and sequencing time, system startup time, and time for the system to attain the required pressure after starting.

The AVS satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

ACTIONS (continued)

C.1 and C.2

If the AVS accident filtration train or isolation damper cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.6.7.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. Monthly heater operations which dry out any moisture accumulated in the carbon from humidity in the ambient air should be performed. Each Iodine filtration train must be operated for ≥ 15 minutes with the heaters energized. The 31 day Frequency is based on the reliability of the equipment and the two train redundancy. The heater energization time and 31 day Frequency are consistent with Reference 6.

SR 3.6.7.2

This SR verifies that the required AVS filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing HEPA filter performance, carbon adsorber efficiency, system flow rate, and the physical properties of the activated carbon (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the VFTP.

B 3.7 PLANT SYSTEMS

B 3.7.9 Safety Chilled Water (SCW) System

BASES

BACKGROUND

The SCW System provides a heat sink for the removal of process and operating heat from safety related components during an anticipated operational occurrence (AOO) or postulated accident. During normal operation, and a normal shutdown, the SCW System also provides this function for the associated safety related systems. The safety related function is covered by this LCO.

The SCW System consists of four trains. Each train consists of a chiller refrigeration unit, chilled water pumps (two pumps), surge tank, piping, valving, and instrumentation. Normally open motor operated cross-tie valves interconnect the supply and return of Train 1 with Train 2 and interconnect the supply and return of Train 3 with Train 4. Each SCW System chiller is sized to meet the system load requirements of two divisional trains. Heat is rejected to the system chilled water as it passes through the cooling coils of the system users. This heat is rejected from the system as it is pumped through the train chiller refrigeration units. Trains 1 and 4 reject this energy to ambient via air cooled condensers while Trains 2 and 3 have condensers cooled by the Component Cooling Water (CCW) System. Each refrigeration chiller in the four divisions of the SCWS provides sufficient operating redundancy and flexibility in the event of a compressor failure.

During normal operation, at least one train of the divisional pair is in operation. Either Train 1 or Train 2 chiller provides safety chilled water cooling within Safeguard Building Divisions 1 and 2, and the associated Fuel Building Ventilation System (FBVS) load. Likewise, the chiller from either Train 3 or 4 provides safety chilled water cooling for both Safeguard Divisions 3 and 4 and the associated FBVS load. During normal operation, the cross-tie isolation valves (supply and return for both divisions) are normally open. The non-operating chiller and pump(s) are maintained in standby. This configuration also allows for maintenance on the non-operating chiller and pump(s). If the normal operating train pump or chiller fails, a switchover sequence to the standby train is automatically initiated. A planned switchover of the operating train is manually initiated from the MCR.

All indicated changes are in response to RAI 462, Question 06.04-7

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.9.3

This SR verifies proper automatic operation of the SCW train on an actual or simulated actuation signal. The SCW System is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage. Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

SR 3.7.9.4

Verifying SCW train leakage is within limits assures an adequate volume of water is maintained for each SCW train for 7 days in post-seismic operation with no make water source available. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage. Operating experience has shown that these components usually pass the Surveillance when performed at the 24 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

The leakage value of 0.5 gallons per hour considers the worst case pressure difference between one operating SCW train with the SCW Cross-tie Supply and Return valves closed and the opposite SCW train shutdown. The leak test differential pressure across the closed cross-tie valves will be established between a normal operating train with pumps in operation and a shutdown train with pumps secured. This alignment would result in the greatest potential seat leakage across the isolated valves. If the train leakage surveillance is not within allowable limits for a SCW train, that train and the opposite train will be declared inoperable. The duration of SR 3.7.9.4 test should be long enough for the installed instrumentation to accurately measure the system losses with considerations to environmental changes in temperatures effecting the thermal contraction and expansion of water in the SCWS.

REFERENCES

1. FSAR Section 9.2.8.

All indicated changes are in response to RAI 462, Question 06.04-7

B 3.7 PLANT SYSTEMS

B 3.7.10 Control Room Emergency Filtration (CREF)

BASES

BACKGROUND

The CREF provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, toxic gases, or smoke.

The CREF consists of two independent, redundant trains that recirculate and filter air in the control room envelope (CRE) and a CRE boundary that limits the in-leakage of unfiltered air. Each CREF train consists of a moisture separator, electric heating coil, prefilter a high efficiency particulate air (HEPA) filter, an activated carbon adsorber section for removal of gaseous activity (principally iodines), a post-filter, and a fan. Ductwork, dampers, doors, barriers, and instrumentation also form part of the system. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provides backup in case of failure of the main HEPA filter bank.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit for normal and accident conditions. This area encompasses the control room, and may encompass other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The CRE is protected during normal operation, natural events and accident conditions. The CRE boundary is the combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the in-leakage of unfiltered air into the CRE will not exceed the in-leakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

BACKGROUND (continued)

The CREF is an emergency system, parts of which may also operate during normal unit operations in the standby mode of operation. Upon receipt of the actuating signal(s), normal air supply to the CRE is isolated, and the stream of ventilation air is recirculated through the system filter trains. The prefilters remove large particles in the air to prevent excessive loading of the HEPA filters and carbon adsorbers.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

Actuation of the CREF places the system in [either of two separate states (emergency radiation state or toxic gas isolation state) of] the emergency mode of operation[, depending on the initiation signal]. Actuation of [the system to the emergency radiation state of] the emergency mode of operation closes the unfiltered outside air intake and unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE through the redundant trains of HEPA and carbon filters, and initiates control room pressurization and filtered ventilation of the air supply to the CRE.

Outside air is mixed with recirculated air from the CRE. This air flows through the CREF unit into a common recirculation plenum where it mixes with air pulled from the CRE rooms. Pressurization of the CRE minimizes infiltration of unfiltered air through the CRE boundary from all the surrounding areas adjacent to the CRE boundary. [The actions taken in the toxic gas isolation state are the same, except that the control room operator switches the CREF to a filtration alignment to minimize any outside air from entering the CRE through the CRE boundary.]

The outside air entering the CRE is continuously monitored by radiation [and toxic gas] detectors. One detector output above the setpoint will cause actuation of the emergency mode [, either the emergency radiation state or toxic gas isolation state, as required]. [The actions of the toxic gas isolation state are more restrictive, and will override the actions of the emergency radiation state.]

BACKGROUND (continued)

One CREF train operating in a filtered alignment at a flow rate of ≤ 4000 cfm (≤ 1000 cfm outside air and 3000 cfm of CRE recirculation air), will pressurize the CRE to ≥ 0.125 inches water gauge relative to all external areas adjacent to the CRE boundary. The CREF operation in maintaining the CRE habitability is discussed in FSAR Section 9.4.1 (Ref. 1).

Redundant supply and recirculation trains provide the required filtration should an excessive pressure drop develop across the other filter train. Isolation dampers are arranged in series so the failure of one damper to shut will not result in a breach of isolation. The CREF is designed in accordance with Seismic Category I requirements.

The CREF is designed to maintain a habitable environment in the CRE for 30 days of continuous occupancy after a design basis accident (DBA) without exceeding a 5 rem whole body dose or its equivalent to any part of the body (5 rem total effective dose equivalent (TEDE)).

APPLICABLE SAFETY ANALYSES

The CREF components are arranged in redundant, safety-related ventilation trains. The location of components and ducting within the CRE ensures an adequate supply of filtered air to all areas requiring access. The CREF provides airborne radiological protection for the CRE occupants, as demonstrated by the CRE occupant dose analyses for the most limiting design basis loss of coolant accident, fission product release presented in FSAR Chapter 15 (Ref. 2).

The CREF consists of two 100% capacity trains. Each CREF train can be aligned with one of the four air conditioning and recirculation trains. There are only two CREF trains since only slow failure modes are assumed and filtration efficiency is checked periodically. Both CREF trains with two of the four of the associated air conditioning and recirculation trains are required to be OPERABLE. One CREF train is assumed to be lost to a single failure. The other train provides 100% of the ventilation to the CRE boundary.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

All indicated changes are in response to RAI 462, Question 06.04-7

BASES

APPLICABLE SAFETY ANALYSES (continued)

The CREF provides protection from radiological hazards [, toxic gases,] and smoke to the CRE occupants. ~~Reference 3 discusses protection of CRE occupants following a hazardous chemical release.~~ Reference 4 discusses protection of the CRE occupants and their ability to control the reactor from the control room or from the remote shutdown panels in the event of a smoke challenge.

The worst case single active failure of a component of the CREF, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The CREF satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

In the event of a postulated accident, one CREF train is required to provide an adequate supply of filtered air to the CRE. To ensure that this requirement is met, both CREF trains must be OPERABLE. The basis for this approach is that two trains are required to satisfy all design requirements (i.e., one train is needed to mitigate the event and other train is assumed to have a single active failure). The failure of both CREF trains could result in exceeding a dose of 5 rem whole body or its equivalent to any part of the body 5 rem TEDE in the event of a large radioactive release.

Each CREF train is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A CREF train is OPERABLE when the associated:

a. Fan is OPERABLE;

b. Prefilters, HEPA filters, and carbon adsorbers, and post-filters are not excessively restricting flow, and are capable of performing their filtration functions; and

c. Heater, ductwork, and dampers are OPERABLE, and air circulation can be maintained.

In order for the CREF trains to be considered OPERABLE, the CRE boundary must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analyses for postulated accidents, and that CRE occupants are protected from [toxic gases and] smoke.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The LCO is modified by a Note allowing the CRE boundary to be opened intermittently under administrative controls. This Note only applies to openings in the CRE boundary that can be rapidly restored to the design conditions, such as doors, hatches, floor plugs, and access panels. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls should be procedurelized, and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

BASES

APPLICABILITY

In MODES 1, 2, 3, and 4, and during movement of irradiated fuel assemblies, the CREF trains must be OPERABLE to ensure that the CRE will remain habitable during and following a postulated accident (i.e., LOCA, main steam line break, rod ejection, and fuel handling accident).

In MODE 5 or 6, the CREF is also required to cope with a failure of the Gaseous Waste Processing System.

During movement of irradiated fuel assemblies, the CREF trains must be OPERABLE to cope with the release from a fuel handling accident.

ACTIONS

A.1

With one CREF train inoperable, action must be taken to restore OPERABLE status within 7 days. In this Condition, the OPERABLE CREF train is adequate to perform the CRE occupant protection function. However, the overall system reliability is reduced. The 7 day Completion Time is based on the low probability of a postulated accident occurring during this time period, and ability of the remaining train to provide the required capability.

ACTIONS (continued)

B.1, B.2, and B.3

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of postulated accident consequences (allowed to be up to 5 rem whole body or its equivalent to any part of the body 5 rem TEDE), or inadequate protection of CRE occupants from [toxic gases or] smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 60 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or [toxic gas] event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a postulated accident, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of postulated accident consequences, and that CRE occupants are protected from radiological hazards [, toxic gas] and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a postulated accident occurring during this time period, and the use of mitigating actions. The 60 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a postulated accident. In addition, the 60 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

ACTIONS (continued)

C.1 and C.2

In MODE 1, 2, 3, or 4, if any Required Action and Completion Time of Condition A or B cannot be met, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1 and D.2

In MODE 5 or 6, or during movement of irradiated fuel assemblies, if the inoperable CREF train cannot be restored to OPERABLE status within the required Completion Time, action must be taken to immediately place the OPERABLE CREF train in the emergency mode. This action ensures that the other train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.

An alternative to Required Action D.1 is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

-----------------------------------REVIEWER'S NOTE-----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

[Required Action D.1 is modified by a Note indicating to place the system in the toxic gas isolation state.]

ACTIONS (continued)

E.1

In MODE 5 or 6, or during movement of irradiated fuel assemblies, with two CREF trains inoperable, or with the CRE boundary inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might enter the CRE. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

F.1

With both CREF trains inoperable in MODE 1, 2, 3, or 4, the CREF may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.7.10.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. Monthly heater operations which dry out any moisture accumulated in the carbon adsorber beds from humidity in the ambient air should be performed. Each CREF train must be operated for ≥ 15 minutes with the heaters energized. The 31 day Frequency is based on the reliability of the equipment and the two train redundancy. The heater energization time and 31 day Frequency are consistent with Reference 8.

SR 3.7.10.2

This SR verifies that the required CREF filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing the performance of the HEPA filter, carbon adsorber efficiency, minimum flow rate, and the physical properties of the activated carbon. Specific test Frequencies and additional information are discussed in detail in the VFTP.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.10.3

This SR verifies that each CREF train starts and operates on an actual or simulated actuation signal. The Frequency of 24 months is based on industry operating experience and is consistent with the typical refueling cycle.

SR 3.7.10.4

This SR verifies the OPERABILITY of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE. The details of the testing are specified in the Control Room Envelope Habitability Program.

The CRE is considered habitable when the radiological dose to CRE occupants calculated in the licensing basis analyses of postulated accident consequences is no more than 5 rem whole body or its equivalent to any part of the body 5 rem TEDE and the CRE occupants are protected from [toxic gases] and smoke. This SR verifies that the unfiltered air inleakage into the CRE is no greater than the flow rate assumed in the licensing basis analyses of postulated accident consequences. When unfiltered air inleakage is greater than the assumed flow rate, Condition B must be entered. Required Action B.3 allows time to restore the CRE boundary to OPERABLE status provided mitigating actions can ensure that the CRE remains within the licensing basis habitability limits for the occupants following an accident. Mitigating actions, or compensatory measures, are discussed in Regulatory Guide 1.196, Section 2.7.3, (Ref. 5) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 6). These compensatory measures may also be used as mitigating measures as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures (Ref. 7). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis postulated accident consequence analysis, repairing the CRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the CRE boundary has been restored to OPERABLE status.

BASES

REFERENCES

1. FSAR Section 9.4.

2. FSAR Section 15.6.

3. Deleted.

4. FSAR Section 9.5.

5. Regulatory Guide 1.196, Rev. 1, January 2007.

6. NEI 99-03, "Control Room Habitability Assessment," June 2001.

7. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2005, "NEI Draft White Paper, Use of Generic Letter 91-18 Process and Alternative Source Terms in the Context of Control Room Habitability" (ADAMS Accession No. ML040300694).

8. Regulatory Guide 1.52, Rev. 3, June 2001.

B 3.7 PLANT SYSTEMS

B 3.7.11 Control Room Air Conditioning System (CRACS)

BASES

BACKGROUND

The CRACS provides temperature control for the control room envelope (CRE) following isolation of the control room.

The CRACS operates in the recycling mode with fresh outside air makeup. There are two 100% capacity identical fresh air intake trains. Train 1 is located in Safeguard Building 2 and train 4 is located in Safeguard Building 3. For each intake train, the fresh air is taken from outside environment through a motor-operated inlet isolation damper, and a pressure control damper. If operating in the unfiltered bypass alignment (intake air bypasses the CREF), outside air flows through a prefilter and duct heater. The fresh outside air then goes to the common recirculation plenum and mixes with CRE recycled air. The mixed air is then directed through two of the four air conditioning trains.

During normal and emergency operation each CRACS cooling unit provides 50% of the cooling for the rooms within the CRE. Each CRACS air handling unit is capable of cooling up to 50% of the normal and emergency cooling load to allow two CRACS air handling units to cool the CRE rooms during a station blackout (SBO) event. During an SBO event, the CRACS air handling units will prevent the CRE room temperature from exceeding 78°F.

Each air conditioning train consists of a final filter, cooling coil, moisture separator, fan suction and discharge silencers, supply air fan, and backdraft damper. The conditioned air is supplied to the control room envelope (CRE) areas. Electric heaters are installed in the supply air ducts to maintain individual room temperature. The air is pulled from the CRE areas into a common recirculation air plenum and then recycled through the air conditioning units for each train. Upon receipt of a high radiation alarm or upon receipt of a containment isolation alarm, the CREF unit operates in the filtered alignment. Operation of either CREF unit or closure of either outside inlet air isolation damper will shut down the normal kitchen or restroom exhaust fan and close isolation dampers in ducting routed to the safeguard building ventilation system (SBVS) where it is exhausted to the outside environment.

During normal operation, the CREF units operate in the bypass alignment (air bypasses the iodine filtration unit). CRE room exhaust from clean areas continues to recycle back to the recirculation plenum and CRACS air conditioning units.

BASES

APPLICABILITY

In MODES 1, 2, 3, 4, 5, and 6, and during movement of irradiated fuel assemblies, the CRACS must be OPERABLE to ensure that the control room temperature will not exceed equipment operational requirements following isolation of the control room.

ACTIONS

A.1

With one CRACS train inoperable, the inoperable train must be returned to OPERABLE status within 120 days. The 120 day Completion Time is based on the assumption that the one CRACS train is out of service for maintenance and is consistent with the dose analysis assumptions in FSAR Chapter 15.

B.1

With two CRACS trains inoperable, action must be taken to restore one CRACS train to OPERABLE status within 30 days. In this Condition, the remaining OPERABLE CRACS trains are adequate to maintain the control room temperature within limits. However, the overall reliability is reduced because a single failure in one of the OPERABLE CRACS trains could result in loss of CRACS function. The 30 day Completion Time is based on the low probability of an event requiring control room isolation, the consideration that the remaining train can provide the required protection, and that alternate safety or non-safety related cooling means are available.

C.1 and C.2

If any Required Action and Associated Completion Time of Condition A or B is not met in MODE 1, 2, 3, or 4, the unit must be placed in a MODE that minimizes the risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

ACTIONS (continued)

D.1 and D.2

In MODE 5 or 6, or during movement of irradiated fuel, if the inoperable CRACS train(s) cannot be restored to OPERABLE status within the required Completion Time, an OPERABLE CRACS train must be placed in operation immediately. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that active failures will be readily detected.

An alternative to Required Action D.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes accident risk. This does not preclude the movement of fuel to a safe position.

E.1

In MODE 5 or 6, or during movement of irradiated fuel assemblies, with three or more CRACS trains inoperable, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

F.1

If three or more CRACS trains are inoperable in MODE 1, 2, 3, or 4, the CRACS may not be capable of performing its intended function. Therefore, LCO 3.0.3 must be entered immediately.

ACTIONS

A.1

With one SBVS Accident Exhaust Filtration train inoperable, action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the SBVS function. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable SBVS train, and the remaining SBVS train providing the required protection.

B.1

----------------------------------REVIEWER'S NOTE----------------------------------
Adoption of Condition B is dependent on a commitment from the licensee to have guidance available describing compensatory measures to be taken in the event of an intentional and unintentional entry into Condition B.

----------------------------------REVIEWER'S NOTE----------------------------------
The need for toxic gas isolation state will be determined by the COL applicant.

If the safeguard building controlled areas or fuel building boundary is inoperable in MODE 1, 2, 3, or 4, the SBVS trains may not be able to perform their intended functions. Actions must be taken to restore an OPERABLE safeguard building controlled areas and fuel building boundaries within 24 hours. During the period that the safeguard building controlled areas or fuel building boundary is inoperable, appropriate compensatory measures consistent with the intent, as applicable, of GDC 19 and 10 CFR Part 100 should be utilized to protect plant personnel from potential hazards such as radioactive contamination, [toxic gases,] smoke, temperature and relative humidity, and physical security. Preplanned measures should be available to address these concerns for intentional and unintentional entry into the condition. The 24 hour Completion Time is reasonable based on the low probability of a postulated accident occurring during this time period, and the use of compensatory measures. The 24 hour Completion Time is a typically reasonable time to diagnose, plan and possibly repair, and test most problems with the safeguard building controlled areas or fuel building boundary.

All indicated changes are in response to RAI 462, Question 06.04-7

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.12.6 and 3.7.12.7

The SBVS exhausts the safeguard building controlled areas and fuel building atmosphere to the environment through appropriate treatment equipment. Each safety SBVS train is designed to draw down the safeguard building controlled areas and fuel building to a pressure of ≤ -0.25 inches of water gauge (wg) in ≤ 305 seconds and maintain the safeguard building controlled areas and fuel building at a pressure of ≤ -0.25 inches wg at a flow rate ≤ 2,640 cfm from the safeguard building controlled areas and fuel building. To ensure that all fission products released to the safeguard building controlled areas and fuel building are treated, SR 3.7.12.6 and SR 3.7.12.7 verify that a pressure in the safeguard building controlled areas and fuel building that is less than the lowest postulated pressure external to the safeguard building controlled areas and fuel building boundaries can be established and maintained. When the SBVS is operating as designed, the establishment and maintenance of safeguard building controlled areas and fuel building pressure cannot be accomplished if the safeguard building controlled areas or fuel building boundaries is not intact. Establishment of this pressure is confirmed by SR 3.7.12.6. SR 3.7.12.7 demonstrates that the safeguard building controlled areas and fuel building can be maintained at a pressure of ≤ -0.25 inches wg. The primary purpose of these SRs is to ensure safeguard building controlled areas and fuel building boundary integrity. The secondary purpose of these SRs is to ensure that the SBVS train being tested functions as designed. These SRs need not be performed with each safety SBVS train. The SBVS train used for these Surveillances is staggered to ensure that in addition to the requirements of LCO 3.7.12, either safety SBVS train will perform this test. The inoperability of the SBVS does not necessarily constitute a failure of these Surveillances relative to the safeguard building controlled areas and fuel building OPERABILITY. Operating experience has shown the safeguard building controlled areas and fuel building boundaries usually pass these Surveillances when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.7.12.8

This SR verifies that the SBVS recirculation coolers that cool the hot mechanical areas are capable of removing the design heat load assumed in the safeguards building heat load calculation. This SR consists of a combination of testing and calculations. The 24-month Frequency is appropriate since significant degradation of the SBVS is slow and is not expected over this time period.