Omaha Public Power District

*444 South 16th Street Mall*
*Omaha NE 68102-2247*

May 16, 2007
LIC-07-0046

U. S. Nuclear Regular Commission
Document Control Desk
Washington, DC 20555

References
1. Docket No. 50-285
2. Letter from OPPD (R. T. Ridenoure) to NRC (Document Control Desk), "Response to Generic Letter (GL) 2003-01, Control Room Habitability," dated December 5, 2003 (LIC-03-0150) (ML 033430569)

**SUBJECT: Application to Revise Technical Specifications Regarding Control Room Envelope Habitability in Accordance with TSTF-448, Revision 3, Using the Consolidated Line Item Improvement Process**

In accordance with the provisions of 10 CFR 50.90, the Omaha Public Power District (OPPD) is submitting a request for an amendment to the technical specifications (TS) for Fort Calhoun Station, Unit No. 1 (FCS). The proposed amendment would modify TS requirements related to control room envelope habitability in accordance with TSTF-448, Revision 3. The submittal of this proposed amendment fulfills a commitment made in Reference 2.

Attachment 1 provides a description of the proposed changes, the requested confirmation of applicability, and plant-specific verifications. Attachment 2 provides the existing TS and Bases pages marked up to show the proposed changes. Attachment 3 provides a table showing where the TSTF-448, Revision 3 changes are located in the FCS TS. Attachment 4 provides revised (clean) TS and Bases pages.

OPPD requests approval of the proposed License Amendment by May 1, 2008 with the amendment being implemented within 270 days of approval.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated State of Nebraska Official.

A102

I declare under penalty of perjury that the foregoing is true and correct. (Executed on May 16, 2007.)

If you should have any questions regarding this submittal, please contact Mr. Thomas C. Matthews at (402) 533-6938.

Sincerely,

Jeffrey A. Reinhart
Site Director - Fort Calhoun Station

JAR/MLE/mle

Attachments:
1. OPPD's Evaluation for Amendment of Operating License
2. Proposed Technical Specification Changes (Mark-Up)
3. Location of TSTF-448, Revision 3 Changes in FCS TS
4. Revised Technical Specification Pages (Clean)

c: B. S. Mallett, NRC Regional Administrator, Region IV
A. B. Wang, NRC Project Manager
J. D. Hanna, NRC Senior Resident Inspector
Director of Consumer Health Services, Department of Regulation and Licensure, Nebraska Health and Human Services, State of Nebraska

**Omaha Public Power District's Evaluation**
**For Amendment of Operating License**

## 1.0 DESCRIPTION

The Omaha Public Power District (OPPD) proposes to modify Fort Calhoun Station, Unit No. 1 (FCS) technical specification (TS) requirements related to control room envelope (CRE) habitability. These requirements are located in TS 2.8.2(4), TS 2.8.3(5), and TS 2.12.1. Surveillance requirements (SR) are contained in TS 3.1 and 3.2. Corresponding Bases changes are also included. A new Specification (TS 5.24) pertaining to the Control Room Envelope Habitability Program is also proposed.

The changes are consistent with Nuclear Regulatory Commission (NRC) approved Industry/Technical Specification Task Force (TSTF) STS change TSTF-448, Revision 3. The availability of this TS improvement was published in the Federal Register on January 17, 2007 as part of the consolidated line item improvement process (CLIIP).

## 2.0 ASSESSMENT

### 2.1 Applicability of Published Safety Evaluation

OPPD has reviewed the safety evaluation dated January 17, 2007 as part of the CLIIP. This review included a review of the NRC staff's evaluation, as well as the supporting information provided to support TSTF-448. OPPD has concluded that the justifications presented in the TSTF proposal and the safety evaluation prepared by the NRC staff are applicable to FCS and justify this amendment for the incorporation of the changes to the FCS TS.

### 2.2 Optional Changes and Variations

The proposed FCS TS changes are consistent with the markup of the Combustion Engineering Owners Group (CEOG) Standard Technical Specifications (STS) of NRC approved TSTF-448, Revision 3. Since FCS has custom TS, the numbering of the proposed TS and the location of the information differs from that of TSTF-448, Revision 3. Attachment 3 identifies the location of the TSTF-448, Revision 3 changes in the FCS TS. OPPD is not proposing any variations or deviations from the TS changes described in TSTF-448, Revision 3, or the applicable parts of the NRC staff's model safety evaluation dated January 17, 2007 except as noted below.

The TSTF-448, Revision 3, note allowing the CRE boundary to be opened intermittently under administrative control was incorporated in TS 2.8.2(4), TS 2.8.3(5), and TS 2.12.1. These limiting conditions for operation (LCO) are equivalent to LCO 3.7.11 of CEOG STS. TS 2.8.2(4) and TS 2.8.3(5), which are applicable when FCS is in Refueling Shutdown (Operating Mode 5), are equivalent to Conditions D and E of LCO 3.7.11. TS 2.12.1 is applicable when reactor coolant temperature $T_{cold}$ is $\geq 210^{\circ}$F and is equivalent to Conditions A, B, C, and F of LCO 3.7.11.

The TSTF-448, Revision 3, note concerning placement in toxic gas protection mode during movement of irradiated fuel assemblies if automatic transfer to toxic gas protection mode is inoperable was added to TS 2.8.2(4) and TS 2.8.3(5). However, the note was revised to encompass the plant-specific licensing basis of the FCS control room. Amendment 248 relocated LCO (TS 2.22) and SR (TS 3.1, Table 3-3, Item 29) requirements on the toxic gas monitors to the FCS Updated Safety Analysis Report (USAR). Therefore, the note was revised to apply when automatic transfer to toxic gas protection mode is "not functional" rather than "inoperable." This terminology is appropriate for structures, systems, and components (SSCs) not controlled by TSs (Reference 1).

TS 2.8.2(4) currently requires the control room ventilation system (CRVS) to be in operation in filtered air mode during core alterations and refueling operations inside containment. TS 2.8.3(5) currently requires the CRVS to be in operation in filtered air mode during refueling operations in the spent fuel pool. By definition, "in operation" means that the system or component is "operable" and performing its design function.

It is proposed that TS 2.8.2(4) and TS 2.8.3(5) be revised such that if a failure of the CRVS train that is in operation should occur, the opposite CRVS train must immediately be placed in operation or core alterations and/or refueling operations must immediately be suspended. This prevents unnecessary interruption of core alterations and/or refueling operations during the momentary transfer to the opposite CRVS train yet preserves the requirement to halt these activities if that train cannot be placed in operation in filtered air mode. The proposed revision is consistent with Condition D of LCO 3.7.11.

To facilitate the adoption of the LCO 3.7.11 Bases, it is proposed to revise the title of TS 2.12 and the table of contents from "Control Room Systems" to "Control Room Ventilation System." Whether called "Control Room Systems" or "Control Room Ventilation System," both titles encompass the control room air filtration system (TS 2.12.1) and the control room air conditioning system (TS 2.12.2). This revision makes TS 2.12 consistent with TS 2.8.2(4) and TS 2.8.3(5) in that all three Specifications will use the same terminology.

The title change is also necessary because as it applies to FCS, a portion of the Bases of LCO 3.7.11 is applicable to the CRVS as a whole. Placing all of the LCO 3.7.11 Bases statements into the Bases of TS 2.12.1 for the control room air filtration system would be inaccurate and misleading. Therefore, a section on the CRVS was added to the Bases of TS 2.12. The CRVS Bases section contains those portions of the Bases of LCO 3.7.11 that are applicable to the CRVS as a whole. This pertains primarily to the description of the CRE boundary and the CRVS emergency mode of operation.

These changes clarify the title of TS 2.12 for consistency with TS 2.8.2(4) and TS 2.8.3(5), do not expand or reduce the scope of TS 2.12, and are consistent with CEOG STS as revised by TSTF-448, Revision 3. Therefore, these changes are considered editorial in nature.

For conciseness, the acronym "CRVS" is proposed for utilization in TS 2.8. This is an editorial change.

TS 3.1, Table 3-3, Item 10 was revised to clarify that it pertains to the control room ventilation "system." TS 3.2, Table 3-5, Item 10a was revised to clarify that it pertains to the control room "air filtration system." These changes are editorial in nature.

To correct a misspelling of the word "assemblies," TS 3.2, Table 3-4, Footnote (4) is revised.

Several minor revisions to TS 3.2, Table 3-5, Item 10a.3.a are proposed. The current SR requires each circuit (train) to be operated for ten hours every month but does not specify that the hours be continuous nor does it specify operation of the heaters. The term "circuit" is revised to "train" and the frequency is revised to require that the hours be continuous with heaters operating. These revisions are editorial in nature to achieve consistency with CEOG STS. The surveillance test is consistent with the continuous run requirement and the system is designed such that the heaters are automatically operational when the filter fans are running.

For consistency with CEOG STS, a minor revision to TS 3.2, Table 3-5, Item 10a.4, which tests automatic and manual initiation of the control room air filtration system is proposed. The proposed revision will require automatic and manual initiation of "each train" rather than "the system." This change is editorial in nature as the conduct of the surveillance test is unaffected.

Two minor variations from the Specification for the Control Room Habitability Program of TSTF-448, Revision 3 are proposed. First, the FCS TS does not contain a definition for "STAGGERED TEST BASIS" as does CEOG STS. Therefore, TS 5.24d was revised to apply to the CRVS, which means that each CRVS train will be operated each time that the SR is performed. Since each train will be operated, at each surveillance interval, the proposed revision is more conservative than TSTF-448, Revision 3 and thus is acceptable.

Secondly, as FCS does not have a ventilation filter testing program (VFTP), the required flow rate for the CRVS was revised to "operating within the tolerance for design flow rate." The design flow rate is that required by TS 3.2, Table 3-5, Item 10a.3.c. Surveillance requirements for the control room charcoal and HEPA filters are located in TS 3.2, Table 3-5, Item 10a.

Finally, OPPD proposes to renumber many of the pages in TS 2.12.1, and TS 3.1 and their associated Bases in order to accommodate the additional text added for consistency with CEOG STS as revised by TSTF-448, Revision 3. In order to remove an inconsistency in the page-numbering scheme, OPPD also proposes to renumber pages in TS 3.2.

The changes proposed above are necessary to adapt the requirements of TSTF-448, Revision 3 to the FCS TS or achieve additional consistency with CEOG STS, or are clearly editorial in nature. As such, these variations are minor and do not have any safety significance.

Accompanying the proposed TS changes are appropriate conforming technical changes to the TS Bases. The Bases of TS 2.8.2(4) and TS 2.8.3(5) does not include the statement from the Bases of LCO 3.7.11 stating that the system is required to cope with the release from a rupture of a waste gas decay tank (WGDT). The plant-specific accident analysis does not credit CRVS filtered air mode for the rupture of a WGDT (Reference 2).

The proposed revisions to the FCS TS Bases conform with TSTF-448, Revision 3 and also include editorial and administrative changes.

The applicability of Section 3.0 of the model safety evaluation (SE) to FCS is as follows:

1. FCS has custom TS. Therefore, the location of TSTF-448, Revision 3 changes in the FCS TS are not as described in Section 3.0 of the model SE. Attachment 3 identifies the location of the TSTF-448, Revision 3 changes in the FCS TS.
2. The first paragraph of Section 3.0 and all of Section 3.1 are applicable to FCS.
3. Section 3.2 is applicable but should be revised to incorporate the editorial changes noted above.
4. Section 3.3, Evaluations 1, 3, and 5 are not applicable to FCS.
5. Section 3.3, Evaluation 2 is applicable to FCS.
6. Section 3.3, Evaluation 4 is applicable to FCS in part. During core alterations and refueling operations, TS 2.8.2(4) and TS 2.8.3(5) require the CRVS to be in operation in filtered air mode. Therefore, to achieve the effect of the TSTF-448, Revision 3, CEOG STS, Condition E, "OR" statement, a new required action was added to TS 2.8.2(4) and 2.8.3(5). The new action requires the suspension of core alterations and refueling operations if one or more CRVS trains are inoperable due to an inoperable CRE boundary.
7. Section 3.3, Evaluation 6 is applicable to FCS. However, please note that the description in Evaluation 6 is not accurate regarding OPPD's Generic Letter 2003-01 response. OPPD committed to submit a license amendment request based on the approved revision of TSTF-448 but did not state that the control room pressurization surveillance is inadequate to demonstrate operability of the CRE boundary. The paragraph following Evaluation 6 is also applicable to FCS. OPPD is not proposing any exceptions to Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.
8. Section 3.4 is applicable in part to FCS. However, the Section 3.4 paragraph concerning measurement of CRE pressure is not accurate. As stated above, the FCS TS do not contain a definition for staggered test basis nor do they contain requirements for a VFTP. TS 5.24d of the CRE Habitability Program requires each CRVS train to be operated within the tolerance for design flow rate each time that the SR is performed.

### 2.3 License Condition Regarding Initial Performance of New Surveillance and Assessment Requirements

The last successful tracer gas test at FCS was performed more than 6 years ago. This was discussed with the NRC Project Manager and it was agreed that the license condition in the model license amendment request would be modified accordingly. Therefore, OPPD proposes the following as a license condition to support implementation of the proposed TS changes:

Upon implementation of Amendment No. xxx adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air inleakage as required by TS 3.1, Table 3-3, Item 10.b. in accordance with TS 5.24c.(i), the assessment of CRE habitability as required by Specification 5.24c.(ii), and the measurement of CRE pressure as required by Specification 5.24d, shall be considered met. Following implementation:

(a) The first performance of TS 3.1, Table 3-3, Item 10.b., in accordance with Specification 5.24c.(i), shall be within the next 18 months as the time period since the most recent successful tracer gas test is greater than 6 years.

(b) The first performance of the periodic assessment of CRE habitability, Specification 5.24c.(ii), shall be within the next 9 months as the time period since the most recent successful tracer gas test is greater than 3 years.

(c) The first performance of the periodic measurement of CRE pressure, Specification 5.24d., shall be within the next 138 days.

## 3.0 REGULATORY ANALYSIS

### 3.1 No Significant Hazards Consideration Determination

OPPD has reviewed the proposed no significant hazards consideration determination (NSHCD) published in the Federal Register as part of the CLIIP. OPPD has concluded that the proposed NSHCD presented in the Federal Register notice is applicable to FCS and is hereby incorporated by reference to satisfy the requirements of 10 CFR 50.91(a).

### 3.2 Commitments

No regulatory commitments are necessary. OPPD's license amendment implementation process requires all procedure changes, design basis documentation updates, and training necessary to comply with the amended technical specifications be completed prior to implementation of the amendment.

## 4.0 ENVIRONMENTAL EVALUATION

OPPD has reviewed the environmental evaluation included in the model safety evaluation dated January 17, 2007 as part of the CLIIP. OPPD has concluded that the staff's findings presented in that evaluation are applicable to FCS and the evaluation is hereby incorporated by reference for this application.

## 5.0 REFERENCES

1. NRC Regulatory Issue Summary 2005-20: Revision to Guidance Formerly Contained in NRC Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," September 26, 2005
2. Updated Safety Analysis Report, Section 14.19, "Gas Decay Tank Rupture"

**Proposed Technical Specification Changes (Markup)**

TECHNICAL SPECIFICATIONS

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2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling
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2.8.2(3) Ventilation Isolation Actuation Signal (VIAS)

Applicability

Applies to operation of the Ventilation Isolation Actuation Signal (VIAS) during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of an accident occurring during CORE ALTERATIONS or REFUELING OPERATIONS that could affect public health and safety.

Specification

VIAS, including manual actuation capability, shall be OPERABLE with one gaseous radiation monitor OPERABLE.

Required Actions

(1) Without one radiation monitor OPERABLE, or VIAS manual actuation capability inoperable, immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

2.8.2(4) Control Room Ventilation System (CRVS)

Applicability

Applies to operation of the ~~control room ventilation system~~ CRVS during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of a fuel handling accident to the control room staff.

Specification

The ~~control room ventilation system~~ CRVS shall be IN OPERATION and in the Filtered Air mode.

---------------------------------Notes---------------------------------

1. The control room envelope (CRE) boundary may be opened intermittently under administrative control.
2. Place in toxic gas protection mode immediately if automatic transfer to toxic gas protection mode is not functional.

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Required Actions

(1) If ~~the control room ventilation system~~ a CRVS train is not IN OPERATION ~~or not~~ in ~~the~~ Filtered Air mode, immediately place the opposite train IN OPERATION in Filtered Air mode OR immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling
2.8.2 Refueling Operations - Containment

2.8.2(4) Control Room Ventilation System (CRVS) (Continued)

Required Actions (Continued)

(2) If one or more CRVS trains are inoperable due to an inoperable control room envelope (CRE) boundary, immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(1) Spent Fuel Assembly Storage

Applicability

Applies to storage of spent fuel assemblies whenever any irradiated fuel assembly is stored in Region 2 (including peripheral cells) of the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the possibility of an accident occurring during REFUELING OPERATIONS that could affect public health and safety.

Specification

The combination of initial enrichment and burnup of each spent fuel assembly stored in Region 2 (including peripheral cells) of the spent fuel pool shall be within the acceptable burnup domain of Figure 2-10.

Required Actions

(1) With the requirements of the LCO not met, initiate action to move the noncomplying fuel assembly immediately.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling
2.8.3 Refueling Operations - Spent Fuel Pool

## 2.8.3(5) Control Room Ventilation System (CRVS)

### Applicability

Applies to operation of the ~~control room ventilation system~~ CRVS during REFUELING OPERATIONS in the spent fuel pool area. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

### Objective

To minimize the consequences of a fuel handling accident to the control room staff

### Specification

(1) The ~~control room ventilation system~~ CRVS shall be IN OPERATION and in the Filtered Air mode.

(2) A spent fuel pool area radiation monitor shall be IN OPERATION.

-------------------------------------------Notes-------------------------------------------

1. The control room envelope (CRE) boundary may be opened intermittently under administrative control.
2. Place in toxic gas protection mode immediately if automatic transfer to toxic gas protection mode is not functional.

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### Required Actions

(1) If ~~the control room ventilation system~~ a CRVS train is not IN OPERATION ~~or not~~ in Filtered Air mode, immediately place the opposite train IN OPERATION in Filtered Air mode OR immediately suspend REFUELING OPERATIONS.

(2) If a spent fuel pool area radiation monitor is not IN OPERATION, immediately suspend REFUELING OPERATIONS.

(3) If one or more CRVS trains are inoperable due to an inoperable control room envelope (CRE) boundary, immediately suspend REFUELING OPERATIONS.

## 2.0 **LIMITING CONDITIONS FOR OPERATION**
## 2.8 Refueling

Bases (Continued)

2.8.2(3) Ventilation Isolation Actuation Signal (VIAS) (Continued)

Requiring one (1) radiation monitor to be OPERABLE and aligned to monitor the containment atmosphere [or stack effluents] is a conservative measure to reduce exposure. Radiation monitoring will assure operators are alerted if a radiological incident occurs in containment to enable implementation of administrative controls as specified in the Bases for 2.8.2(1) "Containment Penetrations." During CORE ALTERATIONS and REFUELING OPERATIONS, the OPERABILITY of the control room ventilation system is addressed by Specification 2.8.2(4). The control room ventilation system is placed in Filtered Air mode as a conservative measure to reduce control room operator exposure. Specification 2.8.2(4) allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident.

When VIAS is inoperable, CORE ALTERATIONS and REFUELING OPERATIONS in containment are immediately suspended. This effectively precludes a fuel handling accident from occurring. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS and REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.8.2(4) Control Room Ventilation System (CRVS)

Operating the ~~control room ventilation system~~ CRVS in the Filtered Air mode is a conservative measure to reduce control room operator exposure. This allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident. If a CRVS train is not IN OPERATION in Filtered Air mode, the opposite train must immediately be placed IN OPERATION in Filtered Air mode. This action ensures that the remaining train is OPERABLE, and that any active failure will be readily detected. An alternative is to immediately suspend activities (CORE ALTERATIONS and REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the control room envelope (CRE).

Similarly, with one or more CRVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities (CORE ALTERATIONS and REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the CRE.

These actions place the unit in a condition that minimizes the accident risk.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS and REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

~~2.8.3(1) Spent Fuel Assembly Storage (Continued)~~2.8.2(4) Control Room Ventilation System (CRVS) (Continued)

The Specification is modified by two notes. The first note allows the CRE boundary to be opened intermittently under administrative controls. This 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. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

The second note requires the CRVS to be in toxic gas protection mode if automatic transfer to toxic gas protection mode is not functional. CORE ALTERATIONS and REFUELING OPERATIONS must be suspended immediately. Toxic gas is monitored at the outside air intake duct. Actuation of the system to toxic gas protection mode trips CRVS fans and isolates the outside air dampers. The CRVS is then placed in recirculation mode. In recirculation mode, the filter trains are bypassed.

Fire and smoke detection is provided at the outlet of the recirculation fans to protect against smoke developed from sources in the outside air stream or from sources inside the control room. As in toxic gas protection mode, CRVS fans are tripped and the outside air dampers are isolated.

2.8.3(1) Spent Fuel Assembly Storage

The spent fuel pool is designed for noncriticality by use of neutron absorbing material. The restrictions on the placement of fuel assemblies within the spent fuel pool, according to Figure 2-10, and the accompanying LCO, ensures that the $k_{eff}$ of the spent fuel pool always remains < 0.95 assuming the pool to be flooded with unborated water.

A spent fuel assembly may be transferred directly from the reactor core to the spent fuel pool Region 2 provided an independent verification of assembly burnups has been completed and the assembly burnup meets the acceptance criteria identified in Figure 2-10. When the configuration of fuel assemblies stored in Region 2 (including the peripheral cells) is not in accordance with Figure 2-10, immediate action must be taken to make the necessary fuel assembly movement(s) to bring the configuration into compliance with Figure 2-10. Acceptable fuel assembly burnup is not a prerequisite for Region 1 storage because Region 1 will maintain any type of fuel assembly that the plant is licensed for in a safe, coolable, subcritical geometry.

2.8.3(1) Spent Fuel Assembly Storage (Continued)

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.3(2) Spent Fuel Pool Water Level

The minimum water level in the spent fuel pool meets the assumption of iodine decontamination factors following a fuel handling accident. When the water level is lower than the required level, the movement of irradiated fuel assemblies in the spent fuel pool is immediately suspended. This effectively precludes a fuel handling accident from occurring in the spent fuel pool. Suspension of REFUELING OPERATION shall not preclude completion of movement of a component to a safe, conservative position. The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.3(3) Spent Fuel Pool Boron Concentration

The basis for the 500 ppm boron concentration requirement with Boral poisoned storage racks is to maintain the $k_{eff}$ below 0.95 in the event a misloaded unirradiated fuel assembly is located next to a spent fuel assembly. A misloaded unirradiated fuel assembly at maximum enrichment condition, in the absence of soluble poison, may result in exceeding the design effective multiplication factor. Soluble boron in the spent fuel pool water, for which credit is permitted under these conditions, would assure that the effective multiplication factor is maintained substantially less than the design condition.

This LCO applies whenever unirradiated fuel assemblies are stored in the spent fuel pool. The boron concentration is periodically sampled in accordance with Specification 3.2. Sampling is performed prior to movement of unirradiated fuel to the spent fuel pool and periodically when unirradiated fuel is stored in the spent fuel pool.

# 2.0 **LIMITING CONDITIONS FOR OPERATION**
## 2.8 Refueling

Bases (Continued)

2.8.3(3) Spent Fuel Pool Boron Concentration (Continued)

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of refueling operations shall not preclude completion of movement of a component to a safe, conservative position.

2.8.3(4) Spent Fuel Pool Area Ventilation

The spent fuel pool area ventilation system contains a charcoal filter to prevent release of significant radionuclides to the outside atmosphere. The system does not automatically realign and therefore must be IN OPERATION prior to REFUELING OPERATIONS in the spent fuel pool. When the spent fuel pool area ventilation system is not IN OPERATION, the movement of irradiated fuel assemblies in the spent fuel pool is immediately suspended. This effectively precludes a fuel handling accident from occurring in the spent fuel pool. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

2.8.3(5) Control Room Ventilation System (CRVS)

Operating the ~~control room ventilation system~~ CRVS in the Filtered Air mode and requiring a radiation monitor to be IN OPERATION are conservative measures to reduce control room operator exposure. This allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident.

Radiation monitoring will assure operators are alerted if a radiological incident occurs. This specification can be satisfied by using a permanent spent fuel pool area radiation monitor or a portable area radiation monitor.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.3(5) Control Room Ventilation System (CRVS) (Continued)

If a CRVS train is not IN OPERATION in Filtered Air mode, the opposite train must immediately be placed IN OPERATION in Filtered Air mode. This action ensures that the remaining train is OPERABLE, and that any active failure will be readily detected. An alternative is to immediately suspend activities (REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the control room envelope (CRE).

Similarly, with one or more CRVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities (REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the CRE.

These actions place the unit in a condition that minimizes the accident risk.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

The Specification is modified by two notes. The first note allows the control room envelope (CRE) boundary to be opened intermittently under administrative controls. This 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. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

The second note requires the CRVS to be in toxic gas protection mode if automatic transfer to toxic gas protection mode is not functional. CORE ALTERATIONS and REFUELING OPERATIONS must be suspended immediately. Toxic gas is monitored at the outside air intake duct. Actuation of the system to toxic gas protection mode trips CRVS fans and isolates the outside air dampers. The CRVS is then placed in recirculation mode. In recirculation mode, the filter trains are bypassed.

Fire and smoke detection is provided at the outlet of the recirculation fans to protect against smoke developed from sources in the outside air stream or from sources inside the control room. As in toxic gas protection mode, CRVS fans are tripped and the outside air dampers are isolated.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.3(6) Spent Fuel Cask Loading

(1) Soluble Boron

The basis for the 800 ppm minimum boron concentration requirement during spent fuel cask loading operations is to maintain the $k_{eff}$ in the cask system less than or equal to 0.95 in the event a mis-loaded unirradiated fuel assembly is located anywhere in the cask with up to 31 other fuel assemblies meeting the burnup and enrichment requirements of LCO 2.8.3(6)(2). This boron concentration also ensures the $k_{eff}$ in the cask system will be less than or equal to 0.95 if an unirradiated fuel assembly is dropped in the space between the spent fuel racks and the cask loading area during cask loading operations next to a spent fuel assembly. A mis-loaded or dropped irradiated fuel assembly at maximum enrichment condition, in the absence of soluble poison, may result in exceeding the design effective multiplication factor. Soluble boron in the spent fuel pool water, for which credit is permitted during spent fuel cask loading operations, assures that the effective multiplication factor is maintained substantially less than the design basis limit.

This LCO applies whenever a fuel assembly is located in a spent fuel cask submerged in the spent fuel pool. The boron concentration is periodically sampled in accordance with Specification 3.2. Sampling is performed prior to movement of fuel into the spent fuel cask and periodically thereafter during cask loading operations, until the cask is removed from the spent fuel pool.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of refueling operations shall not preclude completion of movement of a component to a safe, conservative position.

## 2.0 **LIMITING CONDITIONS FOR OPERATION**
## 2.8 Refueling

Bases (Continued)

### 2.8.3(6) Spent Fuel Cask Loading (Continued)

(2) Burnup vs. Enrichment

The spent fuel cask is designed for subcriticality by use of neutron absorbing material. The restrictions on the placement of fuel assemblies within the spent fuel pool, according to Figure 2-11, and the accompanying LCO, ensure that the $k_{eff}$ of the spent fuel pool always remains ≤ 0.95 assuming the pool to be flooded with borated water and <1.0 assuming the pool is flooded with unborated water, in accordance with 10 CFR 50.68(b)(4).

A spent fuel assembly may be transferred directly from the spent fuel racks to the spent fuel cask provided an independent verification of assembly burnups has been completed and the assembly burnup meets the acceptance criteria identified in Figure 2-11. If any fuel assembly located in the spent fuel cask is not in accordance with Figure 2-11, immediate action must be taken to make the remove of non-complying fuel assembly from the spent fuel cask and return it to the spent fuel rack.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

References

(1) USAR Section 9.5
(2) USAR Section ~~14.18~~9.10
(3) USAR Section 14.18

**2.0 LIMITING CONDITIONS FOR OPERATION**

2.12 Control Room Ventilation System~~s~~

2.12.1 Control Room Air Filtration System - Operating

Applicability

Applies to the operational status of the control room air filtration system when the reactor coolant temperature $T_{cold} \geq$ 210°F.

Objective

To assure operability of equipment required to filter control room air following a Design Basis Accident.

Specification

Two control room air filtration trains shall be OPERABLE.

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

Required Actions

(1) With one control room air filtration train inoperable for reasons other than (2), restore the inoperable train to OPERABLE status within 7 days.

(2) With one or more control room air filtration trains inoperable due to inoperable CRE boundary:

a. initiate mitigating actions immediately, AND
b. verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits, within 24 hours, AND
c. restore CRE boundary to OPERABLE status within 90 days.

(~~2~~3) With the required actions of (1) or (2) not met, be in HOT SHUTDOWN within 6 hours and COLD SHUTDOWN within the following 36 hours.

(~~3~~4) With two control room air filtration trains inoperable for reasons other than (2), enter LCO 2.0.1 immediately.

**2.0 LIMITING CONDITIONS FOR OPERATION**
2.12 Control Room Ventilation Systems
2.12.2 Control Room Air Conditioning System

Applicability

Applies to the operational status of the control room air conditioning system when the reactor coolant temperature $T_{cold} \geq 210°F$.

Objective

To assure operability of equipment required to maintain air temperature within the control room following a Design Basis Accident.

Specification

Two control room air conditioning trains shall be OPERABLE.

Required Actions

(1) With one control room air conditioning train inoperable, restore the inoperable train to OPERABLE status within 30 days.

(2) With the required actions of (1) not met, be in HOT SHUTDOWN within 6 hours, and COLD SHUTDOWN within the following 36 hours.

(3) With two control room air conditioning trains inoperable, enter LCO 2.0.1 immediately.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Systems

### Bases

### 2.12.1 Control Room Air Filtration System - Operating

The control room air filtration system is designed to maintain radiation doses to control room personnel within the limits of General Design Criterion (GDC) 19. When the control room ventilation system is placed in the filtered air makeup mode either manually or after receiving a VIAS, the unfiltered outside air duct is isolated to prevent significant radionuclides from entering the control room.

A control room air filtration train is OPERABLE when the associated train level components and the system level components are OPERABLE and the train can provide filtered outside air and recirculation air to the control room. Train level components consist of the outside air filter unit isolation dampers (PCV-6680A-1, PCV-6680B-1), the outside air filter unit fan (VA-63A, VA-63B), the outside air filter unit (VA-64A, VA-64B), and the outside air filter unit isolation damper (PCV-6680A-2, PCV-6680B-2) and associated ductwork.

System level components consist of the unfiltered outside air duct isolation dampers (PCV-6681A and PCV-6681B), the recirculation duct isolation damper (PCV-6682) and associated ductwork. IF either or both unfiltered outside air duct isolation dampers (PCV-6681A, PCV-6681B) are inoperable, the control room air filtration system is considered OPERABLE if the unfiltered outside air duct is isolated. If only a single unfiltered outside air duct isolation damper is OPERABLE and the unfiltered outside air duct is not isolated, then the 7 day LCO applies. If both unfiltered outside air duct isolation dampers are inoperable concurrently with an unisolated flowpath through the unfiltered outside air ductwork to the control room, then both trains are inoperable and LCO 2.0.1 applies.

The recirculation duct does not require redundant dampers to meet single-failure proof criteria. Damper PCV-6682 meets the acceptance criteria for the damper repair option described in Standard Review Plan 6.4, Appendix A. A radioactivity release requires PCV-6682 to open, should PCV-6682 fail to open, it can be repaired or repositioned open before control room doses exceed the allowable limits of GDC 19.

With the reactor coolant temperature $T_{cold} \geq 210°F$, two trains of the control room air filtration system are required to be OPERABLE. If one train is inoperable it shall be restored to OPERABLE status within 7 days. In this condition the remaining train is adequate to perform the control room radiation protection function. The 7 day completion time is based on the low probability of an accident occurring during this time period, and the ability of the remaining train to provide the required function.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.12 Control Room Ventilation System

Bases

2.12 Control Room Ventilation System

The control room ventilation system (CRVS) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The CRVS contains two independent, redundant control room air filtration trains that filter the air in the control room envelope (CRE), two independent, redundant air conditioning units that circulate and cool the air in the CRE, and a CRE boundary that limits the inleakage of unfiltered air.

The CRE is the area within the confines of the CRE boundary 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.

Actuation of the CRVS 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 through the redundant trains of HEPA and charcoal filters. The emergency radiation state also initiates filtered ventilation of the outside air supply to the CRE.

The actions taken in the toxic gas isolation state are similar, except that the signal switches the CRVS to an isolation mode, minimizing outside air entering the CRE through the CRE boundary. Toxic gas is monitored at the outside air intake duct. Actuation of the system to toxic gas protection mode trips CRVS fans and isolates the outside air dampers. The CRVS is then placed in recirculation mode. In recirculation mode, the filter trains are bypassed.

Fire and smoke detection is provided at the outlet of the recirculation fans to protect against smoke developed from sources in the outside air stream or from sources inside the control room. As in toxic gas protection mode, CRVS fans are tripped and the outside air dampers are isolated.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Systems

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

If the inoperable train cannot be restored to OPERABLE within the allowed completion time, the plant must be placed in a MODE where the specification is no longer applicable. With two trains inoperable, the control room air filtration system may not be capable of performing its design function and the plant must be placed in a MODE where the specification is no longer applicable.

### 2.12.2 Control Room Air Conditioning System

The control room air conditioning system is required to ensure the control room temperature will not exceed equipment OPERABILITY requirements. The reactor protective system panels and the engineered safety features panels were designed for, and the instrumentation was tested at, 120°F. The temperature inside the control cabinets is at most 15°F warmer than the temperature of the control room due to heat produced by the electronic circuitry. Therefore, the temperature of the control room will not affect OPERABILITY of the control cabinets as long as it doesn't exceed 105°F.

During non-emergency operation, the control room temperature may be maintained by using Component Cooling Water (CCW). During design basis accident conditions, the CCW isolation valves to air conditioning units (VA-46A and VA-46B) are automatically closed on a VIAS. This prevents CCW that has been heated by components following a design basis accident from adding heat to the control room. When VIAS is in override, closing these valves maintains the OPERABILITY of the associated air conditioning unit.

With the reactor coolant temperature $T_{cold} \geq$ 210°F, two trains of the control room air conditioning system are required to be OPERABLE. If one train is inoperable it shall be restored to OPERABLE status within 30 days. In this condition the remaining train is adequate to maintain the control room temperature. With both trains inoperable, the control room air conditioning system may not be capable of performing its intended function and LCO 2.0.1 must be entered immediately.

References

(1) USAR Section 9.10

2.0 **LIMITING CONDITIONS FOR OPERATION**

2.12 Control Room Ventilation System

Bases (Continued)

2.12 Control Room Ventilation System (Continued)

The radiation monitoring system provides an airborne radiation monitor (RM-065), which starts after a ventilation isolation actuation signal (VIAS) to verify control room habitability following a design basis accident. The air entering the CRE is continuously monitored by toxic gas detectors. One detector output above the setpoint will cause actuation of the toxic gas isolation state. The actions of the toxic gas isolation state are more restrictive, and will override the actions of the emergency radiation state.

The CRVS 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 CRVS, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

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

2.12.1 Control Room Air Filtration System - Operating

Each control room air filtration system (CRAFS) train contains a heater 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 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 back-up in case of failure of the main HEPA filter bank.

The CRAFS is an emergency system, part of which may also operate during normal unit operations in the standby mode of operation. Upon receipt of a VIAS, normal air supply to the CRE is diverted to the filter trains, and the stream of ventilation air is recirculated through the filter trains of the system. The demisters remove 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.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

Outside air is filtered, and then added to the air being recirculated from the CRE. Pressurization of the CRE minimizes infiltration of unfiltered air though the CRE boundary from all the surrounding areas adjacent to the CRE boundary.

A single CRAFS train operating at a flow rate of ≤ 1000 cfm will pressurize the CRE 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 60% per hour. The CRAFS operation in maintaining the CRE habitable is discussed in USAR, Section 9.10 (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. However, the recirculation duct does not require redundant dampers to meet single failure proof criteria. Damper PCV-6682 meets the acceptance criteria for the damper repair option described in Standard Review Plan 6.4, Appendix A. A release of radioactivity requires PCV-6682 to open, should PCV-6682 fail to open, it can be repaired or repositioned open before control room doses exceed the allowable limits of General Design Criterion 19. The CRAFS is designed in accordance with Seismic Category 1 requirements.

The CRAFS is designed to maintain a habitable environment in the CRE for 30 days of continuous occupancy after a Design Basis Accident (DBA) without exceeding a 5 rem total effective dose equivalent (TEDE). The CRAFS components are arranged in redundant, safety related ventilation trains. The location of components and ducting within the CRE ensures an adequate supply of filtered air to all areas requiring access.

The CRAFS provides airborne radiological protection for the CRE occupants as demonstrated by the CRE occupant dose analyses for the most limiting design basis accident fission product release presented in the USAR, Section 14.15 (Ref. 2).

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

Two independent and redundant trains of the CRAFS 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 filtration trains or from an inoperable CRE boundary, could result in exceeding a dose of 5 rem TEDE to the CRE occupants in the event of a large radioactive release.

Each CRAFS train is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A CRAFS 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 function, and

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

In order for the CRAFS trains to be considered OPERABLE, the CRE boundary must be maintained such that 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 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. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

APPLICABILITY

With the reactor coolant temperature $T_{cold} \geq 210°F$, the CRAFS must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

ACTIONS

(1)

With one CRAFS 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 CRAFS train is adequate to perform the CRE occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE CRAFS train could result in loss of CRAFS 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.

(2)a, (2)b, and (2)c

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 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.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

(3)

With reactor coolant temperature $T_{cold} \geq 210°F$, if the inoperable CRAFS or CRE boundary cannot be restored to OPERABLE status within the required Completion Time, 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 HOT SHUTDOWN within 6 hours, and in COLD SHUTDOWN 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.

(4)

If both CRAFS trains are inoperable with reactor coolant temperature $T_{cold} \geq 210°F$ for reasons other than an inoperable CRE boundary (i.e., Condition 2), the CRAFS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 2.0.1 must be entered immediately.

### 2.12.2 Control Room Air Conditioning System

The control room air conditioning system is required to ensure the control room temperature will not exceed equipment OPERABILITY requirements. The reactor protective system panels and the engineered safety features panels were designed for, and the instrumentation was tested at, 120°F. The temperature inside the control cabinets is at most 15°F warmer than the temperature of the control room due to heat produced by the electronic circuitry. Therefore, the temperature of the control room will not affect OPERABILITY of the control cabinets as long as it doesn't exceed 105°F.

During non-emergency operation, the control room temperature may be maintained by using Component Cooling Water (CCW). During design basis accident conditions, the CCW isolation valves to air conditioning units (VA-46A and VA-46B) are automatically closed on a VIAS. This prevents CCW that has been heated by components following a design basis accident from adding heat to the control room. When VIAS is in override, closing these valves maintains the OPERABILITY of the associated air conditioning unit.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.2 Control Room Air Conditioning System (Continued)

With the reactor coolant temperature $T_{cold} \geq 210°F$, two trains of the control room air conditioning system are required to be OPERABLE. If one train is inoperable it shall be restored to OPERABLE status within 30 days. In this condition the remaining train is adequate to maintain the control room temperature. With both trains inoperable, the control room air conditioning system may not be capable of performing its intended function and LCO 2.0.1 must be entered immediately.

References

(1) USAR Section 9.10
(2) USAR Section 14.15
(3) USAR Section 14.23
(4) Engineering Analysis (EA)-FC-01-013, "Effects of Secondary Environment Resulting from a Fire Event"

## 3.0 SURVEILLANCE REQUIREMENTS

### 3.1 Instrumentation and Control (Continued)

The Control Room Envelope (CRE) surveillance requirement (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 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, Technical Specification (TS) 2.12.1(2) must be entered. TS 2.12.1(2)c 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. 1) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 2). These compensatory measures may also be used as mitigating actions as required by TS 2.12.1(2)b. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 3). 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.

References

1. Regulatory Guide 1.196
2. NEI 99-03, "Control Room Habitability Assessment," June 2001
3. 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).

## TABLE 3-1

## MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. Power Range Safety Channels | a. Check:<br>1) Neutron Flux<br>2) Thermal Power | S | a.<br>1) CHANNEL CHECK<br>2) CHANNEL CHECK |
| | b. Adjustment | D[3] | b. Channel adjustment to agree with heat balance calculation. |
| | c. Test | Q[1] | c. CHANNEL FUNCTIONAL TEST |
| 2. Wide-Range Logarithmic Neutron Monitors | a. Check | S | a. CHANNEL CHECK |
| | b. Test[2] | P | b. CHANNEL FUNCTIONAL TEST |
| 3. Reactor Coolant Flow | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q[1] | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**TABLE 3-1** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 4. Thermal Margin/Low Pressure | a. Check<br>1) Pressure Setpoint<br><br>2) Pressure Input | S | a.<br>1) CHANNEL CHECK<br><br>2) CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate:<br>1) Temperature Input<br><br>2) Pressure Input | R | c.<br>1) CHANNEL CALIBRATION<br><br>2) CHANNEL CALIBRATION |
| 5. High-Pressurizer Pressure | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**TABLE 3-1** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 6. Steam Generator Level | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 7. Steam Generator Pressure | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 8. Containment Pressure | a. Test | Q(1) | a. CHANNEL FUNCTIONAL TEST |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 9. Loss of Load | a. Test | P | a. CHANNEL FUNCTIONAL TEST |
| 10. Manual Trips | a. Test | P | a. CHANNEL FUNCTIONAL TEST |
| 11. Steam Generator Differential Pressure | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**TABLE 3-1** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 12. Reactor Protection System Logic Units | a. Test | Q(1) | a. CHANNEL FUNCTIONAL TEST |
| 13. Axial Power Distribution | a. Check: | S | a. |
| | 1) Axial Shape Index Indication | | 1) CHANNEL CHECK |
| | 2) Upper Trip Setpoint Indication | | 2) CHANNEL CHECK |
| | 3) Lower Trip Setpoint Indication | | 3) CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**NOTES:**

(1) The quarterly tests will be done on only one of four channels at a time to prevent reactor trip.

(2) Calibrate using built-in simulated signals.

(3) Not required unless the reactor is in the power operating condition and is therefore not required during plant startup and shutdown periods.

## TABLE 3-2

## MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. Pressurizer Pressure Low | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q[(1)]P[(4)] | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 2. Pressurizer Low Pressure Blocking Circuit | a. Calibrate | R | a. CHANNEL CALIBRATION |
| 3. Safety Injection Actuation Logic | a. Test | Q | a. CHANNEL FUNCTIONAL TEST (Simulation of PPLS or CPHS 2/4 Logic) |
| | b. Test | R[(7)] | b. CHANNEL FUNCTIONAL TEST |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 4. Containment Pressure High Signal | a. Test | Q | a. CHANNEL FUNCTIONAL TEST |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 5. Containment Spray Actuation Logic | a. Test | Q | a. CHANNEL FUNCTIONAL TEST (Simulation of PPLS and CPHS 2/4 Logic) |
| | b. Test | R(7) | b. CHANNEL FUNCTIONAL TEST |
| 6. Containment Radiation High Signal (2) | a. Check | D | a. CHANNEL CHECK |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| *Channel Description* | *Surveillance Function* | | *Frequency* | *Surveillance Method* | |
|---|---|---|---|---|---|
| 6. (continued) | b. | Test | Q | b. | CHANNEL FUNCTIONAL TEST |
| | c. | Calibrate | R | c. | Secondary and Electronic Calibration performed at refueling frequency. Primary calibration performed with exposure to radioactive sources only when required by the secondary and electronic calibration. |
| 7. Manual Safety Injection Actuation | a. | Test | R | a. | CHANNEL FUNCTIONAL TEST |
| 8. Manual Containment Isolation Actuation | a. | Check | R | a. | Observe isolation valves closure. |
| | b. | Test | R | b. | CHANNEL FUNCTIONAL TEST |
| 9. Manual Containment Spray Actuation | a. | Test | R | a. | CHANNEL FUNCTIONAL TEST |
| 10. Automatic Load Sequencers | a. | Test | Q | a. | CHANNEL FUNCTIONAL TEST |
| 11. Diesel Testing | See Technical Specification 3.7 | | | | |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 12. Diesel Fuel Transfer Pump | a. Test | M | a. Pump run to refill day tank. |
| 13. SIRW Tank Low Level Signal | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 14. Safety Injection Tank Level and Pressure | a. Check | S(5) | a. Verify that level and pressure are within limits. |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method | |
|---|---|---|---|---|---|
| 14. (continued) | b. | Calibrate | R | b. | CHANNEL CALIBRATION |
| 15. Boric Acid Tank Level | a. | Check | W | a. | Verify that level is within limits. |
| 16. Boric Acid Tank Temperature | a. | Check | W | a. | Verify that temperature is within limits. |
| 17. Steam Generator Low Pressure Signal (SGLS) | a. | Check | S | a. | CHANNEL CHECK |
| | b. | Test | Q(3) | b. | CHANNEL FUNCTIONAL TEST |
| | c. | Calibrate | R | c. | CHANNEL CALIBRATION |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method | |
|---|---|---|---|---|---|
| 18. SIRW Tank Temperature | a. | Check | D(6) | a. | Verify that temperature is within limits. |
| | b. | Test | R | b. | Measure temperature of SIRW tank with standard laboratory instruments. |
| 19. Manual Recirculation Actuation | a. | Test | R | a. | CHANNEL FUNCTIONAL TEST |
| 20. Recirculation Actuation Logic | a. | Test | Q | a. | CHANNEL FUNCTIONAL TEST |
| | b. | Test | R(7) | b. | CHANNEL FUNCTIONAL TEST |
| 21. 4.16 KV Emergency Bus Low Voltage (Loss of Voltage and Degraded Voltage) Actuation Logic | a. | Check | S | a. | Verify voltage readings are above alarm initiation on degraded voltage level - supervisory lights "on". |
| | b. | Test | Q | b. | CHANNEL FUNCTIONAL TEST (Undervoltage relay) |
| | c. | Calibrate | R | c. | CHANNEL CALIBRATION |
| 22. Manual Emergency Off-site Power Low Trip Actuation | a. | Test | R | a. | CHANNEL FUNCTIONAL TEST |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method |
|---|---|---|---|---|
| 23. Auxiliary Feedwater | a. | Check:<br>1) Steam Generator Water Level Low (Wide Range)<br>2) Steam Generator Pressure Low | S | a.<br>1) CHANNEL CHECK<br>2) CHANNEL CHECK |
| | b. | Test:<br>1) Actuation Logic | QR(7) | b.<br>1) CHANNEL FUNCTIONAL TEST |
| | c. | Calibrate:<br>1) Steam Generator Water Level Low (Wide Range)<br>2) Steam Generator Pressure Low<br>3) Steam Generator Differential Pressure High | R | c.<br>1) CHANNEL CALIBRATION<br>2) CHANNEL CALIBRATION<br>3) CHANNEL CALIBRATION |
| 24. Manual Auxiliary Feedwater Actuation | a. | Test | R | a. CHANNEL FUNCTIONAL TEST |

**NOTES**:
(1) Not required unless pressurizer pressure is above 1700 psia.
(2) CRHS monitors are the containment atmosphere gaseous radiation monitor and the Auxiliary Building Exhaust Stack gaseous radiation monitor.
(3) Not required unless steam generator pressure is above 600 psia.
(4) QP - Quarterly during designated modes and prior to taking the reactor critical if not completed within the previous 92 days (not applicable to a fast trip recovery).
(5) Not required to be done on a SIT with inoperable level and/or pressure instrumentation.
(6) Not required when outside ambient air temperature is greater than 50°F and less than 105°F.
(7) Tests backup channels such as derived circuits and equipment that cannot be tested when the plant is at power.

**TABLE 3-3**

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. Primary CEA Position Indication System | a. Check | S | a. Comparison of output data with secondary CEAPIS. |
| | b. Test | M | b. Test of power dependent insertion limits, deviation, and sequence monitoring systems. |
| | c. Calibrate | R | c. Physically measured CEDM position used to verify system accuracy. Calibrate CEA position interlocks. |
| 2. Secondary CEA Position Indication System | a. Check | S | a. Comparison of output data with primary CEAPIS. |
| | b. Test | M | b. Test of power dependent insertion limit, deviation, out-of-sequence, and overlap monitoring systems. |
| | c. Calibrate | R | c. Calibrate secondary CEA position indication system and CEA interlock alarms. |
| 3. Area and Post-Accident Radiation Monitors(1) | a. Check | D | a. CHANNEL CHECK |
| | b. Test | Q | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. Secondary and Electronic calibration performed at refueling frequency. Primary calibration with exposure to radioactive sources only when required by the secondary and electronic calibration. RM-091 A/B - Calibration by electronic signal substitution is acceptable for all range decades above 10 R/hr. Calibration for at least one decade below 1-R/hr. shall be by means of calibrated radiation source. |

(1)Post Accident Radiation Monitors are: RM-063, RM-064, and RM-091A/B. Area Radiation Monitors are: RM-070 thru RM-082, RM-084 thru RM-089, and RM-095 thru RM-098.

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method | |
|---|---|---|---|---|---|
| 4. DELETED | | | | | |
| 5. Primary to Secondary Leak-Rate Detection Radiation Monitors (RM-054A/B, RM-057) | a. | Check | D | a. | CHANNEL CHECK |
| | b. | Test | Q | b. | CHANNEL FUNCTIONAL TEST |
| | c. | Calibrate | R | c. | Secondary and Electronic calibration performed at refueling frequency. Primary Calibration performed with exposure to radioactive sources only when required by the secondary and electronic calibration. |
| 6. Pressurizer Level | a. | Check | S | a. | Verify that level is within limits. |
| | b. | Check | M | b. | CHANNEL CHECK |
| | c. | Calibrate | R | c. | CHANNEL CALIBRATION |
| 7. CEA Drive System Interlocks | a. | Test | R | a. | Verify proper operation of all CEDM system interlocks, using simulated signals where necessary. |
| | b. | Test | P | b. | If haven't been checked for three months and plant is shutdown. |

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 8. Dropped CEA Indication | a. Test | R | a. Insert a negative rate of change power signal to all four Power Range Safety Channels to test alarm. |
| | b. Test | R | b. Insert CEA's below lower electrical limit to test dropped CEA alarm. |
| 9. Calorimetric Instrumentation | a. Calibrate | R | a. CHANNEL CALIBRATION |
| 10. Control Room Ventilation System | a. Test | R | a. Check damper operation for DBA mode. |
| | b. Test | ~~R~~In accordance with CRE Habitability Program | b. ~~Check control room for positive pressure.~~Perform required control room envelope (CRE) unfiltered air inleakage testing in accordance with the CRE Habitability Program. |
| 11. Containment Humidity Detector | a. Test | R | a. CHANNEL FUNCTIONAL TEST |
| 12. Interlocks-Isolation Valves on Shutdown Cooling Line | a. Test | R | a. CHANNEL FUNCTIONAL TEST |
| 13. Control Room Air Conditioning System | a. Test | R | a. Verify each train has the capability to remove the assumed heat load through combination of testing and calculations. |

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 14. Not Used | | | |
| 15. Reactor Coolant System Flow | a. Check | R(1) | a. Calculation of reactor coolant flow rate. |
| 16. Pressurizer Pressure | a. Check | S | a. CHANNEL CHECK |
| 17. Reactor Coolant Inlet Temperature | a. Check | S | a. CHANNEL CHECK |
| 18. Low-Temperature Set-point Power-Operated Relief Valves | a. Test | PM | a. CHANNEL FUNCTIONAL TEST (excluding actuation) |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |

(1) Required to be performed within 24 hours after ≥95.00% reactor thermal power following power escalation.

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method |
|---|---|---|---|---|
| 19. Auxiliary Feedwater Flow | a. | Check | M | CHANNEL CHECK |
| | b. | Calibrate | R | CHANNEL CALIBRATION |
| 20. Subcooled Margin Monitor | a. | Check | M | CHANNEL CHECK |
| | b. | Calibrate | R | CHANNEL CALIBRATION |
| 21. PORV Operation and Acoustic Position Indication | a. | Test | M | CHANNEL FUNCTIONAL TEST |
| | b. | Calibrate | R | CHANNEL CALIBRATION |
| 22. PORV Block Valve Operation and Position Indication | a. | Check | Q | Cycle valve. Valve is exempt from testing when it has been closed to comply with LCO Action Statement 2.1.6(5)a. |
| | b. | Calibrate | R | Check valve stroke against limit switch position. |
| 23. Safety Valve Acoustic Position Indication | a. | Test | M | CHANNEL FUNCTIONAL TEST |
| | b. | Calibration | R | CHANNEL CALIBRATION |
| 24. PORV/Safety Valve Tail Pipe Temperature | a. | Check | M | CHANNEL CHECK |
| | b. | Calibrate | R | CHANNEL CALIBRATION |

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 25. Containment Purge Isolation Valves (PCV-742A, B, C, & D) | a. Check | M | a. Verify valve position using control room indication. |
| 26. Not Used | | | |
| 27. Containment Water Level Narrow Range (LT-599 & LT-600) | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| Wide Range (LT-387 & LT-388) | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 28. Containment Wide Range Pressure Indication | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 29. Not Used | | | |



Amendment No. ~~54,68,82,87,107,182,183, 234, 248~~

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 30. Core Exit Thermo-couple | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 31. Heated Junction Thermocouple (YE-116A and YE-116B) | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |

PM - Prior to scheduled cold leg cooldown below 300°F; monthly whenever temperature remains below 300°F and reactor vessel head is installed.

**TABLE 3-3A**
**MINIMUM FREQUENCY FOR CHECKS, CALIBRATIONS AND FUNCTIONAL TESTING OF ALTERNATE SHUTDOWN PANELS (AI-185 AND AI-212) AND EMERGENCY AUXILIARY FEEDWATER PANEL (AI-179) INSTRUMENTATION AND CONTROL CIRCUITS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. WIDE RANGE LOGARITHMIC POWER AND SOURCE RANGE MONITORS (AI-212) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 2. REACTOR COOLANT COLD LEG TEMPERATURE (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 3. REACTOR COOLANT HOT LEG TEMPERATURE (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 4. PRESSURIZER LEVEL (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 5. VOLUME CONTROL TANK LEVEL (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 6. ASP CONTROL CIRCUITS (AI-185) | a. TEST | R | a. CHANNEL FUNCTIONAL TEST |

**TABLE 3-3A** (Continued)
**MINIMUM FREQUENCY FOR CHECKS, CALIBRATIONS AND FUNCTIONAL TESTING OF ALTERNATE SHUTDOWN PANELS (AI-185 AND AI-212) AND EMERGENCY AUXILIARY FEEDWATER PANEL (AI-179) INSTRUMENTATION AND CONTROL CIRCUITS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 7. STEAM GENERATOR LEVEL, WIDE RANGE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 8. STEAM GENERATOR LEVEL, NARROW RANGE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 9. STEAM GENERATOR PRESSURE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 10. PRESSURIZER PRESSURE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 11. EAFW CONTROL CIRCUITS (AI-179) | a. TEST | R | a. CHANNEL FUNCTIONAL TEST |

## 3.0 **SURVEILLANCE REQUIREMENTS**

### 3.2 Equipment and Sampling Tests

Applicability

Applies to plant equipment and conditions related to safety.

Objective

To specify the minimum frequency and type of surveillance to be applied to critical plant equipment and conditions.

Specifications

Equipment and sampling tests shall be conducted as specified in Tables 3-4 and 3-5.

Basis

The equipment testing and system sampling frequencies specified in Tables 3-4 and 3-5 are considered adequate, based upon experience, to maintain the status of the equipment and systems so as to assure safe operation. Thus, those systems where changes might occur relatively rapidly are sampled frequently and those static systems not subject to changes are sampled less frequently.

The control room air ~~treatment~~ filtration system (CRAFS) consists of redundant high efficiency particulate air filters (HEPA) and charcoal adsorbers. HEPA filters are installed before and after the charcoal adsorbers. The charcoal adsorbers are installed to reduce the potential intake of iodine to the control room. The in-place test results will confirm system integrity and performance. The laboratory carbon sample test results should indicate methyl iodide removal efficiency of at least 99.825 percent for expected accident conditions.

CRAFS 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. Each CRAFS train must be operated for ≥ 10 continuous hours with the heaters energized. The monthly Frequency is based on the known reliability of the equipment, and the two train redundancy available.

Each CRAFS train is verified to start and operate on an automatic and manual actuation signal. The Frequency of 18 months is based on industry operating experience and is consistent with the typical refueling cycle.

## 3.0 **SURVEILLANCE REQUIREMENTS**

### 3.2 Equipment and Sampling Tests (continued)

The spent fuel storage-decontamination areas air treatment system is designed to filter the building atmosphere to the auxiliary building vent during refueling operations. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment. In-place testing is performed to confirm the integrity of the filter system. The charcoal adsorbers are periodically sampled to insure capability for the removal of radioactive iodine.

The Safety Injection (SI) pump room air treatment system consists of charcoal adsorbers which are installed in normally bypassed ducts. This system is designed to reduce the potential release of radioiodine in SI pump rooms during the recirculation period following a DBA. The in-place and laboratory testing of charcoal adsorbers will assure system integrity and performance.

Pressure drops across the combined HEPA filters and charcoal adsorbers, of less than 9 inches of water for the control room filters (VA-64A & VA-64B) and of less than 6 inches of water for each of the other air treatment systems will indicate that the filters and adsorbers are not clogged by amounts of foreign matter that would interfere with performance to established levels. ~~Operation of each system for 10 hours every month will demonstrate operability and remove excessive moisture build-up in the adsorbers~~.

The hydrogen purge system provides the control of combustible gases (hydrogen) in containment for a post-LOCA environment. The surveillance tests provide assurance that the system is operable and capable of performing its design function. VA-80A or VA-80B is capable of controlling the expected hydrogen generation (67 SCFM) associated with 1) Zirconium - water reactions, 2) radiolytic decomposition of sump water and 3) corrosion of metals within containment. The system should have a minimum of one blower with associated valves and piping (VA-80A or VA-80B) available at all times to meet the guidelines of Regulatory Guide 1.7 (1971).

If significant painting, fire or chemical release occurs such that the HEPA filters or charcoal adsorbers could become contaminated from the fumes, chemicals or foreign materials, testing will be performed to confirm system performance.

Demonstration of the automatic and/or manual initiation capability will assure the system's availability.

Verifying Reactor Coolant System (RCS) leakage to be within the LCO limits ensures the integrity of the Reactor Coolant Pressure Boundary (RCPB) is maintained. Pressure boundary leakage would at first appear as unidentified leakage and can only be positively identified by inspection. Unidentified leakage is determined by performance of an RCS water inventory balance. Identified leakage is then determined by isolation and/or inspection. Since Primary to Secondary Leakage of 150 gallons per day cannot be measured accurately by an RCS water inventory balance, note "****" for line item 8a on Table 3-5 states that the Reactor Coolant System Leakage surveillance is not applicable to Primary to Secondary Leakage. Primary to secondary leakage is measured by performance of effluent monitoring within the secondary steam and feedwater systems.

## 3.0 SURVEILLANCE REQUIREMENTS

### 3.2 Equipment and Sampling Tests (continued)

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-98b (Ref. 3) are met for new fuel oil when tested in accordance with ASTM D975-98b (Ref. 2), except that the analysis for sulfur may be performed in accordance with ASTM D129-00 (Ref. 2) or ASTM D2622-87 (Ref. 2). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure. Particulate concentrations should be determined in accordance with ASTM 6217-98 (Ref. 2) with the exception that the filters specified in the ASTM method may have a nominal pore size of up to 3 microns. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately. The Surveillance interval of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Surveillance intervals.

Table 3-5, Item 9d ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging. A start cycle is defined as the cranking time required to accelerate the DG to firing speed. The pressure specified in this Surveillance Requirement is intended to reflect the lowest value at which the five starts can be accomplished. The 31 day Surveillance interval takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 92 days per Table 3-5, Item 9e, eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance interval is established to ensure excessive water does not accumulate in the fuel oil system, which meets the intent of Regulatory Guide 1.137 (Ref. 4). This Surveillance Requirement is for preventative maintenance. The presence of water does not necessarily represent failure of this Surveillance Requirement provided the accumulated water is removed during performance of the Surveillance.

## 3.0 **SURVEILLANCE REQUIREMENTS**

### 3.2 Equipment and Sampling Tests (continued)

Table 3-5, Item 8b verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this surveillance requirement is not met, compliance with LCO 3.17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The Surveillance Frequency of daily is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

References

1) USAR, Section 9.10
2) ASTM D4057-95(2000), ASTM D975-98b, ASTM D4176-93, ASTM D129-00, ASTM D2622-87, ASTM D287-82, ASTM 6217-98, ASTM D2709-96
3) ASTM D975-98b, Table 1
4) Regulatory Guide 1.137
5) EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines"

## TABLE 3-4

## MINIMUM FREQUENCIES FOR SAMPLING TESTS

| | Type of Measurement and Analysis | Sample and Analysis Frequency |
|---|---|---|
| 1. Reactor Coolant | | |
| (a) Power Operation (Operating Mode 1) | (1) Gross Radioactivity (Gamma emitters) | 1 per 3 days |
| | (2) Isotopic Analysis for DOSE EQUIVALENT I-131 | (i) 1 per 14 days |
| | | (ii) 1 per 8 hours[1] whenever the radioactivity exceeds 1.0 μCi/gm DOSE EQUIVALENT I-131. |
| | | (iii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period. |
| | (3) E Determination | 1 per 6 months[2] |
| | (4) Dissolved oxygen and chloride | 1 per 3 days |
| (b) Hot Standby (Operating Mode 2) | (1) Gross Radioactivity (Gamma emitters) | 1 per 3 days |
| Hot Shutdown (Operating Mode 3) | (2) Isotopic Analysis for DOSE EQUIVALENT I-131 | (i) 1 per 8 hours[1] whenever the radioactivity exceeds 1.0 μCi/gm DOSE EQUIVALENT I-131. |
| | | (ii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power change exceeding 15% of the rated thermal power within a 1-hour period. |
| | (3) Dissolved oxygen and chloride | 1 per 3 days |

## **TABLE 3-4** (Continued)

## MINIMUM FREQUENCIES FOR SAMPLING TESTS

| | Type of Measurement and Analysis | Sample and Analysis Frequency |
|---|---|---|
| 1. Reactor Coolant (Continued) | | |
| (c) Cold Shutdown (Operating Mode 4) | (1) Chloride | 1 per 3 days |
| (d) Refueling Shutdown (Operating Mode 5) | (1) Chloride<br>(2) Boron Concentration | 1 per 3 days(3)<br>1 per 3 days(3) |
| (e) Refueling Operation | (1) Chloride<br>(2) Boron Concentration | 1 per 3 days(3)<br>1 per 3 days(3) |
| 2. SIRW Tank | Boron Concentration | M |
| 3. Concentrated Boric Acid Tanks | Boron Concentration | W |
| 4. SI Tanks | Boron Concentration | M |
| 5. Spent Fuel Pool | Boron Concentration | See Footnote 4 below |
| 6. Steam Generator Blowdown (Operating Modes 1 and 2) | Isotopic Analysis for Dose Equivalent I-131 | W(5) |

(1) Until the radioactivity of the reactor coolant is restored to ≤1 μCi/gm DOSE EQUIVALENT I-131.

(2) Sample to be taken after a minimum of 2 EFPD and 20 days of power operation have elapsed since reactor was subcritical for 48 hours or longer.

(3) Boron and chloride sampling/analyses are not required when the core has been off-loaded. Reinitiate boron and chloride sampling/analyses prior to reloading fuel into the cavity to assure adequate shutdown margin and allowable chloride levels are met.

(4) Prior to placing unirradiated fuel assemblies in the spent fuel pool or placing fuel assemblies in a spent fuel cask in the spent fuel pool, and weekly when unirradiated fuel assemblies are stored in the spent fuel pool, or every 48 hours when fuel assemblies are in a spent fuel storage cask in the spent fuel pool.

(5) When Steam Generator Dose Equivalent I-131 exceeds 50 percent of the limits in Specification 2.20, the sampling and analysis frequency shall be increased to a minimum of 5 times per week. When Steam Generator Dose Equivalent I-131 exceeds 75 percent of this limit, the sampling and analysis frequency shall be increased to a minimum of once per day.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 1. | Control Element Assemblies | Drop times of all full-length CEA's | Prior to reactor criticality after each removal of the reactor vessel closure head | 7.5.3 |
| 2. | Control Element Assemblies | Partial movement of all CEA's (Minimum of 6 in) | Q | 7 |
| 3. | Pressurizer Safety Valves | Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be 2485 psig ±1% and 2530 psig ±1% respectively. | R | 7 |
| 4. | Main Steam Safety Valves | Set Point | R | 4 |
| 5. | DELETED | | | |
| 6. | DELETED | | | |
| 7. | DELETED | | | |
| 8a. | Reactor Coolant System Leakage*** | Evaluate | D* | 4 |
| 8b. | Primary to Secondary Leakage**** | Continuous process radiation monitors or radiochemical grab sampling | D* | 4 |
| 9a | Diesel Fuel Supply | Fuel Inventory | M | 8.4 |
| 9b. | Diesel Lubricating Oil Inventory | Lube Oil Inventory | M | 8.4 |
| 9c. | Diesel Fuel Oil Properties | Test Properties | In accordance with the Diesel Fuel Oil Testing Program | 8.4 |
| 9d. | Required Diesel Generator Air Start Receiver Bank Pressure | Air Pressure | M | 8.4 |

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

* Whenever the system is at or above operating temperature and pressure.

*** Not applicable to primary to secondary LEAKAGE.

**** Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.
This surveillance is not required to be performed until 12 hours after establishment of steady state operation.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 9e. | Check for and Remove Accumulated Water from Each Fuel Oil Storage Tank | Check for Water and Remove | Q | 8.4 |
| 10a. | Charcoal and HEPA Filters for Control Room Air Filtration System (CRAFS) | 1. In-Place Testing** Charcoal adsorbers and HEPA filter banks shall be leak tested and show ≥99.95% Freon (R-11 or R-112) and cold DOP particulates removal, respectively. | On a refueling frequency or every 720 hours of system operation or after each complete or partial replacement of the charcoal adsorber/HEPA filter banks, or after any major structural maintenance on the system housing or following significant painting, fire or chemical releases in a ventilation zone communicating with the system. | 9.10 |
| | | 2. Laboratory Testing** Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 0.175% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%. | On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | |

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

**TABLE 3-5**
***MINIMUM FREQUENCIES FOR EQUIPMENT TESTS***

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 10a. | (continued) | 3. Overall System Operation<br>a. Each ~~circuit~~ train shall be operated. | Ten continuous hours every month~~.~~ with heaters operating. | |
| | | b. The pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 9 inches of water at system design flow rate. | R | |
| | | c. Fan shall be shown to operate within ± 10% design flow. | R | |
| | | 4. Automatic and manual initiation of each train ~~the system~~ shall be demonstrated. | R | |
| 10b. | Charcoal Adsorbers for Spent Fuel Storage Pool Area | 1. In-Place Testing**<br>Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal. | On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | 6.2<br>9.10 |
| | | 2. Laboratory Testing<br>Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%. | On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | |

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 10b. | (continued) | 3. Overall System Operation | | |
| | | a. Operation of each circuit shall be demonstrated. | Ten hours every month. | |
| | | b. Volume flow rate through charcoal filter shall be shown to be between 4500 and 12,000 cfm. | R | |
| | | 4. Manual initiation of the system shall be demonstrated. | R | |
| 10c. | Charcoal Adsorbers for S.I. Pump Room | 1. In-Place Testing** Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal. | On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in any ventilation zone communicating with the system. | 9.10<br>6.2 |
| | | 2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%. | On a refueling frequency or following 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | |
| | | 3. Overall System Operation | | |
| | | a. Operation of each circuit shall be demonstrated. | Ten hours every month. | |
| | | b. Volume flow rate shall be shown to be between 3000 and 6000 cfm. | R | |

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 10c. | (continued) | 4. Automatic and/or manual initiation of the system shall be demonstrated. | R | |
| 11. | Containment Ventilation System Fusible Linked Dampers | 1. Demonstrate damper action.<br>2. Test a spare fusible link. | 1 year, 2 years, 5 years, and every 5 years thereafter. | 9.10 |
| 12. | Diesel Generator Calibrate Under-Voltage Relays | | R | 8.4.3 |
| 13. | Motor Operated Safety Injection Loop Valve Motor Starters (HCV-311, 314, 317, 320, 327, 329, 331, 333, 312, 315, 318, 321) | Verify the contactor pickup value at ≤85% of 460 V. | R | |
| 14. | Pressurizer Heaters | Verify control circuits operation for post-accident heater use. | R | |
| 15. | Spent Fuel Pool Racks | Test neutron poison samples for dimensional change, weight, neutron attenuation change and specific gravity change. | 1, 2, 4, 7, and 10 years after installation, and every 5 years thereafter. | |
| 16. | Reactor Coolant Gas Vent System | 1. Verify all manual isolation valves in each vent path are in the open position. | During each refueling outage just prior to plant start-up. | |
| | | 2. Cycle each automatic valve in the vent path through at least one complete cycle of full travel from the control room. Verification of valve cycling may be determined by observation of position indicating lights. | R | |
| | | 3. Verify flow through the reactor coolant vent system vent paths. | R | |

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency |
|---|---|---|---|
| 17. | Hydrogen Purge System | 1. Verify all manual valves are operable by completing at least one cycle. | R |
| | | 2. Cycle each automatic valve through at least one complete cycle of full travel from the control room. Verification of the valve cycling may be determined by the observation of position indicating lights. | R |
| | | 3. Initiate flow through the VA-80A and VA-80B blowers, HEPA filter, and charcoal adsorbers and verify that the system operates for at least | |
| | | (a) 30 minutes with suction from the auxiliary building (Room 59) | a) M |
| | | (b) 10 hours with suction from the containment | b) R |
| | | 4. Verify the pressure drop across the VA-82 HEPAs and charcoal filter to be less than 6 inches of water. Verify a system flow rate of greater than 80 scfm and less than 230 scfm during system operation when tested in accordance with 3b. above. | R |
| 18. | Shutdown Cooling | 1. Verify required shutdown cooling loops are OPERABLE and one shutdown cooling loop is IN OPERATION. | S (when shutdown cooling is required by TS 2.8). |
| | | 2. Verify correct breaker alignment and indicated power is available to the required shutdown cooling pump that is not IN OPERATION. | W (when shutdown cooling is required by TS 2.8). |

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency |
|---|---|---|---|
| 19. | Refueling Water Level | Verify refueling water level is ≥ 23 ft. above the top of the reactor vessel flange. | Prior to commencing, and daily during CORE ALTERATIONS and/or REFUELING OPERATIONS inside containment. |
| 20. | Spent Fuel Pool Level | Verify spent fuel pool water level is ≥ 23 ft. above the top of irradiated fuel assemblies seated in the storage racks. | Prior to commencing, and weekly during REFUELING OPERATIONS in the spent fuel pool. |
| 21. | Containment Penetrations | Verify each required containment penetration is in the required status. | Prior to commencing, and weekly during CORE ALTERATIONS and/or REFUELING OPERATIONS in containment. |
| 22. | Spent Fuel Assembly Storage | Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-10. | Prior to storing the fuel assembly in Region 2 (including peripheral cells). |
| 23. | P-T Limit Curve | Verify RCS Pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified by the P-T limit Figure(s) shown in the PTLR. | This test is only required during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. While these operations are occurring, this test shall be performed every 30 minutes. |
| 24. | Spent Fuel Cask Loading | Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-11. | Prior to placing the fuel assembly in a spent fuel cask in the spent fuel pool. |

# 5.0 ADMINISTRATIVE CONTROLS

## 5.24 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 Ventilation System (CRVS), 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 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 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 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.

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 the CRVS, operating within the tolerance for design flow rate, at a Frequency of 18 months. The results shall be trended and used as part of an 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 3.0.1 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered leakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.

**Location of TST-448, Revision 3 Changes in FCS Technical Specifications**

| CEOG STS, LCO 3.7.11 | FCS TS |
|---|---|
| Note concerning opening CRE boundary under administrative control. | TS 2.8.2(4), TS 2.8.3(5), TS 2.12.1 |
| Condition A | TS 2.12.1(1) |
| Condition B | TS 2.12.1(2) |
| Condition C (no change) | TS 2.12.1(3) revised to apply to TS 2.12.1(1) or TS 2.12.1(2). |
| Condition D | TS 2.8.2(4), TS 2.8.3(5) |
| Condition E (OR statement) | TS 2.8.2(4)(2), TS 2.8.3(5)(3) |
| Condition F (no change) | TS 2.12.1(4) |
| SR 3.7.11.1 (no change) | TS 3.2, Table 3-5, Item 10a.3.a revised for consistency with CEOG STS. |
| SR 3.7.11.2 | TS 3.2, Table 3-5, Item 10a.1, 10a.2 (No change - FCS does not have a VFTP.) |
| SR 3.7.11.3 (no change) | TS 3.2, Table 3-5, Item 10a.4 |
| SR 3.7.11.4 | TS 3.1, Table 3-3, Item 10.b. |
| Specification 5.5.18 | TS 5.24 |
| Bases 3.7.11 (Mode 1, 2, 3, & 4) | TS 2.12.1 Bases |
| Bases 3.7.11 (Mode 5 & 6) | Bases of TS 2.8.2(4), and 2.8.3(5). |
| Bases SR 3.7.11.1 (no change) | Basis of TS 3.2 |
| Bases SR 3.7.11.2 (no change) | Basis of TS 3.2 (No change – FCS does not have a VFTP.) |
| Bases SR 3.7.11.3 | Basis of TS 3.2 |
| Bases SR 3.7.11.4 | Basis of TS 3.1 |
| Bases References | References 1 through 4 are located in the Basis of TS 2.12.1. References 5 through 7 are located in the Basis of TS 3.1. |

**Revised Technical Specification Pages (Clean)**

TECHNICAL SPECIFICATIONS

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2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling
2.8.2 Refueling Operations - Containment

2.8.2(3) Ventilation Isolation Actuation Signal (VIAS)

Applicability

Applies to operation of the Ventilation Isolation Actuation Signal (VIAS) during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of an accident occurring during CORE ALTERATIONS or REFUELING OPERATIONS that could affect public health and safety.

Specification

VIAS, including manual actuation capability, shall be OPERABLE with one gaseous radiation monitor OPERABLE.

Required Actions

(1) Without one radiation monitor OPERABLE, or VIAS manual actuation capability inoperable, immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

2.8.2(4) Control Room Ventilation System (CRVS)

Applicability

Applies to operation of the CRVS during CORE ALTERATIONS and REFUELING OPERATIONS inside containment.

Objective

To minimize the consequences of a fuel handling accident to the control room staff.

Specification

The CRVS shall be IN OPERATION and in the Filtered Air mode.

--------------------------------------------------Notes--------------------------------------------------

1. The control room envelope (CRE) boundary may be opened intermittently under administrative control.
2. Place in toxic gas protection mode immediately if automatic transfer to toxic gas protection mode is not functional.

----------------------------------------------------------------------------------------------------------

Required Actions

(1) If a CRVS train is not IN OPERATION in Filtered Air mode, immediately place the opposite train IN OPERATION in Filtered Air mode OR immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

## 2.0 **LIMITING CONDITIONS FOR OPERATION**
## 2.8 Refueling
## 2.8.2 Refueling Operations – Containment

2.8.2(4) Control Room Ventilation System (CRVS) (Continued)

Required Actions (Continued)

(2) If one or more CRVS trains are inoperable due to an inoperable control room envelope (CRE) boundary, immediately suspend CORE ALTERATIONS and REFUELING OPERATIONS.

## 2.8.3 Refueling Operations - Spent Fuel Pool

2.8.3(1) Spent Fuel Assembly Storage

Applicability

Applies to storage of spent fuel assemblies whenever any irradiated fuel assembly is stored in Region 2 (including peripheral cells) of the spent fuel pool. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the possibility of an accident occurring during REFUELING OPERATIONS that could affect public health and safety.

Specification

The combination of initial enrichment and burnup of each spent fuel assembly stored in Region 2 (including peripheral cells) of the spent fuel pool shall be within the acceptable burnup domain of Figure 2-10.

Required Actions

(1) With the requirements of the LCO not met, initiate action to move the noncomplying fuel assembly immediately.

# 2.0 **LIMITING CONDITIONS FOR OPERATION**

## 2.8 Refueling

### 2.8.3 Refueling Operations - Spent Fuel Pool

#### 2.8.3(5) Control Room Ventilation System (CRVS)

Applicability

Applies to operation of the CRVS during REFUELING OPERATIONS in the spent fuel pool area. The provisions of Specification 2.0.1 for Limiting Conditions for Operation are not applicable.

Objective

To minimize the consequences of a fuel handling accident to the control room staff.

Specification

(1) The CRVS shall be IN OPERATION and in the Filtered Air mode.

(2) A spent fuel pool area radiation monitor shall be IN OPERATION.

------------------------------------------Notes------------------------------------------

1. The control room envelope (CRE) boundary may be opened intermittently under administrative control.
2. Place in toxic gas protection mode immediately if automatic transfer to toxic gas protection mode is not functional.

-----------------------------------------------------------------------------------------

Required Actions

(1) If a CRVS train is not IN OPERATION in Filtered Air mode, immediately place the opposite train IN OPERATION in Filtered Air mode OR Immediately suspend REFUELING OPERATIONS.

(2) If a spent fuel pool area radiation monitor is not IN OPERATION, immediately suspend REFUELING OPERATIONS.

(3) If one or more CRVS trains are inoperable due to an inoperable control room envelope (CRE) boundary, immediately suspend REFUELING OPERATIONS.

**2.0 LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.2(3) Ventilation Isolation Actuation Signal (VIAS) (Continued)

Requiring one (1) radiation monitor to be OPERABLE and aligned to monitor the containment atmosphere [or stack effluents] is a conservative measure to reduce exposure. Radiation monitoring will assure operators are alerted if a radiological incident occurs in containment to enable implementation of administrative controls as specified in the Bases for 2.8.2(1) "Containment Penetrations." During CORE ALTERATIONS and REFUELING OPERATIONS, the OPERABILITY of the control room ventilation system is addressed by Specification 2.8.2(4). The control room ventilation system is placed in Filtered Air mode as a conservative measure to reduce control room operator exposure. Specification 2.8.2(4) allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident.

When VIAS is inoperable, CORE ALTERATIONS and REFUELING OPERATIONS in containment are immediately suspended. This effectively precludes a fuel handling accident from occurring. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS and REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.8.2(4) Control Room Ventilation System (CRVS)

Operating the CRVS in the Filtered Air mode is a conservative measure to reduce control room operator exposure. This allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident. If a CRVS train is not IN OPERATION in Filtered Air mode, the opposite train must immediately be placed IN OPERATION in Filtered Air mode. This action ensures that the remaining train is OPERABLE, and that any active failure will be readily detected. An alternative is to immediately suspend activities (CORE ALTERATIONS and REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the control room envelope (CRE).

Similarly, with one or more CRVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities (CORE ALTERATIONS and REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the CRE.

These actions place the unit in a condition that minimizes the accident risk.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of CORE ALTERATIONS and REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.2(4) Control Room Ventilation System (CRVS) (Continued)

The Specification is modified by two notes. The first note allows the CRE boundary to be opened intermittently under administrative controls. This 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. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

The second note requires the CRVS to be in toxic gas protection mode if automatic transfer to toxic gas protection mode is not functional. CORE ALTERATIONS and REFUELING OPERATIONS must be suspended immediately. Toxic gas is monitored at the outside air intake duct. Actuation of the system to toxic gas protection mode trips CRVS fans and isolates the outside air dampers. The CRVS is then placed in recirculation mode. In recirculation mode, the filter trains are bypassed.

Fire and smoke detection is provided at the outlet of the recirculation fans to protect against smoke developed from sources in the outside air stream or from sources inside the control room. As in toxic gas protection mode, CRVS fans are tripped and the outside air dampers are isolated.

2.8.3(1) Spent Fuel Assembly Storage

The spent fuel pool is designed for noncriticality by use of neutron absorbing material. The restrictions on the placement of fuel assemblies within the spent fuel pool, according to Figure 2-10, and the accompanying LCO, ensures that the $k_{eff}$ of the spent fuel pool always remains < 0.95 assuming the pool to be flooded with unborated water.

A spent fuel assembly may be transferred directly from the reactor core to the spent fuel pool Region 2 provided an independent verification of assembly burnups has been completed and the assembly burnup meets the acceptance criteria identified in Figure 2-10. When the configuration of fuel assemblies stored in Region 2 (including the peripheral cells) is not in accordance with Figure 2-10, immediate action must be taken to make the necessary fuel assembly movement(s) to bring the configuration into compliance with Figure 2-10. Acceptable fuel assembly burnup is not a prerequisite for Region 1 storage because Region 1 will maintain any type of fuel assembly that the plant is licensed for in a safe, coolable, subcritical geometry.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.3(1) Spent Fuel Assembly Storage (Continued)

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.3(2) Spent Fuel Pool Water Level

The minimum water level in the spent fuel pool meets the assumption of iodine decontamination factors following a fuel handling accident. When the water level is lower than the required level, the movement of irradiated fuel assemblies in the spent fuel pool is immediately suspended. This effectively precludes a fuel handling accident from occurring in the spent fuel pool. Suspension of REFUELING OPERATION shall not preclude completion of movement of a component to a safe, conservative position. The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

2.8.3(3) Spent Fuel Pool Boron Concentration

The basis for the 500 ppm boron concentration requirement with Boral poisoned storage racks is to maintain the $k_{eff}$ below 0.95 in the event a misloaded unirradiated fuel assembly is located next to a spent fuel assembly. A misloaded unirradiated fuel assembly at maximum enrichment condition, in the absence of soluble poison, may result in exceeding the design effective multiplication factor. Soluble boron in the spent fuel pool water, for which credit is permitted under these conditions, would assure that the effective multiplication factor is maintained substantially less than the design condition.

This LCO applies whenever unirradiated fuel assemblies are stored in the spent fuel pool. The boron concentration is periodically sampled in accordance with Specification 3.2. Sampling is performed prior to movement of unirradiated fuel to the spent fuel pool and periodically when unirradiated fuel is stored in the spent fuel pool.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.8 Refueling

Bases (Continued)

2.8.3(3) Spent Fuel Pool Boron Concentration (Continued)

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of refueling operations shall not preclude completion of movement of a component to a safe, conservative position.

2.8.3(4) Spent Fuel Pool Area Ventilation

The spent fuel pool area ventilation system contains a charcoal filter to prevent release of significant radionuclides to the outside atmosphere. The system does not automatically realign and therefore must be IN OPERATION prior to REFUELING OPERATIONS in the spent fuel pool. When the spent fuel pool area ventilation system is not IN OPERATION, the movement of irradiated fuel assemblies in the spent fuel pool is immediately suspended. This effectively precludes a fuel handling accident from occurring in the spent fuel pool. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operation. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

2.8.3(5) Control Room Ventilation System (CRVS)

Operating the CRVS in the Filtered Air mode and requiring a radiation monitor to be IN OPERATION are conservative measures to reduce control room operator exposure. This allows the radiological consequences analysis for a fuel handling accident to credit the Filtered Air mode at the time of the accident.

Radiation monitoring will assure operators are alerted if a radiological incident occurs. This specification can be satisfied by using a permanent spent fuel pool area radiation monitor or a portable area radiation monitor.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.8 Refueling

Bases (Continued)

2.8.3(5) Control Room Ventilation System (CRVS) (Continued)

If a CRVS train is not IN OPERATION in Filtered Air mode, the opposite train must immediately be placed IN OPERATION in Filtered Air mode. This action ensures that the remaining train is OPERABLE, and that any active failure will be readily detected. An alternative is to immediately suspend activities (REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the control room envelope (CRE).

Similarly, with one or more CRVS trains inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities (REFUELING OPERATIONS) that could result in a release of radioactivity that might require isolation of the CRE.

These actions place the unit in a condition that minimizes the accident risk.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of REFUELING OPERATIONS shall not preclude completion of movement of a component to a safe, conservative position.

The Specification is modified by two notes. The first note allows the control room envelope (CRE) boundary to be opened intermittently under administrative controls. This 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. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

The second note requires the CRVS to be in toxic gas protection mode if automatic transfer to toxic gas protection mode is not functional. CORE ALTERATIONS and REFUELING OPERATIONS must be suspended immediately. Toxic gas is monitored at the outside air intake duct. Actuation of the system to toxic gas protection mode trips CRVS fans and isolates the outside air dampers. The CRVS is then placed in recirculation mode. In recirculation mode, the filter trains are bypassed.

Fire and smoke detection is provided at the outlet of the recirculation fans to protect against smoke developed from sources in the outside air stream or from sources inside the control room. As in toxic gas protection mode, CRVS fans are tripped and the outside air dampers are isolated.

**2.0 LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.3(6) Spent Fuel Cask Loading

(1) Soluble Boron

The basis for the 800 ppm minimum boron concentration requirement during spent fuel cask loading operations is to maintain the $k_{eff}$ in the cask system less than or equal to 0.95 in the event a mis-loaded unirradiated fuel assembly is located anywhere in the cask with up to 31 other fuel assemblies meeting the burnup and enrichment requirements of LCO 2.8.3(6)(2). This boron concentration also ensures the $k_{eff}$ in the cask system will be less than or equal to 0.95 if an unirradiated fuel assembly is dropped in the space between the spent fuel racks and the cask loading area during cask loading operations next to a spent fuel assembly. A mis-loaded or dropped irradiated fuel assembly at maximum enrichment condition, in the absence of soluble poison, may result in exceeding the design effective multiplication factor. Soluble boron in the spent fuel pool water, for which credit is permitted during spent fuel cask loading operations, assures that the effective multiplication factor is maintained substantially less than the design basis limit.

This LCO applies whenever a fuel assembly is located in a spent fuel cask submerged in the spent fuel pool. The boron concentration is periodically sampled in accordance with Specification 3.2. Sampling is performed prior to movement of fuel into the spent fuel cask and periodically thereafter during cask loading operations, until the cask is removed from the spent fuel pool.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown.

When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner. Suspension of refueling operations shall not preclude completion of movement of a component to a safe, conservative position.

**2.0 LIMITING CONDITIONS FOR OPERATION**
2.8 Refueling

Bases (Continued)

2.8.3(6) Spent Fuel Cask Loading (Continued)

(2) Burnup vs. Enrichment

The spent fuel cask is designed for subcriticality by use of neutron absorbing material. The restrictions on the placement of fuel assemblies within the spent fuel pool, according to Figure 2-11, and the accompanying LCO, ensure that the $k_{eff}$ of the spent fuel pool always remains $\leq 0.95$ assuming the pool to be flooded with borated water and $<1.0$ assuming the pool is flooded with unborated water, in accordance with 10 CFR 50.68(b)(4).

A spent fuel assembly may be transferred directly from the spent fuel racks to the spent fuel cask provided an independent verification of assembly burnups has been completed and the assembly burnup meets the acceptance criteria identified in Figure 2-11. If any fuel assembly located in the spent fuel cask is not in accordance with Figure 2-11, immediate action must be taken to make the remove of non-complying fuel assembly from the spent fuel cask and return it to the spent fuel rack.

The provisions of Specification 2.0.1 for Limiting Conditions for Operations are not applicable. If moving fuel assemblies while in MODES 4 or 5, LCO 2.0.1 would not specify any actions. If moving fuel assemblies in MODES 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, inability to suspend movement of fuel assemblies is not sufficient reason to require a reactor shutdown. When "immediately" is used as a completion time, the required action should be pursued without delay and in a controlled manner.

References

(1) USAR Section 9.5
(2) USAR Section 9.10
(3) USAR Section 14.18

**2.0 LIMITING CONDITIONS FOR OPERATION**
2.12 Control Room Ventilation System
2.12.1 Control Room Air Filtration System - Operating

Applicability

Applies to the operational status of the control room air filtration system when the reactor coolant temperature $T_{cold} \geq 210°F$.

Objective

To assure operability of equipment required to filter control room air following a Design Basis Accident.

Specification

Two control room air filtration trains shall be OPERABLE.

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

Required Actions

(1) With one control room air filtration train inoperable for reasons other than (2), restore the inoperable train to OPERABLE status within 7 days.

(2) With one or more control room air filtration trains inoperable due to inoperable CRE boundary:

a. initiate mitigating actions immediately, AND
b. verify mitigating actions ensure CRE occupant exposures to radiological, chemical, and smoke hazards will not exceed limits, within 24 hours, AND
c. restore CRE boundary to OPERABLE status within 90 days.

(3) With the required actions of (1) or (2) not met, be in HOT SHUTDOWN within 6 hours and COLD SHUTDOWN within the following 36 hours.

(4) With two control room air filtration trains inoperable for reasons other than (2), enter LCO 2.0.1 immediately.

**2.0 LIMITING CONDITIONS FOR OPERATION**

2.12 Control Room Ventilation System

2.12.2 Control Room Air Conditioning System

Applicability

Applies to the operational status of the control room air conditioning system when the reactor coolant temperature $T_{cold} \geq 210°F$.

Objective

To assure operability of equipment required to maintain air temperature within the control room following a Design Basis Accident.

Specification

Two control room air conditioning trains shall be OPERABLE.

Required Actions

(1) With one control room air conditioning train inoperable, restore the inoperable train to OPERABLE status within 30 days.

(2) With the required actions of (1) not met, be in HOT SHUTDOWN within 6 hours, and COLD SHUTDOWN within the following 36 hours.

(3) With two control room air conditioning trains inoperable, enter LCO 2.0.1 immediately.

**2.0 LIMITING CONDITIONS FOR OPERATION**

2.12 Control Room Ventilation System

Bases

2.12 Control Room Ventilation System

The control room ventilation system (CRVS) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke. The CRVS contains two independent, redundant control room air filtration trains that filter the air in the control room envelope (CRE), two independent, redundant air conditioning units that circulate and cool the air in the CRE, and a CRE boundary that limits the inleakage of unfiltered air.

The CRE is the area within the confines of the CRE boundary 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.

Actuation of the CRVS 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 through the redundant trains of HEPA and charcoal filters. The emergency radiation state also initiates filtered ventilation of the outside air supply to the CRE.

The actions taken in the toxic gas isolation state are similar, except that the signal switches the CRVS to an isolation mode, minimizing outside air entering the CRE through the CRE boundary. Toxic gas is monitored at the outside air intake duct. Actuation of the system to toxic gas protection mode trips CRVS fans and isolates the outside air dampers. The CRVS is then placed in recirculation mode. In recirculation mode, the filter trains are bypassed.

Fire and smoke detection is provided at the outlet of the recirculation fans to protect against smoke developed from sources in the outside air stream or from sources inside the control room. As in toxic gas protection mode, CRVS fans are tripped and the outside air dampers are isolated.

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.12 Control Room Ventilation System

Bases (Continued)

2.12 Control Room Ventilation System (Continued)

The radiation monitoring system provides an airborne radiation monitor (RM-065), which starts after a ventilation isolation actuation signal (VIAS) to verify control room habitability following a design basis accident. The air entering the CRE is continuously monitored by toxic gas detectors. One detector output above the setpoint will cause actuation of the toxic gas isolation state. The actions of the toxic gas isolation state are more restrictive, and will override the actions of the emergency radiation state.

The CRVS 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 CRVS, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

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

2.12.1 Control Room Air Filtration System - Operating

Each control room air filtration system (CRAFS) train contains a heater 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 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 back-up in case of failure of the main HEPA filter bank.

The CRAFS is an emergency system, part of which may also operate during normal unit operations in the standby mode of operation. Upon receipt of a VIAS, normal air supply to the CRE is diverted to the filter trains, and the stream of ventilation air is recirculated through the filter trains of the system. The demisters remove 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.

**2.0 LIMITING CONDITIONS FOR OPERATION**
2.12 Control Room Ventilation System

Bases (Continued)

2.12.1 Control Room Air Filtration System - Operating (Continued)

Outside air is filtered, and then added to the air being recirculated from the CRE. Pressurization of the CRE minimizes infiltration of unfiltered air though the CRE boundary from all the surrounding areas adjacent to the CRE boundary.

A single CRAFS train operating at a flow rate of ≤ 1000 cfm will pressurize the CRE 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 60% per hour. The CRAFS operation in maintaining the CRE habitable is discussed in USAR, Section 9.10 (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. However, the recirculation duct does not require redundant dampers to meet single failure proof criteria. Damper PCV-6682 meets the acceptance criteria for the damper repair option described in Standard Review Plan 6.4, Appendix A. A release of radioactivity requires PCV-6682 to open, should PCV-6682 fail to open, it can be repaired or repositioned open before control room doses exceed the allowable limits of General Design Criterion 19. The CRAFS is designed in accordance with Seismic Category 1 requirements.

The CRAFS is designed to maintain a habitable environment in the CRE for 30 days of continuous occupancy after a Design Basis Accident (DBA) without exceeding a 5 rem total effective dose equivalent (TEDE). The CRAFS components are arranged in redundant, safety related ventilation trains. The location of components and ducting within the CRE ensures an adequate supply of filtered air to all areas requiring access.

The CRAFS provides airborne radiological protection for the CRE occupants as demonstrated by the CRE occupant dose analyses for the most limiting design basis accident fission product release presented in the USAR, Section 14.15 (Ref. 2).

2.0 **LIMITING CONDITIONS FOR OPERATION**
2.12 Control Room Ventilation System

Bases (Continued)

2.12.1 Control Room Air Filtration System - Operating (Continued)

Two independent and redundant trains of the CRAFS 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 filtration trains or from an inoperable CRE boundary, could result in exceeding a dose of 5 rem TEDE to the CRE occupants in the event of a large radioactive release.

Each CRAFS train is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A CRAFS 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 function, and

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

In order for the CRAFS trains to be considered OPERABLE, the CRE boundary must be maintained such that 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 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. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

APPLICABILITY

With the reactor coolant temperature $T_{cold} \geq 210°F$, the CRAFS must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA.

## 2.0 LIMITING CONDITIONS FOR OPERATION

### 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

ACTIONS

(1)

With one CRAFS 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 CRAFS train is adequate to perform the CRE occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE CRAFS train could result in loss of CRAFS 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.

(2)a, (2)b, and (2)c

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 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.

## 2.0 LIMITING CONDITIONS FOR OPERATION
## 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.1 Control Room Air Filtration System - Operating (Continued)

(3)

With reactor coolant temperature $T_{cold}$ ≥ 210°F, if the inoperable CRAFS or CRE boundary cannot be restored to OPERABLE status within the required Completion Time, 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 HOT SHUTDOWN within 6 hours, and in COLD SHUTDOWN 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.

(4)

If both CRAFS trains are inoperable with reactor coolant temperature $T_{cold}$ ≥ 210°F for reasons other than an inoperable CRE boundary (i.e., Condition 2), the CRAFS may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 2.0.1 must be entered immediately.

### 2.12.2 Control Room Air Conditioning System

The control room air conditioning system is required to ensure the control room temperature will not exceed equipment OPERABILITY requirements. The reactor protective system panels and the engineered safety features panels were designed for, and the instrumentation was tested at, 120°F. The temperature inside the control cabinets is at most 15°F warmer than the temperature of the control room due to heat produced by the electronic circuitry. Therefore, the temperature of the control room will not affect OPERABILITY of the control cabinets as long as it doesn't exceed 105°F.

During non-emergency operation, the control room temperature may be maintained by using Component Cooling Water (CCW). During design basis accident conditions, the CCW isolation valves to air conditioning units (VA-46A and VA-46B) are automatically closed on a VIAS. This prevents CCW that has been heated by components following a design basis accident from adding heat to the control room. When VIAS is in override, closing these valves maintains the OPERABILITY of the associated air conditioning unit.

## 2.0 **LIMITING CONDITIONS FOR OPERATION**

### 2.12 Control Room Ventilation System

Bases (Continued)

### 2.12.2 Control Room Air Conditioning System (Continued)

With the reactor coolant temperature $T_{cold} \geq 210°F$, two trains of the control room air conditioning system are required to be OPERABLE. If one train is inoperable it shall be restored to OPERABLE status within 30 days. In this condition the remaining train is adequate to maintain the control room temperature. With both trains inoperable, the control room air conditioning system may not be capable of performing its intended function and LCO 2.0.1 must be entered immediately.

References

(1) USAR Section 9.10
(2) USAR Section 14.15
(3) USAR Section 14.23
(4) Engineering Analysis (EA)-FC-01-013, “Effects of Secondary Environment Resulting from a Fire Event”

## 3.0 **SURVEILLANCE REQUIREMENTS**

### 3.1 Instrumentation and Control (Continued)

The Control Room Envelope (CRE) surveillance requirement (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 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, Technical Specification (TS) 2.12.1(2) must be entered. TS 2.12.1(2)c 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. 1) which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F (Ref. 2). These compensatory measures may also be used as mitigating actions as required by TS 2.12.1(2)b. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY (Ref. 3). 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.

References


1. Regulatory Guide 1.196
2. NEI 99-03, "Control Room Habitability Assessment," June 2001
3. 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).

**TABLE 3-1**

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. Power Range Safety Channels | a. Check:<br>1) Neutron Flux<br>2) Thermal Power | S | a.<br>1) CHANNEL CHECK<br>2) CHANNEL CHECK |
| | b. Adjustment | D(3) | b. Channel adjustment to agree with heat balance calculation. |
| | c. Test | Q(1) | c. CHANNEL FUNCTIONAL TEST |
| 2. Wide-Range Logarithmic Neutron Monitors | a. Check | S | a. CHANNEL CHECK |
| | b. Test(2) | P | b. CHANNEL FUNCTIONAL TEST |
| 3. Reactor Coolant Flow | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**TABLE 3-1** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 4. Thermal Margin/Low Pressure | a. Check<br>1) Pressure Setpoint | S | a.<br>1) CHANNEL CHECK |
| | 2) Pressure Input | | 2) CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate:<br>1) Temperature Input | R | c.<br>1) CHANNEL CALIBRATION |
| | 2) Pressure Input | | 2) CHANNEL CALIBRATION |
| 5. High-Pressurizer Pressure | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**TABLE 3-1** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 6. Steam Generator Level | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 7. Steam Generator Pressure | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 8. Containment Pressure | a. Test | Q(1) | a. CHANNEL FUNCTIONAL TEST |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 9. Loss of Load | a. Test | P | a. CHANNEL FUNCTIONAL TEST |
| 10. Manual Trips | a. Test | P | a. CHANNEL FUNCTIONAL TEST |
| 11. Steam Generator Differential Pressure | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**TABLE 3-1** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF REACTOR PROTECTIVE SYSTEM**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 12. Reactor Protection System Logic Units | a. Test | Q(1) | a. CHANNEL FUNCTIONAL TEST |
| 13. Axial Power Distribution | a. Check: | S | a. |
| | 1) Axial Shape Index Indication | | 1) CHANNEL CHECK |
| | 2) Upper Trip Setpoint Indication | | 2) CHANNEL CHECK |
| | 3) Lower Trip Setpoint Indication | | 3) CHANNEL CHECK |
| | b. Test | Q(1) | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |

**NOTES:**

(1) The quarterly tests will be done on only one of four channels at a time to prevent reactor trip.

(2) Calibrate using built-in simulated signals.

(3) Not required unless the reactor is in the power operating condition and is therefore not required during plant startup and shutdown periods.

## TABLE 3-2

## MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS

| Channel Description | Surveillance Function | | Frequency | Surveillance Method | |
|---|---|---|---|---|---|
| 1. Pressurizer Pressure Low | a. | Check | S | a. | CHANNEL CHECK |
| | b. | Test | Q[1]P[4] | b. | CHANNEL FUNCTIONAL TEST |
| | c. | Calibrate | R | c. | CHANNEL CALIBRATION |
| 2. Pressurizer Low Pressure Blocking Circuit | a. | Calibrate | R | a. | CHANNEL CALIBRATION |
| 3. Safety Injection Actuation Logic | a. | Test | Q | a. | CHANNEL FUNCTIONAL TEST (Simulation of PPLS or CPHS 2/4 Logic) |
| | b. | Test | R[7] | b. | CHANNEL FUNCTIONAL TEST |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 4. Containment Pressure High Signal | a. Test | Q | a. CHANNEL FUNCTIONAL TEST |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 5. Containment Spray Actuation Logic | a. Test | Q | a. CHANNEL FUNCTIONAL TEST (Simulation of PPLS and CPHS 2/4 Logic) |
| | b. Test | R(7) | b. CHANNEL FUNCTIONAL TEST |
| 6. Containment Radiation High Signal (2) | a. Check | D | a. CHANNEL CHECK |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 6. (continued) | b. Test | Q | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. Secondary and Electronic Calibration performed at refueling frequency. Primary calibration performed with exposure to radioactive sources only when required by the secondary and electronic calibration. |
| 7. Manual Safety Injection Actuation | a. Test | R | a. CHANNEL FUNCTIONAL TEST |
| 8. Manual Containment Isolation Actuation | a. Check | R | a. Observe isolation valves closure. |
| | b. Test | R | b. CHANNEL FUNCTIONAL TEST |
| 9. Manual Containment Spray Actuation | a. Test | R | a. CHANNEL FUNCTIONAL TEST |
| 10. Automatic Load Sequencers | a. Test | Q | a. CHANNEL FUNCTIONAL TEST |
| 11. Diesel Testing | See Technical Specification 3.7 | | |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 12. Diesel Fuel Transfer Pump | a. Test | M | a. Pump run to refill day tank. |
| 13. SIRW Tank Low Level Signal | a. Check | S | a. CHANNEL CHECK |
| | b. Test | Q | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 14. Safety Injection Tank Level and Pressure | a. Check | S(5) | a. Verify that level and pressure are within limits. |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method | |
|---|---|---|---|---|---|
| 14. (continued) | b. | Calibrate | R | b. | CHANNEL CALIBRATION |
| 15. Boric Acid Tank Level | a. | Check | W | a. | Verify that level is within limits. |
| 16. Boric Acid Tank Temperature | a. | Check | W | a. | Verify that temperature is within limits. |
| 17. Steam Generator Low Pressure Signal (SGLS) | a. | Check | S | a. | CHANNEL CHECK |
| | b. | Test | Q[(3)] | b. | CHANNEL FUNCTIONAL TEST |
| | c. | Calibrate | R | c. | CHANNEL CALIBRATION |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | | Surveillance Function | | Frequency | | Surveillance Method |
|---|---|---|---|---|---|---|
| 18. SIRW Tank Temperature | a. | Check | | D[(6)] | a. | Verify that temperature is within limits. |
| | b. | Test | | R | b. | Measure temperature of SIRW tank with standard laboratory instruments. |
| 19. Manual Recirculation Actuation | a. | Test | | R | a. | CHANNEL FUNCTIONAL TEST |
| 20. Recirculation Actuation Logic | a. | Test | | Q | a. | CHANNEL FUNCTIONAL TEST |
| | b. | Test | | R[(7)] | b. | CHANNEL FUNCTIONAL TEST |
| 21. 4.16 KV Emergency Bus Low Voltage (Loss of Voltage and Degraded Voltage) Actuation Logic | a. | Check | | S | a. | Verify voltage readings are above alarm initiation on degraded voltage level - supervisory lights "on". |
| | b. | Test | | Q | b. | CHANNEL FUNCTIONAL TEST (Undervoltage relay) |
| | c. | Calibrate | | R | c. | CHANNEL CALIBRATION |
| 22. Manual Emergency Off-site Power Low Trip Actuation | a. | Test | | R | a. | CHANNEL FUNCTIONAL TEST |

**TABLE 3-2** (continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF ENGINEERED SAFETY FEATURES, INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 23. Auxiliary Feedwater | a. Check:<br>1) Steam Generator Water Level Low (Wide Range)<br>2) Steam Generator Pressure Low | S | a.<br>1) CHANNEL CHECK<br>2) CHANNEL CHECK |
| | b. Test:<br>1) Actuation Logic | QR[7] | b.<br>1) CHANNEL FUNCTIONAL TEST |
| | c. Calibrate:<br>1) Steam Generator Water Level Low (Wide Range)<br>2) Steam Generator Pressure Low<br>3) Steam Generator Differential Pressure High | R | c.<br>1) CHANNEL CALIBRATION<br>2) CHANNEL CALIBRATION<br>3) CHANNEL CALIBRATION |
| 24. Manual Auxiliary Feedwater Actuation | a. Test | R | a. CHANNEL FUNCTIONAL TEST |

**NOTES**:
(1) Not required unless pressurizer pressure is above 1700 psia.
(2) CRHS monitors are the containment atmosphere gaseous radiation monitor and the Auxiliary Building Exhaust Stack gaseous radiation monitor.
(3) Not required unless steam generator pressure is above 600 psia.
(4) QP - Quarterly during designated modes and prior to taking the reactor critical if not completed within the previous 92 days (not applicable to a fast trip recovery).
(5) Not required to be done on a SIT with inoperable level and/or pressure instrumentation.
(6) Not required when outside ambient air temperature is greater than 50°F and less than 105°F.
(7) Tests backup channels such as derived circuits and equipment that cannot be tested when the plant is at power.

**TABLE 3-3**

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. Primary CEA Position Indication System | a. Check | S | a. Comparison of output data with secondary CEAPIS. |
| | b. Test | M | b. Test of power dependent insertion limits, deviation, and sequence monitoring systems. |
| | c. Calibrate | R | c. Physically measured CEDM position used to verify system accuracy. Calibrate CEA position interlocks. |
| 2. Secondary CEA Position Indication System | a. Check | S | a. Comparison of output data with primary CEAPIS. |
| | b. Test | M | b. Test of power dependent insertion limit, deviation, out-of-sequence, and overlap monitoring systems. |
| | c. Calibrate | R | c. Calibrate secondary CEA position indication system and CEA interlock alarms. |
| 3. Area and Post-Accident Radiation Monitors(1) | a. Check | D | a. CHANNEL CHECK |
| | b. Test | Q | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. Secondary and Electronic calibration performed at refueling frequency. Primary calibration with exposure to radioactive sources only when required by the secondary and electronic calibration. RM-091 A/B - Calibration by electronic signal substitution is acceptable for all range decades above 10 R/hr. Calibration for at least one decade below 1-R/hr. shall be by means of calibrated radiation source. |

(1)Post Accident Radiation Monitors are: RM-063, RM-064, and RM-091A/B. Area Radiation Monitors are: RM-070 thru RM-082, RM-084 thru RM-089, and RM-095 thru RM-098.

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 4. DELETED | | | |
| 5. Primary to Secondary Leak-Rate Detection Radiation Monitors (RM-054A/B, RM-057) | a. Check | D | a. CHANNEL CHECK |
| | b. Test | Q | b. CHANNEL FUNCTIONAL TEST |
| | c. Calibrate | R | c. Secondary and Electronic calibration performed at refueling frequency. Primary Calibration performed with exposure to radioactive sources only when required by the secondary and electronic calibration. |
| 6. Pressurizer Level | a. Check | S | a. Verify that level is within limits. |
| | b. Check | M | b. CHANNEL CHECK |
| | c. Calibrate | R | c. CHANNEL CALIBRATION |
| 7. CEA Drive System Interlocks | a. Test | R | a. Verify proper operation of all CEDM system interlocks, using simulated signals where necessary. |
| | b. Test | P | b. If haven't been checked for three months and plant is shutdown. |

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method |
|---|---|---|---|---|
| 8. Dropped CEA Indication | a. | Test | R | a. Insert a negative rate of change power signal to all four Power Range Safety Channels to test alarm. |
| | b. | Test | R | b. Insert CEA's below lower electrical limit to test dropped CEA alarm. |
| 9. Calorimetric Instrumentation | a. | Calibrate | R | a. CHANNEL CALIBRATION |
| 10. Control Room Ventilation System | a. | Test | R | a. Check damper operation for DBA mode. |
| | b. | Test | In accordance with CRE Habitability Program | b. Perform required control room envelope (CRE) unfiltered air inleakage testing in accordance with the CRE Habitability Program. |
| 11. Containment Humidity Detector | a. | Test | R | a. CHANNEL FUNCTIONAL TEST |
| 12. Interlocks-Isolation Valves on Shutdown Cooling Line | a. | Test | R | a. CHANNEL FUNCTIONAL TEST |
| 13. Control Room Air Conditioning System | a. | Test | R | a. Verify each train has the capability to remove the assumed heat load through combination of testing and calculations. |

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method | |
|---|---|---|---|---|---|
| 14. Not Used | | | | | |
| 15. Reactor Coolant System Flow | a. | Check | R[(1)] | a. | Calculation of reactor coolant flow rate. |
| 16. Pressurizer Pressure | a. | Check | S | a. | CHANNEL CHECK |
| 17. Reactor Coolant Inlet Temperature | a. | Check | S | a. | CHANNEL CHECK |
| 18. Low-Temperature Set-point Power-Operated Relief Valves | a. | Test | PM | a. | CHANNEL FUNCTIONAL TEST (excluding actuation) |
| | b. | Calibrate | R | b. | CHANNEL CALIBRATION |

(1) Required to be performed within 24 hours after ≥95.00% reactor thermal power following power escalation.

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | | Frequency | Surveillance Method |
|---|---|---|---|---|
| 19. Auxiliary Feedwater Flow | a. | Check | M | CHANNEL CHECK |
| | b. | Calibrate | R | CHANNEL CALIBRATION |
| 20. Subcooled Margin Monitor | a. | Check | M | CHANNEL CHECK |
| | b. | Calibrate | R | CHANNEL CALIBRATION |
| 21. PORV Operation and Acoustic Position Indication | a. | Test | M | CHANNEL FUNCTIONAL TEST |
| | b. | Calibrate | R | CHANNEL CALIBRATION |
| 22. PORV Block Valve Operation and Position Indication | a. | Check | Q | Cycle valve. Valve is exempt from testing when it has been closed to comply with LCO Action Statement 2.1.6(5)a. |
| | b. | Calibrate | R | Check valve stroke against limit switch position. |
| 23. Safety Valve Acoustic Position Indication | a. | Test | M | CHANNEL FUNCTIONAL TEST |
| | b. | Calibration | R | CHANNEL CALIBRATION |
| 24. PORV/Safety Valve Tail Pipe Temperature | a. | Check | M | CHANNEL CHECK |
| | b. | Calibrate | R | CHANNEL CALIBRATION |



Amendment No. ~~39,54,110,161,182~~

**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 25. Containment Purge Isolation Valves (PCV-742A, B, C, & D) | a. Check | M | a. Verify valve position using control room indication. |
| 26. Not Used | | | |
| 27. Containment Water Level Narrow Range (LT-599 & LT-600) | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| Wide Range (LT-387 & LT-388) | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 28. Containment Wide Range Pressure Indication | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 29. Not Used | | | |



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**TABLE 3-3** (Continued)

**MINIMUM FREQUENCIES FOR CHECKS, CALIBRATIONS AND TESTING OF MISCELLANEOUS INSTRUMENTATION AND CONTROLS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 30. Core Exit Thermo-couple | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |
| 31. Heated Junction Thermocouple (YE-116A and YE-116B) | a. Check | M | a. CHANNEL CHECK |
| | b. Calibrate | R | b. CHANNEL CALIBRATION |

PM - Prior to scheduled cold leg cooldown below 300°F; monthly whenever temperature remains below 300°F and reactor vessel head is installed.



Amendment No. ~~87,107,110,122,182, 183~~

**TABLE 3-3A**
**MINIMUM FREQUENCY FOR CHECKS, CALIBRATIONS AND FUNCTIONAL TESTING OF ALTERNATE SHUTDOWN PANELS (AI-185 AND AI-212) AND EMERGENCY AUXILIARY FEEDWATER PANEL (AI-179) INSTRUMENTATION AND CONTROL CIRCUITS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 1. WIDE RANGE LOGARITHMIC POWER AND SOURCE RANGE MONITORS (AI-212) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 2. REACTOR COOLANT COLD LEG TEMPERATURE (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 3. REACTOR COOLANT HOT LEG TEMPERATURE (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 4. PRESSURIZER LEVEL (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 5. VOLUME CONTROL TANK LEVEL (AI-185) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 6. ASP CONTROL CIRCUITS (AI-185) | a. TEST | R | a. CHANNEL FUNCTIONAL TEST |

**TABLE 3-3A** (Continued)

**MINIMUM FREQUENCY FOR CHECKS, CALIBRATIONS AND FUNCTIONAL TESTING OF ALTERNATE SHUTDOWN PANELS (AI-185 AND AI-212) AND EMERGENCY AUXILIARY FEEDWATER PANEL (AI-179) INSTRUMENTATION AND CONTROL CIRCUITS**

| Channel Description | Surveillance Function | Frequency | Surveillance Method |
|---|---|---|---|
| 7. STEAM GENERATOR LEVEL, WIDE RANGE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 8. STEAM GENERATOR LEVEL, NARROW RANGE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 9. STEAM GENERATOR PRESSURE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 10. PRESSURIZER PRESSURE (AI-179) | a. CHECK | M | a. CHANNEL CHECK |
| | b. CALIBRATE | R | b. CHANNEL CALIBRATION |
| 11. EAFW CONTROL CIRCUITS (AI-179) | a. TEST | R | a. CHANNEL FUNCTIONAL TEST |

## 3.0 **SURVEILLANCE REQUIREMENTS**

### 3.2 Equipment and Sampling Tests

Applicability

Applies to plant equipment and conditions related to safety.

Objective

To specify the minimum frequency and type of surveillance to be applied to critical plant equipment and conditions.

Specifications

Equipment and sampling tests shall be conducted as specified in Tables 3-4 and 3-5.

Basis

The equipment testing and system sampling frequencies specified in Tables 3-4 and 3-5 are considered adequate, based upon experience, to maintain the status of the equipment and systems so as to assure safe operation. Thus, those systems where changes might occur relatively rapidly are sampled frequently and those static systems not subject to changes are sampled less frequently.

The control room air filtration system (CRAFS) consists of redundant high efficiency particulate air filters (HEPA) and charcoal adsorbers. HEPA filters are installed before and after the charcoal adsorbers. The charcoal adsorbers are installed to reduce the potential intake of iodine to the control room. The in-place test results will confirm system integrity and performance. The laboratory carbon sample test results should indicate methyl iodide removal efficiency of at least 99.825 percent for expected accident conditions.

CRAFS 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. Each CRAFS train must be operated for ≥ 10 continuous hours with the heaters energized. The monthly Frequency is based on the known reliability of the equipment, and the two train redundancy available.

Each CRAFS train is verified to start and operate on an automatic and manual actuation signal. The Frequency of 18 months is based on industry operating experience and is consistent with the typical refueling cycle.

## 3.0 **SURVEILLANCE REQUIREMENTS**

3.2 Equipment and Sampling Tests (continued)

The spent fuel storage-decontamination areas air treatment system is designed to filter the building atmosphere to the auxiliary building vent during refueling operations. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment. In-place testing is performed to confirm the integrity of the filter system. The charcoal adsorbers are periodically sampled to insure capability for the removal of radioactive iodine.

The Safety Injection (SI) pump room air treatment system consists of charcoal adsorbers which are installed in normally bypassed ducts. This system is designed to reduce the potential release of radioiodine in SI pump rooms during the recirculation period following a DBA. The in-place and laboratory testing of charcoal adsorbers will assure system integrity and performance.

Pressure drops across the combined HEPA filters and charcoal adsorbers, of less than 9 inches of water for the control room filters (VA-64A & VA-64B) and of less than 6 inches of water for each of the other air treatment systems will indicate that the filters and adsorbers are not clogged by amounts of foreign matter that would interfere with performance to established levels.

The hydrogen purge system provides the control of combustible gases (hydrogen) in containment for a post-LOCA environment. The surveillance tests provide assurance that the system is operable and capable of performing its design function. VA-80A or VA-80B is capable of controlling the expected hydrogen generation (67 SCFM) associated with 1) Zirconium - water reactions, 2) radiolytic decomposition of sump water and 3) corrosion of metals within containment. The system should have a minimum of one blower with associated valves and piping (VA-80A or VA-80B) available at all times to meet the guidelines of Regulatory Guide 1.7 (1971).

If significant painting, fire or chemical release occurs such that the HEPA filters or charcoal adsorbers could become contaminated from the fumes, chemicals or foreign materials, testing will be performed to confirm system performance.

Demonstration of the automatic and/or manual initiation capability will assure the system's availability.

Verifying Reactor Coolant System (RCS) leakage to be within the LCO limits ensures the integrity of the Reactor Coolant Pressure Boundary (RCPB) is maintained. Pressure boundary leakage would at first appear as unidentified leakage and can only be positively identified by inspection. Unidentified leakage is determined by performance of an RCS water inventory balance. Identified leakage is then determined by isolation and/or inspection. Since Primary to Secondary Leakage of 150 gallons per day cannot be measured accurately by an RCS water inventory balance, note "***" for line item 8a on Table 3-5 states that the Reactor Coolant System Leakage surveillance is not applicable to Primary to Secondary Leakage. Primary to secondary leakage is measured by performance of effluent monitoring within the secondary steam and feedwater systems.

## 3.0 **SURVEILLANCE REQUIREMENTS**

### 3.2 Equipment and Sampling Tests (continued)

Failure to meet any of the above limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO concern since the fuel oil is not added to the storage tanks. Within 31 days following the initial new fuel oil sample, the fuel oil is analyzed to establish that the other properties specified in Table 1 of ASTM D975-98b (Ref. 3) are met for new fuel oil when tested in accordance with ASTM D975-98b (Ref. 2), except that the analysis for sulfur may be performed in accordance with ASTM D129-00 (Ref. 2) or ASTM D2622-87 (Ref. 2). The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. This Surveillance ensures the availability of high quality fuel oil for the DGs. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure. Particulate concentrations should be determined in accordance with ASTM 6217-98 (Ref. 2) with the exception that the filters specified in the ASTM method may have a nominal pore size of up to 3 microns. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. For those designs in which the total stored fuel oil volume is contained in two or more interconnected tanks, each tank must be considered and tested separately. The Surveillance interval of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Surveillance intervals.

Table 3-5, Item 9d ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of five engine start cycles without recharging. A start cycle is defined as the cranking time required to accelerate the DG to firing speed. The pressure specified in this Surveillance Requirement is intended to reflect the lowest value at which the five starts can be accomplished. The 31 day Surveillance interval takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 92 days per Table 3-5, Item 9e, eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance interval is established to ensure excessive water does not accumulate in the fuel oil system, which meets the intent of Regulatory Guide 1.137 (Ref. 4). This Surveillance Requirement is for preventative maintenance. The presence of water does not necessarily represent failure of this Surveillance Requirement provided the accumulated water is removed during performance of the Surveillance.

## 3.0 SURVEILLANCE REQUIREMENTS

### 3.2 Equipment and Sampling Tests (continued)

Table 3-5, Item 8b verifies that primary to secondary LEAKAGE is less or equal to 150 gallons per day through any one SG. Satisfying the primary to secondary LEAKAGE limit ensures that the operational LEAKAGE performance criterion in the Steam Generator Program is met. If this surveillance requirement is not met, compliance with LCO 3.17, "Steam Generator Tube Integrity," should be evaluated. The 150 gallons per day limit is measured at room temperature as described in Reference 5. The operational LEAKAGE rate limit applies to LEAKAGE through any one SG. If it is not practical to assign the LEAKAGE to an individual SG, all the primary to secondary LEAKAGE should be conservatively assumed to be from one SG.

The Surveillance is modified by a Note which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For RCS primary to secondary LEAKAGE determination, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows.

The Surveillance Frequency of daily is a reasonable interval to trend primary to secondary LEAKAGE and recognizes the importance of early leakage detection in the prevention of accidents. The primary to secondary LEAKAGE is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Ref. 5).

References

1) USAR, Section 9.10
2) ASTM D4057-95(2000), ASTM D975-98b, ASTM D4176-93, ASTM D129-00, ASTM D2622-87, ASTM D287-82, ASTM 6217-98, ASTM D2709-96
3) ASTM D975-98b, Table 1
4) Regulatory Guide 1.137
5) EPRI, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines."

## TABLE 3-4

## MINIMUM FREQUENCIES FOR SAMPLING TESTS

| | Type of Measurement and Analysis | Sample and Analysis Frequency |
|---|---|---|
| 1. Reactor Coolant | | |
| (a) Power Operation (Operating Mode 1) | (1) Gross Radioactivity (Gamma emitters) | 1 per 3 days |
| | (2) Isotopic Analysis for DOSE EQUIVALENT I-131 | (i) 1 per 14 days |
| | | (ii) 1 per 8 hours[(1)] whenever the radioactivity exceeds 1.0 $\mu$Ci/gm DOSE EQUIVALENT I-131. |
| | | (iii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period. |
| | (3) E Determination | 1 per 6 months[(2)] |
| | (4) Dissolved oxygen and chloride | 1 per 3 days |
| (b) Hot Standby (Operating Mode 2) | (1) Gross Radioactivity (Gamma emitters) | 1 per 3 days |
| Hot Shutdown (Operating Mode 3) | (2) Isotopic Analysis for DOSE EQUIVALENT I-131 | (i) 1 per 8 hours[(1)] whenever the radioactivity exceeds 1.0 $\mu$Ci/gm DOSE EQUIVALENT I-131. |
| | | (ii) 1 sample between 2-8 hours following a thermal power change exceeding 15% of the rated thermal power change exceeding 15% of the rated thermal power within a 1-hour period. |
| | (3) Dissolved oxygen and chloride | 1 per 3 days |

## **TABLE 3-4** (Continued)

## MINIMUM FREQUENCIES FOR SAMPLING TESTS

| | | Type of Measurement and Analysis | Sample and Analysis Frequency |
|---|---|---|---|
| 1. | Reactor Coolant (Continued) | | |
| | (c) Cold Shutdown (Operating Mode 4) | (1) Chloride | 1 per 3 days |
| | (d) Refueling Shutdown (Operating Mode 5) | (1) Chloride<br>(2) Boron Concentration | 1 per 3 days[3]<br>1 per 3 days[3] |
| | (e) Refueling Operation | (1) Chloride<br>(2) Boron Concentration | 1 per 3 days[3]<br>1 per 3 days[3] |
| 2. | SIRW Tank | Boron Concentration | M |
| 3. | Concentrated Boric Acid Tanks | Boron Concentration | W |
| 4. | SI Tanks | Boron Concentration | M |
| 5. | Spent Fuel Pool | Boron Concentration | See Footnote 4 below |
| 6. | Steam Generator Blowdown (Operating Modes 1 and 2) | Isotopic Analysis for Dose Equivalent I-131 | W[5] |

(1) Until the radioactivity of the reactor coolant is restored to $\leq 1$ $\mu$Ci/gm DOSE EQUIVALENT I-131.

(2) Sample to be taken after a minimum of 2 EFPD and 20 days of power operation have elapsed since reactor was subcritical for 48 hours or longer.

(3) Boron and chloride sampling/analyses are not required when the core has been off-loaded. Reinitiate boron and chloride sampling/analyses prior to reloading fuel into the cavity to assure adequate shutdown margin and allowable chloride levels are met.

(4) Prior to placing unirradiated fuel assemblies in the spent fuel pool or placing fuel assemblies in a spent fuel cask in the spent fuel pool, and weekly when unirradiated fuel assemblies are stored in the spent fuel pool, or every 48 hours when fuel assemblies are in a spent fuel storage cask in the spent fuel pool.

(5) When Steam Generator Dose Equivalent I-131 exceeds 50 percent of the limits in Specification 2.20, the sampling and analysis frequency shall be increased to a minimum of 5 times per week. When Steam Generator Dose Equivalent I-131 exceeds 75 percent of this limit, the sampling and analysis frequency shall be increased to a minimum of once per day.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 1. | Control Element Assemblies | Drop times of all full-length CEA's | Prior to reactor criticality after each removal of the reactor vessel closure head | 7.5.3 |
| 2. | Control Element Assemblies | Partial movement of all CEA's (Minimum of 6 in) | Q | 7 |
| 3. | Pressurizer Safety Valves | Verify each pressurizer safety valve is OPERABLE in accordance with the Inservice Testing Program. Following testing, lift settings shall be 2485 psig ±1% and 2530 psig ±1% respectively. | R | 7 |
| 4. | Main Steam Safety Valves | Set Point | R | 4 |
| 5. | DELETED | | | |
| 6. | DELETED | | | |
| 7. | DELETED | | | |
| 8a. | Reactor Coolant System Leakage*** | Evaluate | D* | 4 |
| 8b. | Primary to Secondary Leakage **** | Continuous process radiation monitors or radiochemical grab sampling | D* | 4 |
| 9a | Diesel Fuel Supply | Fuel Inventory | M | 8.4 |
| 9b. | Diesel Lubricating Oil Inventory | Lube Oil Inventory | M | 8.4 |
| 9c. | Diesel Fuel Oil Properties | Test Properties | In accordance with the Diesel Fuel Oil Testing Program | 8.4 |
| 9d. | Required Diesel Generator Air Start Receiver Bank Pressure | Air Pressure | M | 8.4 |

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

* Whenever the system is at or above operating temperature and pressure.

*** Not applicable to primary to secondary LEAKAGE.

**** Verify primary to secondary LEAKAGE is ≤ 150 gallons per day through any one SG.
This surveillance is not required to be performed until 12 hours after establishment of steady state operation.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 9e. | Check for and Remove Accumulated Water from Each Fuel Oil Storage Tank | Check for Water and Remove | Q | 8.4 |
| 10a. | Charcoal and HEPA Filters for Control Room Air Filtration System (CRAFS) | 1. In-Place Testing** Charcoal adsorbers and HEPA filter banks shall be leak tested and show ≥99.95% Freon (R-11 or R-112) and cold DOP particulates removal, respectively. | On a refueling frequency or every 720 hours of system operation or after each complete or partial replacement of the charcoal adsorber/HEPA filter banks, or after any major structural maintenance on the system housing or following significant painting, fire or chemical releases in a ventilation zone communicating with the system. | 9.10 |
| | | 2. Laboratory Testing** Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 0.175% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%. | On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | |

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 10a. | (continued) | 3. Overall System Operation | | |
| | | a. Each train shall be operated. | Ten continuous hours every month with heaters operating. | |
| | | b. The pressure drop across the combined HEPA filters and charcoal adsorber banks shall be demonstrated to be less than 9 inches of water at system design flow rate. | R | |
| | | c. Fan shall be shown to operate within ± 10% design flow. | R | |
| | | 4. Automatic and manual initiation of each train shall be demonstrated. | R | |
| 10b. | Charcoal Adsorbers for Spent Fuel Storage Pool Area | 1. In-Place Testing** Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal. | On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | 6.2<br>9.10 |
| | | 2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%. | On a refueling frequency or every 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | |

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 10b. | (continued) | 3. Overall System Operation | | |
| | | a. Operation of each circuit shall be demonstrated. | Ten hours every month. | |
| | | b. Volume flow rate through charcoal filter shall be shown to be between 4500 and 12,000 cfm. | R | |
| | | 4. Manual initiation of the system shall be demonstrated. | R | |
| 10c. | Charcoal Adsorbers for S.I. Pump Room | 1. In-Place Testing** Charcoal adsorbers shall be leak tested and shall show ≥99% Freon (R-11 or R-112) removal. | On a refueling frequency or every 720 hours of system operation, or after each complete or partial replacement of the charcoal adsorber bank, or after any major structural maintenance on the system housing or following significant painting, fire or chemical release in any ventilation zone communicating with the system. | 9.10<br>6.2 |
| | | 2. Laboratory Testing Verify, within 31 days after removal, that a laboratory test of a sample of the charcoal adsorber, when obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows methyliodide penetration less than 10% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 95%. | On a refueling frequency or following 720 hours of system operation or after any structural maintenance on the HEPA filter or charcoal adsorber housing or following significant painting, fire or chemical release in a ventilation zone communicating with the system. | |
| | | 3. Overall System Operation | | |
| | | a. Operation of each circuit shall be demonstrated. | Ten hours every month. | |
| | | b. Volume flow rate shall be shown to be between 3000 and 6000 cfm. | R | |

**Tests shall be performed in accordance with applicable section(s) of ANSI N510-1980.

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency | USAR Section Reference |
|---|---|---|---|---|
| 10c. | (continued) | 4. Automatic and/or manual initiation of the system shall be demonstrated. | R | |
| 11. | Containment Ventilation System Fusible Linked Dampers | 1. Demonstrate damper action.<br>2. Test a spare fusible link. | 1 year, 2 years, 5 years, and every 5 years thereafter. | 9.10 |
| 12. | Diesel Generator Calibrate Under-Voltage Relays | | R | 8.4.3 |
| 13. | Motor Operated Safety Injection Loop Valve Motor Starters (HCV-311, 314, 317, 320, 327, 329, 331, 333, 312, 315, 318, 321) | Verify the contactor pickup value at ≤85% of 460 V. | R | |
| 14. | Pressurizer Heaters | Verify control circuits operation for post-accident heater use. | R | |
| 15. | Spent Fuel Pool Racks | Test neutron poison samples for dimensional change, weight, neutron attenuation change and specific gravity change. | 1, 2, 4, 7, and 10 years after installation, and every 5 years thereafter. | |
| 16. | Reactor Coolant Gas Vent System | 1. Verify all manual isolation valves in each vent path are in the open position. | During each refueling outage just prior to plant start-up. | |
| | | 2. Cycle each automatic valve in the vent path through at least one complete cycle of full travel from the control room. Verification of valve cycling may be determined by observation of position indicating lights. | R | |
| | | 3. Verify flow through the reactor coolant vent system vent paths. | R | |

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency |
|---|---|---|---|
| 17. | Hydrogen Purge System | 1. Verify all manual valves are operable by completing at least one cycle. | R |
| | | 2. Cycle each automatic valve through at least one complete cycle of full travel from the control room. Verification of the valve cycling may be determined by the observation of position indicating lights. | R |
| | | 3. Initiate flow through the VA-80A and VA-80B blowers, HEPA filter, and charcoal adsorbers and verify that the system operates for at least | |
| | | (a) 30 minutes with suction from the auxiliary building (Room 59) | a) M |
| | | (b) 10 hours with suction from the containment | b) R |
| | | 4. Verify the pressure drop across the VA-82 HEPAs and charcoal filter to be less than 6 inches of water. Verify a system flow rate of greater than 80 scfm and less than 230 scfm during system operation when tested in accordance with 3b. above. | R |
| 18. | Shutdown Cooling | 1. Verify required shutdown cooling loops are OPERABLE and one shutdown cooling loop is IN OPERATION. | S (when shutdown cooling is required by TS 2.8). |
| | | 2. Verify correct breaker alignment and indicated power is available to the required shutdown cooling pump that is not IN OPERATION. | W (when shutdown cooling is required by TS 2.8). |

**TABLE 3-5**
**MINIMUM FREQUENCIES FOR EQUIPMENT TESTS**

| | | Test | Frequency |
|---|---|---|---|
| 19. | Refueling Water Level | Verify refueling water level is ≥ 23 ft. above the top of the reactor vessel flange. | Prior to commencing, and daily during CORE ALTERATIONS and/or REFUELING OPERATIONS inside containment. |
| 20. | Spent Fuel Pool Level | Verify spent fuel pool water level is ≥ 23 ft. above the top of irradiated fuel assemblies seated in the storage racks. | Prior to commencing, and weekly during REFUELING OPERATIONS in the spent fuel pool. |
| 21. | Containment Penetrations | Verify each required containment penetration is in the required status. | Prior to commencing, and weekly during CORE ALTERATIONS and/or REFUELING OPERATIONS in containment. |
| 22. | Spent Fuel Assembly Storage | Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-10. | Prior to storing the fuel assembly in Region 2 (including peripheral cells). |
| 23. | P-T Limit Curve | Verify RCS Pressure, RCS temperature, and RCS heatup and cooldown rates are within the limits specified by the P-T limit Figure(s) shown in the PTLR. | This test is only required during RCS heatup and cooldown operations and RCS inservice leak and hydrostatic testing. While these operations are occurring, this test shall be performed every 30 minutes. |
| 24. | Spent Fuel Cask Loading | Verify by administrative means that initial enrichment and burnup of the fuel assembly is in accordance with Figure 2-11. | Prior to placing the fuel assembly in a spent fuel cask in the spent fuel pool. |

# 5.0 **ADMINISTRATIVE CONTROLS**

## 5.24 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 Ventilation System (CRVS), 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 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 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 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.

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 the CRVS, operating within the tolerance for design flow rate, at a Frequency of 18 months. The results shall be trended and used as part of an 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 3.0.1 are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered leakage, and measuring CRE pressure and assessing the CRE boundary as required by paragraphs c and d, respectively.