August 8, 2006 TSTF-06-18

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

SUBJECT: TSTF-448, Revision 3, "Control Room Habitability"

Dear Sir or Madam:

Enclosed for NRC consideration is Technical Specification Task Force Traveler TSTF-448, Revision 3, "Control Room Habitability." This revision was developed by the Technical Specification Task Force and the Nuclear Energy Institute (NEI) Control Room Habitability Task Force (CRHTF). TSTF-448, Revision 3, is consistent with the draft Technical Specifications and draft Safety Evaluation transmitted from the NRC to the TSTF on March 10, 2006, as modified by the changes described in a letter from the NRC to the TSTF dated May 12, 2006.

NRC review of this Traveler has been granted a fee waiver pursuant to the provisions of 10 CFR 170.11 as documented in a letter to A. R. Pietrangelo (NEI) dated January 10, 2003.

Should you have any questions, please do not hesitate to contact us.

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Enclosure

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PWROG PWR Owners Group
BWR OWNERS' GROUP

Technical Specification Task Force
Improved Standard Technical Specifications Change Traveler

Control Room Habitability

NUREGs Affected: ☑ 1430 ☑ 1431 ☑ 1432 ☑ 1433 ☑ 1434

Classification: 1) Technical Change

Recommended for CLIIP?: Yes

Correction or Improvement: Not Applicable

NRC Fee Status: Exempt

Benefit: Not Applicable

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See attached.

Revision History

OG Revision 0 Revision Status: Closed

Revision Proposed by: NEI CRH Task Force

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 29-Nov-02

Owners Group Comments
(No Comments)

Owners Group Resolution: Approved Date: 16-Dec-02

TSTF Review Information

TSTF Received Date: 29-Nov-02 Date Distributed for Review 29-Nov-02

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 16-Dec-02

NRC Review Information

NRC Received Date: 20-Dec-02

Date of NRC Letter: 01-Jul-03

OG Revision 0 Revision Status: Closed

Final Resolution: Superceded by Revision Final Resolution Date: 01-Jul-03

TSTF Revision 1 Revision Status: Closed

Revision Proposed by: NEI CRH Task Force

Revision Description:
On July 1, 2003, the NRC provided comments on TSTF-448, Revision 0. Based on the NRC's comments, the following changes are made:

1. A new Condition B is added to address control room inleakage. This Condition applies when one or more control room ventilation trains are inoperable due to inleakage into the control room and the requirements of the Control Room Habitability Program can still be met with compensatory measures in place. Otherwise, Condition D applies. Condition B requires compensatory actions be initiated immediately and the inleakage be within limit within 14 days.

2. Condition C requires a report be submitted to the NRC within 90 days if the Required Actions and associated Completion Times of Condition B are not met.

3. The original Condition B, now Condition D, which applies when one or more control room ventilation trains are inoperable due to an inoperable control room boundary, is modified to not apply when Condition B is entered and the original 24 hour Completion Time is restored. The Bases state that the Condition applies to significant inleakage or breaches to the control room boundary in which the requirements of the Control Room Integrity Program cannot be met even with compensatory measures in place.

4. Condition A is modified to add, "for reasons other than Condition B or D" to prevent multiple condition entry of Condition A with Condition B or D.

5. The subsequent ACTIONS are renumbered due to the insertions.

6. The inleakage Surveillance is revised to clarify the purpose and acceptance criteria for the SR. The revised wording is consistent with that proposed by the NRC in Regulatory Guide 1.196. The Bases to the Surveillance are revised to more clearly describe the relationship between the Surveillance and the Control Room Integrity Program.

7. The Control Room Integrity Program is revised to reference Regulatory Guide 1.197, Revision 0, May 2003, and to allow for NRC approved, plant-specific exceptions. The purpose of the program is expanded and the program is required to contain the limits on control room inleakage and control room configuration control, management of breaches, and preventative maintenance of the control room.

8. The description of the report is revised to be more consistent with the Required Action.

9. The Bases of NUREG-1430 (B&W) are revised to be more consistent with the content of the comparable Bases in the other ISTS NUREGs.

10. In the July 1 letter, the NRC requested that a statement be added to the Control Room Integrity Program stating that the provisions of SR 3.0.2 are not applicable. Under the ITS usage rules, the provisions of Section 3.0 are not applicable to Frequencies in Chapter 5 unless specifically stated. However, the provisions of SR 3.0.2 should apply to the Frequencies in the Control Room Integrity Program. Control room in-leakage

TSTF Revision 1 Revision Status: Closed

testing is a time-consuming and elaborate test. The provisions of SR 3.0.2 are intended to allow such tests to be scheduled efficiently and integrated into other plant activities. The Staff's comment that there is very limited data concerning control room integrity is not sufficient justification for eliminating this important planning provision. There is no demonstrated safety concern that would prohibit the use of SR 3.0.2 to schedule control room in-leakage testing in an efficient and effective manner. Therefore, a statement that SR 3.0.2 is applicable to the in-leakage testing Frequencies has been added.

An additional change, not related to the NRC's comment is made. The existing Condition B Bases state that during the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke, temperature and relative humidity, and physical security. The phrase "and physical security" is eliminated. Physical security is not an aspect of GDC 19 nor of control room habitability. Including the phrase in the Bases for this Action is confusing. Furthermore, it is unnecessary. 10 CFR 73.55 "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage," requires compensatory measures when physical barriers are not in place. 10 CFR 73.55(g) states, "Testing and maintenance. Each licensee shall test and maintain intrusion alarms, emergency alarms, communications equipment, physical barriers, and other security related devices or equipment utilized pursuant to this section as follows: (1) All alarms, communication equipment, physical barriers, and other security related devices or equipment shall be maintained in operable condition. The licensee shall develop and employ compensatory measures including equipment, additional security personnel and specific procedures to assure that the effectiveness of the security system is not reduced by failure or other contingencies affecting the operation of the security related equipment or structures." Repeating requirements that are found in the regulations in the Technical Specification Bases is unnecessary, confusing, and contrary to the ISTS use and format guidelines.

TSTF Review Information

TSTF Received Date: 29-Jul-03 Date Distributed for Review 29-Jul-03

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:

(No Comments)

TSTF Resolution: Approved Date: 18-Aug-03

NRC Review Information

NRC Received Date: 19-Aug-03

NRC Comments: Date of NRC Letter: 16-Dec-03

NRC provided comments in a letter dated 12/16/03. TSTF and NEI CRH Task Force preparing responses.

Final Resolution: Superceded by Revision Final Resolution Date: 16-Dec-03

TSTF Revision 2 Revision Status: Closed

Revision Proposed by: TSTF & NEI CRHTF

Revision Description:
Revision 2 is a complete replacement of Revision 1. See Appendix A of the justification for a description of the changes.

TSTF Revision 2 Revision Status: Closed

TSTF Review Information

TSTF Received Date: 13-Jul-05 Date Distributed for Review 13-Jul-05

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 17-Aug-05

NRC Review Information

NRC Received Date: 18-Aug-05

Date of NRC Letter: 28-Dec-05

Final Resolution: NRC Requests Changes: TSTF Will Revise Final Resolution Date: 28-Dec-05

TSTF Revision 3 Revision Status: Active

Revision Proposed by: NRC

Revision Description:
Revision 3 is a complete replacement of TSTF-448, Revision 2.

The changes in Revision 3 are based on the proposed Technical Specifications in the NRC's March 10, 2006 letter to the TSTF, as modified by the dicussions in the NRC's May 12, 2006 letter to the TSTF.

TSTF Review Information

TSTF Received Date: 26-Jun-06 Date Distributed for Review 26-Jun-06

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
(No Comments)

TSTF Resolution: Approved Date: 07-Aug-06

NRC Review Information

NRC Received Date: 07-Aug-06

Affected Technical Specifications

Bkgnd 3.7.10 Bases CREVS NUREG(s)- 1430 Only

S/A 3.7.10 Bases	CREVS	NUREG(s)- 1430 Only
LCO 3.7.10	CREVS Change Description: Revised LCO Note	NUREG(s)- 1430 Only
LCO 3.7.10 Bases	CREVS	NUREG(s)- 1430 Only
Appl. 3.7.10 Bases	CREVS	NUREG(s)- 1430 Only
Ref. 3.7.10 Bases	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.A	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.A Bases	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.B	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.B Bases	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.C Bases	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.D	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.D Bases	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.E	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.E Bases	CREVS	NUREG(s)- 1430 Only
Action 3.7.10.F Bases	CREVS	NUREG(s)- 1430 Only
SR 3.7.10.3 Bases	CREVS	NUREG(s)- 1430 Only
SR 3.7.10.4	CREVS Change Description: New SR	NUREG(s)- 1430 Only
SR 3.7.10.4	CREVS Change Description: Deleted	NUREG(s)- 1430 Only
SR 3.7.10.4 Bases	CREVS Change Description: Deleted	NUREG(s)- 1430 Only
SR 3.7.10.4 Bases	CREVS Change Description: New SR	NUREG(s)- 1430 Only
SR 3.7.10.5	CREVS	NUREG(s)- 1430 Only
SR 3.7.10.5 Bases	CREVS Change Description: Added	NUREG(s)- 1430 Only
5.5.18	Control Room Envelope Habitability Program	NUREG(s)- 1430 Only
Bkgnd 3.7.10 Bases	CREFS	NUREG(s)- 1431 Only

S/A 3.7.10 Bases	CREFS	NUREG(s)- 1431 Only
LCO 3.7.10	CREVS Change Description: Revised LCO Note	NUREG(s)- 1431 Only
LCO 3.7.10 Bases	CREFS	NUREG(s)- 1431 Only
Appl. 3.7.10 Bases	CREFS	NUREG(s)- 1431 Only
Ref. 3.7.10 Bases	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.A	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.A Bases	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.B	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.B Bases	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.C Bases	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.D Bases	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.E	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.E Bases	CREFS	NUREG(s)- 1431 Only
Action 3.7.10.F Bases	CREVS	NUREG(s)- 1431 Only
SR 3.7.10.3 Bases	CREFS	NUREG(s)- 1431 Only
SR 3.7.10.4	CREFS Change Description: New SR	NUREG(s)- 1431 Only
SR 3.7.10.4	CREFS Change Description: Deleted	NUREG(s)- 1431 Only
SR 3.7.10.4 Bases	CREFS Change Description: New SR	NUREG(s)- 1431 Only
SR 3.7.10.4 Bases	CREFS Change Description: Deleted	NUREG(s)- 1431 Only
5.5.18	Control Room Envelope Habitability Program	NUREG(s)- 1431 Only
Bkgnd 3.7.11 Bases	CREACS	NUREG(s)- 1432 Only
S/A 3.7.11 Bases	CREACS	NUREG(s)- 1432 Only
LCO 3.7.11	CREACS Change Description: Revised LCO Note	NUREG(s)- 1432 Only
LCO 3.7.11 Bases	CREACS	NUREG(s)- 1432 Only

Appl. 3.7.11 Bases	CREACS	NUREG(s)- 1432 Only
Ref. 3.7.11 Bases	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.A	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.A Bases	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.B	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.B Bases	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.C Bases	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.D	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.D Bases	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.E	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.E Bases	CREACS	NUREG(s)- 1432 Only
Action 3.7.11.F Bases	CREACS	NUREG(s)- 1432 Only
SR 3.7.11.3 Bases	CREACS	NUREG(s)- 1432 Only
SR 3.7.11.4	CREACS Change Description: Deleted	NUREG(s)- 1432 Only
SR 3.7.11.4	CREACS Change Description: New SR	NUREG(s)- 1432 Only
SR 3.7.11.4 Bases	CREACS Change Description: Deleted	NUREG(s)- 1432 Only
SR 3.7.11.4 Bases	CREACS Change Description: New SR	NUREG(s)- 1432 Only
5.5.18	Control Room Envelope Habitability Program	NUREG(s)- 1432 Only
Bkgnd 3.7.4 Bases	[MCREC] System	NUREG(s)- 1433 Only
S/A 3.7.4 Bases	[MCREC] System	NUREG(s)- 1433 Only
LCO 3.7.4	[MCREC] System Change Description: Revised LCO Note	NUREG(s)- 1433 Only
LCO 3.7.4 Bases	[MCREC] System	NUREG(s)- 1433 Only
Appl. 3.7.4 Bases	[MCREC] System	NUREG(s)- 1433 Only
Ref. 3.7.4 Bases	[MCREC] System	NUREG(s)- 1433 Only

Action 3.7.4.A	[MCREC] System	NUREG(s)- 1433 Only
Action 3.7.4.A Bases	[MCREC] System	NUREG(s)- 1433 Only
Action 3.7.4.B	[MCREC] System	NUREG(s)- 1433 Only
Action 3.7.4.B Bases	[MCREC] System	NUREG(s)- 1433 Only
Action 3.7.4.C Bases	[MCREC] System Change Description: Revised LCO Note	NUREG(s)- 1433 Only
Action 3.7.4.D Bases	[MCREC] System	NUREG(s)- 1433 Only
Action 3.7.4.E Bases	[MCREC] System Change Description: Revised LCO Note	NUREG(s)- 1433 Only
Action 3.7.4.F	[MCREC] System	NUREG(s)- 1433 Only
Action 3.7.4.F Bases	[MCREC] System	NUREG(s)- 1433 Only
SR 3.7.4.3 Bases	[MCREC] System	NUREG(s)- 1433 Only
SR 3.7.4.4	[MCREC] System Change Description: New SR	NUREG(s)- 1433 Only
SR 3.7.4.4	[MCREC] System Change Description: Deleted	NUREG(s)- 1433 Only
SR 3.7.4.4 Bases	[MCREC] System Change Description: Deleted	NUREG(s)- 1433 Only
SR 3.7.4.4 Bases	[MCREC] System Change Description: New SR	NUREG(s)- 1433 Only
5.5.15	Control Room Envelope Habitability Program	NUREG(s)- 1433 Only
Bkgnd 3.7.3 Bases	[CRFA] System	NUREG(s)- 1434 Only
S/A 3.7.3 Bases	[CRFA] System	NUREG(s)- 1434 Only
LCO 3.7.3	[CRFA] System Change Description: Revised LCO Note	NUREG(s)- 1434 Only
LCO 3.7.3 Bases	[CRFA] System	NUREG(s)- 1434 Only
Appl. 3.7.3 Bases	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.A	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.A Bases	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.B	[CRFA] System	NUREG(s)- 1434 Only

Action 3.7.3.B Bases	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.D Bases	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.E Bases	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.F	[CRFA] System	NUREG(s)- 1434 Only
Action 3.7.3.F Bases	[CRFA] System	NUREG(s)- 1434 Only
SR 3.7.3.3 Bases	[CRFA] System	NUREG(s)- 1434 Only
SR 3.7.3.4	[CRFA] System Change Description: Deleted	NUREG(s)- 1434 Only
SR 3.7.3.4	[CRFA] System Change Description: New SR	NUREG(s)- 1434 Only
SR 3.7.3.4 Bases	[CRFA] System Change Description: New SR	NUREG(s)- 1434 Only
SR 3.7.3.4 Bases	[CRFA] System Change Description: Deleted	NUREG(s)- 1434 Only
Ref. 3.7.3.4 Bases	[CRFA] System	NUREG(s)- 1434 Only
5.5.15	Control Room Envelope Habitability Program	NUREG(s)- 1434 Only

1.0 Description

In NRC Generic Letter 2003-01 (Reference 1), licensees were alerted to findings at facilities that existing technical specification surveillance requirements for the Control Room Emergency Filtration System (CREFS[1]) may not be adequate. Specifically, the results of tracer gas tests at facilities indicated that the differential pressure surveillance is not a reliable method for demonstrating control room envelope (CRE) integrity.

The Technical Specification Task Force (TSTF) and the Nuclear Energy Institute (NEI) Control Room Habitability Task Force (CRHTF) have developed proposed changes to the Improved Standard Technical Specifications (ISTS) (NUREGs 1430 through 1434) to address the control room habitability issue by replacing the differential pressure surveillance with a tracer gas surveillance, adding a Technical Specification Action for an inoperable CRE, and by instituting a Control Room Envelope Habitability Program that will ensure that CRE habitability is maintained.

2.0 Proposed Change

The following changes are proposed to:

NUREG-1430, TS 3.7.10, "Control Room Emergency Ventilation System (CREVS);"
NUREG-1431, TS 3.7.10, "Control Room Emergency Filtration System (CREFS);"
NUREG-1432, TS 3.7.11, "Control Room Emergency Air Cleanup System (CREACS);"
NUREG-1433, TS 3.7.4, "[Main Control Room Environmental Control (MCREC)] System;" and
NUREG-1434, TS 3.7.3, "[Control Room Fresh Air (CRFA)] System."

- Condition A is revised from "One CREFS train inoperable" to "One CREFS train inoperable for reasons other than Condition B."

- In NUREG-1430, 1431, and 1432, Condition B is revised from "Two CREFS trains inoperable due to inoperable control room boundary in MODE 1, 2, 3, or 4" to "One or more CREFS trains inoperable due to inoperable CRE boundary in MODE 1, 2, 3, or 4."

- In NUREG-1433 and 1434, Condition B is revised from "Two CREFS subsystems inoperable due to inoperable control room boundary in MODE 1, 2, or 3" to "One or more CREFS subsystems inoperable due to inoperable CRE boundary in MODE 1, 2, or 3."

- Condition B is revised by adding a new Required Action B.1 which states, "Initiate action to implement mitigating actions," with a Completion Time of "Immediately."

[1] Note: The name for the system that provides filtered air to the control room following an accident varies between plants and in the Improved Standard Technical Specifications (ISTS) for each plant design. For the purposes of this document, the term CREFS is used generically.

- Condition B is revised by adding a new Required Action B.2 which states, "Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits," with a Completion Time of 24 hours.

- Condition B is revised by renaming Required Action B.1 to Required Action B.3 and revising it to state, "Restore CRE boundary to OPERABLE status," with a Completion Time of 90 days.

- In NUREG-1430, 1431, and 1432, Condition E is revised by adding a new Condition which states, "One or more CREFS trains inoperable due to an inoperable CRE boundary [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies."

- In NUREG-1433 and 1434, Condition F is revised by adding a new Condition. In NUREG-1433, the new Condition states, "One or more [MCREC] subsystems inoperable due to an inoperable CRE boundary during movement of [recently] irradiated fuel assemblies in the [secondary] containment or during OPDRVs." In NUREG-1434, the new Condition states, "One or more [CRFA] subsystems inoperable due to an inoperable CRE boundary during movement of [recently] irradiated fuel assemblies in the [primary or secondary containment] or during OPDRVs."

- SR 3.7.[X].4 is deleted, where [X] is 10, 11, 4, or 3 depending on the ISTS NUREG affected.

- A new Surveillance is added labeled SR 3.7.[X].4, where [X] is 10, 11, 4, or 3 depending on the ISTS NUREG affected. The new SR states, "Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program." The Frequency is "In accordance with the Control Room Envelope Habitability Program."

- NUREG-1430, Conditions D and E are revised. These Conditions should contain the phrase "[in MODE 5 or 6, or]" (similar to NUREG-1431) so that the Condition is consistent with the Applicability. This phrase was missing from NUREG-1430 and is added to correct this omission.

- NUREG-1432, Conditions D and E are revised. These Conditions contain the phrase "[in MODE 5 and 6, or]," but should state, "[in MODE 5 or 6, or]," (similar to NUREG-1431) so that the Condition is consistent with the Applicability.

- NUREG-1432, Condition D, Required Action D.1 Note is revised from "Place in toxic gas protection mode if automatic transfer to toxic gas mode inoperable" to "Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable." This uses consistent terminology within the Note and the Bases and is consistent with NUREG-1431.

The Bases of these Specifications are also revised to describe the CRE boundary, the accident analysis assumptions regarding toxic gas and smoke protection, and the new Surveillance. Also, the Bases are revised to provide a greater level of consistency and level of detail.

Corrections are made to the NUREG-1430, Specification 3.7.10 Bases. SR 3.7.10.5 has been in NUREG-1430 since Revision 0, but the NUREG has never contained Bases for the SR. Therefore, Bases are provided. In addition, the NUREG-1430 Applicability Bases are revised to discuss the Mode 5 or 6 Applicability, consistent with NUREG-1431 and 1432.

A new Administrative Controls program is added to the ISTS entitled, "Control Room Envelope Habitability Program." In NUREG-1430, 1431, and 1432, this program is 5.5.18. In NUREG-1433 and NUREG-1434 the program is 5.5.15. The program describes the programmatic and testing requirements necessary to maintain CRE habitability. It addresses definitions, maintaining integrity, assessing habitability, inleakage testing, differential pressure testing, and inleakage limits.

Plants that rely on toxic gas monitors to automatically isolate the CRE and that have relocated those monitors outside of the Technical Specifications during conversion to the Improved Technical Specifications should consider the advantages of adding the toxic gas monitors to the plant-specific equivalent of NUREG-1431 LCO 3.3.7, "CREFS Actuation Instrumentation." NUREG-1431 LCO 3.3.7 provides a 7 day Completion Time for one instrument channel inoperable and provides the option to place the CREFS in emergency radiation protection mode instead of declaring the CREFS inoperable when the actuation instrumentation is inoperable. If the instrumentation is in the Technical Specifications, LCO 3.0.6 allows the Actions for the instrumentation to be followed instead of the Actions for an inoperable CREFS. However, this allowance does not exist if the instrumentation has been relocated out of the Technical Specifications. In that case, inoperable actuation instrumentation would result in the CREVS being inoperable under the definition of Operability."

3.0 Background

In NRC Generic Letter 2003-01, licensees were alerted to findings at facilities that existing technical specification surveillance requirements for the CREFS may not be adequate. Specifically, the results of tracer gas tests at facilities indicated that the differential pressure surveillance is not a reliable method for demonstrating CRE integrity. Licensees were requested to provide a basis for a conclusion that the differential pressure surveillance remains adequate to demonstrate CRE integrity. If a licensee concluded that the differential pressure surveillance was not adequate, licensees were requested to provide a schedule for revising the surveillance requirement in technical specifications to reference an acceptable surveillance methodology, and make any necessary modifications so that compliance can be demonstrated with the revised technical specification.

Note that the ISTS CREFS requirements are based on a positive pressure CRE design. Since this Traveler proposes changes to the ISTS, the information provided only addresses positive pressure control rooms. These changes may or may not be applicable to plants with differing designs.

The TSTF created TSTF-448 to address the surveillance requirement issue and provided Revision 0 to the NRC on December 30, 2002 (Reference 2). The industry drafted TSTF-448 prior to the issuance of Generic Letter 2003-01. The industry had been working closely with the NRC since 1999 to address issues associated with control room habitability so Revision 0 was considered to address the NRC's concerns, as understood at the time.

The TSTF received comments on TSTF-448, Revision 0, on July 1, 2003 (Reference 3). On July 11, 2003, the NRC, the TSTF, and the NEI CRHTF met to discuss TSTF-448. TSTF-448 was revised to address the comments in the letter and those raised at the meeting. Revision 1 to TSTF-448 was submitted to the NRC on August 19, 2003 (Reference 4).

In a letter dated December 16, 2003 (Reference 5), the NRC requested additional information to support their review of TSTF-448, Revision 1. Responses to the NRC's questions were developed by the TSTF and the NEI CRHTF. The responses were submitted to the NRC on March 8, 2004 (Reference 6). In developing the responses, the TSTF and the CRHTF identified beneficial revisions to TSTF-448. The TSTF provided a resolution consistent with the NRC's comments, with a few minor exceptions, and proposed draft technical specification changes that clarified and simplified the presentation. If the NRC agreed with the proposed changes, the TSTF indicated that a formal revision to TSTF-448 would be provided.

During the Summer and Fall of 2004, the NRC reviewed plant-specific license amendments that resulted in the NRC requesting changes to the requesting plant's CREFS technical specifications. The technical specification changes requested by the NRC were significantly different from those in TSTF-448 or the model technical specifications in the Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors," dated May 2003 (Reference 7).

On January 24, 2005, the NRC provided a letter (Reference 8) documenting their disposition of the TSTF's March 8, 2004 letter. This letter included model Technical Specifications illustrating the NRC's comments.

The TSTF and the NEI CRHTF evaluated the NRC's letter and developed a description of the significant differences between the NRC's letter and model Technical Specifications and the industry position. The industry shared this document with the NRC at a meeting between the TSTF, the NEI CRHTF, and the NRC, which was held on May 26, 2005 (Reference 9). At that meeting the industry and the NRC agreed on conceptual approaches for many of the differences between the industry and NRC proposals. On

August 18, 2005, the TSTF submitted Revision 2 of TSTF-448, which implemented the approaches discussed at the May 26, 2005 meeting (Reference 10).

On December 28, 2005, the NRC provided a letter to the TSTF with their comments on TSTF-448, Revision 2 (Reference 11). In the letter, the NRC stated that they disagreed with many of the approaches taken in TSTF-448, Revision 2. In particular, the NRC did not agree with the approach of considering the CRE degraded but operable if CRE inleakage exceeds the inleakage assumed in the accident analysis, even if the control room operators can be protected with mitigating actions. The NRC did not agree with placing restrictions on the use of compensatory measures in the Administrative Controls in lieu of a Required Action. The NRC stated that the Technical Specifications should contain a Completion Time to restore the CRE boundary when CRE inleakage exceed the inleakage assumed in the accident analysis. The NRC stated that licensees should measure CRE differential pressure against all adjacent spaces as part of the periodic assessment of CRE boundary integrity, whether or not such measurement is required in the plant's current Technical Specifications.

On March 10, 2006, the NRC provided draft Technical Specifications and a draft Safety Evaluation to be used as the basis for TSTF-448, Revision 3 (Reference 12).

On April 20, 2006, the TSTF and the NEI CRHTF met with the NRC to discuss the December 28, 2005 and March 10, 2006 letters. The industry suggested five modifications to the draft Technical Specifications in the March 20, 2006 letter regarding elimination of Technical Specification commitments to Regulatory Guides 1.196 and 1.178, extension of the proposed 60 day Completion Time to 90 days, revision of the differential pressure measurement to only require one measurement across each interface of the CRE and an external area adjacent to the CRE, elimination of a reference to quantitative limits on smoke in the CRE, and several clarifications to the proposed Bases.

On May 12, 2006, the NRC published minutes of the April 20, 2006 meeting (Reference 13). The meeting minutes documented the NRC's acceptance of the suggested changes and provided revisions to the draft Technical Specifications included in the March 10, 2006 letter.

As the understanding of the issues and the relative positions of the NRC and the industry has increased, the proposed approach to addressing the CRE habitability concerns has changed. As a result, this revision of TSTF-448 is substantially different than the previous revisions of this Traveler.

4.0 Technical Analysis

Discussion of the specific changes are given below.

Technical Specification 3.7.10 (NUREG-1430, 1431), 3.7.11 (NUREG-1432), 3.7.4 (NUREG-1433), and 3.7.3 (NUREG-1434)

Condition A is changed from "One CREFS train inoperable" to "One CREFS train inoperable for reasons other than Condition B." This change is necessary due to a change to Condition B from "Two trains inoperable..." to "One or more trains inoperable...". The change to existing Condition A is less restrictive because this Condition will no longer apply in the event one or two [CREVS] trains are inoperable due to an inoperable CRE boundary during unit operation in Mode 1, 2, 3, or 4 for NUREG-1430, -1431, and -1432, and Mode 1, 2, and 3 for NUREG-1433 and NUREG-1434. This is acceptable because the new Action B establishes adequate remedial measures in this condition.

Condition B is changed from "Two CREFS trains inoperable due to inoperable control room boundary in MODE 1, 2, 3, or 4" to "One or more CREFS trains inoperable due to inoperable CRE boundary in MODE 1, 2, 3, or 4." (In NUREGs 1433 and 1434, the MODES are 1, 2, and 3.) During the development of TSTF-448 it was pointed out that in some cases, such as leaking duct work or dampers, an inoperable CRE boundary may only affect one CREFS train.

A new Required Action B.1 is added, which states, "Initiate action to implement mitigating actions" with a Completion Time of "Immediately." The ISTS Bases for the existing Required Action B.1 requires a licensee commitment to implement compensatory measures. Therefore, adding this Required Action does not change the actions taken in the plant but provides clearer direction to the operator.

A new Required Action B.2 is added, which states, "Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits," with a Completion Time of 24 hours. The purpose of the Required Action is to ensure that the CRE occupants can respond to an event during the period that the CRE boundary is inoperable. If it cannot be verified that the CRE occupants are protected by the mitigating actions, a plant shutdown is required. This Required Action will ensure the reactor can be controlled safely from the CRE.

The existing Required Action B.1 is renamed Required Action B.3 and revised to state, "Restore CRE boundary to OPERABLE status," with a Completion Time of 90 days. The 90 day Completion Time is considered adequate given the mitigating actions and the low probability of an accident that would require the CRE boundary to protect the operators, provides a reasonable time to diagnose, plan, possibly repair, and test most problems with the CRE boundary, while minimizing the period of time that CRE occupants might have to respond to an event while utilizing the mitigating actions that could adversely affect their ability to control the reactor and maintain it in a safe shutdown condition.

Condition E in NUREG-1430, 1431, and 1432 and Condition F in NUREG-1433 and 1434 are modified to apply when one or more CREFS trains are inoperable due to an inoperable CRE boundary. These conditions apply in MODES and other specified

Conditions in the Applicability other than MODES 1, 2, 3, and 4 for NUREG-1430, 1431, and 1432 and MODES 1, 2, 3 for NUREG-1433 and 1434. This ACTION is appropriate to prevent accidents that could challenge CRE habitability.

SR 3.7.[X].4 (where [X] is 10, 11, 3, or 4 depending on the ISTS NUREG), which requires verification that one CREFS train can maintain a positive pressure relative to the adjacent [turbine building] during pressurization mode of operation, is eliminated. As discussed in Generic Letter 2003-01, the positive pressure test is inadequate to verify the CREFS is OPERABLE. 10 CFR 50.36 states that the purpose of Surveillances is to demonstrate that the LCO is met. ISTS SR 3.0.1 states that failure to meet a surveillance shall be considered failure to meet the LCO. If the differential pressure test is not a reliable indicator of CRE habitability, it should not be a Surveillance. Therefore, the Surveillance Requirement is deleted. However, a positive pressure test is added to the Control Room Envelope Habitability Program testing requirements as part of the periodic assessment of CRE boundary health.

A new Surveillance is substituted for the deleted SR 3.7.[X].4 (where [X] is 10, 11, 3, or 4 depending on the ISTS NUREG). The new SR states, "Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program." The Frequency is "In accordance with the Control Room Envelope Habitability Program." The format of the requirement is consistent with similar Surveillances which implement testing requirements described in an Administrative Controls Program, such as those SRs that reference the Ventilation Filter Testing Program. See the discussion, below, of the program requirements related to performing this Surveillance.

<u>Technical Specification 5.5.18 (NUREG-1430, 1431, and 1432) and 5.5.15 (NUREG-1433 and NUREG-1434)</u>

The introductory paragraph addresses the purpose of the program and uses, to the extent possible, the wording of GDC 19. It provides the relationship between CRE habitability and OPERABILITY of the CREFS. The wording of GDC 19 was used instead of referencing GDC 19. As discussed in NEI 99-03 (Reference 14), Section 2.2, licensees have different levels of commitment to GDC 19. Not all plants are licensed to the requirement, but may have similar commitments defining acceptable operator radiological exposure. However, for most plants the operator dose criterion limit is 5 rem whole body or its equivalent to any part of the body for any postulated design basis accident, or 5 rem Total Effective Dose Equivalent (TEDE) for licensees that have implemented the Alternative Source Term (AST). Stating the specific requirement instead of referencing GDC 19 increases standardization between plants and avoids various, plant-specific variations in the adoption of TSTF-448. There is an additional consideration. The GDC are design, not operating, criteria. It is inconsistent with the remainder of the ISTS to impose a GDC as an OPERABILITY limit. Stating the specific requirement instead of referencing the GDC avoids any possible confusion.

The required program elements are divided into five parts: definitions, maintaining CRE boundary integrity, inleakage testing and assessing habitability, differential pressure testing, and inleakage limits.

Paragraph a requires that the program contain the definition of the control room envelope and the CRE boundary.

Paragraph b requires the program to describe how CRE boundary integrity is maintained, including configuration control, management of breaches, and preventive maintenance.

Paragraph c states the program shall require unfiltered air inleakage testing in accordance with the regulatory positions given in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0 (Reference 15). Paragraph c also states that the program will require assessing CRE habitability at the frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0. Paragraph c provides the format for an optional list of plant-specific exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197.

Paragraph d requires measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one train of the CREFS, operating at the flow rate required by the Ventilation Filter Test Program, at a Frequency of [18] months on a STAGGERED TEST BASIS. The test data is to be trended and used as part of the [18] month assessment of the CRE boundary required by Paragraph c. The measurement of the differential pressure between the CRE and adjacent areas provides a gross indication of barrier integrity and is useful in monitoring the health of the CRE barrier between performances of inleakage testing. NEI 99-03, Section 9.3, "Periodic Evaluations," recommends periodic evaluation of the CRE boundary integrity, including comparison to previous assessments, to examine the performance history. However, as pointed out in Generic Letter 2003-01, the usefulness of differential pressure measurements is very limited and the importance of data from these measurements should not be overemphasized. Therefore, the Control Room Envelope Habitability Program requires measuring differential pressure every [18] months on a STAGGERED TEST BASIS in a manner similar to the current requirement in the Technical Specifications. The results will be trended and compared to positive pressure measurements taken, or to be taken, during CRE inleakage testing. These evaluations will be used as part of an assessment of CRE boundary integrity between CRE boundary inleakage tests. This approach balances the desire to assess CRE habitability between the performance of inleakage tests with the complexities inherent in the interpretation of differential pressure measurements.

Paragraph e describes the basis and format for the quantitative limits on CRE inleakage in the licensee's program.

The last paragraph states that the provisions of SR 3.0.2 are applicable to the program Frequencies for performing the activities in Paragraphs c and d. This statement is needed to avoid confusion. SR 3.0.2 is applicable to the Surveillance that references the testing in the Control Room Envelope Habitability Program. However, SR 3.0.2 is not applicable to Administrative Controls unless specifically invoked. Providing this statement in the program eliminates any confusion regarding whether SR 3.0.2 is applicable.

Bases Changes

The Bases are revised to use the terms "control room envelope (CRE)" and "CRE boundary" instead of the ambiguous term "control room." The definition of "control room envelope" and "control room envelope boundary" are added to the Background section of the Bases.

The Bases are revised to refer to control room "occupants" instead of control room "operators" because the control room habitability requirements in GDC 19 apply to all occupants in the control room.

The "Applicable Safety Analyses" section of the Bases is revised to include a description of the analyses of CRE occupant protection from hazardous chemical releases and smoke challenges. References to a more detailed, plant-specific description of the hazardous chemical and smoke hazard analysis bases are also included.

The Background and LCO sections state that the CREFS is designed to limit CRE occupant dose to 5 rem whole body dose or its equivalent to any part of the body. The Bases are revised to include, as a bracketed option, "[5 rem TEDE]" for those plants that have adopted the Alternative Source Term (AST).

The LCO section is revised to clarify that CRE boundary integrity is a requirement for CREFS train OPERABILITY.

The LCO section is revised to clarify that the LCO Note exception only applies to openings in the CRE boundary that can be rapidly restored to the design condition, such as doors, hatches, floor plugs, and access panels. This clarifies the original intention of the Note, which has been a source of confusion since it's addition to the ISTS by TSTF-287.

The Bases of the Conditions are revised to reflect the changes made to the Specifications. Bases are provided for the added Required Action B.1, which requires initiation of action to implement mitigating actions immediately. The Bases are consistent with the actions required under the commitment added to the Bases by TSTF-287.

The Bases of SR 3.7.[X].4 (where [X] is 10, 11, 4, or 3 depending on the ISTS NUREG affected) are deleted to reflect the deletion of the SR.

Bases for the new SR are added. As the Bases contain important information needed to implement the SR, it is expected that any plant adopting TSTF-448 will adopt the SR Bases or justify any deviations from the SR Bases.

Reference 4, "NUREG-0800" is deleted from NUREG-1431 and NUREG-1432. The reference is only used in the deleted SR Bases.

A correction is made to the Bases of SR 3.7.[X].3 (where [X] is 10, 11, 4, or 3 depending on the ISTS NUREG affected). The Bases state that the [18] month Frequency for verifying that each CREFS train actuates on an actual or simulated actuation signal is specified in Regulatory Guide 1.52. This is incorrect. Regulatory Guide 1.52 does not discuss testing the actuation signal. The Regulatory Guide addresses filter and heater testing and recommends an 24 month Frequency. The Bases are revised to state, "The Frequency of [18] months is based on industry operating experience and is consistent with the typical refueling cycle." This eliminates the only reference to Regulatory Guide 1.52. The References section is revised accordingly.

Bases are provided for NUREG-1430, SR 3.7.10.5. SR 3.7.10.5 has been in NUREG-1430 since Revision 0, but the NUREG has never contained Bases for the SR.

5.0 Regulatory Analysis

5.1 No Significant Hazards Consideration

The TSTF has evaluated whether or not a significant hazards consideration is involved with the proposed generic change by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility. The proposed changes do not alter or prevent the ability of structures, systems, and components (SSCs) to perform their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. This is a revision to the Technical Specifications for the control room ventilation system which is a mitigation system designed to minimize unfiltered air inleakage into the control room envelope (CRE) and to filter the CRE atmosphere to protect the CRE occupants following accidents previously analyzed. An important part of the system is the CRE boundary. The CRE ventilation system is not an initiator or precursor to any accident previously evaluated. Therefore, the probability of any accident previously evaluated is not increased. Performing tests and

implementing programs that verify the integrity of the CRE boundary and CRE habitability ensure that the mitigation features are capable of performing the assumed function. Therefore, the consequences of any accident previously evaluated are not increased.

Therefore, it is concluded that this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   This revision will not impact the accident analysis. The changes will not alter the requirements of the CRE ventilation system or its function during accident conditions. No new or different accidents result from performing the new surveillance or following the new program. The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a significant change in the methods governing normal plant operation. The changes do not alter assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

   Therefore, it is concluded that this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by these changes. The proposed changes will not result in plant operation in a configuration outside the design basis for an unacceptable period of time without compensatory measures. The proposed changes do not adversely affect systems that respond to safely shutdown the plant and to maintain the plant in a safe shutdown condition.

   Therefore, it is concluded that this change does not involve a significant reduction in a margin of safety.

Based on the above, the TSTF concludes that the proposed change presents no significant hazards considerations under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

The proposed change to the Improved Standard Technical Specifications will ensure that compliance with requirements equivalent to 10 CFR 50, Appendix A, GDC 19 is maintained. Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the approval of the proposed change will not be inimical to the common defense and security or to the health and safety of the public.

6.0 Environmental Consideration

A review has determined that the proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

7.0 References

1. NRC Generic Letter 2003-01, "Control Room Habitability," dated June 12, 2003.

2. Letter from Anthony R. Pietrangelo, NEI, to Dr. William Beckner, NRC, dated December 30, 2002, "Forwarding of TSTF."

3. Letter from Dr. William Beckner, NRC, to Anthony R. Pietrangelo, NEI, dated July 1, 2003.

4. Letter from the Technical Specifications Task Force to Dr. William Beckner, NRC, dated August 19, 2003, "TSTF-448, Revision 1," (TSTF-03-03).

5. Letter from Thomas Boyce, NRC, to the Technical Specifications Task Force dated December 16, 2003.

6. Letter from the Technical Specifications Task Force to Dr. William Beckner, NRC, dated March 8, 2004, "Response to NRC Request for Additional Information Regarding TSTF-448, Revision 1, ‘Control Room Habitability’," (TSTF-04-02).

7. Regulatory Guide 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors," dated May 2003.

8. Letter from Patrick Hiland, NRC, to the Technical Specifications Task Force, dated January 24, 2005.

9. Letter from C. Craig Harbuck, NRC, to Alex Marion, NEI, dated June 23, 2005, "Summary of Meeting Held May 26, 2005 Between NRC Staff and Industry on TSTF-448, Control Room Habitability, Revision 1."

10. Letter from Technical Specifications Task Force to U.S. NRC, "TSTF-448, Revision 2, 'Control Room Habitability'," dated August 18, 2005.

11. Letter from Thomas H. Boyce (NRC) to Technical Specifications Task Force dated December 28, 2005.

12. Letter from Thomas H. Boyce (NRC) to Technical Specifications Task Force dated March 10, 2006.

13. Letter from Timothy J. Kobetz (NRC) to Technical Specifications Task Force dated May 12, 2006.

14. NEI 99-03, Revision 1, "Control Room Habitability Assessment Guidance" dated March 2003.

15. Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003.

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Ventilation System (CREVS)

LCO 3.7.10 Two CREVS trains shall be OPERABLE.

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREVS train inoperable for reasons other than Condition B.	A.1 Restore CREVS train to OPERABLE status.	7 days
B. ~~Two~~ One or more CREVS trains inoperable due to inoperable CRE~~control room~~ boundary in MODE 1, 2, 3, or 4.	B.1 Initiate action to implement mitigating actions. AND B.2 Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits. AND B.3~~1~~ Restore CRE~~control room~~ boundary to OPERABLE status.	Immediately 24 hours 90 days~~24 hours~~
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. AND C.2 Be in MODE 5.	6 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. [Required Action and associated Completion Time of Condition A not met [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies.	D.1 ----------NOTE---------- Place in emergency mode if automatic transfer to emergency mode is inoperable. ---------- Place OPERABLE CREVS train in emergency mode.	Immediately
	OR	
	D.2 Suspend movement of [recently] irradiated fuel assemblies.	Immediately]
E. [Two CREVS trains inoperable [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies. OR One or more CREVS trains inoperable due to an inoperable CRE boundary [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies.	E.1 Suspend movement of [recently] irradiated fuel assemblies.	Immediately]
F. Two CREVS trains inoperable ~~during~~ in MODE 1, 2, 3, or 4 for reasons other than Condition B.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Operate each CREVS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.10.2	Perform required CREVS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with the [VFTP]
SR 3.7.10.3	Verify [each CREVS train actuates] [or the control room isolates] on an actual or simulated actuation signal.	[18] months
SR 3.7.10.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program. ~~Verify one CREVS train can maintain a positive pressure of ≥ [0.125] inches water gauge relative to the adjacent [area] during the [pressurization] mode of operation at a flow rate of ≤ [3300] cfm.~~	In accordance with the Control Room Envelope Habitability Program ~~[18] months on a STAGGERED TEST BASIS~~
SR 3.7.10.5	[Verify the system makeup flow rate is ≥ [270] and ≤ [330] cfm when supplying the ~~the~~ control room with outside air.	[18] months]

5.5 Programs and Manuals

5.5.17 Battery Monitoring and Maintenance Program

This Program provides for battery restoration and maintenance, based on [the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," or of the battery manufacturer] including the following:

a. Actions to restore battery cells with float voltage < [2.13] V, and

b. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

5.5.18 Control Room Envelope Habitability Program

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Emergency Ventilation System (CREVS), CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of [5 rem whole body or its equivalent to any part of the body] [5 rem total effective dose equivalent (TEDE)] for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

   [The following are exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0:

   1. ;and]

d. Measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one train of the CREVS, operating at the flow rate required by the VFTP, at a Frequency of [18] months on a STAGGERED

TEST BASIS. The results shall be trended and used as part of the [18] month assessment of the CRE boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

B 3.7 PLANT SYSTEMS

B 3.7.10 Control Room Emergency Ventilation System (CREVS)

BASES

BACKGROUND

The CREVS provides a protected environment from which ~~operators~~ occupants can control the unit following an uncontrolled release of radioactivity.~~[, chemicals, or toxic gas]~~ hazardous chemicals, or smoke.

The CREVS consists of two independent, redundant trains that recirculate and filter the air in the control room envelope (CRE) and a CRE boundary that limits the inleakage of unfiltered air.~~, fan filter assemblies.~~ Each CREVS ~~filter~~ train consists of a roughing filter, a water condensing unit, a high efficiency particulate air (HEPA) filter, ~~and~~ a charcoal filter for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, doors, barriers, and instrumentation also form part of the system.

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 during 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 inleakage of unfiltered air into the CRE will not exceed the inleakage 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.

The CREVS is an emergency system. Upon receipt of the activating signal(s), the normal CRE ~~control room~~ ventilation system is automatically shut down and the CREVS can be manually started. The roughing filters and water condensing units remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA and charcoal filters.

A single CREVS train operating at a flow rate of ≤ [3300] cfm will pressurize the CRE~~control room with a 1.5 ft2 LEAKAGE area~~ to about 1/8 inch water gauge relative to external areas adjacent to the CRE boundary. The CREVS operation is discussed in the FSAR, Section [9.4] (Ref. 1).

The CREVS is designed to maintain a habitable environment in the CRE~~control room~~ 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 CREVS components are arranged in redundant safety related ventilation trains. The location of components and ducting within the CRE~~control room envelope~~ ensures an adequate supply of filtered air to all areas requiring access. The CREVS provides airborne radiological protection for the CRE occupants~~control room operators~~ as demonstrated by the CRE occupant ~~control room accident~~ dose analyses for the most limiting design basis ~~loss of coolant~~ accident fission product release presented in the FSAR, Chapter [15] (Ref. 2).

The CREVS provides protection from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the CRE following a hazardous chemical release (Ref. 3). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (Ref. 4).

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

~~[For this unit, there are no sources of toxic gases or chemicals that could be released to affect control room habitability.]~~

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

BASES

LCO

Two independent and redundant CREVS trains are required to be OPERABLE to ensure that at least one is available if a single active failure disables the other train. Total system failure, such as from a loss of both ventilation trains or from an inoperable CRE boundary, could result in exceeding a dose of [5 rem whole body or its equivalent to any part of the body] [5 rem TEDE] to the CRE occupants~~control room operators~~ in the event of a large radioactive release.

~~The~~ Each CREVS train is considered OPERABLE when the individual components necessary to limit CRE occupant ~~control operator~~ exposure are OPERABLE~~ in both trains~~. A CREVS train is considered OPERABLE when the associated:

a. Fan is OPERABLE,

b. HEPA filter and charcoal absorber are not excessively restricting flow, and are capable of performing their filtration functions, and

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

~~In addition, the control room boundary, including the integrity of the walls, floors, ceilings, ductwork, and access doors, must be maintained within the assumptions of the design analysis.~~

In order for the CREVS 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 DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the CRE~~control room~~ 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 condition, 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 proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE~~control room~~. 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~~control room~~ isolation is indicated.

APPLICABILITY

In MODES 1, 2, 3, ~~and~~ 4, [5, and 6,] and during movement of [recently] irradiated fuel assemblies, the CREVS must be OPERABLE to ensure that the CRE~~control room~~ will remain habitable during and following a DBA.

In MODES [5 and 6], the CREVS is required to cope with the release from a rupture of an outside waste gas tank.

During movement of [recently] irradiated fuel assemblies, the CREVS must be OPERABLE to cope with a release due to a fuel handling accident [involving handling recently irradiated fuel. Due to radioactive decay, the CREVS is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)].

BASES

ACTIONS

A.1

With one CREVS train inoperable, for reasons other than an inoperable CRE boundary, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREVS train is adequate to perform the ~~control room radiation~~ CRE occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE CREVS train could result in loss of CREVS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

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

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

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 DBA 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 hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 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 chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals 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 DBA occurring during this time period, and the use of mitigating actions. The 90 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 DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.
~~If the control room boundary is inoperable in MODE 1, 2, 3, or 4, the CREVS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, 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 DBA 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 control room boundary.~~

C.1 and C.2

In MODE 1, 2, 3, or 4, if the inoperable CREVS train or the CRE ~~control room~~ boundary cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes accident risk~~in which the LCO does not apply~~. 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 unit systems.

BASES

ACTIONS (continued)

[D.1 and D.2

[In MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies, if the inoperable CREVS train cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE CREVS train must immediately be placed in the emergency mode. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected. ~~Required Action D.1 is modified by a Note indicating to place the system in the emergency mode if automatic transfer to emergency mode is inoperable.~~

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

Required Action D.1 is modified by a Note indicating to place the system in the emergency mode if automatic transfer to the emergency mode is inoperable.]

[E.1

[In MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies, when two CREVS trains are inoperable or with one or more CREVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the CRE ~~control room~~. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.]

F.1

If both CREVS trains are inoperable in MODE 1, 2, 3, or 4 for reasons other than an inoperable CRE~~control room~~ boundary (i.e., Condition B), the CREVS may not be capable of performing the intended function and the unit is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be entered immediately.

BASES

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 severe, testing each train once every month adequately checks this system. Monthly heater operations dry out any moisture that has accumulated in the charcoal because of humidity in the ambient air. [Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.

SR 3.7.10.2

This SR verifies that the required CREVS testing is performed in accordance with the [Ventilation Filter Testing Program (VFTP)]. The [VFTP] includes testing HEPA filter performance, charcoal absorber efficiency, minimum system flow rate, and the physical properties of the activated charcoal. Specific test F~~f~~requencies and additional information are discussed in detail in the [VFTP].

SR 3.7.10.3

This SR verifies that [each CREVS train starts] [or the ~~control room~~ CRE isolates] and operates on an actual or simulated actuation signal. The Frequency of [18] months is based on industry operating experience and is consistent with the typical refueling cycle.~~The Frequency of [18] months is consistent with that specified in Reference 3.~~

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 DBA 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 hazardous chemicals 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 DBA 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. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.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 actions as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 7). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA 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.

~~This SR verifies the integrity of the control room enclosure and the assumed inleakage rates of the potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify that the CREVS is functioning properly. During the emergency mode of operation, the CREVS is designed to pressurize the control room ≥ [0.125] inches water gauge positive pressure, with respect to adjacent areas, to prevent unfiltered inleakage. The CREVS is designed to maintain this positive pressure with one train at a flow rate of ≤ [3300] cfm. This value includes [300] cfm of outside air. The Frequency of [18] months on a STAGGERED TEST BASIS is consistent with industry practice and other filtration SRs.~~

SR 3.7.10.5

This SR verifies the CREVS can supply the CRE with outside air to meet the design requirement. The Frequency of [18] months is consistent with industry practice and other filtration SRs.

BASES

REFERENCES

1. FSAR, Section [9.4].

2. FSAR, Chapter [15].

3. FSAR, Section [6.4].

4. FSAR, Section [9.5].

~~3~~5. Regulatory Guide 1.196~~1.52, Rev. [2]~~.

6. NEI 99-03, "Control Room Habitability Assessment," March 2003.

7. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, "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).

3.7 PLANT SYSTEMS

3.7.10 Control Room Emergency Filtration System (CREFS)

LCO 3.7.10 Two CREFS trains shall be OPERABLE.

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREFS train inoperable for reasons other than Condition B.	A.1 Restore CREFS train to OPERABLE status.	7 days
B. ~~Two~~ One or more CREFS trains inoperable due to inoperable CRE~~control room~~ boundary in MODE 1, 2, 3, or 4.	B.1 Initiate action to implement mitigating actions. AND B.2 Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits. AND B.~~1~~3 Restore CRE~~control room~~ boundary to OPERABLE status.	Immediately 24 hours 90 days~~24 hours~~
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. AND C.2 Be in MODE 5.	6 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies.	D.1 ----------NOTE---------- [Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.] ---------- Place OPERABLE CREFS train in emergency mode.	Immediately
	OR	
	D.2 Suspend movement of [recently] irradiated fuel assemblies.	Immediately
E. Two CREFS trains inoperable [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies. OR One or more CREFS trains inoperable due to an inoperable CRE boundary in MODE 5 or 6, or during movement of [recently] irradiated fuel assemblies.	E.1 Suspend movement of [recently] irradiated fuel assemblies.	Immediately
F. Two CREFS trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.10.1	Operate each CREFS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.10.2	Perform required CREFS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with the [VFTP]
SR 3.7.10.3	Verify each CREFS train actuates on an actual or simulated actuation signal.	[18] months
SR 3.7.10.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program. ~~Verify one CREFS train can maintain a positive pressure of ≥ [0.125] inches water gauge, relative to the adjacent [turbine building] during the pressurization mode of operation at a makeup flow rate of ≤ [3000] cfm.~~	In accordance with the Control Room Envelope Habitability Program ~~[18] months on a STAGGERED TEST BASIS~~

5.5 Programs and Manuals

5.5.16 Containment Leakage Rate Testing Program (continued)

1. Containment leakage rate acceptance criterion is ≤ 1.0 L_a. During the first unit startup following testing in accordance with this program, the leakage rate acceptance criteria are < 0.60 L_a for the Type B and C tests and [< 0.75 L_a for Option A Type A tests] [≤ 0.75 L_a for Option B Type A tests].

2. Air lock testing acceptance criteria are:

   a) Overall air lock leakage rate is ≤ [0.05 L_a] when tested at ≥ P_a.

   b) For each door, leakage rate is ≤ [0.01 L_a] when pressurized to [≥ 10 psig].

e. The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

f. Nothing in these Technical Specifications shall be construed to modify the testing Frequencies required by 10 CFR 50, Appendix J.

5.5.17 Battery Monitoring and Maintenance Program

This Program provides for battery restoration and maintenance, based on [the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," or of the battery manufacturer] including the following:

a. Actions to restore battery cells with float voltage < [2.13] V, and

b. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

5.5.18 Control Room Envelope Habitability Program

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Emergency Filtration System (CREFS), CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of [5 rem whole body or its equivalent to any part of the body] [5 rem total effective dose equivalent (TEDE)] for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

[The following are exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0:

1. ;and]

d. Measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one train of the CREFS, operating at the flow rate required by the VFTP, at a Frequency of [18] months on a STAGGERED TEST BASIS. The results shall be trended and used as part of the [18] month assessment of the CRE boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

B 3.7 PLANT SYSTEMS

B 3.7.10 Control Room Emergency Filtration System (CREFS)

BASES

BACKGROUND

The CREFS provides a protected environment from which ~~operators~~ occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke~~[, chemicals, or toxic gas]~~.

The CREFS consists of two independent, redundant trains that recirculate and filter the air in the control room envelope (CRE)~~air~~ and a CRE boundary that limits the inleakage of unfiltered air. Each CREFS train consists of a prefilter or demister, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, doors, barriers, and instrumentation also form part of the system, as well as demisters to remove water droplets from the air stream. 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 during 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 inleakage of unfiltered air into the CRE will not exceed the inleakage 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.

The CREFS 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~~control room~~ is isolated, and the stream of ventilation air is recirculated through the system filter trains. The prefilters or demisters remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and charcoal adsorbers. Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers. Both the demister and heater are important to the effectiveness of the charcoal adsorbers.

Actuation of the CREFS 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 ~~control room~~ air within the CRE through the redundant trains of HEPA and the charcoal filters. The emergency radiation state also initiates pressurization and filtered ventilation of the air supply to the CRE~~control room~~.

BASES

BACKGROUND (continued)

Outside air is filtered, diluted with building air from the electrical equipment and cable spreading rooms, and added to the air being recirculated from the CRE~~control room~~. Pressurization of the CRE minimizes ~~control room prevents~~ infiltration of unfiltered air through the CRE boundary from all the surrounding areas adjacent to the CRE boundary ~~of the building~~. The actions taken in the toxic gas isolation state are the same, except that the signal switches the CREFS ~~control room ventilation~~ to an isolation alignment to minimize any ~~prevent~~ outside air from entering the CRE through the CRE boundary~~control room~~.

The air entering the CRE~~control room~~ is continuously monitored by radiation and toxic gas detectors. One detector output above the setpoint will cause actuation of 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.

A single CREFS train operating at a flow rate of < [3000] cfm will pressurize the CRE~~control room~~ to about [0.125] inches water gauge relative to external areas adjacent to the CRE boundary. The CREFS operation in maintaining the CRE~~control room~~ habitable is discussed in the FSAR, Section [~~6~~9.4] (Ref. 1).

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

The CREFS is designed to maintain a habitable environment in the CRE~~the control room environment~~ 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 CREFS components are arranged in redundant, safety related ventilation trains. The location of components and ducting within the CRE~~control room envelope~~ ensures an adequate supply of filtered air to all areas requiring access. The CREFS provides airborne radiological protection for the CRE occupants~~control room operators~~, as demonstrated by the CRE ~~control room accident dose~~occupant dose analyses for the most limiting design basis ~~loss of coolant~~ accident~~,~~ fission product release presented in the FSAR, Chapter [15] (Ref. 2).

~~The analysis of toxic gas releases demonstrates that the toxicity limits are not exceeded in the control room following a toxic chemical release, as presented in Reference 1.~~

BASES

APPLICABLE SAFETY ANALYSES (continued)

The CREFS provides protection from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the CRE following a hazardous chemical release (Ref. 3). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (Ref. 4).

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

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

LCO

Two independent and redundant CREFS trains are required to be OPERABLE to ensure that at least one is available ~~assuming~~ if a single active failure disables the other train. Total system failure, such as from a loss of both ventilation trains or from an inoperable CRE boundary, could result in exceeding a dose of [5 rem whole body or its equivalent to any part of the body] [5 rem TEDE] to the CRE occupants ~~to the control room operator~~ in the event of a large radioactive release.

~~The~~ Each CREFS train is considered OPERABLE when the individual components necessary to limit CRE occupant ~~operator~~ exposure are OPERABLE ~~in both trains~~. A CREFS train is OPERABLE when the associated:

a. Fan is OPERABLE,

b. HEPA filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions, and

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

~~In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.~~

In order for the CREFS 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 DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the CRE~~control room~~ 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 condition, 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 proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE~~control room~~. 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~~control room~~ isolation is indicated.

APPLICABILITY

In MODES 1, 2, 3, 4, [5, and 6,] and during movement of [recently] irradiated fuel assemblies, the CREFS must be OPERABLE to ensure that the CRE will remain habitable ~~control operator exposure~~ during and following a DBA.

BASES

APPLICABILITY (continued)

In [MODES 5 ~~or~~ and 6], the CREFS is required to cope with the release from the rupture of an outside waste gas tank.

During movement of [recently] irradiated fuel assemblies, the CREFS must be OPERABLE to cope with the release from a fuel handling accident [involving handling recently irradiated fuel]. [The CREFS is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days), due to radioactive decay.]

ACTIONS

A.1

When one CREFS train is inoperable, for reasons other than an inoperable CRE boundary, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREFS train is adequate to perform the CRE occupant ~~control room~~ protection function. However, the overall reliability is reduced because a ~~single~~ failure in the OPERABLE CREFS train could result in loss of CREFS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

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

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

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 DBA 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 hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 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 chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that

CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals 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 DBA occurring during this time period, and the use of mitigating actions. The 90 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 DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

~~If the control room boundary is inoperable in MODE 1, 2, 3, or 4, the CREFS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, smoke,~~

BASES

ACTIONS (continued)

~~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 DBA 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 control room boundary.~~

C.1 and C.2

In MODE 1, 2, 3, or 4, if the inoperable CREFS train or the CRE ~~control room~~ boundary cannot be restored to OPERABLE status within the required Completion Time, 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 unit systems.

D.1 and D.2

[In MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies, if the inoperable CREFS train cannot be restored to OPERABLE status within the required Completion Time, action must be taken to immediately place the OPERABLE CREFS train in the emergency mode. This action ensures that the remaining 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~~control room~~. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

[Required Action D.1 is modified by a Note indicating to place the system in the toxic gas protection mode if automatic transfer to the toxic gas protection mode is inoperable.]

BASES

ACTIONS (continued)

E.1

[In MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies, with two CREFS trains inoperable or with one or more CREVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that could result in a release of radioactivity that might ~~enter~~ require isolation of the CRE~~control room~~. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

F.1

If both CREFS trains are inoperable in MODE 1, 2, 3, or 4 for reasons other than an inoperable CRE~~control room~~ boundary (i.e., Condition B), the CREFS 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 dry out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for ≥10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥15 minutes to demonstrate the function of the system.] The 31 day Frequency is based on the reliability of the equipment and the two train redundancy ~~availability~~.

SR 3.7.10.2

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.10.3

This SR verifies that each CREFS train starts and operates on an actual or simulated actuation signal. The Frequency of [18] months is based on industry operating experience and is consistent with the typical refueling cycle.~~The Frequency of [18] months is specified in Regulatory Guide 1.52 (Ref. 3)~~.

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 DBA 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 hazardous chemicals 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 DBA 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. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.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 actions as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 7). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA 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.

~~This SR verifies the integrity of the control room enclosure, and the assumed inleakage rates of the potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper functioning of the CREFS. During the emergency mode of operation, the CREFS is designed to pressurize the control room ≥[0.125] inches water gauge positive~~

~~pressure with respect to adjacent areas in order to prevent unfiltered inleakage. The CREFS is designed to maintain this positive pressure with one train at a makeup flow rate of [3000] cfm. The Frequency of [18] months on a STAGGERED TEST BASIS is consistent with the guidance provided in NUREG-0800 (Ref. 4).~~

REFERENCES

1. FSAR, Section [~~6~~9.4].

2. FSAR, Chapter [15].

3. FSAR, Section [6.4].

4. FSAR, Section [9.5].

~~3~~5. Regulatory Guide 1.196~~1.52, Rev. [2]~~.

6. NEI 99-03, "Control Room Habitability Assessment," March 2003.

7. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, "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).

~~4. NUREG-0800, Section 6.4, Rev. 2, July 1981.~~

3.7 PLANT SYSTEMS

3.7.11 Control Room Emergency Air Cleanup System (CREACS)

LCO 3.7.11 Two CREACS trains shall be OPERABLE.

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

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREACS train inoperable for reasons other than Condition B.	A.1 Restore CREACS train to OPERABLE status.	7 days
B. ~~Two~~ One or more CREACS trains inoperable due to inoperable CRE~~control room~~ boundary in MODE 1, 2, 3, or 4.	B.1 Initiate action to implement mitigating actions. AND B.2 Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits. AND B.3~~1~~ Restore CRE~~control room~~ boundary to OPERABLE status.	Immediately 24 hours 90 days~~24 hours~~
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. AND C.2 Be in MODE 5.	6 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met [in MODE~~S~~ 5 ~~and~~ or 6, or] during movement of [recently] irradiated fuel assemblies.	D.1 ----------NOTE---------- Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable. ---------- Place OPERABLE CREACS train in emergency radiation protection mode.	Immediately
	OR	
	D.2 Suspend movement of [recently] irradiated fuel assemblies.	Immediately
E. Two CREACS trains inoperable [in MODE~~S~~ 5 ~~and~~ or 6, or] during movement of [recently] irradiated fuel assemblies. OR One or more CREACS trains inoperable due to an inoperable CRE boundary [in MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies.	E.1 Suspend movement of [recently] irradiated fuel assemblies.	Immediately
F. Two CREACS trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	F.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.11.1	Operate each CREACS train for [≥ 10 continuous hours with heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.11.2	Perform required CREACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with the [VFTP]
SR 3.7.11.3	Verify each CREACS train actuates on an actual or simulated actuation signal.	[18] months
SR 3.7.11.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program. ~~Verify one CREACS train can maintain a positive pressure of ≥ [0.125] inches water gauge, relative to the adjacent [area] during the emergency radiation state of the emergency mode of operation at a emergency ventilation flow rate of ≤ [3000] cfm.~~	In accordance with the Control Room Envelope Habitability Program ~~[18] months on a STAGGERED TEST BASIS~~

5.5 Programs and Manuals

5.5.17 Battery Monitoring and Maintenance Program

This Program provides for battery restoration and maintenance, based on [the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," or of the battery manufacturer] including the following

a. Actions to restore battery cells with float voltage < [2.13] V, and

b. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

5.5.18 Control Room Envelope Habitability Program

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Emergency Air Cleanup System (CREACS), CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of [5 rem whole body or its equivalent to any part of the body] [5 rem total effective dose equivalent (TEDE)] for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

   [The following are exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0:

   1. ;and]

d. Measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one train of the CREACS, operating at the flow rate required by the VFTP, at a Frequency of [18] months on a STAGGERED

TEST BASIS. The results shall be trended and used as part of the [18] month assessment of the CRE boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

B 3.7 PLANT SYSTEMS

B 3.7.11 Control Room Emergency Air Cleanup System (CREACS)

BASES

BACKGROUND

The CREACS provides a protected environment from which ~~operators~~ occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke~~[chemicals, or toxic gas]~~.

The CREACS consists of two independent, redundant trains that recirculate and filter the air in the control room envelope (CRE)~~air~~ and a CRE boundary that limits the inleakage of unfiltered air. Each CREACS train consists of a prefilter and demister, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, doors, barriers, and instrumentation also form part of the system, as ~~do~~ well as demisters that remove water droplets from the air stream. A second bank of HEPA filters follows the adsorber section to collect carbon fines, and provides ~~to~~ back-up in case of failure of the main HEPA filter bank ~~if it fails~~.

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 during 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 inleakage of unfiltered air into the CRE will not exceed the inleakage 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.

The CREACS is an emergency system, part 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~~control room~~ is isolated, and the stream of ventilation air is recirculated through the filter trains of the system. The prefilters and demisters remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and charcoal adsorbers. Continuous operation of each train for at least 10 hours per month, with the heaters on, reduces moisture buildup on the HEPA filters and adsorbers. Both the demister and heater are important to the effectiveness of the charcoal adsorbers.

Actuation of the CREACS places the system into either of two separate states 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~~control room air~~ through the redundant trains of HEPA and charcoal filters. The emergency radiation state also initiates pressurization and filtered ventilation of the air supply to the CRE~~control room~~.

Outside air is filtered, [diluted with building air from the electrical equipment and cable spreading rooms,] and then added to the air being recirculated from the CRE~~control room~~. Pressurization of the CRE~~control room~~ ~~prevents~~ minimizes infiltration of unfiltered air through the CRE boundary from all the surrounding areas adjacent to the CRE boundary~~of the~~

BASES

BACKGROUND (continued)

~~building~~. The actions taken in the toxic gas isolation state are the same, except that the signal switches the CREACS ~~control room ventilation~~ to an isolation mode, minimizing ~~preventing~~ outside air ~~from~~ entering the CRE through the CRE boundary~~control room~~.

The air entering the CRE~~control room~~ is continuously monitored by radiation and toxic gas detectors. One detector output above the setpoint will cause actuation of 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.

A single CREACS train operating at a flow rate of ≤ [3000] cfm will pressurize the CRE ~~control room~~ to about [0.125] inches water gauge relative to external areas adjacent to the CRE boundary, and provides an air exchange rate in excess of 25% per hour. The CREACS operation in maintaining the CRE~~control room~~ habitable is discussed in the FSAR, Section [9.4] (Ref. 1).

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

The CREACS is designed to maintain a habitable environment in the CRE ~~the control room environment~~ 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 CREACS components are arranged in redundant, safety related ventilation trains. The location of components and ducting within the CRE~~control room envelope~~ ensures an adequate supply of filtered air to all areas requiring access.

The CREACS provides airborne radiological protection for the CRE occupants~~control room operators~~, as demonstrated by the CRE occupant ~~control room accident~~ dose analyses for the most limiting design basis ~~loss of coolant~~ accident fission product release presented in the FSAR, Chapter [15] (Ref. 2).

The CREACS provides protection from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the CRE following a hazardous chemical release (Ref. 3). The evaluation of a

smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (Ref. 4).

~~The analysis of toxic gas releases demonstrates that the toxicity limits are not exceeded in the control room following a toxic chemical release, as presented in Reference 1.~~

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

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

BASES (continued)

LCO

Two independent and redundant trains of the CREACS are required to be OPERABLE to ensure that at least one is available~~, assuming~~ if ~~that~~ a single active failure disables the other train. Total system failure, such as from a loss of both ventilation trains or from an inoperable CRE boundary, could result in ~~a control room operator receiving~~ exceeding a dose ~~in excess~~ of [5 rem whole body or its equivalent to any part of the body] [5 rem TEDE] to the CRE occupants~~5 rem~~ in the event of a large radioactive release.

~~The~~ Each CREACS train is considered OPERABLE when the individual components necessary to ~~control operator~~ limit CRE occupant exposure are OPERABLE~~ in both trains~~. A CREACS train is considered OPERABLE when the associated:

a. Fan is OPERABLE,

b. HEPA filters and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration functions, and

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

In order for the CREACS 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 DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

~~In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.~~

The LCO is modified by a Note allowing the CRE~~control room~~ 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 condition, 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 proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE~~control room~~. 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~~control room~~ isolation is indicated.

APPLICABILITY

In MODES 1, 2, 3, ~~and~~ 4, [5, and 6,] and during movement of [recently] irradiated fuel assemblies, the CREACS must be OPERABLE to ensure that the CRE will remain habitable~~limit operator exposure~~ during and following a DBA.

In MODES [5 and 6], the CREACS is required to cope with the release from a rupture of an outside waste gas tank.

During movement of [recently] irradiated fuel assemblies, the CREACS must be OPERABLE to cope with the release from a fuel handling accident [involving handline recently irradiated fuel]. [Due to radioactive decay, the CREACS is only required to cope with fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days).]

BASES

ACTIONS

A.1

With one CREACS train inoperable, for reasons other than an inoperable CRE boundary, action must be taken to restore OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CREACS ~~subsystem~~ train is adequate to perform the CRE occupant ~~control room radiation~~ protection function. However, the overall reliability is reduced because a ~~single~~ failure in the OPERABLE CREACS train could result in loss of CREACS function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and the ability of the remaining train to provide the required capability.

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

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

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 DBA 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 hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 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 chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals 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 DBA occurring during this time period, and the use of mitigating actions. The 90 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 DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

~~If the control room boundary is inoperable in MODES 1, 2, 3, and 4, the CREACS trains cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, 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 DBA 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 control room boundary.~~

C.1 and C.2

In MODE 1, 2, 3, or 4, if~~If~~ the inoperable CREACS or the CRE~~control room~~ boundary cannot be restored to OPERABLE status within the ~~associated~~ required Completion Time~~ in MODE 1, 2, 3, or 4~~, the unit must be placed in a MODE that minimizes the 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 unit systems.

BASES

ACTIONS (continued)

D.1 and D.2

~~Required Action D.1 is modified by a Note indicating to place the system in the emergency radiation protection mode if the automatic transfer to emergency mode is inoperable.~~

[In MODE 5 or 6, or] during movement of [recently] irradiated fuel assemblies, if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE CREACS train must be immediately placed in the emergency mode of operation. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will 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~~control room~~. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel assemblies to a safe position.

Required Action D.1 is modified by a Note indicating to place the system in the toxic gas protection mode if the automatic transfer to the toxic gas protection mode is inoperable.

E.1

When [in MODE~~S~~ 5 ~~and~~ or 6, or] during movement of [recently] irradiated fuel assemblies, with two CREACS trains inoperable or with one or more CREACS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the CRE~~control room~~. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

F.1

If both CREACS trains are inoperable in MODE 1, 2, 3, or 4 for reasons other than an inoperable CRE~~control room~~ boundary (i.e., Condition B), the CREACS 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.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.11.1

Standby systems should be checked periodically to ensure that they function properly. Since the environment and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system.

Monthly heater operations dry out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment, and the two train redundancy available.

SR 3.7.11.2

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

SR 3.7.11.3

This SR verifies that each CREACS train starts and operates on an actual or simulated actuation signal. The Frequency of [18] months is based on industry operating experience and is consistent with the typical refueling cycle.~~The Frequency of [18] months is consistent with that specified in Reference 3.~~

SR 3.7.11.4

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 DBA 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 hazardous chemicals 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 DBA 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. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.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 actions as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 7). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA 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.

~~This SR verifies the integrity of the control room enclosure and the assumed inleakage rates of potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper function of the CREACS. During the emergency radiation state of the emergency mode of operation, the CREACS is designed to pressurize the control room ≥ [0.125] inches water gauge positive pressure with respect to adjacent areas in order to prevent unfiltered inleakage. The CREACS is designed to maintain this positive pressure with one train at an emergency ventilation flow rate of [3000] cfm. The Frequency of [18] months on a STAGGERED TEST BASIS is consistent with the guidance provided in NUREG-0800, Section 6.4 (Ref. 4).~~

BASES

REFERENCES

1. FSAR, Section [9.4].

2. FSAR, Chapter [15].

3. FSAR, Section [6.4].

4. FSAR, Section [9.5].

~~3~~5. Regulatory Guide 1.196~~1.52, Rev. [2]~~.

~~4. NUREG-0800, Section 6.4, Rev. 2, July 1981.~~

6. NEI 99-03, "Control Room Habitability Assessment," March 2003.

7. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, "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).

3.7 PLANT SYSTEMS

3.7.4 [Main Control Room Environmental Control (MCREC)] System

LCO 3.7.4 Two [MCREC] subsystems shall be OPERABLE.

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

APPLICABILITY: MODES 1, 2, and 3,
During movement of [recently] irradiated fuel assemblies in the [secondary] containment,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [MCREC] subsystem inoperable for reasons other than Condition B.	A.1 Restore [MCREC] subsystem to OPERABLE status.	7 days
B. ~~Two~~One or more [MCREC] subsystems inoperable due to inoperable CRE~~control room~~ boundary in MODE 1, 2, or 3.	B.1 Initiate action to implement mitigating actions. AND B.2 Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits. AND B.3~~1~~ Restore CRE~~control room~~ boundary to OPERABLE status.	Immediately 24 hours 90 days~~24 hours~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 4.	12 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met during movement of [recently] irradiated fuel assemblies in the [secondary] containment or during OPDRVs.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- D.1 ----------NOTE---------- [Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.] ---------- Place OPERABLE [MCREC] subsystem in [pressurization] mode.	 Immediately
	<u>OR</u>	
	D.2.1 Suspend movement of [recently] irradiated fuel assemblies in the [secondary] containment.	Immediately
	<u>AND</u>	
	D.2.2 Initiate action to suspend OPDRVs.	Immediately
E. Two [MCREC] subsystems inoperable in MODE 1, 2, or 3 for reasons other than Condition B.	E.1 Enter LCO 3.0.3.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two [MCREC] subsystems inoperable during movement of [recently] irradiated fuel assemblies in the [secondary] containment or during OPDRVs. OR One or more [MCREC] subsystems inoperable due to an inoperable CRE boundary during movement of [recently] irradiated fuel assemblies in the [secondary] containment or during OPDRVs.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- F.1 Suspend movement of [recently] irradiated fuel assemblies in the [secondary] containment. AND F.2 Initiate action to suspend OPDRVs.	 Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.4.1	Operate each [MCREC] subsystem for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days
SR 3.7.4.2	Perform required [MCREC] filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with the [VFTP]
SR 3.7.4.3	Verify each [MCREC] subsystem actuates on an actual or simulated initiation signal.	[18] months
SR 3.7.4.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program. ~~[Verify each [MCREC] subsystem can maintain a~~	In accordance with the Control Room Envelope Habitability Program

SURVEILLANCE	FREQUENCY
~~positive pressure of ≥ [0.1] inches water gauge relative to the [turbine building] during the [pressurization] mode of operation at a flow rate of ≤ [400] cfm.~~	~~[18] months on a STAGGERED TEST BASIS]~~

5.5 Programs and Manuals

5.5.14 Battery Monitoring and Maintenance Program

This Program provides for battery restoration and maintenance, based on [the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications," or of the battery manufacturer] of the following:

a. Actions to restore battery cells with float voltage < [2.13] V, and

b. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

5.5.15 Control Room Envelope Habitability Program

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE [Main Control Room Environmental Control (MCREC)] System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of [5 rem whole body or its equivalent to any part of the body] [5 rem total effective dose equivalent (TEDE)] for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

   [The following are exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0:

   1. ;and]

d. Measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one subsystem of the [MCREC] System, operating at the flow rate required by the VFTP, at a Frequency of [18] months on a

STAGGERED TEST BASIS. The results shall be trended and used as part of the [18] month assessment of the CRE boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

B 3.7 PLANT SYSTEMS

B 3.7.4 [Main Control Room Environmental Control (MCREC)] System

BASES

BACKGROUND

The [MCREC] System provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke~~radiologically controlled environment from which the unit can be safely operated following a Design Basis Accident (DBA)~~.

The safety related function of the [MCREC] System includes two independent and redundant high efficiency air filtration subsystems for emergency treatment of recirculated air or outside supply air and a CRE boundary that limits the inleakage of unfiltered air. Each [MCREC] subsystem consists of a demister, an electric heater, a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section, a second HEPA filter, a booster fan, an air handling unit (excluding the condensing unit), and the associated ductwork, valves or dampers, doors, barriers, and instrumentation~~ductwork and dampers~~. Demisters remove water droplets from the airstream. Prefilters and HEPA filters remove particulate matter, which may be radioactive. The charcoal adsorbers provide a holdup period for gaseous iodine, allowing time for decay.

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 during 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 inleakage of unfiltered air into the CRE will not exceed the inleakage 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.

The [MCREC] System is a standby system, parts of which also operate during normal unit operations to maintain the CRE~~control room~~ environment. Upon receipt of the initiation signal(s) (indicative of conditions that could result in radiation exposure to CRE occupants~~control room personnel~~), the [MCREC] System automatically switches to the pressurization mode of operation to ~~prevent~~ minimize infiltration of contaminated air into the CRE~~control room~~. A system of dampers isolates the CRE~~control room~~, and a part of the recirculated air

is routed through either of the two filter subsystems. Outside air is taken in at the normal ventilation intake and is mixed with the recirculated air before being passed through one of the charcoal adsorber filter subsystems for removal of airborne radioactive particles.

The [MCREC] System is designed to maintain a habitable environment in the CRE ~~the control room environment~~ for a 30 day continuous occupancy after a DBA without exceeding [5 rem whole body dose or its equivalent to any part of the body] [5 rem total effective dose equivalent (TEDE)]. A single [MCREC] subsystem operating at a flow rate of ≤ [400] cfm will pressurize the CRE~~control room~~ to about [0.1] inches water gauge relative to external areas adjacent to the CRE boundary to minimize ~~to prevent~~ infiltration of air from all surrounding areas adjacent to the CRE boundary~~surrounding buildings~~. [MCREC] System operation in maintaining ~~control room~~CRE habitability is discussed in the FSAR, Chapters [6] and [9], (Refs. 1 and 2, respectively).

BASES

APPLICABLE SAFETY ANALYSES

The ability of the [MCREC] System to maintain the habitability of the CRE~~control room~~ is an explicit assumption for the safety analyses presented in the FSAR, Chapters [6] and [15] (Refs. 1 and 3, respectively). The pressurization mode of the [MCREC] System is assumed to operate following a DBA~~loss of coolant accident, fuel handling accident [involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)], main steam line break, and control rod drop accident~~, as discussed in the FSAR, Section [6.4.1.2.2] (Ref. 4). The radiological doses to the CRE occupants~~control room personnel~~ as a result of the various DBAs are summarized in Reference 3. No single active or passive failure will cause the loss of outside or recirculated air from the CRE~~control room~~.

The [MCREC] System provides protection from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the CRE following a hazardous chemical release (Ref. 5). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (Ref. 6).

The [MCREC] System satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Two redundant subsystems of the [MCREC] System are required to be OPERABLE to ensure that at least one is available~~, assuming~~ if a single active failure disables the other subsystem. Total [MCREC] S~~s~~ystem failure, such as from a loss of both ventilation subsystems or from an inoperable CRE boundary, could result in exceeding a dose of [5 rem whole body or its equivalent to any part of the body] [5 rem TEDE] to the CRE occupants ~~to the control room operators~~ in the event of a DBA.

~~The~~ Each [MCREC] subsystem ~~System~~ is considered OPERABLE when the individual components necessary to limit CRE occupant ~~control operator~~ exposure are OPERABLE ~~in both subsystems~~. A subsystem is considered OPERABLE when its associated:

a. Fan is OPERABLE,

b. HEPA filter and charcoal adsorbers are not excessively restricting flow and are capable of performing their filtration functions, and

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

~~In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.~~

In order for the [MCREC] subsystems 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 DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

The LCO is modified by a Note allowing the ~~main control room~~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 condition, 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 proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE~~main control room~~. 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~~main control room~~ isolation is indicated.

BASES

APPLICABILITY

In MODES 1, 2, and 3, the [MCREC] System must be OPERABLE to ensure that the CRE will remain habitable ~~control operator exposure~~ during and following a DBA, since the DBA could lead to a fission product release.

In MODES 4 and 5, the probability and consequences of a DBA are reduced because of the pressure and temperature limitations in these MODES. Therefore, maintaining the [MCREC] System OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

a. During operations with a potential for draining the reactor vessel (OPDRVs) and

b. During movement of [recently] irradiated fuel assemblies in the [secondary] containment. [Due to radioactive decay, the MCREC System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days).]

ACTIONS

A.1

With one [MCREC] subsystem inoperable, for reasons other than an inoperable CRE boundary, the inoperable [MCREC] subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE [MCREC] subsystem is adequate to perform the CRE occupant ~~control room radiation~~ protection function. However, the overall reliability is reduced because a ~~single~~ failure in the OPERABLE subsystem could result in loss of the ~~reduced~~ [MCREC] System function~~capability~~. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and that the remaining subsystem can provide the required capabilities.

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

~~REVIEWER'S NOTE~~

~~Adoption of Condition B is dependent on a commitment from the licensee to have written procedures available describing compensatory measures to be taken in the event of an intentional or unintentional entry into Condition B.~~

BASES

ACTIONS (continued)

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 DBA 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 hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 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 chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals 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 DBA occurring during this time period, and the use of mitigating actions. The 90 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 DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

~~If the main control room boundary is inoperable in MODE 1, 2, or 3, the MCREC subsystems cannot perform their intended functions. Actions must be taken to restore an OPERABLE main control room boundary within 24 hours. During the period that the main control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, 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 DBA 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 main control room boundary.~~

C.1 and C.2

In MODE 1, 2, or 3, if the inoperable [MCREC] subsystem or the CRE~~control room~~ boundary cannot be restored to OPERABLE status within the ~~associated~~ required Completion Time, 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 12 hours and in MODE 4 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 unit systems.

D.1, D.2.1 and D.2.2

The Required Actions of Condition D are modified by a Note indicating that LCO 3.0.3 does not apply. If moving [recently] irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of [recently] irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

BASES

ACTIONS (continued)

During movement of [recently] irradiated fuel assemblies in the [secondary] containment or during OPDRVs, if the inoperable [MCREC] subsystem cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE [MCREC] subsystem may be placed in the pressurization mode. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent automatic actuation will occur, and that any active failure will be readily detected.

[Required Action D.1 is modified by a Note alerting the operator to [place the system in the toxic gas protection mode if the toxic gas protection mode automatic transfer capability is inoperable~~]~~.]

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 CRE~~control room~~. This places the unit in a condition that minimizes the accident risk.

If applicable, movement of [recently] irradiated fuel assemblies in the [secondary] containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and the subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

E.1

If both [MCREC] subsystems are inoperable in MODE 1, 2, or 3 for reasons other than an inoperable CRE~~control room~~ boundary (i.e., Condition B), the [MCREC] System may not be capable of performing the intended function and the unit is in a condition outsideof the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

F.1 and F.2

The Required Actions of Condition F are modified by a Note indicating that LCO 3.0.3 does not apply. If moving [recently] irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of [recently] irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

BASES

ACTIONS (continued)

During movement of [recently] irradiated fuel assemblies in the [secondary] containment or during OPDRVs, with two [MCREC] subsystems inoperable or with one or more [MCREC] subsystems inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the CRE~~control room~~. This places the unit in a condition that minimizes the accident risk.

If applicable, movement of [recently] irradiated fuel assemblies in the [secondary] containment must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. If applicable, actions must be initiated immediately to suspend OPDRV~~R~~s to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

SURVEILLANCE REQUIREMENTS

SR 3.7.4.1

This SR verifies that a subsystem in a standby mode starts on demand and continues to operate. Standby systems should be checked periodically to ensure that they start and function properly. As the environmental and normal operating conditions of this system are not severe, testing each subsystem once every month provides an adequate check on this system. Monthly heater operation dries out any moisture that has accumulated in the charcoal as a result of humidity in the ambient air. [Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system.] Furthermore, the 31 day Frequency is based on the known reliability of the equipment and the two subsystem redundancy available.

SR 3.7.4.2

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

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.4.3

This SR verifies that on an actual or simulated initiation signal, each [MCREC] subsystem starts and operates. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.7.1.5 overlaps this SR to provide complete testing of the safety function. The Frequency of [18] months is based on industry operating experience and is consistent with the typical refueling cycle.~~The [18] month Frequency is specified in Reference 5.~~

~~[~~ SR 3.7.4.4

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 DBA 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 hazardous chemicals 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 DBA 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. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3, (Ref. 7) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 8). These compensatory measures may also be used as mitigating actions as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 9). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA 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.
~~This SR verifies the integrity of the control room enclosure and the assumed inleakage rates of potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas (the turbine building), is periodically tested to verify proper function of the [MCREC] System. During the emergency mode of operation, the [MCREC] System is designed to slightly pressurize the control room~~

~~≥ [0.1] inches water gauge positive pressure with respect to the turbine building to prevent unfiltered inleakage. The [MCREC] System is designed to maintain this positive pressure at a flow rate of ≤ [400] cfm to the control room in the pressurization mode. The Frequency of [18] months on a STAGGERED TEST BASIS is consistent with industry practice and other filtration systems SRs.]~~

REFERENCES

1. FSAR, Chapter [6].
2. FSAR, Chapter [9].
3. FSAR, Chapter [15].
4. FSAR, Section [6.4.1.2.2].
5. FSAR, Section [6.4].
6. FSAR, Section [9.5].
~~5~~7. Regulatory Guide 1.196~~1.52, Rev. [2]~~.
8. NEI 99-03, "Control Room Habitability Assessment," March 2003.
9. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, "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).

3.7 PLANT SYSTEMS

3.7.3 [Control Room Fresh Air (CRFA)] System

LCO 3.7.3 Two [CRFA] subsystems shall be OPERABLE.

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

APPLICABILITY: MODES 1, 2, and 3,
During movement of [recently] irradiated fuel assemblies in the [primary or secondary containment],
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [CRFA] subsystem inoperable for reasons other than Condition B.	A.1 Restore [CRFA] subsystem to OPERABLE status.	7 days
B. ~~Two~~One or more [CRFA] subsystems inoperable due to inoperable CRE~~control room~~ boundary in MODE 1, 2, or 3.	B.1 Initiate action to implement mitigating actions.	Immediately
	AND	
	B.2 Verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.	24 hours
	AND	
	B.3~~1~~ Restore CRE ~~control room~~ boundary to OPERABLE status.	90 days~~24 hours~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 4.	12 hours 36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met during movement of [recently] irradiated fuel assemblies in the [primary or secondary containment] or during OPDRVs.	----------NOTE---------- LCO 3.0.3 is not applicable. ---------- D.1 ----------NOTE---------- [Place in toxic gas protection mode if automatic transfer to toxic gas protection mode is inoperable.] ---------- Place OPERABLE [CRFA] subsystem in [isolation] mode.	 Immediately
	<u>OR</u>	
	D.2.1 Suspend movement of [recently] irradiated fuel assemblies in the [primary and secondary containment].	Immediately
	<u>AND</u>	
	D.2.2 Initiate action to suspend OPDRVs.	Immediately
E. Two [CRFA] subsystems inoperable in MODE 1, 2, or 3 for reasons other than Condition B.	E.1 Enter LCO 3.0.3.	Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two [CRFA] subsystems inoperable during movement of [recently] irradiated fuel assemblies in the [primary or secondary containment] or during OPDRVs.	----------NOTE---------- LCO 3.0.3 is not applicable. ----------	
	F.1 Suspend movement of [recently] irradiated fuel assemblies in the [primary and secondary containment].	Immediately
	AND	
OR One or more [CRFA] subsystems inoperable due to inoperable CRE boundary during movement of [recently] irradiated fuel assemblies in the [primary or secondary containment] or during OPDRVs.	F.2 Initiate action to suspend OPDRVs.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.3.1	Operate each [CRFA] subsystem for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days
SR 3.7.3.2	Perform required [CRFA] filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with the [VFTP]
SR 3.7.3.3	Verify each [CRFA] subsystem actuates on an actual or simulated initiation signal.	[18] months
SR 3.7.3.4	Perform required CRE unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program. [~~Verify each [CRFA] subsystem can maintain a~~	In accordance with the Control Room Envelope Habitability

SURVEILLANCE	FREQUENCY
~~positive pressure of ≥ [ ] inches water gauge relative to [adjacent buildings] during the [isolation] mode of operation at a flow rate of ≤ [ ] cfm.~~	Program ~~[18] months on a STAGGERED TEST BASIS~~]

5.5.15 Control Room Envelope Habitability Program

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE [Control Room Fresh Air (CRFA)] System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of [5 rem whole body or its equivalent to any part of the body] [5 rem total effective dose equivalent (TEDE)] for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

[The following are exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0:

1. ;and]

d. Measurement, at designated locations, of the CRE pressure relative to all external areas adjacent to the CRE boundary during the pressurization mode of operation by one subsystem of the [CRFA] System, operating at the flow rate required by the VFTP, at a Frequency of [18] months on a STAGGERED TEST BASIS. The results shall be trended and used as part of the [18] month assessment of the CRE boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and

measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

B 3.7 PLANT SYSTEMS

B 3.7.3 [Control Room Fresh Air (CRFA)] System

BASES

BACKGROUND

The [CRFA] System provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke~~radiologically controlled environment from which the unit can be safely operated following a Design Basis Accident (DBA)~~.

The safety related function of the [CRFA] System used to control radiation exposure consists of two independent and redundant high efficiency air filtration subsystems for treatment of recirculated air or outside supply air and a CRE boundary that limits the inleakage of unfiltered air. Each [CRFA] subsystem consists of a demister, an electric heater, a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section, a second HEPA filter, a fan, and the associated ductwork, ~~and~~ valves or dampers, doors, barriers, and instrumentation. Demisters remove water droplets from the airstream. Prefilters and HEPA filters remove particulate matter, which ~~that~~ may be radioactive. The charcoal adsorbers provide a holdup period for gaseous iodine, allowing time for decay.

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 during 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 for 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 inleakage of unfiltered air into the CRE will not exceed the inleakage 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.

In addition to the safety related standby emergency filtration function, parts of the [CRFA] System are operated to maintain the CRE ~~control room~~ environment during normal operation. Upon receipt of the initiation signal(s) (indicative of conditions that could result in radiation exposure to CRE occupants~~control room personnel~~), the [CRFA] System automatically switches to the isolation mode of operation to ~~prevent~~ minimize infiltration of contaminated air into the CRE~~control room~~. A system of dampers isolates the CRE~~control room~~, and CRE~~control room~~

air flow is recirculated and processed through either of the two filter subsystems.

The [CRFA] System is designed to maintain a habitable environment in the CRE~~the control room environment~~ for a 30 day continuous occupancy after a 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)]. [CRFA] System operation in maintaining the CRE ~~control room~~ habitability is discussed in the FSAR, Sections [6.5.1] and [9.4.1] (Refs. 1 and 2, respectively).

APPLICABLE SAFETY ANALYSES

The ability of the [CRFA] System to maintain the habitability of the ~~control room~~ CRE is an explicit assumption for the safety analyses presented in the FSAR, Chapters [6] and [15] (Refs. 3 and 4, respectively). The isolation mode of the [CRFA] System is assumed to operate following a DBA~~loss of coolant accident, main steam line break, fuel handling accident [involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days)], and control rod drop accident~~. The radiological doses to CRE occupants~~control room personnel~~ as a result of the various DBAs are summarized in Reference 4. No single active or passive failure will cause the loss of outside or recirculated air from the CRE~~control room~~.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The [CRFA] System provides protection from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases demonstrates that the toxicity limits are not exceeded in the CRE following a hazardous chemical release (Ref. 5). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (Ref. 6).

The [CRFA] System satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Two redundant subsystems of the [CRFA] System are required to be OPERABLE to ensure that at least one is available~~, assuming~~ if a single active failure disables the other subsystem. Total [CRFA] ~~system~~ System failure, such as from a loss of both ventilation subsystems or from an inoperable CRE boundary, could result in exceeding a dose of [5 rem whole body or its equivalent to any part of the body] [5 rem TEDE] to the CRE occupants ~~to the control room operators~~ in the event of a DBA.

~~The~~ Each [CRFA] subsystem~~System~~ is considered OPERABLE when the individual components necessary to limit CRE occupant ~~control operator~~ exposure are OPERABLE ~~in both subsystems~~. A subsystem is considered OPERABLE when its associated:

a. Fan is OPERABLE,

b. HEPA filter and charcoal adsorber are not excessively restricting flow and are capable of performing their filtration functions, and

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

In order for the [CRFA] subsystems 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 DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

~~In addition, the control room boundary must be maintained, including the integrity of the walls, floors, ceilings, ductwork, and access doors.~~

The LCO is modified by a Note allowing the CRE~~control room~~ 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 condition, 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 proceduralized and consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE~~control room~~. 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 ~~control room~~CRE isolation is indicated.

APPLICABILITY

In MODES 1, 2, and 3, the [CRFA] System must be OPERABLE to ensure that the CRE will remain habitable ~~control operator exposure~~ during and following a DBA, since the DBA could lead to a fission product release.

In MODES 4 and 5, the probability and consequences of a DBA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the [CRFA] System OPERABLE is not required in MODE 4 or 5, except for the following situations under which significant radioactive releases can be postulated:

BASES

APPLICABILITY (continued)

a. During operations with a potential for draining the reactor vessel (OPDRVs) and

b. During movement of [recently] irradiated fuel assemblies in the [primary or secondary containment]. [Due to radioactive decay, the CRFA System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous [X] days).]

ACTIONS

A.1

With one [CRFA] subsystem inoperable for reasons other than an inoperable CRE boundary, the inoperable [CRFA] subsystem must be restored to OPERABLE status within 7 days. With the unit in this condition, the remaining OPERABLE [CRFA] subsystem is adequate to perform the CRE occupant ~~control room radiation~~ protection function. However, the overall reliability is reduced because a ~~single~~ failure in the OPERABLE subsystem could result in loss of [CRFA] System function. The 7 day Completion Time is based on the low probability of a DBA occurring during this time period, and that the remaining subsystem can provide the required capabilities.

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

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

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 DBA 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 hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 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 chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that

CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals 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 DBA occurring during this time period, and the use of mitigating actions. The 90 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 DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

~~If the control room boundary is inoperable in MODE 1, 2, or 3, the CRFA subsystems cannot perform their intended functions. Actions must be taken to restore an OPERABLE control room boundary within 24 hours. During the period that the control room boundary is inoperable, appropriate compensatory measures (consistent with the intent of GDC 19) should be utilized to protect control room operators from potential hazards such as radioactive contamination, toxic chemicals, 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 DBA 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 control room boundary.~~

BASES

ACTIONS (continued)

C.1 and C.2

In MODE 1, 2, or 3, if the inoperable [CRFA] subsystem or ~~control room~~ the CRE boundary cannot be restored to OPERABLE status within the ~~associated~~ required Completion Time, 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 12 hours and in MODE 4 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 unit systems.

D.1, D.2.1 and D.2.2

The Required Actions of Condition D are modified by a Note indicating that LCO 3.0.3 does not apply. If moving [recently] irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of [recently] irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of [recently] irradiated fuel assemblies in the [primary or secondary containment] or during OPDRVs, if the inoperable [CRFA] subsystem cannot be restored to OPERABLE status within the required Completion Time, the OPERABLE [CRFA] subsystem may be placed in the isolation mode. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent automatic actuation will occur, and that any active failure will be readily detected.

[Required Action D.1 is modified by a Note alerting the operator to ~~[~~place the system in the toxic gas protection mode if the toxic gas protection mode~~,~~ automatic transfer capability is inoperable~~]~~.]

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 CRE~~control room~~. This places the unit in a condition that minimizes the accident risk.

If applicable, movement of [recently] irradiated fuel assemblies in the [primary and secondary containment] must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

BASES

ACTIONS (continued)

E.1

If both [CRFA] subsystems are inoperable in MODE 1, 2, or 3 for reasons other than an inoperable CRE~~control room~~ boundary (i.e., Condition B), the [CRFA] System may not be capable of performing the intended function and the unit is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

F.1 and F.2

The Required Actions of Condition F are modified by a Note indicating that LCO 3.0.3 does not apply. If moving [recently] irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of [recently] irradiated fuel assemblies is not sufficient reason to require a reactor shutdown.

During movement of [recently] irradiated fuel assemblies in the [primary or secondary containment] or during OPDRVs, with two [CRFA] subsystems inoperable or with one or more [CRFA] subsystems inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the ~~control room~~CRE. This places the unit in a condition that minimizes the accident risk.

If applicable, movement of [recently] irradiated fuel assemblies in the [primary and secondary containment] must be suspended immediately. Suspension of these activities shall not preclude completion of movement of a component to a safe position. If applicable, actions must be initiated immediately to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until the OPDRVs are suspended.

SURVEILLANCE REQUIREMENTS

SR 3.7.3.1

This SR verifies that a subsystem in a standby mode starts on demand and continues to operate. Standby systems should be checked periodically to ensure that they start and function properly. As the environmental and normal operating conditions of this system are not severe, testing each subsystem once every month provides an adequate check on this system. Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for

BASES

SURVEILLANCE REQUIREMENTS (continued)

≥ 15 minutes to demonstrate the function of the system.] Furthermore, the 31 day Frequency is based on the known reliability of the equipment and the two subsystem redundancy available.

SR 3.7.3.2

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

SR 3.7.3.3

This SR verifies that each [CRFA] subsystem starts and operates on an actual or simulated initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.7.1.5 overlaps this SR to provide complete testing of the safety function. The Frequency of [18] months is based on industry operating experience and is consistent with the typical refueling cycle. ~~The [18] month Frequency is specified in Reference 5.~~

SR 3.7.3.4

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 DBA 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 hazardous chemicals 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 DBA 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. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3, (Ref. 7) which endorses, with

exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 8). These compensatory measures may also be used as mitigating actions as required by Required Action B.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 9). Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA 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.

~~This SR verifies the integrity of the control room enclosure and the assumed inleakage rates of potentially contaminated air. The control room positive pressure, with respect to potentially contaminated adjacent areas, is periodically tested to verify proper function of the [CRFA] System. During the emergency mode of operation, the [CRFA] System is designed to slightly pressurize the control room to [0.1] inches water gauge positive pressure with respect to adjacent areas to prevent unfiltered inleakage. The [CRFA] System is designed to maintain this positive pressure at a flow rate of [500] cfm to the control room in the isolation mode. The Frequency of [18] months on a STAGGERED TEST BASIS is consistent with industry practice and other filtration system SRs.~~

BASES

REFERENCES

1. FSAR, Section [6.5.1].

2. FSAR, Section [9.4.1].

3. FSAR, Chapter [6].

4. FSAR, Chapter [15].

5. FSAR, Section [6.4].

6. FSAR, Section [9.5].

~~5~~7. Regulatory Guide 1.196~~52, Rev. [2]~~.

8. NEI 99-03, "Control Room Habitability Assessment," March 2003.

9. Letter from Eric J. Leeds (NRC) to James W. Davis (NEI) dated January 30, 2004, "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).