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Detroit Edison



10CFR50.67
10CFR50.90

December 29, 2000
NRC-00-0073

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

- References:
- 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43
 - 2) U.S. Nuclear Regulatory Commission, NUREG-1465, "Accident Source Terms for Light-Water Nuclear Power Plants," February 1995
 - 3) U.S. Nuclear Regulatory Commission. Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000

Subject: **Proposed License Amendment for a Limited Scope Application of the Alternative Source Term Guidelines in NUREG-1465 Related to the Re-evaluation of the Fuel Handling Accident Dose Consequences**

Pursuant to 10 CFR 50.67 and 50.90, Detroit Edison hereby proposes to amend the Fermi 2 Plant Operating License NPF-43, Appendix A, Technical Specifications (TS) to modify the requirements for handling irradiated fuel and performing Core Alterations. The proposed changes utilize the acceptance criteria in Reference 3 to evaluate the radiological consequences of the Fuel Handling Accident (FHA). The requested changes revise those specifications associated with various engineered safety feature systems which need no longer be credited following a design basis FHA. These changes are based on the revised analysis of the Fermi 2 Fuel Handling Accident.

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Enclosure 1 provides a description and an evaluation of the proposed license change. Enclosure 2 provides an analysis of significant hazards consideration using the standards of 10 CFR 50.92. Enclosure 3 provides marked up pages of the existing TS and TS Bases to show the proposed changes and a typed version of the affected TS and TS Bases pages with the proposed changes incorporated.

Detroit Edison has reviewed the proposed license change against the criteria of 10 CFR 51.22 for categorical exclusion of environmental review. The proposed change does not involve a significant hazards consideration, nor does it significantly change the types or significantly increase the amounts of effluents that may be released offsite. The change does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed license change meets the criteria provided in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement or an Environmental Assessment.

Detroit Edison requests the approval of this proposed license by August 17, 2001, with a 60-day implementation period following NRC approval. The requested approval date is based on the plan to implement this amendment before the upcoming eighth refueling outage currently scheduled to start on October 26, 2001.

The following commitment is made in this letter:

As part of the implementation of this license amendment, Detroit Edison will revise the guidelines for the assessment of systems removed from service during fuel handling or Core Alterations at Fermi 2 to implement the provisions of Section 11.3.6.5 of NUMARC 93-01.

Should you have any questions or require additional information, please contact Mr. Norman K. Peterson of my staff at (734) 586-4258.

Sincerely,

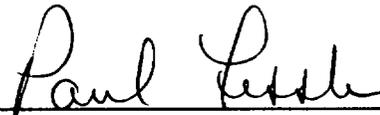
A handwritten signature in black ink, appearing to read "P. Lessler". The signature is written in a cursive style with a large initial "P".

Enclosures

USNRC
NRC-00-0073
Page 3

cc: M. A. Ring
M. A. Shuaibi
NRC Resident Office
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission

I, PAUL FESSLER, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.



PAUL FESSLER
Assistant Vice President – Nuclear Operations

On this 29th day of December, 2000 before me personally appeared Paul Fessler, being first duly sworn and says that he executed the foregoing as his free act and deed.



Notary Public

NORMAN K. PETERSON
Notary Public, Monroe County, MI
My Commission Expires July 24, 2002



**ENCLOSURE 1 TO
NRC-00-0073**

**FERMI 2 NRC DOCKET NO. 50-341
OPERATING LICENSE NO. NPF-43**

REQUEST FOR LICENSE AMENDMENT:

**SELECTIVE SCOPE IMPLEMENTATION OF
ALTERNATIVE SOURCE TERM GUIDELINES RELATED TO
THE FUEL HANDLING ACCIDENT**

**DESCRIPTION AND EVALUATION OF
THE PROPOSED CHANGE**

DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGES

DESCRIPTION

Fermi 2 Technical Specifications (TS) currently impose certain conditions on structures, systems and components when handling irradiated fuel assemblies or when performing Core Alterations. These conditions requiring the operability of certain structures, systems and components are captured in the Applicability statements of the TS. The standard wording of the Applicability statements is:

During movement of irradiated fuel assemblies in the secondary containment,
During CORE ALTERATIONS,

Systems and components related to mitigating the release of radioactive material and that are part of the primary success path for the design basis Fuel Handling Accident (FHA) must be operable during movement of irradiated fuel assemblies in the Secondary Containment and during Core Alterations. Additionally, the Secondary Containment envelope must also be operable during the above conditions.

The Fuel Handling Accident evaluation is described in the Fermi 2 Updated Final Safety Analysis Report (UFSAR), Section 15.7.4. This design basis FHA analysis is based on the NRC Standard Review Plan (SRP), Section 15.7.4, and Regulatory Guide 1.25. The limiting event postulates a drop of a channeled irradiated fuel assembly and the refueling mast onto the open reactor core while the plant is in the refueling mode. As a result, some of the fuel rods in the impacted fuel assemblies in the reactor core and all the rods in the dropped assembly are damaged resulting in the release of gaseous fission products to the reactor coolant and reactor building atmosphere. The reactor building ventilation radiation monitoring system isolates the ventilation system and starts the Standby Gas Treatment (SGT) System. The operable Secondary Containment, SGT, and Control Room Emergency Filtration (CREF) Systems limit the transport of fission products to the environment and the Control Room to within the regulatory limits in 10 CFR Part 100 and the guidelines in SRP 15.7.4.

The Secondary Containment, SGT, CREF and other associated power systems are directly related to mitigating the release of radioactive material and are part of the primary success path for the design basis Fuel Handling Accident. Therefore, appropriate operating restrictions are imposed by the TS to ensure their operability during events that have the potential for fuel cladding integrity damage. Table 15.7.4-3 of the UFSAR indicates that the radiological effects resulting from the FHA at the Exclusion Area Boundary (EAB) are 0.229 rem whole body dose and 0.238 rem thyroid dose for the 9X9 fuel rod assemblies. These values are well within the regulatory acceptance criteria. Control Room dose was not calculated in support of the original

Fermi 2 FHA because the accident scenario assumed operation of both the Standby Gas Treatment System and the Control Room Emergency Filtration System; and because the source term released as a result of the FHA is bounded by that for the Loss of Coolant Accident (LOCA).

Following reactor shutdown, decay of short-lived fission products greatly reduces the fission product inventory present in irradiated fuel. Section 9.1.4.3.2 of the Fermi 2 UFSAR states that the reactor shall be determined to have been subcritical for at least 24 hours prior to movement of irradiated fuel in the reactor pressure vessel. This short period of time for radioactive decay is an assumption in the current FHA analysis. The changes proposed in this license amendment request are based on a longer decay period and take credit for the consequential reduction in radionuclide inventory available for release in the event of a Fuel Handling Accident.

This license amendment involves applying the Alternative Source Term (AST) guidelines described in NUREG-1465 (Reference 2) and Regulatory Guide 1.183 (Reference 3) to the re-analysis of the design basis Fuel Handling Accident and to the evaluation of the associated radiological consequences. This proposed amendment also implements Technical Specification Task Force (TSTF)-51, Revision 2 and Draft Revision 2 of NUREG-1433.

This proposed license amendment requests revisions to selected Technical Specifications that impose certain conditions on structures, systems and components that are part of the primary success path for mitigating the release of radioactive material during the design basis Fuel Handling Accident. The Applicability statements for the Technical Specifications associated with Secondary Containment and selected Engineered Safety Feature (ESF) systems are proposed to be revised to require operability only if fuel which has recently been in the critical reactor core (“recently irradiated fuel”) is handled during the first few days of an outage (prior to the completion of the longer decay period). Along with this TS change, a TS Bases revision will identify recently irradiated fuel as fuel that has occupied part of a critical reactor core within the previous seven days. The seven-day value is based on the results of the FHA re-analysis described below.

In addition, reference to Core Alterations is deleted from the Applicability statements for the Secondary Containment and other affected ESF system Technical Specifications. The Fuel Handling Accident is the only event during Core Alterations that is postulated to result in fuel damage and radiological release. The FHA radiological consequences, following the longer decay period, have been evaluated in the revised FHA analysis. Regulatory safety margins are shown to be preserved without the need for Secondary Containment and without the treatment of the fission product gaseous releases.

The following table identifies the Fermi 2 TS Limiting Conditions for Operation (LCOs) for which the Applicability statements are changed from “During movement of irradiated fuel assemblies in the secondary containment” to “During movement of recently irradiated fuel

assemblies in the secondary containment.” The table also identifies those LCOs for which reference to Core Alterations is deleted from the Applicability statements. Consistent changes are made to the associated Actions in each of these LCOs to reflect the changes to the Applicability statements. Corresponding changes to the affected TS Bases are also made. Following approval of this license amendment, Section 15.7.4 of the UFSAR will be revised in accordance with 10 CFR 50.71(e) to describe the re-analysis of the FHA as part of the TS change implementation plan.

TS Number	TS Title	Add “recently” irradiated?	Delete Core Alterations?
3.3.6.2	Secondary Containment Isolation Instrumentation	Yes	Yes
3.3.7.1	Control Room Emergency Filtration (CREF) System Instrumentation	Yes	Yes
3.6.4.1	Secondary Containment	Yes	Yes
3.6.4.2	Secondary Containment Isolation Valves (SCIVs)	Yes	Yes
3.6.4.3	Standby Gas Treatment (SGT) System	Yes	Yes
3.7.3	Control Room Emergency Filtration (CREF) System	Yes	Yes
3.7.4	Control Center Air Conditioning (AC) System	Yes	Yes
3.8.2	AC Sources – Shutdown	Yes	No
3.8.5	DC Sources – Shutdown	Yes	No
3.8.8	Distribution Systems – Shutdown	Yes	No

The proposed changes do not impact the Applicability of TS requirements for systems needed to prevent or mitigate events postulated during Core Alterations other than the Fuel Handling Accident such as those requirements for the Refueling Equipment Interlocks. The changes also do not alter the requirements for maintaining minimum water level over irradiated fuel, or the requirements for systems needed for decay heat removal or for the mitigation of events during operations with a potential for draining the reactor vessel (OPDRVs).

Implementation of the proposed changes will have significant beneficial impact on outage activities at Fermi 2 and are expected to result in reduced outage costs and increased flexibility while maintaining adequate safety margin. Currently, moving large equipment into Secondary Containment, such as chemical decontamination equipment or large plant equipment requiring repair, must be coordinated with the requirements for the establishment of Secondary Containment. This sometimes results in delays to certain “critical path” activities and extends outage duration. Additionally, the high level of modification, maintenance and repair activities during refueling outages has resulted in excessive usage of airlock doors, which has led to frequent break downs and need for repairs. This situation resulted in less effective approaches to

work activities, less convenient access paths, and less efficient utilization of personnel and contract resources.

Refueling outage work on some divisional systems is scheduled such that one division is maintained operable while work is being completed on the other division. In some cases, unanticipated problems with one of the required operable systems may result in the suspension of movement of irradiated fuel or other Core Alterations such as Control Rod Drive (CRD) testing while restoring the divisional systems to meet TS requirements. Examples of such divisional systems are the Non-interruptible Air Supply System that feeds the inflatable seals for the railway airlock doors of the Reactor Building to maintain Secondary Containment and other associated support systems such as the Emergency Equipment Cooling Water (EECW) and the Emergency Equipment Service Water (EESW) Systems. The proposed changes will also allow for performing maintenance work on the non-redundant components or portion of the CREF System without suspending refueling activities.

These factors, coupled with the increased flexibility in scheduling other testing and maintenance activities during outages, will translate into improvements in plant maintenance, operation and safety, and are predicted to result in approximately one day shortening in the overall refueling outage duration. These benefits will be realized while still maintaining adequate safety margin.

EVALUATION OF THE PROPOSED CHANGES

The use of the term “recently irradiated fuel” provides a mechanism for applying TS operational restrictions when handling irradiated fuel that contains fission products and when significant radioactive releases can be postulated as a result of dropping a fuel assembly. Such restrictions would not be imposed when the postulation of these releases is no longer applicable. The seven-day period that defines the term “recently irradiated fuel” in the TS Bases has been derived from the re-analysis of the Fuel Handling Accident. This period allows for sufficient reduction in fuel fission product levels such that the radiological consequences resulting from an FHA will be within the Total Effective Dose Equivalent (TEDE) acceptance criteria of Regulatory Guide 1.183 (Reference 3) and the limits in 10 CFR 50.67. Based on the analysis, the 10 CFR 50.59 process may be used to change the seven-day value in the TS Bases to three days if the fuel burnup is verified to meet the limits imposed by the footnote to Table 3 of Regulatory Guide 1.183.

In addition to the Fuel Handling Accident, other accidents postulated to occur during Core Alterations include Control Rod Removal Error During Refueling (UFSAR 15.4.1.1); Control Rod Maloperation (UFSAR 15.4.3); and Misplaced Bundle Accident (UFSAR 15.4.7). As described in the referenced UFSAR Sections, these three events have been determined to not involve fuel cladding integrity damage. The only accident postulated to occur during Core Alterations that has the potential to cause significant radioactive release is the Fuel Handling Accident. The limiting FHA event involves dropping a recently irradiated fuel assembly along

with the refueling mast onto other recently irradiated fuel assemblies in the open reactor core. However, a less limiting FHA that could occur as part of Core Alterations would be the drop of a non-irradiated assembly along with the fuel mast onto irradiated fuel assemblies that have occupied part of a critical core 24 hours before the accident. This scenario has also been evaluated as part of the FHA re-analysis taking no credit for Secondary Containment, SGT or CREF Systems. The radiological consequences associated with this accident were found to meet the acceptance criteria of Reference 3. Therefore, deleting reference to Core Alterations in the Applicability statements of the pertinent TS would not result in exceeding the regulatory dose criteria.

The proposed changes to the TS Applicability statements and associated Actions have no direct effect on the probability of the Fuel Handling Accident. Radiological consequences will remain within the acceptable regulatory guidelines. The “defense in depth” risk management strategy for operation during plant shutdown conditions requires the establishment of contingency plans for restoring Secondary Containment in the event of an FHA. The proposed changes have no significant impact on the plant risk associated with refueling operations nor on the at-power Core Damage Frequency (CDF) and Large Early Release Frequency (LERF).

Re-Analysis of the Fuel Handling Accident

The Fermi 2 Fuel Handling Accident has been reanalyzed to evaluate the offsite and Control Room radiological consequences assuming a longer post-shutdown decay and no credit for certain ESF structures, systems and subsystems previously credited to mitigate this event. Prior to this decay period, the fuel is classified as “recently irradiated” and dose consequences are calculated taking credit for these structures and systems. The scope of the analysis also includes the evaluation of the radiological consequences associated with dropping a new fuel bundle over the core 24 hours after shutdown (i.e. over recently irradiated fuel) without credit for certain ESF mitigating structures and systems.

In accordance with the methodology in Regulatory Guide 1.183, the new analysis evaluates the radiological consequences of the FHA in terms of the Total Effective Dose Equivalent (TEDE). The analysis demonstrates that the offsite and Control Room dose consequences associated with the worst-case accident meet the acceptance criteria established in Regulatory Guide 1.183. The analysis establishes that seven days after reactor shutdown, fuel from the reactor vessel does not need to be considered “recently irradiated” and ESF systems supporting Secondary Containment and Control Room integrity and filtration do not need to be credited.

The following describes the highlights of the FHA re-analysis:

- Except as noted below, the analysis is based on NRC Standard Review Plan 15.0.1 and Regulatory Guide 1.183.

- The consequences associated with both 9x9 fuel rod assembly (GE11) and 10x10 fuel rod assembly (GE14) are evaluated. Because the allowable burnup on the GE11 fuel is assumed to exceed the limitations imposed by the footnote to Table 3 in Regulatory Guide 1.183, the GE11 is analyzed in accordance with the AST but assuming the currently licensed non-LOCA gap fractions as described in Section 15.7.4 of the UFSAR and summarized in Table 1 below. GE14 fuel is not presently loaded in the Fermi 2 reactor core; however, its use has been generically approved by the NRC as part of General Electric's generic licensing submittals. The approved parameters for the GE14 fuel meet the Regulatory Guide 1.183 limitations on fuel burnup; therefore, it is analyzed using the Regulatory Guide 1.183 non-LOCA gap fractions. It is important to note that if the burnup on the GE11 fuel was verified to meet the limitations specified in Regulatory Guide 1.183, and thus evaluated assuming the same gap release fractions applied to the GE14 fuel, the GE14 FHA source term would be more limiting.
- In accordance with Regulatory Guide 1.183, the analyses for both the GE11 and GE14 fuel types assume the decontamination factors of 500 and 1 for the elemental and organic iodine species for the calculation of the overall decontamination factor using the Burley formulation. These are the decontamination factors corresponding to a 23-foot depth of water.

Although as little as 22 feet of water may be present over the assemblies in the spent fuel pool, a drop over the Reactor Pressure Vessel has greater associated radiological consequences since it results in a larger number of damaged fuel rods. The difference in the iodine decontamination factor for a drop over the spent fuel pool is not significant enough to limit the FHA analysis; therefore, only drops over the reactor core are explicitly evaluated.

- As with the gap fractions, a different chemical iodine distribution is assumed for each the GE11 and GE14 fuel based on the possibility that the GE11 fuel would exceed the limitation imposed by the footnote to Table 3 in Regulatory Guide 1.183. The GE11 iodine chemical distribution is based on the Regulatory Guide 1.25 values and the GE14 values are based on Regulatory Guide 1.183.
- The number of damaged fuel rods is based on the analysis and methodology described in Section 15.7.4 of the Fermi 2 UFSAR assuming a 34-ft drop over the core inside the Reactor Pressure Vessel (RPV).
- Dose Conversion Factors (DCFs) for Inhalation and Immersion are taken from the Environmental Protection Agency (EPA) Federal Guidance Reports (FGRs) 11 and 12, respectively. Regulatory Guide 1.109 is the source of the DCFs used in

the original Fermi 2 FHA analysis. The FGR values represent current accepted estimates and are cited in Regulatory Guide 1.183 as acceptable values.

- An offsite dose limit of 6.3 rem TEDE is used per Regulatory Guide 1.183.
- A worst-case two-hour Control Room dose limit of 5-rem TEDE is used per 10 CFR 50 Appendix A, General Design Criterion (GDC) 19.
- The NRC's ARCON96 code is used to calculate new Control Room atmospheric dispersion values (χ/Qs) for both the SGT and Reactor Building Heating, Ventilation and Air Conditioning (RBHVAC) exhaust stacks as well as for the Reactor Building first floor railway and Outage Building air look doors using the Fermi 2 site meteorological data for the years 1995 – 1999. This χ/Q evaluation was necessary because the RBHVAC stack and the first floor railway doors were not previously evaluated as release points for the Control Room. The SGT stack χ/Qs to the north and south Control Room air intakes were also re-evaluated in a manner consistent with the new release points. The analysis assumes a χ/Q value which bounds releases through the SGT and RBHVAC exhaust stacks and the two first floor release locations. Other release points were considered but ruled out since they are not likely to be open long enough to affect dose consequences.

The new χ/Qs for elevated release points were calculated assuming a zero-velocity vent release. Selecting this option for the evaluation allowed the ARCON96 computer code to use the 60-meter meteorological tower data with the ground release equations. Releases from the first floor locations were evaluated using the ground release option of ARCON96. These assumptions correspond more closely to the actual release conditions and were determined to be conservative.

The Exclusion Area Boundary and Low Population Zone χ/Q estimates were not re-evaluated.

- Secondary Containment automatic isolation and filtration were not credited for drops of irradiated fuel after a seven-day decay time (three days for the GE14 fuel).
- No mitigation credit was assumed for the CREF System for FHAs occurring after a seven-day decay time (three days for the GE14 fuel), i.e.
 - Normal Control Room ventilation circulation and makeup continues to operate
 - No automatic Control Room ventilation isolations
 - No recirculation filtration

- No manual operation to select the emergency air inlet with the lowest dose
- Other key inputs not discussed above are presented in Table 1 below.

As delineated in Regulatory Guide 1.183, radionuclides that should be considered for the FHA include xenons, kryptons, halogens, cesiums and rubidiums. Table 2 lists the core radionuclide inventory used in the FHA re-analysis. This core inventory is consistent with the one used in the original FHA analysis. Cesiums and rubidiums are particulates that remain in the water of the RPV cavity.

Table 3 provides the dose consequences resulting from dropping a 9X9 or a 10X10 fuel assembly on the reactor core for two different FHA scenarios. The first scenario is a drop of an irradiated bundle several days after shutdown and the second one is a drop of a new (non-irradiated) bundle 24 hours after shutdown. For both scenarios, no credit is taken for Secondary Containment, Standby Gas Treatment System or Control Room Emergency Filtration System. The dose consequences are provided in total effective dose equivalent (TEDE) values at the Exclusion Area Boundary (EAB), Low Population Zone (LPZ) and to the Control Room.

Table 1

Key Inputs for the FHA re-Analysis

Description	Value	Notes
Reactor Power Level	3499 MWt	Includes 2% uncertainty in accordance with RG 1.183
Radial Peaking Factor	1.5 / 1.7	GE11 / GE14
Fuel Rods Damaged	140 / 172 66 / 85	GE11 / GE14 irradiated fuel bundle dropped over RPV GE11 / GE14 new fuel bundle dropped over RPV
Total Rods In Core	56,536 / 66,720	GE11 / GE14
Core Radionuclide Inventory	See Table 2 below	Current Fermi 2 core inventory assumed for both GE11 and GE14 fuel types. Also, decay and daughtering is credited.
Gap Fractions: <ul style="list-style-type: none"> • Iodine 131 • Other Halogens • Kr-85 • Noble Gases (excluding Kr-85) 	12% / 8% 10% / 5% 30% / 10% 10% / 5%	GE11 / GE14 For GE11, the analysis assigns 12% gap fraction to all the iodine source term and not just for I-131.
Iodine Release Chemical Form <ul style="list-style-type: none"> • Elemental • Organic • Aerosol 	99.75% / 4.85% 0.25% / 0.15% 0.0% / 95%	GE11 / GE14 In accordance with Regulatory Guide 1.183, the 95% aerosol component for the GE14 fuel is assumed to be in the form of cesium iodine (CsI) which instantaneously dissociates in the water. The iodine is then assumed to instantaneously re-evolve in the elemental form.
Overall Effective Iodine Decontamination Factor	222.5 / 280.0	GE11 / GE14 Based on the Burley formulation.
χ/Q : Control Room EAB	4.15E-3 m ³ /s 1.23E-4 m ³ /s	Bounding χ/Q represents transport to the south Control Room air intake. Original UFSAR value
Control Room Volume	2.53E5 ft ³	Ventilated Volume
Control Room Fresh Air Makeup Rate	13,000 cfm	Maximum expected rate from normal (south) air intake.
Refuel Floor Volume	950,000 ft ³	5 th Floor Reactor Building
Refuel Floor Ventilation Rate	95,000 cfm	95,000 cfm is conservatively assumed to ensure the source term is released within 2 hours. 33,000 cfm is the normal rate of ventilation supplied by RBHVAC. 95,000 cfm effectively releases the source term within one-hour.

Table 2
FHA Core Radionuclide Inventory

Nuclide	Shutdown Activity (Ci/MWt)	24 hour Activity (Ci/MWt)	7 days Activity (Ci/MWt)
Xe-131m	158	165	177
Xe-133	55280	53212	26678
Xe-133m	2305	1971	361
Xe-135	7149	12302	0
Xe-135m	10420	748	0
Kr-83m	3137	0	0
Kr-85	302	302	301
Kr-85m	6734	164	0
Kr-87	12920	0	0
Kr-88	18300	52	0
I-131	26310	24320	14671
I-132	38450	32040	8942
I-133	55020	24727	204
I-134	60560	0	0
I-135	51950	4194	0
Te-131m	3730	2142	77
Te-132	37900	30637	8551

Table 3
FHA Dose Consequences

Dropped Bundle	Irradiated or New	Time from Shutdown	EAB TEDE Dose (rem)	LPZ TEDE Dose (rem)	Control Room TEDE Dose (rem)
9X9	Irradiated	7 days	0.180	0.020	4.807
10X10	Irradiated	7days	0.109	0.012	2.968
10X10	Irradiated	3 days	0.164	0.019	4.307
9X9	New	24 hours	0.218	0.025	4.557
10X10	New	24 hours	0.132	0.015	2.790

Supplemental Shutdown Risk Justification

10 CFR 50.65 (a) (4) requires the assessment and management of the increase in risk that may result from performing certain maintenance activities and taking risk significant systems out of service. These provisions apply during power operation and during reactor shutdown. Regulatory Guide 1.182 "Assessing and Managing Risk before Maintenance Activities at Nuclear Power Plants" states that the methods described in Section 11 of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," are acceptable to the NRC staff for complying with the provisions of 10 CFR 50.65 (a) (4). Specifically, Section 11.3.6.5 of NUMARC 93-01 states:

Maintenance activities involving the need for open containment should include evaluation of the capability to achieve containment closure in sufficient time to mitigate potential fission product release. This time is dependent on a number of factors, including the decay heat level and the amount of RCS inventory available.

For BWRs, technical specifications may require secondary containment to be closed under certain conditions, such as during fuel handling and operations with a potential to drain the vessel.

In addition to the guidance in NUMARC 91-06, for plants which obtain license amendments to utilize shutdown safety administrative controls in lieu of Technical Specification requirements on primary or secondary containment operability and ventilation system operability during fuel handling or core alterations, the following guidelines should be included in the assessment of systems removed from service:

- *During fuel handling/core alterations, ventilation system and radiation monitor availability (as defined in NUMARC 91-06) should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the RCS decays fairly rapidly. The basis of the Technical Specification operability amendment is the reduction in doses due to such decay. The goal of maintaining ventilation system and radiation monitor availability is to reduce doses even further below that provided by the natural decay, and to avoid unmonitored releases.*
- *A single normal or contingency method to promptly close primary or secondary containment penetrations should be developed. Such prompt methods need not completely block the penetration or be capable of resisting pressure. The purpose is to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored.*

Fermi 2 Integrated Work Management Guidelines (IWMG) for outage nuclear safety require the review of provisions to maintain or restore Secondary Containment integrity, as necessary during each plant outage state, based on considerations for TS requirements, activities being performed, availability of SGT System and conditions that would prevent the establishment of Secondary Containment integrity.

The IWMG for outage nuclear safety discuss the establishment of contingency plans for recovery of Secondary Containment whenever planned breaches are to occur. The guidelines for the assessment of systems removed from service during fuel handling or Core Alterations will be revised upon approval of this License Amendment request to implement the provisions of Section 11.3.6.5 of NUMARC 93-01.

**ENCLOSURE 2 TO
NRC-00-0073**

**FERMI 2 NRC DOCKET NO. 50-341
NRC LICENSE NO. NPF-43**

REQUEST FOR LICENSE AMENDMENT:

**SELECTIVE SCOPE IMPLEMENTATION OF
ALTERNATIVE SOURCE TERM GUIDELINES RELATED TO
THE FUEL HANDLING ACCIDENT**

10CFR50.92 SIGNIFICANT HAZARDS CONSIDERATION

10CFR50.92 SIGNIFICANT HAZARDS CONSIDERATION

In accordance with 10 CFR 50.92, Detroit Edison has made a determination that the proposed amendment involves no significant hazards consideration. The License Amendment described above does not involve a significant hazards consideration for the following reasons:

1. The change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The new “recently irradiated fuel” term to describe irradiated fuel assemblies is used to establish operational conditions where specific activities represent situations where significant radioactive releases can be postulated. These operational conditions are consistent with the design basis analysis. Because the equipment affected by the revised operational conditions is not an initiator to any previously analyzed accident, the proposed change cannot increase the probability of any previously evaluated accident.

The re-analysis of the Fuel Handling Accident concludes that radiological consequences are within the acceptance criteria in Regulatory Guide 1.183 (Reference 3). The results of the Core Alterations events other than the Fuel Handling Accident remain unchanged from the original design basis, which showed that these events do not result in fuel cladding damage or radioactive release. The FHA re-analysis includes a drop of a non-irradiated fuel assembly over recently irradiated assemblies in the reactor core 24 hours after reactor shutdown. The radiological consequences associated with this scenario, assuming no mitigation credit for Secondary Containment, SGT and CREF Systems, have been shown to satisfy the acceptance criteria in Reference 3. Therefore, the proposed changes do not significantly increase the radiological consequences of any previously evaluated accident.

Based on the above, the proposed changes do not significantly increase the probability or consequences of any accident previously evaluated.

2. The change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed requirements are imposed when specific activities represent situations where significant radioactive releases are not postulated. The proposed requirements are supported by the revised design basis Fuel Handling Accident analysis. The proposed changes do not introduce any new modes of plant operation and do not involve physical modifications to the plant. Therefore, the proposed change does not create the potential for a new or different kind of accident from any accident previously evaluated.

3. The change does not involve a significant reduction in the margin of safety.

The proposed changes revise the Fermi 2 TS to establish operational conditions where specific activities represent situations during which significant radioactive releases can be postulated. These operational conditions are consistent with the design basis analysis and are established such that the radiological consequences are at or below the regulatory guidelines. Safety margins and analytical conservatisms are retained to ensure that the analysis adequately bounds all postulated event scenarios. The proposed TS Applicability statements continue to ensure that the TEDE at both the Control Room and the exclusion area and low population zone boundaries are below the corresponding regulatory guidelines in Reference 3; therefore, the proposed change will not result in a significant reduction in the margin of safety.

**ENCLOSURE 3 TO
NRC-00-0073**

**FERMI NRC DOCKET NO. 50-341
OPERATING LICENSE NPF-43**

REQUEST FOR LICENSE AMENDMENT:

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ALTERNATIVE SOURCE TERM GUIDELINES RELATED TO
THE FUEL HANDLING ACCIDENT**

Attached is a mark-up of the affected Technical Specifications (TS) and TS Bases pages, indicating the proposed changes (Part 1), and a typed version of the affected TS and TS Bases pages incorporating the proposed changes (Part 2).

**ENCLOSURE 3 TO
NRC-00-0073
PART 1**

**A MARK-UP OF AFFECTED TS PAGES
INDICATING PROPOSED CHANGES
(INCLUDING TS BASES)**

Affected TS Pages:

3.3-62, 3.3-70
3.6-40, 3.6-41, 3.6-43, 3.6-45, 3.6-47, 3.6-48, 3.6-49
3.7-6, 3.7-7, 3.7-8, 3.7-11, 3.7-12, 3.7-13
3.8-10, 3.8-11, 3.8-12, 3.8-19, 3.8-20, 3.8-28

Affected TS Bases Pages:

B 3.3.6.2-6, B 3.3.6.2-7
B 3.3.7.1-5
B 3.6.4.1-1, B 3.6.4.1-2, B 3.6.4.1-4
B 3.6.4.2-1, B 3.6.4.2-2, B 3.6.4.2-5
B 3.6.4.3-2, B 3.6.4.3-3, B 3.6.4.3-4, B 3.6.4.3-5
B 3.7.3-2, B 3.7.3-3, B 3.7.3-4, B 3.7.3-5, B 3.7.3-6
B 3.7.4-3, B 3.7.4-4, B 3.7.4-5
B 3.8.2-1, B 3.8.2-3, B 3.8.2-4, B 3.8.2-5
B 3.8.5-1, B 3.8.5-2, B 3.8.5-3
B 3.8.8-1, B 3.8.8-2, B 3.8.8-3

Insert A (page B 3.3.6.2-6)

Due to radioactive decay, this Function is only required to isolate secondary containment during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert B (page B 3.3.7.1-5, two places)

Also due to radioactive decay, this Function is only required to initiate the CREF System during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert C (pages B 3.6.4.1-1, B 3.6.4.2-1, B 3.6.4.3-2 and B 3.7.3-2)

involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days)

Insert D (page B 3.6.4.1-2)

Due to radioactive decay, secondary containment is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert E (page B 3.6.4.2-2)

Due to radioactive decay, SCIVs are only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert F (page B 3.6.4.3-3)

Due to radioactive decay, the SGT System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert G (page B 3.7.3-3)

Due to radioactive decay, the CREF System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert H (page B 3.7.4-3)

Due to radioactive decay, the Control Room AC System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert I (page B 3.8.2-1)

involving handling recently irradiated fuel. Due to radioactive decay, AC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert J (pages B 3.8.2-3, B 3.8.5-2 and B 3.8.8-2)

involving handling recently irradiated fuel

Insert K (pages B 3.8.2-4, B 3.8.5-2 and B 3.8.8-2)

involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days)

Insert L (page B 3.8.5-1)

involving handling recently irradiated fuel. Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Insert M (page B 3.8.8-1)

involving handling recently irradiated fuel. Due to radioactive decay, AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

Secondary Containment Isolation Instrumentation
3.3.6.2

Table 3.3.6.2-1 (page 1 of 1)
Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low, Level 2	1.2.3. (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	≥ 103.8 inches
2. Drywell Pressure - High	1.2.3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 1.88 psig
3. Fuel Pool Ventilation Exhaust Radiation - High	1.2.3. (a).(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 6 mR/hr
4. Manual Initiation	1.2.3. (a).(b)	1	SR 3.3.6.2.5	NA

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

(b) During CORE ALTERATIONS and during movement of irradiated fuel assemblies in secondary containment.

recently

Table 3.3.7.1-1 (page 1 of 1)
Control Room Emergency Filtration System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low. Level 2	1.2.3.(a)	2	B	SR 3.3.7.1.1 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5 SR 3.3.7.1.6	≥ 103.8 inches
2. Drywell Pressure - High	1.2.3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5 SR 3.3.7.1.6	≤ 1.88 psig
3. Fuel Pool Ventilation Exhaust Radiation - High	1.2.3. (a).(b)	2	B	SR 3.3.7.1.1 SR 3.3.7.1.3 SR 3.3.7.1.5 SR 3.3.7.1.6	≤ 6 mR/hr
4. Control Center Normal Makeup Air Radiation - High	1.2.3. (a).(b)	1	C	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.5	≤ 5 mR/hr

- (a) During operations with a potential for draining the reactor vessel.
- (b) During ~~CGRE ALTERATIONS~~ and ~~during~~ movement of irradiated fuel assemblies in the secondary containment.

recently

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3. ^{recently}
 During movement of irradiated fuel assemblies in the secondary containment.
~~During CORE ALTERATIONS;~~
 During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Secondary Containment inoperable due to one railroad bay access door inoperable.	A.1 Restore railroad bay door to OPERABLE status.	7 days
B. Secondary containment inoperable in MODE 1, 2, or 3 for reasons other than Condition A.	B.1 Restore secondary containment to OPERABLE status.	4 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	12 hours
	<u>AND</u> C.2 Be in MODE 4.	36 hours

(continued)

Secondary Containment
3.6.4.1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Secondary containment inoperable during movement of irradiated fuel assemblies in the secondary containment during CORE ALTERATIONS or during OPDRVs.	-----NOTE----- LCO 3.0.3 is not applicable. -----	
	D.1 Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND D.2 Suspend CORE ALTERATIONS.	Immediately
	AND D.3 Initiate action to suspend OPDRVs.	Immediately

Handwritten annotations: "recently" circled and connected to "movement of irradiated fuel assemblies"; "D.1", "D.2", and "D.3" circled; "AND" and "D.2" crossed out; "D.3" crossed out and "2" written below it; "Immediately" circled in the second row.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.4.1.1 Verify secondary containment vacuum is ≥ 0.125 inch of vacuum water gauge.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. Required Action and associated Completion Time of Condition A or B not met during movement of irradiated fuel assemblies in the secondary containment <u>during CORE ALTERATIONS</u>, or during OPDRVs.</p> <p><i>recently</i></p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>D.1 Suspend movement of irradiated fuel assemblies in the secondary containment.</p> <p><i>AND</i></p> <p>D.2 Suspend CORE ALTERATIONS.</p> <p>AND</p> <p><i>D.3</i> 2 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3. ^{recently}
 During movement of irradiated fuel assemblies in the secondary containment.
~~During CORE ALTERATIONS.~~
 During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment ⁶ during CORE ALTERATIONS, or during OPDRVs.</p> <p>recently →</p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>C.1 Place OPERABLE SGT subsystem in operation.</p> <p>OR</p> <p>C.2.1 Suspend movement of irradiated fuel assemblies in secondary containment.</p> <p>AND</p> <p>C.2.2 Suspend CORE ALTERATIONS.</p> <p>AND</p> <p>C.2.3 ₂ Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p>
<p>D. Two SGT subsystems inoperable in MODE 1, 2, or 3.</p>	<p>D.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>E. Two SGT subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment during CORE ALTERATIONS, or during OPDRVs.</p> <p><i>recently</i></p>	<p>.....NOTE..... LCO 3.0.3 is not applicable. </p> <p>E.1 Suspend movement of irradiated fuel assemblies in secondary containment.</p> <p>AND</p> <p>E.2 Suspend CORE ALTERATIONS.</p> <p>AND</p> <p><i>E.2</i> 2 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

3.7 PLANT SYSTEMS

3.7.3 Control Room Emergency Filtration (CREF) System

LCO 3.7.3 The CREF System shall be OPERABLE.

APPLICABILITY:

MODES 1, 2, and 3.

recently

During movement of irradiated fuel assemblies in the secondary containment.

~~During CORE ALTERATIONS.~~

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREF subsystem inoperable.	A.1 Restore CREF subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment during CORE ALTERATIONS or during OPDRVs.</p> <p><i>recently</i></p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>C.1 Place OPERABLE CREF subsystem in recirculation mode.</p> <p>OR</p> <p>C.2.1 Initiate action to suspend OPDRVs.</p> <p><u>AND</u></p> <p>-----NOTE----- Not required for a CREF System or subsystem inoperable for performance of SR 3.7.3.6 due to failure to provide the required filtration efficiency, or due to replacement of charcoal filtration media. -----</p> <p>C.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment.</p> <p>AND</p> <p>C.2.3 Suspend CORE ALTERATIONS.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. Two CREF subsystems or a non-redundant component or portion of the CREF System inoperable in MODE 1, 2, or 3.</p>	<p>D.1 Enter LCO 3.0.3.</p>	<p>Immediately.</p>
<p>E. Two CREF subsystems or a non-redundant component or portion of the CREF System inoperable during movement of irradiated fuel assemblies in the secondary containment during CORE ALTERATIONS, or during OPDRVs.</p> <p><i>recently</i></p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>E.1 Initiate action to suspend OPDRVs.</p> <p><u>AND</u></p> <p>-----NOTE----- Not required for a CREF System or subsystem inoperable for performance of SR 3.7.3.6 due to failure to provide the required filtration efficiency, or due to replacement of charcoal filtration media. -----</p> <p>E.2 Suspend movement of irradiated fuel assemblies in the secondary containment.</p> <p>AND</p> <p>E.3 Suspend CORE ALTERATIONS.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

3.7 PLANT SYSTEMS

3.7.4 Control Center Air Conditioning (AC) System

LCO 3.7.4 Two control center AC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3. ^{recently}
 During movement of irradiated fuel assemblies in the secondary containment.
~~During CORE ALTERATIONS.~~
 During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control center AC subsystem inoperable.	A.1 Restore control center AC subsystem to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment ⁶ during CORE ALTERATIONS, or during OPDRVs.</p> <p><i>recently</i> →</p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>C.1 Place OPERABLE control center AC subsystem in operation.</p> <p>OR</p> <p>C.2.1 Suspend movement of irradiated fuel assemblies in the secondary containment.</p> <p>AND</p> <p>C.2.2 Suspend CORE ALTERATIONS.</p> <p>AND</p> <p>² C.2.3 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p> <p>Immediately</p>
<p>D. Two control center AC subsystems inoperable in MODE 1, 2, or 3.</p>	<p>D.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>E. Two control center AC subsystems inoperable during movement of irradiated fuel assemblies in the secondary containment during CORE ALTERATIONS or during OPDRVs.</p> <p><i>recently</i></p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>E.1 Suspend movement of irradiated fuel assemblies in the secondary containment.</p> <p><u>AND</u></p> <p>E.2 Suspend CORE ALTERATIONS.</p> <p><u>AND</u></p> <p>E.3 2 Initiate actions to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.7.4.1 Verify the control room air temperature is $\leq 95^{\circ}\text{F}$.</p>	<p>12 hours</p>

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources - Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

- a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8. "Distribution Systems - Shutdown"; and
- b. Two emergency diesel generators (EDGs) capable of supplying one division of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8.

APPLICABILITY: MODES 4 and 5. ^{recently}
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One required offsite circuit inoperable.</p>	<p>-----NOTE----- Enter applicable Condition and Required Actions of LCO 3.8.8, with one required division de-energized as a result of Condition A. -----</p> <p>A.1 Declare affected required feature(s), with no offsite power available, inoperable.</p> <p><u>OR</u></p>	<p>Immediately</p> <p>(continued)</p>

ACTIONS		
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Suspend CORE ALTERATIONS.	Immediately.
	<u>AND</u>	
	A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	<u>AND</u>	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately

recently



(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or both required EDGs inoperable.	B.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	B.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	B.3 Initiate action to suspend OPDRVs.	Immediately
	AND	
	B.4 Initiate action to restore required EDGs to OPERABLE status.	Immediately

recently



SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.2.1NOTE..... The following SRs are not required to be performed: SR 3.8.1.2, SR 3.8.1.3, and SR 3.8.1.7 through SR 3.8.1.17. For AC sources required to be OPERABLE SR 3.8.1.1 through SR 3.8.1.17, are applicable.	In accordance with applicable SRs

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. (continued)</p>	<p>A.2.1 Suspend CORE ALTERATIONS.</p>	<p>Immediately.</p>
	<p><u>AND</u></p>	
	<p>A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment.</p>	<p>Immediately</p>
	<p><u>AND</u></p>	
	<p>A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.</p>	<p>Immediately</p>
	<p><u>AND</u></p>	
	<p>A.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.</p>	<p>Immediately</p>

recently



3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Distribution Systems - Shutdown

LCO 3.8.8 The necessary portions of the AC and DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 4 and 5. ^{recently}
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC or DC electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
^{recently} →	A.2.2 Suspend handling of irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>	
		(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

individual monitor whose trip outputs are assigned to an isolation channel. Four channels of Fuel Pool Ventilation Exhaust Radiation-High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are chosen to promptly detect gross failure of the fuel cladding.

The Fuel Pool Ventilation Exhaust Radiation-High Function is required to be OPERABLE in MODES 1, 2, and 3 where considerable energy exists; thus, there is a probability of pipe breaks resulting in significant releases of radioactive steam and gas. In MODES 4 and 5, the probability and consequences of these events are low due to the RCS pressure and temperature limitations of these MODES; thus, this Function is not required. In addition, the Function is also required to be OPERABLE during CORE ALTERATIONS, OPDRVs, and movement of irradiated fuel assemblies in the secondary containment, because the capability of detecting radiation releases due to fuel failures (due to fuel uncover or dropped fuel assemblies) must be provided to ensure that offsite dose limits are not exceeded.

recently

Insert A

4. Manual Initiation

The Manual Initiation push button channels introduce signals into the secondary containment isolation and SGTS initiation logic that are redundant to the automatic protective instrumentation channels and provide manual isolation capability. There is no specific UFSAR safety analysis that takes credit for this Function. It is retained for the overall redundancy and diversity of the secondary containment isolation instrumentation as required by the NRC approved licensing basis.

There are two push buttons for the logic, one manual initiation push button per trip system. There is no Allowable Value for this Function, since the channels are mechanically actuated based solely on the position of the push buttons.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

recently

Two channels of Manual Initiation Function are available and are required to be OPERABLE in MODES 1, 2, and 3, and during ~~CORE ALTERATIONS~~, OPDRVs, and movement of irradiated fuel assemblies in the secondary containment. These are the MODES and other specified conditions in which the Secondary Containment Isolation automatic Functions are required to be OPERABLE.

ACTIONS

A Note has been provided to modify the ACTIONS related to secondary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable secondary containment isolation instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable secondary containment isolation instrumentation channel.

A.1

Because of the diversity of sensors available to provide isolation signals and the redundancy of the isolation design, an allowable out of service time of 12 hours for Function 2, and 24 hours for Functions other than Function 2, has been shown to be acceptable (Refs. 4 and 5) to permit restoration of any inoperable channel to OPERABLE status. This out of service time is only acceptable provided the associated Function is still maintaining isolation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

ventilation exhaust). Four channels of Fuel Pool Ventilation Exhaust Radiation-High Function are available (two channels per trip system) and are required to be OPERABLE to ensure that no single instrument failure can preclude CREF System initiation. The Allowable Value was selected to ensure that the Function will promptly detect high activity that could threaten exposure to control room personnel.

recently

The Fuel Pool Ventilation Exhaust Radiation-High Function is required to be OPERABLE in MODES 1, 2, and 3 and during movement of irradiated fuel assemblies in the secondary containment, CORE ALTERATIONS, and operations with a potential for draining the reactor vessel (OPDRVs), to ensure that control room personnel are protected during a LOCA, fuel handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., CORE ALTERATIONS), the probability of a LOCA or fuel damage is low; thus, the Function is not required.

Insert B

OPDRVs

4. Control Center Normal Makeup Air Radiation-High

The control center normal makeup air radiation monitors measure radiation levels before filtration in the inlet ducting of the MCR. A high radiation level may pose a threat to MCR personnel; thus, automatically initiating the CREF System.

The Control Center Normal Makeup Air Radiation-High Function consists of two independent monitors. Two channels of Control Center Normal Makeup Air Radiation-High are available and are required to be OPERABLE to ensure that no single instrument failure can preclude CREF System initiation. The Allowable Value was selected to ensure protection of the control room personnel.

The Control Center Normal Makeup Air Radiation-High Function is required to be OPERABLE in MODES 1, 2, and 3 and during CORE ALTERATIONS, OPDRVs, and movement of irradiated fuel assemblies in the secondary containment, to ensure that control room personnel are protected during a LOCA, fuel handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., CORE ALTERATIONS), the probability of a LOCA or fuel damage is low; thus, the Function is not required.

recently

OPDRVs

Insert B

B 3.6 CONTAINMENT SYSTEMS

B 3.6.4.1 Secondary Containment

BASES

BACKGROUND

The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment following a Design Basis Accident (DBA). In conjunction with operation of the Standby Gas Treatment (SGT) System and closure of certain valves whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside primary containment.

The secondary containment is a structure that completely encloses the primary containment and those components that may be postulated to contain primary system fluid. This structure forms a control volume that serves to hold up and dilute the fission products. It is possible for the pressure in the control volume to rise relative to the environmental pressure (e.g., due to pump and motor heat load additions). To prevent ground level exfiltration while allowing the secondary containment to be designed as a conventional structure, the secondary containment requires support systems to maintain the control volume pressure at less than the external pressure. Requirements for these systems are specified separately in LCO 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)," and LCO 3.6.4.3, "Standby Gas Treatment (SGT) System."

APPLICABLE SAFETY ANALYSES

There are two principal accidents for which credit is taken for secondary containment OPERABILITY. These are a loss of coolant accident (LOCA) (Ref. 1) and a fuel handling accident inside secondary containment (Ref. 2). The secondary containment performs no active function in response to each of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials from the primary containment is

Insert C

BASES

APPLICABLE SAFETY ANALYSES (continued)

restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the secondary containment structure will be treated by the SGT System prior to discharge to the environment.

Secondary containment satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

An OPERABLE secondary containment provides a control volume into which fission products that bypass or leak from primary containment, or are released from the reactor coolant pressure boundary components located in secondary containment, can be diluted and processed prior to release to the environment. For the secondary containment to be considered OPERABLE, it must have adequate leak tightness to ensure that the required vacuum can be established and maintained.

APPLICABILITY

In MODES 1, 2, and 3, a LOCA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, secondary containment OPERABILITY is required during the same operating conditions that require primary containment OPERABILITY.

In MODES 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining secondary containment OPERABLE is not required in MODE 4 or 5 to ensure a control volume, except for other situations for which significant releases of radioactive material can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs) ~~during CORE~~ ALTERATIONS or during movement of irradiated fuel assemblies in the secondary containment.

recently

↑

Insert D

BASES

ACTIONS (continued)

~~D.1, D.2, and D.3~~

recently

Movement of irradiated fuel assemblies in the secondary containment, ~~CORE ALTERATIONS~~ and OPDRVs can be postulated to cause fission product release to the secondary containment. In such cases, the secondary containment is the only barrier to release of fission products to the environment. ~~CORE ALTERATIONS and~~ movement of irradiated fuel assemblies must be immediately suspended if the secondary containment is inoperable.

Therefore,

Suspension of these activities shall not preclude completing an action that involves moving a component to a safe position. Also, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

recently

The Required Actions have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.6.4.1.1

This SR ensures that the secondary containment boundary is sufficiently leak tight to preclude exfiltration under expected wind conditions. The 24 hour Frequency of this SR was developed based on operating experience related to secondary containment vacuum variations during the applicable MODES and the low probability of a DBA occurring between surveillances.

Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal secondary containment vacuum condition.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

BASES

BACKGROUND

The function of the SCIVs, in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents (DBAs). Secondary containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that fission products that leak from primary containment following a DBA, or that are released during certain operations when primary containment is not required to be OPERABLE or take place outside primary containment, are maintained within the secondary containment boundary.

The OPERABILITY requirements for SCIVs help ensure that an adequate secondary containment boundary is maintained during and after an accident by minimizing potential paths to the environment. These isolation devices consist of either passive devices or active (automatic) devices. Manual valves, de-activated automatic valves secured in their closed position (including check valves with flow through the valve secured), and blind flanges are considered passive devices.

Automatic SCIVs close on a secondary containment isolation signal to establish a boundary for untreated radioactive material within secondary containment following a DBA or other accidents.

Other penetrations are isolated by the use of valves in the closed position or blind flanges.

APPLICABLE SAFETY ANALYSES

Insert C →

The SCIVs must be OPERABLE to ensure the secondary containment barrier to fission product releases is established. The principal accidents for which the secondary containment boundary is required are a loss of coolant accident (Ref. 1) and a fuel handling accident inside secondary containment (Ref. 2). The secondary containment performs no active function in response to either of these limiting events, but the boundary established by SCIVs is required to ensure that leakage from the primary containment is processed by the Standby Gas

BASES

APPLICABLE SAFETY ANALYSES (continued)

Treatment (SGT) System before being released to the environment.

Maintaining SCIVs OPERABLE with isolation times within limits ensures that fission products will remain trapped inside secondary containment so that they can be treated by the SGT System prior to discharge to the environment.

SCIVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

SCIVs form a part of the secondary containment boundary. The SCIV safety function is related to control of offsite radiation releases resulting from DBAs.

The power operated automatic isolation valves are considered OPERABLE when their isolation times are within limits and the valves actuate on an automatic isolation signal. The valves covered by this LCO, along with their associated stroke times, are listed in Reference 3.

The normally closed isolation valves or blind flanges are considered OPERABLE when manual valves and blind flanges are closed, or open in accordance with appropriate administrative controls. These passive isolation valves or devices are listed in plant procedures.

APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to the primary containment that leaks to the secondary containment. Therefore, the OPERABILITY of SCIVs is required.

In MODES 4 and 5, the probability and consequences of these events are reduced due to pressure and temperature limitations in these MODES. Therefore, maintaining SCIVs OPERABLE is not required in MODE 4 or 5, except for other situations under which significant radioactive releases can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs) during CORE ALTERATIONS, or during movement of irradiated fuel assemblies in the secondary containment. Moving irradiated fuel assemblies in the secondary containment may also occur in MODES 1, 2, and 3.

recently

Insert E

BASES

ACTIONS (continued)

C.1 and C.2

If any Required Action and associated Completion Time cannot be met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1, D.2, and D.3

If any Required Action and associated Completion Time are not met, the plant must be placed in a condition in which the LCO does not apply. If applicable, ~~CORE ALTERATIONS and the movement of irradiated fuel assemblies~~ in the secondary containment must be immediately suspended. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be immediately initiated to suspend OPDRVs in order to minimize the probability of a vessel draindown and the subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

recently

The Required Actions have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

BASES

BACKGROUND (continued)

The moisture separator is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream to less than 70% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter removes fine particulate matter and protects the charcoal from fouling. The charcoal adsorber removes gaseous elemental iodine and organic iodides, and the final HEPA filter collects any carbon fines exhausted from the charcoal adsorber.

The SGT System automatically starts and operates in response to actuation signals indicative of conditions or an accident that could require operation of the system. Following initiation, both charcoal filter train fans start. Upon verification that both subsystems are operating, the redundant subsystem is normally shut down.

APPLICABLE
SAFETY ANALYSES

The design basis for the SGT System is to mitigate the consequences of a loss of coolant accident and fuel handling accidents (Ref. 2). For all events analyzed, the SGT System is shown to be automatically initiated to reduce, via filtration and adsorption, the radioactive material released to the environment.

Insert C

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

LCO

Following a DBA, a minimum of one SGT subsystem is required to maintain the secondary containment at a negative pressure with respect to the environment and to process gaseous releases. Meeting the LCO requirements for two OPERABLE subsystems ensures operation of at least one SGT subsystem in the event of a single active failure.

APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, SGT System OPERABILITY is required during these MODES.

BASES

APPLICABILITY (continued)

In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the SGT System in OPERABLE status is not required in MODE 4 or 5, except for other situations under which significant releases of radioactive material can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs), ~~during CORE ALTERATIONS~~ or during movement of irradiated fuel assemblies in the secondary containment.

recently →

← Insert F

ACTIONS

A.1

With one SGT subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status in 7 days. In this Condition, the remaining OPERABLE SGT subsystem is adequate to perform the required radioactivity release control function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release control function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant SGT System and the low probability of a DBA occurring during this period.

B.1 and B.2

If the SGT subsystem cannot be restored to OPERABLE status within the required Completion Time in MODE 1, 2, or 3, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner, and without challenging plant systems.

BASES

ACTIONS (continued)

C.1, C.2.1, C.2.2, and C.2.3

During movement of irradiated fuel assemblies, in the secondary containment, during CORE ALTERATIONS, or during OPDRVs, when Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE SGT subsystem should immediately be placed in operation. This action ensures that the remaining subsystem is OPERABLE, that no failures that could prevent automatic actuation have occurred, and that any other failure would be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that represent a potential for releasing radioactive material to the secondary containment, thus placing the plant in a condition that minimizes risk. If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies must immediately be suspended. Suspension of these activities must not preclude completion of movement of a component to a safe position. Also, if applicable, actions must immediately be initiated to suspend OPDRVs in order to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

The Required Actions of Condition C have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

D.1

If both SGT subsystems are inoperable in MODE 1, 2, or 3, the SGT System may not be capable of supporting the required radioactivity release control function. Therefore, actions are required to enter LCO 3.0.3 immediately.

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BASES

ACTIONS (continued)

~~E.1, E.2, and E.3~~

When two SGT subsystems are inoperable, if applicable, ~~CORE~~ ~~ALTERATIONS and~~ movement of irradiated fuel assemblies in secondary containment must immediately be suspended.

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

The Required Actions have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. ~~If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.~~

recently

SURVEILLANCE
REQUIREMENTS

SR 3.6.4.3.1

Operating each SGT subsystem from the control room with flow through the HEPA filters and charcoal adsorbers for ≥ 10 continuous hours ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters on (automatic heater cycling to maintain temperature) for ≥ 10 continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

SR 3.6.4.3.2

This SR verifies that the required SGT filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The SGT System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 3). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical

BASES

BACKGROUND (continued)

automatically switches to the recirculation mode of operation to prevent infiltration of contaminated air into the control room. A part of the recirculated air is routed through the emergency recirculation filter train. Outside air is taken in at one of two emergency outside air ventilation intakes and is passed through the emergency makeup filter train before being mixed with recirculated air. The air mixture is then returned to the control room.

The CREF System is designed to maintain the control room environment for a 30 day continuous occupancy after a DBA without exceeding 5 rem whole body dose or its equivalent to any part of the body. The recirculation mode will pressurize the control room to about 0.250 ± 0.125 inches water gauge to prevent infiltration of air from surrounding buildings. CREF System operation in maintaining control room habitability is discussed in the UFSAR, Chapters 6 and 9 (Refs. 1 and 2, respectively).

APPLICABLE
SAFETY ANALYSES

The ability of the CREF System to maintain the habitability of the control room is an explicit assumption for the safety analyses presented in the UFSAR, Chapters 6 and 15 (Refs. 1 and 3, respectively). The recirculation mode of the CREF System is assumed to operate following a loss of coolant accident, fuel handling accident, main steam line break, and control rod drop accident, as discussed in the UFSAR (Ref. 3). The radiological doses to control room personnel as a result of the various DBAs are also summarized in Reference 3. No single active failure will cause the loss of outside or recirculated air from the control room.

Insert C

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

LCO

The non-redundant passive components and both divisions of the redundant active components of the CREF System must be OPERABLE to ensure that the system safety function can be performed assuming any active single failure. Total system failure could result in exceeding a dose of 5 rem whole-body (or its equivalent to any part of the body) to the control room operators in the event of a DBA.

BASES

LCO (continued)

Redundant components, of which both divisions must be OPERABLE, include:

- a. Emergency inlet air heater;
- b. Emergency recirculation fans;
- c. Return fans;
- d. Supply fans;
- e. Emergency air intakes; and
- f. Air handling dampers needed to support the system operation.

Non-redundant components required to be OPERABLE include:

- a. Emergency recirculation air filter train;
- b. Emergency makeup air filter train; and
- c. Ductwork and other system structures needed to form the necessary air flow paths.

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

APPLICABILITY

In MODES 1, 2, and 3, the CREF System must be OPERABLE to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

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

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

~~b. During CORE ALTERATIONS,~~ and recently

- ~~b.~~ During movement of irradiated fuel assemblies in the secondary containment.

Insert G

BASES

ACTIONS

A.1

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

B.1 and B.2

In MODE 1, 2, or 3, if the inoperable CREF subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

C.1, C.2.1, C.2.2, and C.2.3

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

recently →

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

BASES

ACTIONS (continued)

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

A Note is applied to Required Actions C.2.2 and C.2.3. This Note allows these Required Actions to not be required when the inoperability is due to CREF system duct work testing required by SR 3.7.3.6 or when the system charcoal filter train filter media cannot provide the required efficiency or is being replaced. Dose calculations have shown that the CREF system is not needed during the activities that would otherwise be suspended by these Required Actions.

D.1

If both CREF subsystems or a non-redundant component or portion of the CREF System are inoperable in MODE 1, 2, or 3, the CREF System may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

BASES

ACTIONS (continued)

~~E.1, E.2, and E.3~~

recently

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

During movement of irradiated fuel assemblies in the secondary containment, ~~during CORE ALTERATIONS~~ or during OPDRVs, with two CREF subsystems or a non-redundant component or portion of the CREF System inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

recently

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

A Note is applied to Required Actions E.2 and E.3. This Note allows these Required Actions to not be required when the inoperability is due to CREF system duct work testing required by SR 3.7.3.6 or when the system charcoal filter train filter media cannot provide the required efficiency or is being replaced. Dose calculations have shown that the CREF system is not needed during the activities that would otherwise be suspended by these Required Actions.

BASES

APPLICABILITY (continued)

- a. During operations with a potential for draining the reactor vessel (OPDRVs);
- ~~b. During CORE ALTERATIONS;~~ and recently
- b f. During movement of irradiated fuel assemblies in the secondary containment. Insert H

ACTIONS

A.1

With one control center AC subsystem inoperable, the inoperable control center AC subsystem must be restored to OPERABLE status within 30 days. With the unit in this condition, the remaining OPERABLE control center AC subsystem is adequate to perform the control center air conditioning function. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in loss of the control center air conditioning function. The 30 day Completion Time is based on the low probability of an event occurring requiring control room isolation, the consideration that the remaining subsystem can provide the required protection, and the availability of alternate safety and nonsafety cooling methods.

B.1 and B.2

In MODE 1, 2, or 3, if the inoperable control center AC subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

ACTIONS (continued)

~~C.1, C.2.1, C.2.2, and C.2.3~~

recently

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

During movement of irradiated fuel assemblies in the secondary containment, ~~during CORE ALTERATIONS~~ or during OPDRVs, if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE control center AC subsystem may be placed immediately in operation. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

D.1

If both control center AC subsystems are inoperable in MODE 1, 2, or 3, the Control Center AC System may not be capable of performing the intended function. Therefore, LCO 3.0.3 must be entered immediately.

BASES

ACTIONS (continued)

~~E.1, E.2, and E.3~~

recently

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

During movement of irradiated fuel assemblies in the secondary containment ~~during CORE ALTERATIONS~~ or during OPDRVs, with two control center AC subsystems inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

SURVEILLANCE
REQUIREMENTS

SR 3.7.4.1

This SR verifies that the heat removal capability of the system is sufficient to remove the control room heat load. The SR consists of a verification of the control room temperature. The 12 hour Frequency is appropriate since significant degradation of the Control Center AC System is not expected over this time period.

REFERENCES

1. UFSAR, Section 6.4.
2. UFSAR, Section 9.4.1.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources – Shutdown

BASES

BACKGROUND A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources – Operating."

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 4 and 5 and during movement of irradiated fuel assemblies ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

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In general, when the unit is shut down the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have no specific analyses in MODES 4 and 5. Worst case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and corresponding stresses result in the probabilities of occurrences significantly reduced or eliminated, and minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

BASES

LCO (continued)

buses required OPERABLE by LCO 3.8.8, ensures that a diverse power source is available for providing electrical power support assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and EDGs ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and reactor vessel draindown).

Insert J

The qualified offsite circuit(s) must be capable of maintaining rated frequency and voltage while connected to their respective ESF bus(es), and of accepting required loads during an accident. Qualified offsite circuits are those that are described in the UFSAR and are part of the licensing basis for the unit. The offsite circuit consists of incoming breakers and disconnect to the station service 64 or 65 transformer, and the respective circuit path including feeder breakers to all 4.16 kV ESF buses required by LCO 3.8.8.

The required EDGs must be capable of starting, accelerating to rated speed and voltage, connecting to their respective ESF buses on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds. Each EDG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as EDG in standby with engine hot and EDG in standby with engine at ambient conditions.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for EDG OPERABILITY.

It is acceptable for divisions to be cross tied during shutdown conditions, permitting a single offsite power circuit to supply all required divisions.

BASES

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment to provide assurance that:

recently

- a. Systems providing adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
- b. Systems needed to mitigate a fuel handling accident are available; Insert K
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

ACTIONS

LCO 3.0.3 is not applicable while in MODE 4 or 5. However, since irradiated fuel assembly movement can occur in MODE 1, 2, or 3, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be sufficient reason to require a reactor shutdown.

A.1

An offsite circuit is considered inoperable if it is not available to one required ESF division. If two or more ESF 4.16 kV buses are required per LCO 3.8.8, one division with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required features inoperable with no offsite power available, appropriate restrictions can be

recently irradiated

BASES

ACTIONS (continued)

implemented in accordance with the affected required feature(s) LCOs' ACTIONS.

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required divisions, the option still exists to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With one or both required EDGs inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and activities that could result in inadvertent draining of the reactor vessel.

recently

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, ACTIONS for LCO 3.8.8 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a division is de-energized. LCO 3.8.8 provides the appropriate restrictions for the situation involving a de-energized division.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources - Shutdown

BASES

BACKGROUND A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources - Operating."

APPLICABLE SAFETY ANALYSES The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the emergency diesel generators (EDGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

recently

Insert L

The DC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO At least one DC electrical power subsystem consisting of two 130 VDC batteries in series, two battery chargers, and the corresponding control equipment and interconnecting cabling is required to be OPERABLE to support required DC distribution subsystems required OPERABLE by LCO 3.8.8, "Distribution Systems - Shutdown." In addition, when the redundant division of the Class 1E DC electrical power subsystem is required by LCO 3.8.8, the other DC source subsystem, consisting of either a battery or a battery charger, the corresponding control equipment and interconnecting cabling, is required to be OPERABLE. This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

Insert J

APPLICABILITY The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

recently

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
- b. Required features needed to mitigate a fuel handling accident are available;
- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Insert K

The DC electrical power requirements for MODES 1, 2, and 3, are covered in LCO 3.8.4.

BASES

ACTIONS

LCO 3.0.3 is not applicable while in MODE 4 or 5. However, since irradiated fuel assembly movement can occur in MODE 1, 2, or 3, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be sufficient reason to require a reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.8, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

recently irradiated

recently

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems, should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Distribution Systems – Shutdown

BASES

BACKGROUND A description of the AC and DC electrical power distribution system is provided in the Bases for LCO 3.8.7, "Distribution Systems – Operating."

APPLICABLE SAFETY ANALYSES The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC and DC electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC and DC electrical power sources and associated power distribution subsystems during MODES 4 and 5, and during movement of irradiated fuel assemblies in the secondary containment ensures that:

recently

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

Insert M

BASES

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of Technical Specifications required systems, equipment, and components—both specifically addressed by their own LCO, and implicitly required by the definition of OPERABILITY.

In addition, during the shutdown conditions applicable to this LCO, cross-tie breakers between redundant safety related power distribution systems may be closed.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the plant in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

Insert J

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

recently

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;
- b. Systems needed to mitigate a fuel handling accident are available;
- c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

Insert K

The AC and DC electrical power distribution subsystem requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

BASES

ACTIONS

LCO 3.0.3 is not applicable while in MODE 4 or 5. However, since irradiated fuel assembly movement can occur in MODE 1, 2, or 3, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be sufficient reason to require a reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant divisions of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem division may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made, (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and any activities that could result in inadvertent draining of the reactor vessel).

recently irradiated

recently

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the plant safety systems.

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal-shutdown cooling (RHR-SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR-SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is

**ENCLOSURE 3 TO
NRC-00-0073
PART 2**

**AFFECTED TS PAGES
INCORPORATING PROPOSED CHANGES
(INCLUDING TS BASES)**

Affected TS Pages:

3.3-62, 3.3-70
3.6-40, 3.6-41, 3.6-43, 3.6-45, 3.6-47, 3.6-48, 3.6-49
3.7-6, 3.7-7, 3.7-8, 3.7-11, 3.7-12, 3.7-13
3.8-10, 3.8-11, 3.8-12, 3.8-19, 3.8-20, 3.8-28

Affected TS Bases Pages:

B 3.3.6.2-6, B 3.3.6.2-7
B 3.3.7.1-5, B 3.3.7.1-5a
B 3.6.4.1-1, B 3.6.4.1-2, B 3.6.4.1-4
B 3.6.4.2-1, B 3.6.4.2-2, B 3.6.4.2-3, B 3.6.4.2-4, B 3.6.4.2-5
B 3.6.4.3-2, B 3.6.4.3-3, B 3.6.4.3-4, B 3.6.4.3-5
B 3.7.3-2, B 3.7.3-3, B 3.7.3-4, B 3.7.3-5, B 3.7.3-6
B 3.7.4-3, B 3.7.4-4, B 3.7.4-5
B 3.8.2-1, B 3.8.2-3, B 3.8.2-4, B 3.8.2-5
B 3.8.5-1, B 3.8.5-2, B 3.8.5-3
B 3.8.8-1, B 3.8.8-2, B 3.8.8-3, B 3.8.8-4

Secondary Containment Isolation Instrumentation
3.3.6.2

Table 3.3.6.2-1 (page 1 of 1)
Secondary Containment Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level -Low Low, Level 2	1,2,3, (a)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	≥ 103.8 inches
2. Drywell Pressure-High	1,2,3	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.3 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 1.88 psig
3. Fuel Pool Ventilation Exhaust Radiation-High	1,2,3, (a),(b)	2	SR 3.3.6.2.1 SR 3.3.6.2.2 SR 3.3.6.2.4 SR 3.3.6.2.5	≤ 6 mR/hr
4. Manual Initiation	1,2,3, (a),(b)	1	SR 3.3.6.2.5	NA

- (a) During operations with a potential for draining the reactor vessel.
- (b) During movement of recently irradiated fuel assemblies in secondary containment.

Table 3.3.7.1-1 (page 1 of 1)
Control Room Emergency Filtration System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
1. Reactor Vessel Water Level - Low Low, Level 2	1,2,3,(a)	2	B	SR 3.3.7.1.1 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5 SR 3.3.7.1.6	≥ 103.8 inches
2. Drywell Pressure - High	1,2,3	2	B	SR 3.3.7.1.1 SR 3.3.7.1.3 SR 3.3.7.1.4 SR 3.3.7.1.5 SR 3.3.7.1.6	≤ 1.88 psig
3. Fuel Pool Ventilation Exhaust Radiation - High	1,2,3, (a),(b)	2	B	SR 3.3.7.1.1 SR 3.3.7.1.3 SR 3.3.7.1.5 SR 3.3.7.1.6	≤ 6 mR/hr
4. Control Center Normal Makeup Air Radiation - High	1,2,3, (a),(b)	1	C	SR 3.3.7.1.1 SR 3.3.7.1.2 SR 3.3.7.1.5	≤ 5 mR/hr

- (a) During operations with a potential for draining the reactor vessel.
- (b) During movement of recently irradiated fuel assemblies in the secondary containment.

3.6 CONTAINMENT SYSTEMS

3.6.4.1 Secondary Containment

LCO 3.6.4.1 The secondary containment shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in
the secondary containment.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Secondary Containment inoperable due to one railroad bay access door inoperable.	A.1 Restore railroad bay door to OPERABLE status.	7 days
B. Secondary containment inoperable in MODE 1, 2, or 3 for reasons other than Condition A.	B.1 Restore secondary containment to OPERABLE status.	4 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3.	12 hours
	<u>AND</u> C.2 Be in MODE 4.	36 hours

(continued)

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LC0 3.6.4.3 Two SGT subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in
the secondary containment,

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem inoperable.	A.1 Restore SGT subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs.</p>	<p>.....-NOTE-..... LCO 3.0.3 is not applicable. </p> <p>C.1 Place OPERABLE SGT subsystem in operation.</p> <p><u>OR</u></p> <p>C.2.1 Suspend movement of recently irradiated fuel assemblies in secondary containment.</p> <p><u>AND</u></p> <p>C.2.2 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>
<p>D. Two SGT subsystems inoperable in MODE 1, 2, or 3.</p>	<p>D.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>E. Two SGT subsystems inoperable during movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs.</p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p>	<p>Immediately</p>
	<p>E.1 Suspend movement of recently irradiated fuel assemblies in secondary containment.</p>	
	<p><u>AND</u></p> <p>E.2 Initiate action to suspend OPDRVs.</p>	

3.7 PLANT SYSTEMS

3.7.3 Control Room Emergency Filtration (CREF) System

LCO 3.7.3 The CREF System shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in
the secondary containment,

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One CREF subsystem inoperable.	A.1 Restore CREF subsystem to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs.</p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p>	
	<p>C.1 Place OPERABLE CREF subsystem in recirculation mode.</p> <p><u>OR</u></p>	<p>Immediately</p>
	<p>C.2.1 Initiate action to suspend OPDRVs.</p> <p><u>AND</u></p>	<p>Immediately</p>
	<p>-----NOTE----- Not required for a CREF System or subsystem inoperable for performance of SR 3.7.3.6 due to failure to provide the required filtration efficiency, or due to replacement of charcoal filtration media. -----</p>	
	<p>C.2.2 Suspend movement of recently irradiated fuel assemblies in the secondary containment.</p>	<p>Immediately</p>

(continued)

3.7 PLANT SYSTEMS

3.7.4 Control Center Air Conditioning (AC) System

LCO 3.7.4 Two control center AC subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of recently irradiated fuel assemblies in
the secondary containment,

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One control center AC subsystem inoperable.	A.1 Restore control center AC subsystem to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, or 3.	B.1 Be in MODE 3.	12 hours
	<u>AND</u> B.2 Be in MODE 4.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>C. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs.</p>	<p>-----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>C.1 Place OPERABLE control center AC subsystem in operation.</p> <p><u>OR</u></p> <p>C.2.1 Suspend movement of recently irradiated fuel assemblies in the secondary containment.</p> <p><u>AND</u></p> <p>C.2.2 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>
<p>D. Two control center AC subsystems inoperable in MODE 1, 2, or 3.</p>	<p>D.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

(continued)

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources-Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

- a. One qualified circuit between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems-Shutdown"; and
- b. Two emergency diesel generators (EDGs) capable of supplying one division of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8.

APPLICABILITY: MODES 4 and 5,
During movement of recently irradiated fuel assemblies in the secondary containment.

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. One required offsite circuit inoperable.</p>	<p>-----NOTE----- Enter applicable Condition and Required Actions of LCO 3.8.8, with one required division de-energized as a result of Condition A. -----</p> <p>A.1 Declare affected required feature(s), with no offsite power available, inoperable.</p> <p><u>OR</u></p>	<p>Immediately</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	<u>AND</u>	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One or both required EDGs inoperable.	B.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	B.2 Suspend movement of recently irradiated fuel assemblies in secondary containment.	Immediately
	<u>AND</u>	
	B.3 Initiate action to suspend OPDRVs.	Immediately
	<u>AND</u>	
	B.4 Initiate action to restore required EDGs to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.8.2.1</p> <p>-----NOTE----- The following SRs are not required to be performed: SR 3.8.1.2, SR 3.8.1.3, and SR 3.8.1.7 through SR 3.8.1.17. -----</p> <p>For AC sources required to be OPERABLE SR 3.8.1.1 through SR 3.8.1.17, are applicable.</p>	<p>In accordance with applicable SRs</p>

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources - Shutdown

LCO 3.8.5 The following shall be OPERABLE:

- a. One DC electrical power subsystem capable of supplying one division of the onsite Class 1E electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution System-Shutdown"; and
- b. One DC electrical power subsystem battery or battery charger, other than that required by LCO 3.8.5.a, capable of supplying the remaining onsite Class 1E electrical power distribution subsystem(s) when required by LCO 3.8.8.

APPLICABILITY: MODES 4 and 5,
During movement of recently irradiated fuel assemblies in the secondary containment.

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1 Declare affected required feature(s) inoperable. <u>OR</u>	Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Suspend CORE ALTERATIONS. <u>AND</u>	Immediately
	A.2.2 Suspend movement of recently irradiated fuel assemblies in the secondary containment. <u>AND</u>	Immediately
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel. <u>AND</u>	Immediately
	A.2.4 Initiate action to restore required DC electrical power subsystems to OPERABLE status.	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Distribution Systems-Shutdown

LCO 3.8.8 The necessary portions of the AC and DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 4 and 5,
During movement of recently irradiated fuel assemblies in the secondary containment.

ACTIONS

-----NOTE-----
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC or DC electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend handling of recently irradiated fuel assemblies in the secondary containment.	Immediately
	<u>AND</u>	(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

individual monitor whose trip outputs are assigned to an isolation channel. Four channels of Fuel Pool Ventilation Exhaust Radiation-High Function are available and are required to be OPERABLE to ensure that no single instrument failure can preclude the isolation function.

The Allowable Values are chosen to promptly detect gross failure of the fuel cladding.

The Fuel Pool Ventilation Exhaust Radiation-High Function is required to be OPERABLE in MODES 1, 2, and 3 where considerable energy exists; thus, there is a probability of pipe breaks resulting in significant releases of radioactive steam and gas. In MODES 4 and 5, the probability and consequences of these events are low due to the RCS pressure and temperature limitations of these MODES; thus, this Function is not required. In addition, the Function is also required to be OPERABLE during OPDRVs and movement of recently irradiated fuel assemblies in the secondary containment, because the capability of detecting radiation releases due to fuel failures (due to fuel uncover or dropped fuel assemblies) must be provided to ensure that offsite dose limits are not exceeded. Due to radioactive decay, this Function is only required to isolate secondary containment during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

4. Manual Initiation

The Manual Initiation push button channels introduce signals into the secondary containment isolation and SGTS initiation logic that are redundant to the automatic protective instrumentation channels and provide manual isolation capability. There is no specific UFSAR safety analysis that takes credit for this Function. It is retained for the overall redundancy and diversity of the secondary containment isolation instrumentation as required by the NRC approved licensing basis.

There are two push buttons for the logic, one manual initiation push button per trip system. There is no Allowable Value for this Function, since the channels are mechanically actuated based solely on the position of the push buttons.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

Two channels of Manual Initiation Function are available and are required to be OPERABLE in MODES 1, 2, and 3, and during OPDRVs and movement of recently irradiated fuel assemblies in the secondary containment. These are the MODES and other specified conditions in which the Secondary Containment Isolation automatic Functions are required to be OPERABLE.

ACTIONS

A Note has been provided to modify the ACTIONS related to secondary containment isolation instrumentation channels. Section 1.3, Completion Times, specifies that once a Condition has been entered, subsequent divisions, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition. Section 1.3 also specifies that Required Actions of the Condition continue to apply for each additional failure, with Completion Times based on initial entry into the Condition. However, the Required Actions for inoperable secondary containment isolation instrumentation channels provide appropriate compensatory measures for separate inoperable channels. As such, a Note has been provided that allows separate Condition entry for each inoperable secondary containment isolation instrumentation channel.

A.1

Because of the diversity of sensors available to provide isolation signals and the redundancy of the isolation design, an allowable out of service time of 12 hours for Function 2, and 24 hours for Functions other than Function 2, has been shown to be acceptable (Refs. 4 and 5) to permit restoration of any inoperable channel to OPERABLE status. This out of service time is only acceptable provided the associated Function is still maintaining isolation capability (refer to Required Action B.1 Bases). If the inoperable channel cannot be restored to OPERABLE status within the allowable out of service time, the channel must be placed in the tripped condition per Required Action A.1. Placing the inoperable channel in trip would conservatively compensate for the inoperability, restore

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

ventilation exhaust). Four channels of Fuel Pool Ventilation Exhaust Radiation-High Function are available (two channels per trip system) and are required to be OPERABLE to ensure that no single instrument failure can preclude CREF System initiation. The Allowable Value was selected to ensure that the Function will promptly detect high activity that could threaten exposure to control room personnel.

The Fuel Pool Ventilation Exhaust Radiation-High Function is required to be OPERABLE in MODES 1, 2, and 3 and during movement of recently irradiated fuel assemblies in the secondary containment and operations with a potential for draining the reactor vessel (OPDRVs), to ensure that control room personnel are protected during a LOCA, fuel handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., OPDRVs, the probability of a LOCA is low; thus, the Function is not required. Also due to radioactive decay, this Function is only required to initiate the CREF system during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

4. Control Center Normal Makeup Air Radiation-High

The control center normal makeup air radiation monitors measure radiation levels before filtration in the inlet ducting of the MCR. A high radiation level may pose a threat to MCR personnel; thus, automatically initiating the CREF System.

The Control Center Normal Makeup Air Radiation-High Function consists of two independent monitors. Two channels of Control Center Normal Makeup Air Radiation-High are available and are required to be OPERABLE to ensure that no single instrument failure can preclude CREF System initiation. The Allowable Value was selected to ensure protection of the control room personnel.

The Control Center Normal Makeup Air Radiation-High Function is required to be OPERABLE in MODES 1, 2, and 3 and during OPDRVs and movement of recently irradiated fuel assemblies in the secondary containment, to ensure that control room personnel are protected during a LOCA, fuel

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

handling event, or vessel draindown event. During MODES 4 and 5, when these specified conditions are not in progress (e.g., OPDRVs), the probability of a LOCA is low; thus, the Function is not required. Also due to radioactive decay, this Function is only required to initiate the CREF system during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

B 3.6 CONTAINMENT SYSTEMS

B 3.6.4.1 Secondary Containment

BASES

BACKGROUND

The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment following a Design Basis Accident (DBA). In conjunction with operation of the Standby Gas Treatment (SGT) System and closure of certain valves whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside primary containment.

The secondary containment is a structure that completely encloses the primary containment and those components that may be postulated to contain primary system fluid. This structure forms a control volume that serves to hold up and dilute the fission products. It is possible for the pressure in the control volume to rise relative to the environmental pressure (e.g., due to pump and motor heat load additions). To prevent ground level exfiltration while allowing the secondary containment to be designed as a conventional structure, the secondary containment requires support systems to maintain the control volume pressure at less than the external pressure. Requirements for these systems are specified separately in LCO 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)," and LCO 3.6.4.3, "Standby Gas Treatment (SGT) System."

APPLICABLE SAFETY ANALYSES

There are two principal accidents for which credit is taken for secondary containment OPERABILITY. These are a loss of coolant accident (LOCA) (Ref. 1) and a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days) inside secondary containment (Ref. 2). The secondary containment performs no active function in response to each of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials from the primary

BASES

APPLICABLE SAFETY ANALYSES (continued)

containment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the secondary containment structure will be treated by the SGT System prior to discharge to the environment.

Secondary containment satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

An OPERABLE secondary containment provides a control volume into which fission products that bypass or leak from primary containment, or are released from the reactor coolant pressure boundary components located in secondary containment, can be diluted and processed prior to release to the environment. For the secondary containment to be considered OPERABLE, it must have adequate leak tightness to ensure that the required vacuum can be established and maintained.

APPLICABILITY

In MODES 1, 2, and 3, a LOCA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, secondary containment OPERABILITY is required during the same operating conditions that require primary containment OPERABILITY.

In MODES 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining secondary containment OPERABLE is not required in MODE 4 or 5 to ensure a control volume, except for other situations for which significant releases of radioactive material can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs) or during movement of recently irradiated fuel assemblies in the secondary containment. Due to radioactive decay, secondary containment is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

BASES

ACTIONS (continued)

D.1 and D.2

Movement of recently irradiated fuel assemblies in the secondary containment and OPDRVs can be postulated to cause fission product release to the secondary containment. In such cases, the secondary containment is the only barrier to release of fission products to the environment. Therefore, movement of recently irradiated fuel assemblies must be immediately suspended if the secondary containment is inoperable.

Suspension of these activities shall not preclude completing an action that involves moving a component to a safe position. Also, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

The Required Actions have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving recently irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving recently irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of recently irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTS

SR 3.6.4.1.1

This SR ensures that the secondary containment boundary is sufficiently leak tight to preclude exfiltration under expected wind conditions. The 24 hour Frequency of this SR was developed based on operating experience related to secondary containment vacuum variations during the applicable MODES and the low probability of a DBA occurring between surveillances.

Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal secondary containment vacuum condition.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.4.2 Secondary Containment Isolation Valves (SCIVs)

BASES

BACKGROUND

The function of the SCIVs, in combination with other accident mitigation systems, is to limit fission product release during and following postulated Design Basis Accidents (DBAs). Secondary containment isolation within the time limits specified for those isolation valves designed to close automatically ensures that fission products that leak from primary containment following a DBA, or that are released during certain operations when primary containment is not required to be OPERABLE or take place outside primary containment, are maintained within the secondary containment boundary.

The OPERABILITY requirements for SCIVs help ensure that an adequate secondary containment boundary is maintained during and after an accident by minimizing potential paths to the environment. These isolation devices consist of either passive devices or active (automatic) devices. Manual valves, de-activated automatic valves secured in their closed position (including check valves with flow through the valve secured), and blind flanges are considered passive devices.

Automatic SCIVs close on a secondary containment isolation signal to establish a boundary for untreated radioactive material within secondary containment following a DBA or other accidents.

Other penetrations are isolated by the use of valves in the closed position or blind flanges.

APPLICABLE SAFETY ANALYSES

The SCIVs must be OPERABLE to ensure the secondary containment barrier to fission product releases is established. The principal accidents for which the secondary containment boundary is required are a loss of coolant accident (Ref. 1) and a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days) inside secondary containment (Ref. 2). The secondary containment performs no active function in

BASES

APPLICABLE SAFETY ANALYSES (continued)

response to either of these limiting events, but the boundary established by SCIVs is required to ensure that leakage from the primary containment is processed by the Standby Gas Treatment (SGT) System before being released to the environment.

Maintaining SCIVs OPERABLE with isolation times within limits ensures that fission products will remain trapped inside secondary containment so that they can be treated by the SGT System prior to discharge to the environment.

SCIVs satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

SCIVs form a part of the secondary containment boundary. The SCIV safety function is related to control of offsite radiation releases resulting from DBAs.

The power operated automatic isolation valves are considered OPERABLE when their isolation times are within limits and the valves actuate on an automatic isolation signal. The valves covered by this LCO, along with their associated stroke times, are listed in Reference 3.

The normally closed isolation valves or blind flanges are considered OPERABLE when manual valves and blind flanges are closed, or open in accordance with appropriate administrative controls. These passive isolation valves or devices are listed in plant procedures.

APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to the primary containment that leaks to the secondary containment. Therefore, the OPERABILITY of SCIVs is required.

In MODES 4 and 5, the probability and consequences of these events are reduced due to pressure and temperature limitations in these MODES. Therefore, maintaining SCIVs OPERABLE is not required in MODE 4 or 5, except for other situations under which significant radioactive releases can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs) or during movement |

BASES

ACTIONS

of recently irradiated fuel assemblies in the secondary containment. Moving recently irradiated fuel assemblies in the secondary containment may also occur in MODES 1, 2, and 3. Due to radioactive decay, SCIVs are only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

The ACTIONS are modified by three Notes. The first Note allows penetration flow paths to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator, who is in continuous communication with the control room, at the controls of the isolation device. In this way, the penetration can be rapidly isolated when a need for secondary containment isolation is indicated.

The second Note provides clarification that for the purpose of this LCO separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable SCIV. Complying with the Required Actions may allow for continued operation, and subsequent inoperable SCIVs are governed by subsequent Condition entry and application of associated Required Actions.

The third Note ensures appropriate remedial actions are taken, if necessary, if the affected system(s) are rendered inoperable by an inoperable SCIV.

A.1 and A.2

In the event that there are one or more penetration flow paths with one SCIV inoperable, the affected penetration flow path(s) must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic SCIV, a closed manual valve, and a blind flange. For penetrations isolated in accordance with Required Action A.1, the device used to isolate the penetration should be the closest available device to secondary containment. The Required Action must be completed within the 8 hour Completion Time. The specified

BASES

ACTIONS (continued)

time period is reasonable considering the time required to isolate the penetration, and the probability of a DBA, which requires the SCIVs to close, occurring during this short time is very low.

For affected penetrations that have been isolated in accordance with Required Action A.1, the affected penetration must be verified to be isolated on a periodic basis. This is necessary to ensure that secondary containment penetrations required to be isolated following an accident, but no longer capable of being automatically isolated, will be in the isolation position should an event occur. The Completion Time of once per 31 days is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low. This Required Action does not require any testing or device manipulation. Rather, it involves verification that the affected penetration remains isolated.

Required Action A.2 is modified by two Notes. Note 1 applies to devices located in high radiation areas and allows them to be verified closed by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment, once they have been verified to be in the proper position, is low. Note 2 applies to isolation devices that are locked, sealed, or otherwise secured in position and allows these devices to be verified closed by use of administrative means. Allowing verification by administrative means is considered acceptable, since the function of locking, sealing, or securing components is to ensure that these devices are not inadvertently repositioned.

B.1

With two SCIVs in one or more penetration flow paths inoperable, the affected penetration flow path must be isolated within 4 hours. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, and a blind flange. The 4 hour Completion Time is reasonable

BASES

ACTIONS (continued)

considering the time required to isolate the penetration and the probability of a DBA, which requires the SCIVs to close, occurring during this short time, is very low.

The Condition has been modified by a Note stating that Condition B is only applicable to penetration flow paths with two isolation valves. This clarifies that only Condition A is entered if one SCIV is inoperable in each of two penetrations.

C.1 and C.2

If any Required Action and associated Completion Time cannot be met, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1, D.2, and D.3

If any Required Action and associated Completion Time are not met, the plant must be placed in a condition in which the LCO does not apply. If applicable, the movement of recently irradiated fuel assemblies in the secondary containment must be immediately suspended. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must be immediately initiated to suspend OPDRVs in order to minimize the probability of a vessel draindown and the subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

The Required Actions have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving recently irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of recently irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

BASES

BACKGROUND (continued)

The moisture separator is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream to less than 70% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter removes fine particulate matter and protects the charcoal from fouling. The charcoal adsorber removes gaseous elemental iodine and organic iodides, and the final HEPA filter collects any carbon fines exhausted from the charcoal adsorber.

The SGT System automatically starts and operates in response to actuation signals indicative of conditions or an accident that could require operation of the system. Following initiation, both charcoal filter train fans start. Upon verification that both subsystems are operating, the redundant subsystem is normally shut down.

APPLICABLE
SAFETY ANALYSES

The design basis for the SGT System is to mitigate the consequences of a loss of coolant accident and fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days) (Ref. 2). For all events analyzed, the SGT System is shown to be automatically initiated to reduce, via filtration and adsorption, the radioactive material released to the environment.

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

LCO

Following a DBA, a minimum of one SGT subsystem is required to maintain the secondary containment at a negative pressure with respect to the environment and to process gaseous releases. Meeting the LCO requirements for two OPERABLE subsystems ensures operation of at least one SGT subsystem in the event of a single active failure.

APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, SGT System OPERABILITY is required during these MODES.

BASES

APPLICABILITY (continued)

In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the SGT System in OPERABLE status is not required in MODE 4 or 5, except for other situations under which significant releases of radioactive material can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs) or during movement of recently irradiated fuel assemblies in the secondary containment. Due to radioactive decay, the SGT System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

ACTIONS

A.1

With one SGT subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status in 7 days. In this Condition, the remaining OPERABLE SGT subsystem is adequate to perform the required radioactivity release control function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release control function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant SGT System and the low probability of a DBA occurring during this period.

B.1 and B.2

If the SGT subsystem cannot be restored to OPERABLE status within the required Completion Time in MODE 1, 2, or 3, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

C.1, C.2.1 and C.2.2

During movement of recently irradiated fuel assemblies, in the secondary containment, during CORE ALTERATIONS, or during OPDRVs, when Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE SGT subsystem should immediately be placed in operation. This action ensures that the remaining subsystem is OPERABLE, that no failures that could prevent automatic actuation have occurred, and that any other failure would be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that represent a potential for releasing a significant amount of radioactive material to the secondary containment, thus placing the plant in a condition that minimizes risk. If applicable, movement of recently irradiated fuel assemblies must immediately be suspended. Suspension of these activities must not preclude completion of movement of a component to a safe position. Also, if applicable, actions must immediately be initiated to suspend OPDRVs in order to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

The Required Actions of Condition C have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of recently irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

D.1

If both SGT subsystems are inoperable in MODE 1, 2, or 3, the SGT System may not be capable of supporting the required radioactivity release control function. Therefore, actions are required to enter LCO 3.0.3 immediately.

BASES

ACTIONS (continued)

E.1 and E.2

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

The Required Actions have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving recently irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of recently irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

SURVEILLANCE
REQUIREMENTSSR 3.6.4.3.1

Operating each SGT subsystem from the control room with flow through the HEPA filters and charcoal adsorbers for ≥ 10 continuous hours ensures that both subsystems are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation with the heaters on (automatic heater cycling to maintain temperature) for ≥ 10 continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

SR 3.6.4.3.2

This SR verifies that the required SGT filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The SGT System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 3). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, minimum system flow rate, and the physical

BASES

BACKGROUND (continued)

automatically switches to the recirculation mode of operation to prevent infiltration of contaminated air into the control room. A part of the recirculated air is routed through the emergency recirculation filter train. Outside air is taken in at one of two emergency outside air ventilation intakes and is passed through the emergency makeup filter train before being mixed with recirculated air. The air mixture is then returned to the control room.

The CREF System is designed to maintain the control room environment for a 30 day continuous occupancy after a DBA without exceeding 5 rem whole body dose or its equivalent to any part of the body. The recirculation mode will pressurize the control room to about 0.250 ± 0.125 inches water gauge to prevent infiltration of air from surrounding buildings. CREF System operation in maintaining control room habitability is discussed in the UFSAR, Chapters 6 and 9 (Refs. 1 and 2, respectively).

APPLICABLE
SAFETY ANALYSES

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

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

LCO

The non-redundant passive components and both divisions of the redundant active components of the CREF System must be OPERABLE to ensure that the system safety function can be performed assuming any active single failure. Total system failure could result in exceeding a dose of 5 rem whole-body (or its equivalent to any part of the body) to the control room operators in the event of a DBA.

BASES

LCO (continued)

Redundant components, of which both divisions must be OPERABLE, include:

- a. Emergency inlet air heater;
- b. Emergency recirculation fans;
- c. Return fans;
- d. Supply fans;
- e. Emergency air intakes; and
- f. Air handling dampers needed to support the system operation.

Non-redundant components required to be OPERABLE include:

- a. Emergency recirculation air filter train;
- b. Emergency makeup air filter train; and
- c. Ductwork and other system structures needed to form the necessary air flow paths.

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

APPLICABILITY

In MODES 1, 2, and 3, the CREF System must be OPERABLE to control operator exposure during and following a DBA, since the DBA could lead to a fission product release.

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

- a. During operations with potential for draining the reactor vessel (OPDRVs); and
 - b. During movement of recently irradiated fuel assemblies in the secondary containment. Due to radioactive decay, the CREF System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).
-

BASES

ACTIONS

A.1

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

B.1 and B.2

In MODE 1, 2, or 3, if the inoperable CREF subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

C.1, C.2.1 and C.2.2

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

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

BASES

ACTIONS (continued)

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

A Note is applied to Required Actions C.2.2 and C.2.3. This Note allows these Required Actions to not be required when the inoperability is due to CREF system duct work testing required by SR 3.7.3.6 or when the system charcoal filter train filter media cannot provide the required efficiency or is being replaced. Dose calculations have shown that the CREF system is not needed during the activities that would otherwise be suspended by these Required Actions.

D.1

If both CREF subsystems or a non-redundant component or portion of the CREF System are inoperable in MODE 1, 2, or 3, the CREF System may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

BASES

ACTIONS (continued)

E.1 and E.2

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

During movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs, with two CREF subsystems or a non-redundant component or portion of the CREF System inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

A Note is applied to Required Actions E.2 and E.3. This Note allows these Required Actions to not be required when the inoperability is due to CREF system duct work testing required by SR 3.7.3.6 or when the system charcoal filter train filter media cannot provide the required efficiency or is being replaced. Dose calculations have shown that the CREF system is not needed during the activities that would otherwise be suspended by these Required Actions.

BASES

APPLICABILITY (continued)

- a. During operations with a potential for draining the reactor vessel (OPDRVs); and
- b. During movement of recently irradiated fuel assemblies in the secondary containment. Due to radioactive decay, the Control Room AC System is only required to be OPERABLE during fuel handling involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

ACTIONS

A.1

With one control center AC subsystem inoperable, the inoperable control center AC subsystem must be restored to OPERABLE status within 30 days. With the unit in this condition, the remaining OPERABLE control center AC subsystem is adequate to perform the control center air conditioning function. However, the overall reliability is reduced because a single failure in the OPERABLE subsystem could result in loss of the control center air conditioning function. The 30 day Completion Time is based on the low probability of an event occurring requiring control room isolation, the consideration that the remaining subsystem can provide the required protection, and the availability of alternate safety and nonsafety cooling methods.

B.1 and B.2

In MODE 1, 2, or 3, if the inoperable control center AC subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE that minimizes risk. To achieve this status, the unit must be placed in at least MODE 3 within 12 hours and in MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

BASES

ACTIONS (continued)

C.1, C.2.1 and C.2.2

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

During movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs, if Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE control center AC subsystem may be placed immediately in operation. This action ensures that the remaining subsystem is OPERABLE, that no failures that would prevent actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action C.1 is to immediately suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

D.1

If both control center AC subsystems are inoperable in MODE 1, 2, or 3, the Control Center AC System may not be capable of performing the intended function. Therefore, LCO 3.0.3 must be entered immediately.

BASES

ACTIONS (continued)

E.1 and E.2

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

During movement of recently irradiated fuel assemblies in the secondary containment or during OPDRVs, with two control center AC subsystems inoperable, action must be taken immediately to suspend activities that present a potential for releasing radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk.

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

SURVEILLANCE
REQUIREMENTS

SR 3.7.4.1

This SR verifies that the heat removal capability of the system is sufficient to remove the control room heat load. The SR consists of a verification of the control room temperature. The 12 hour Frequency is appropriate since significant degradation of the Control Center AC System is not expected over this time period.

REFERENCES

1. UFSAR, Section 6.4.
2. UFSAR, Section 9.4.1.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources - Shutdown

BASES

BACKGROUND A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources - Operating."

APPLICABLE SAFETY ANALYSES The OPERABILITY of the minimum AC sources during MODES 4 and 5 and during movement of recently irradiated fuel assemblies ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

In general, when the unit is shut down the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have no specific analyses in MODES 4 and 5. Worst case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and corresponding stresses result in the probabilities of occurrences significantly reduced or eliminated, and minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

BASES

LCO (continued)

buses required OPERABLE by LCO 3.8.8, ensures that a diverse power source is available for providing electrical power support assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and EDGs ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel and reactor vessel draindown).

The qualified offsite circuit(s) must be capable of maintaining rated frequency and voltage while connected to their respective ESF bus(es), and of accepting required loads during an accident. Qualified offsite circuits are those that are described in the UFSAR and are part of the licensing basis for the unit. The offsite circuit consists of incoming breakers and disconnect to the station service 64 or 65 transformer, and the respective circuit path including feeder breakers to all 4.16 kV ESF buses required by LCO 3.8.8.

The required EDGs must be capable of starting, accelerating to rated speed and voltage, connecting to their respective ESF buses on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds. Each EDG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the ESF buses. These capabilities are required to be met from a variety of initial conditions such as EDG in standby with engine hot and EDG in standby with engine at ambient conditions.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for EDG OPERABILITY.

It is acceptable for divisions to be cross tied during shutdown conditions, permitting a single offsite power circuit to supply all required divisions.

BASES

- APPLICABILITY The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the secondary containment to provide assurance that:
- a. Systems providing adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
 - b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days) are available;
 - c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
 - d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

ACTIONS LCO 3.0.3 is not applicable while in MODE 4 or 5. However, since irradiated fuel assembly movement can occur in MODE 1, 2, or 3, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be sufficient reason to require a reactor shutdown.

A.1

An offsite circuit is considered inoperable if it is not available to one required ESF division. If two or more ESF 4.16 kV buses are required per LCO 3.8.8, one division with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, recently irradiated fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required features

BASES

ACTIONS (continued)

inoperable with no offsite power available, appropriate restrictions can be implemented in accordance with the affected required feature(s) LCOs' ACTIONS.

A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4

With the offsite circuit not available to all required divisions, the option still exists to declare all required features inoperable. Since this option may involve undesired administrative efforts, the allowance for sufficiently conservative actions is made. With one or both required EDGs inoperable, the minimum required diversity of AC power sources is not available. It is, therefore, required to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies in the secondary containment, and activities that could result in inadvertent draining of the reactor vessel.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no AC power to any required ESF bus, ACTIONS for LCO 3.8.8 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a division is de-energized. LCO 3.8.8 provides the appropriate restrictions for the situation involving a de-energized division.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources - Shutdown

BASES

BACKGROUND A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources - Operating."

APPLICABLE SAFETY ANALYSES The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the emergency diesel generators (EDGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of recently irradiated fuel assemblies ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

The DC sources satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO At least one DC electrical power subsystem consisting of two 130 VDC batteries in series, two battery chargers, and the corresponding control equipment and interconnecting cabling is required to be OPERABLE to support required DC distribution subsystems required OPERABLE by LCO 3.8.8, "Distribution Systems-Shutdown." In addition, when the redundant division of the Class 1E DC electrical power subsystem is required by LCO 3.8.8, the other DC source subsystem, consisting of either a battery or a battery charger, the corresponding control equipment and interconnecting cabling, is required to be OPERABLE. This ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel and inadvertent reactor vessel draindown).

APPLICABILITY The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the secondary containment provide assurance that:

- a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;
- b. Required features needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days) are available;
- c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

BASES

ACTIONS

LCO 3.0.3 is not applicable while in MODE 4 or 5. However, since irradiated fuel assembly movement can occur in MODE 1, 2, or 3, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be sufficient reason to require a reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.8, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, recently irradiated fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Distribution Systems -Shutdown

BASES

BACKGROUND A description of the AC and DC electrical power distribution system is provided in the Bases for LCO 3.8.7, "Distribution Systems- Operating."

APPLICABLE SAFETY ANALYSES The initial conditions of Design Basis Accident and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC and DC electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC and DC electrical power sources and associated power distribution subsystems during MODES 4 and 5, and during movement of recently irradiated fuel assemblies in the secondary containment ensures that:

- a. The facility can be maintained in the shutdown or refueling condition for extended periods;
- b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and
- c. Adequate power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident involving handling recently irradiated fuel. Due to radioactive decay, AC and DC electrical power is only required to mitigate fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days).

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The AC and DC electrical power distribution systems satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of Technical Specifications required systems, equipment, and components—both specifically addressed by their own LCO, and implicitly required by the definition of OPERABILITY.

In addition, during the shutdown conditions applicable to this LCO, cross-tie breakers between redundant safety related power distribution systems may be closed.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the plant in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents involving handling recently irradiated fuel and inadvertent reactor vessel draindown).

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 4 and 5 and during movement of recently irradiated fuel assemblies in the secondary containment provide assurance that:

- a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;
 - b. Systems needed to mitigate a fuel handling accident involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous seven days) are available;
 - c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and
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BASES

APPLICABILITY (continued)

- d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC and DC electrical power distribution subsystem requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

ACTIONS

LCO 3.0.3 is not applicable while in MODE 4 or 5. However, since irradiated fuel assembly movement can occur in MODE 1, 2, or 3, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be sufficient reason to require a reactor shutdown.

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant divisions of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem division may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, recently irradiated fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made, (i.e., to suspend CORE ALTERATIONS, movement of recently irradiated fuel assemblies in the secondary containment, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the plant safety systems.

BASES

ACTIONS (continued)

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal-shutdown cooling (RHR-SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR-SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR-SDC inoperable and not in operation, which results in taking the appropriate RHR-SDC ACTIONS.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power.

SURVEILLANCE
REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the AC and DC electrical power distribution subsystem is functioning properly, with the buses energized. The verification of proper voltage availability on the buses ensures that the required power is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the electrical power distribution subsystems, as well as other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. UFSAR, Chapter 6.
 2. UFSAR, Chapter 15.
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