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Joseph M. Farley Nuclear Plant – Units 1 and 2
Revise Technical Specification Requirements During Handling Irradiated Fuel and Core Alterations – TSTF-51 and TSTF-471

Ladies and Gentlemen:

References:

1. Standard Technical Specifications (STS) Change Traveler Technical Specifications Task Force (TSTF)-51-A, "Revise containment requirements during handling irradiated fuel and core alterations," Revision 2 (NRC Agencywide Documents Access and Management System (ADAMS) Accession No. ML040400343).

2. STS Change Traveler TSTF-471-A, "Eliminate use of term CORE ALTERATIONS in ACTIONS and Notes" Revision 1.

3. NRC NUREG-1431, "Standard Technical Specifications – Westinghouse Plants, Volume 1 Specifications," Revision 4.0 (NRC ADAMS Accession No. ML12100A222).

Ladies and Gentlemen:

Pursuant to the provisions of Section 50.90 of Title 10 of the Code of Federal Regulations (10 CFR), Southern Nuclear Operating Company (SNC) hereby requests the proposed amendment to the Technical Specifications (TSs), for Farley Nuclear Plant (FNP) Unit 1 Renewed Facility Operating License NPF-2 and Unit 2 Renewed Facility Operating License NPF-8. The proposed amendment would revise certain TSs to remove the requirements for engineered safety feature (ESF) systems (e.g., containment, containment purge and exhaust, isolation capability) to be operable after sufficient radioactive decay of irradiated fuel has occurred following a plant shutdown. Following sufficient radioactive decay, these systems are no longer required during a fuel handling accident (FHA) to ensure main control room personnel dose remains below the 10 CFR 50.67(b)(2)(iii) dose limit and off-site dose remains below the accident dose limit specified in the NRC standard review plan, which represents a small fraction of the 10 CFR 50.67 dose limits. The proposed amendment also revises certain TSs actions that are not needed to mitigate accidents postulated during shutdown.

This change represents a partial adoption of STS change travelers TSTF-51-A, Revision 2, and TSTF-471-A, Revision 1 (References 1 and 2).

To support this proposed amendment, SNC also requests a licensing basis change to the FNP Units 1 and 2 FHA analysis in accordance with the requirements of 10 CFR 50.59(c)(2) because the revised dose results are more than a minimal increase in the FHA consequences. The revised FNP FHA analysis reduces the fuel decay period following plant shutdown before fuel movement is permitted and eliminates the reliance on auxiliary building closure and emergency filtration in the spent fuel pool room prior to radioactive release to the environment during a FHA.

The proposed amendment will allow FNP Units 1 and 2 the flexibility to move personnel and equipment and perform work which would affect containment operability during the handling of irradiated fuel. The proposed amendment would also align the FNP TSs more closely, as technically practicable, with the latest revision of the standard technical specifications (Reference 3).

SNC requests approval of the proposed license amendment by September 1, 2019 to support the Fall 2019 FNP Unit 1 refueling outage. The proposed amendment will be implemented within 60 days of issuance.

Enclosure 1 provides a basis for the proposed change, including a proposed no significant hazards considerations analysis. Attachments 1 and 2 contain marked-up TS pages and revised TS pages, respectively. Attachment 3 contains revised TS Bases pages marked to show the accompanying proposed changes for information only.

This letter contains NRC regulatory commitments as stated in Enclosure 2.

In accordance with 10 CFR 50.91, SNC is notifying the State of Alabama of this license amendment request by transmitting a copy of this letter, enclosure, and attachments to the designated State Official.

If you have any questions, please contact Jamie Coleman at 205.992.6611.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of November 2018.

Respectfully submitted,

C. A. Gayheart
Director, Regulatory Affairs
Southern Nuclear Operating Company

CAG/RMJ

Enclosures:

1. Basis for Proposed Change
2. List of Regulatory Commitments

Attachments:

1. Technical Specification Marked-up Pages
2. Revised Technical Specification Pages
3. Technical Specification Bases Marked-up Pages (For Information Only)

cc: Regional Administrator, Region II
NRR Project Manager – Farley
Senior Resident Inspector – Farley
Director, Alabama Office of Radiation Control
RTYPE: CFA04.054

Joseph M. Farley Nuclear Plant – Units 1 and 2

Revise Technical Specification Requirements During Handling Irradiated Fuel and Core Alterations – TSTF-51 and TSTF-471

Enclosure 1

Basis for Proposed Change

Enclosure 1 – Basis for Proposed Change

1. Summary Description

The proposed amendment to Farley Nuclear Plant (FNP) – Units 1 and 2 renewed facility operating licenses would revise certain Technical Specifications (TSs) to remove the requirements for engineered safety feature (ESF) systems to be operable after sufficient radioactive decay of irradiated fuel has occurred following a plant shutdown. The subject ESF systems are: containment, containment purge and exhaust isolation radiation instrumentation, penetration room filtration (PRF) system, and associated PRF system actuation instrumentation associated with the spent fuel pool (SFP) room. Following sufficient radioactive decay, these systems are no longer required during a fuel handling accident (FHA) to ensure main control room (MCR) personnel dose remains below the 10 CFR 50.67(b)(2)(iii) dose limit and off-site dose remains below the accident dose limit specified in the NRC standard review plan, which represents a small fraction of the 10 CFR 50.67 dose limits.

The proposed amendment also revises certain TSs actions that are not needed to mitigate accidents postulated during shutdown. Specifically, the requirement to immediately suspend core alterations when boron concentration is not within the required limit in refueling condition is deleted. In addition, when one or more required source range neutron flux monitors are inoperable in the refueling condition, a note added to the actions will permit fuel assemblies, sources, and reactivity control components to be moved if necessary to restore an inoperable source range neutron flux monitor to operable status.

This change represents a partial adoption of standard technical specification (STS) change travelers Technical Specification Task Force (TSTF) -51-A, Revision 2, and TSTF-471-A, Revision 1 (Refs. 1 and 2) and will align the FNP Units 1 and 2 technical specifications more closely, as technically practicable, with the STS described in NUREG 1431, Revision 4.0 (Ref. 3).

To support this proposed amendment, Southern Nuclear Operating Company (SNC) also requests a licensing basis change to the FNP Units 1 and 2 FHA analysis in accordance with the requirements of 10 CFR 50.59(c)(2) because the dose results are more than a minimal increase in the FHA consequences. The revised FNP FHA analysis reduces the fuel decay period following plant shutdown and eliminates the reliance on auxiliary building closure and PRF system filtration in the SFP room prior to radioactive release to the environment during a FHA.

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2. Detailed Description

2.1 System Design and Operation

During refueling operations, the containment serves to contain fission product radioactivity that may be released from the reactor core following an accident (i.e., FHA), such that off-site and MCR radiation exposures are maintained within the requirements of 10 CFR 50.67.

Containment purge and exhaust isolation instrumentation closes the containment isolation valves in the mini purge and main purge systems. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident.

Two radiation monitoring channels are provided as input to the containment purge and exhaust isolation. The two channels measure radiation in the containment purge exhaust. Both detectors will respond to events that release radioactivity to containment, including an FHA during refueling. A high radiation signal from either detector initiates containment purge isolation, which closes containment isolation valves in the mini purge and main purge systems.

The PRF system filters airborne radioactive particulates from the area of the fuel pool following an FHA. The system initiates filtered ventilation of the SFP room following receipt of a high radiation signal or a low air flow signal from the normal ventilation system. The system initiates filtered ventilation of the ECCS pump rooms and penetration area following receipt of a containment isolation actuation signal and manual isolation of the SFP room.

The source range neutron flux monitors are used during refueling operations to monitor the core reactivity condition. These detectors are located external to the reactor vessel and detect neutrons leaking from the core. Two installed source range neutron flux monitors are BF3 detectors operating in the proportional region of the gas filled detector characteristic curve. These detectors provide continuous visual indication in the control room and an audible count rate to alert operators to a possible dilution accident. Additionally, an installed source range Gamma-Metrics post accident neutron flux monitor is an enriched U-235 fission chamber operating in the ion chamber region of the gas filled detector characteristic curve. This detector provides continuous visual indication in the control room. Source range neutron flux monitors alert the operator to unexpected changes in core reactivity and the audible count rate allows operators to promptly recognize the initiation of a boron dilution event.

2.2 Current Technical Specification Requirements

The following FNP Units 1 and 2 TSs currently include the Applicability, in part, "During movement of irradiated fuel assemblies..." and the applicable actions require suspending movement of irradiated fuel assemblies:

- TS 3.3.6, Containment Purge and Exhaust Isolation Instrumentation
- TS 3.3.8, Penetration Room Filtration (PRF) System Actuation Instrumentation
- TS 3.7.12, Penetration Room Filtration (PRF) System
- TS 3.9.3, Containment Penetrations

The following FNP Units 1 and 2 TSs also include the Applicability, in part, "During CORE ALTERATIONS," and the applicable actions require immediate suspension of core alterations:

- TS 3.3.6, Containment Purge and Exhaust Isolation Instrumentation
- TS 3.9.3, Containment Penetrations

Required Action A.1 of TS 3.9.1, "Boron Concentration," and TS 3.9.2, "Nuclear Instrumentation," requires immediate suspension of core alterations when the boron concentration is not within the required limit and when one or two required source range neutron flux monitoring channels are inoperable, respectively, while in the refueling mode (i.e., Mode 6).

2.3 Reason for the Proposed Change

After sufficient radioactive decay of irradiated fuel following a reactor shutdown, the proposed amendment will allow FNP Units 1 and 2 the flexibility to move personnel and equipment and perform work, which would affect containment operability during the handling of irradiated fuel. The proposed amendment would also align the FNP TSs more closely, as technically practicable, with the STS described in NUREG-1431, Revision 4.0 (Ref. 3).

2.4 Description of the Proposed Change

The proposed change revises the applicability requirements of several TSs to require these specifications, "During movement of recently irradiated fuel assemblies," and eliminate the applicability requirement, "During CORE ALTERATIONS." The proposed term "recently," as it relates to irradiated fuel, is described in the associated TS Bases as fuel that has occupied part of a critical reactor core within the previous 70 hours. The TS actions are revised to reflect the change to the TS applicability requirements. Specifically, the following TS applicability and action requirements proposed to be modified are (deleted text in ~~strikeout~~ and added text in *italics*):

TS 3.3.6, Containment Purge and Exhaust Isolation Instrumentation

The following revisions are proposed to Condition C:

- Condition C Note is revised to state, "Only applicable during ~~CORE ALTERATIONS or~~ movement of *recently* irradiated fuel assemblies within containment."

Table 3.3.6-1 Footnote (a), "During CORE ALTERATIONS," and reference to this footnote in the Applicability column of Table 3.3.6-1, Function 1, "Manual Initiation," and Function 3, "Containment Radiation Gaseous (R-24A, B)," are deleted. Table 3.3.6-1 footnotes are renumbered as a result of the deletion.

Table 3.3.6-1 Footnote (b) (proposed Footnote (a)) is revised to state, "During movement of *recently* irradiated fuel assemblies within containment."

TS 3.3.8, PRF System Actuation Instrumentation

The following revisions are proposed to Condition C and Required Action C.1:

- Condition C Note is revised to state, "Only applicable to Functions required OPERABLE by Table 3.3.8-1 during movement of *recently* irradiated fuel assemblies in the spent fuel pool room."
- Condition C is revised to state, "Required Action and associated Completion Time for Condition A or B not met during movement of *recently* irradiated fuel assemblies in the spent fuel pool room."

- Required Action C.1 is revised to state, "Suspend movement of *recently* irradiated fuel assemblies in the spent fuel pool room."

Table 3.3.8-1 Footnote (a) is revised to state, "During movement of *recently* irradiated fuel assemblies in the spent fuel pool room."

<u>TS 3.7.12, Penetration Room Filtration (PRF) System</u>

The following revisions are proposed to the Applicability and Condition D:

- Applicability is revised to state, in part, "During movement of *recently* irradiated fuel assemblies in the SFPR for the fuel handling accident mode of operation."

- Condition D is revised to state, "Required Action and associated Completion Time of Condition A not met during movement of *recently* irradiated fuel assemblies in the SFPR."

- Condition E is revised to state, "Two PRF trains inoperable during movement of *recently* irradiated fuel assemblies in the SFPR."

- Required Actions D.2 and E.1 are revised to state, "Suspend movement of *recently* irradiated fuel assemblies in the SFPR."

- SR 3.7.12.1 Note is revised to state, "Only required to be *met* ~~performed~~ during movement of *recently* irradiated fuel assemblies in the SFPR."

<u>TS 3.9.1, Boron Concentration</u>

The following revisions are proposed to Required Actions:

- Required Action A.1, "Suspend CORE ALTERATIONS," and the associated Completion Time are deleted and Required Actions A.2 and A.3 are renumbered.

<u>TS 3.9.2, Nuclear Instrumentation</u>

The following Note is proposed to Required Action A.1:

---------------NOTE--------------
CORE ALTERATIONS may
continue to restore an
inoperable source range
neutron flux monitor.

Conditions A and B are revised to include the word "required" when referring to one or two source range neutron flux monitors inoperable.

<u>TS 3.9.3, Containment Penetrations</u>

The following revisions are proposed to the Applicability and Required Actions:

- Applicability is revised to state, "~~During CORE ALTERATIONS,~~ During movement of *recently* irradiated fuel assemblies within containment."

- Required Action A.1 and associated Completion Time are deleted and Required Action A.2 is renumbered.

- Required Action A.2 (proposed Required Action A.1) is revised to state, "Suspend movement of *recently* irradiated fuel assemblies within containment."

As a result of the proposed amendments, SNC is revising Regulatory Commitments 1 and 3 in Enclosure 14 of the alternative source term (AST) license amendment request (LAR) (Ref. 4). The following shows the revisions and these revised regulatory commitments are also listed in Enclosure 2 of this LAR (Regulatory Commitments 2 and 3, respectively) (deleted text in ~~strikeout~~ and added text in *italics*):

- Regulatory Commitment 1 (proposed Regulatory Commitment 2)

  Applicable FNP Unit 1 and 2 procedures will be revised to ensure administrative~~Administrative~~ controls ~~will be~~*are* established to ensure appropriate personnel are aware of the open status of the penetration flow path(s) during ~~core alterations or~~ movement of *recently* irradiated fuel assemblies within the containment.

- Regulatory Commitment 3 (proposed Regulatory Commitment 3)

  Applicable FNP Unit 1 and Unit 2 procedures will be revised to ensure that with~~With~~ the Personnel Airlock open during fuel handling operations *involving recently irradiated fuel* ~~or core alterations~~, the Containment Purge System will be in operation.

To support the proposed TS revisions, SNC proposes to revise the FNP design basis FHA radiological consequences analysis eliminating reliance on auxiliary building closure and the PRF system for containment and filtration of radioactivity during an FHA. This change to the FHA analysis results in more than a minimal increase in dose results.

3. Technical Evaluation

3.1 Current Licensing Basis and Accident Analysis

As described in Subsection 15.4.5, "Fuel Handling Accident," of the FNP Final Safety Analysis Report (FSAR), the FHA involves the drop of a spent fuel assembly during refueling operations. The analysis assumes that the total number of failed fuel rods is 264, which is one fuel assembly out of the 157 fuel assemblies in the core. The depth of water over the damaged fuel is not less than 23 feet and is controlled by TS 3.7.13, "Fuel Storage Pool Water Level," and TS 3.9.6, "Refueling Cavity Water Level." Following reactor shutdown, decay of short lived fission products greatly reduces the fission product inventory present in irradiated fuel. Radiological dose analyses take credit for the normal decay of irradiated fuel.

The FHA analysis evaluated radiological dose assuming several fission product decay periods, including 70 and 100 hours after shutdown. Four FHA cases were analyzed and results obtained for each of the fission product decay periods:

- FHA in containment with the equipment hatch and the personnel airlock open.
- FHA in containment with the personnel airlock open and the equipment hatch closed.
- FHA in containment with the personnel airlock closed and the equipment hatch open.
- FHA in the SFP with exhaust through the PRF system.

By letter dated December 20, 2017 (Ref. 5), the NRC issued Amendment No. 216 to Renewed Facility Operating License No. NPF-2 and Amendment No. 213 to Renewed Facility Operating License No. NPF-8 for FNP Units 1 and 2, respectively. These amendments, in part, approved full implementation of AST radiological methodology. Full AST implementation replaced the previous accident source term used in FNP design basis radiological analyses and incorporated the total effective dose equivalent (TEDE) dose criteria.

In the December 20, 2017 NRC Safety Evaluation (SE) associated with FNP License Amendments 216 and 213 (Ref. 5), the NRC staff concluded, in part, that SNC used methods consistent with applicable regulations, guidance, and standards. The NRC staff concluded that the meteorological data complied with the guidance of NRC Regulatory Guide (RG) 1.23 (Ref. 6) and that the inputs and assumptions used to calculate the control room atmospheric dispersion (χ/Q) values were also consistent with the guidance of NRC RG 1.194 (Ref. 7). The NRC staff also found that SNC's use of previous licensing basis exclusion area boundary (EAB) and low population zone (LPZ) χ/Q values for the design basis dose analyses were acceptable for use in calculating the radiological consequences assessments. The NRC staff concluded that the SNC's calculated dose results of an FHA given in Section 4.0, Table 1 of the SE (Ref. 5) and the assumptions presented in Table 3 of the SE (Ref. 5) were acceptable.

The FNP χ/Q calculation as summarized in the AST LAR (Ref. 4) and supplemented in NRC RAI responses in letters dated May 23, 2017, June 8, 2017, and September 7, 2017 (Refs. 8, 9, and 10) have not been revised as a result of the proposed change. The plant vent stack continues to be the most conservative source location for use in calculating the radiological consequences to personnel in the MCR following a design basis FHA.

The control of movement of loads heavier than a fuel assembly over irradiated fuel is described in SNC responses to Generic Letter 81-07, "Control of Heavy Loads," (Ref. 11) which references NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" (Ref. 12). Subsection 9.1.7, "Heavy Loads," of the FNP FSAR describes the licensing basis regarding control of heavy loads. This section includes the following topics:

- Definition of safe load paths
- Establishment of load handling procedures

- Implementation of standards with respect to: training of crane operators, use of special lifting devices, use of slings, and design, inspection, testing, and maintenance of cranes.
- Heavy load drop analysis

As summarized in FSAR Sub-subsection 9.1.7.4, "Load Drop Analysis," for reactor vessel head lifts and spent-fuel cask lifts over the spent-fuel pool, a load drop analysis is provided that bounds the planned lifts with respect to load weight, load height, and medium present under the load, and is implemented into procedures for moving the load that reflect the applicable safety basis. This analysis demonstrated that moving a heavy load within the established safe load paths was acceptable. It has been verified that the buckling load on affected fuel assemblies would not exceed design limits and that there will be no consequential damage to the structural integrity of the reactor vessel, reactor vessel nozzles, or RCS loop piping. Therefore, core cooling capability and the integrity of the fuel cladding will be maintained. Thus, the inadvertent drop of a heavy load at FNP would have no impact on the health or safety of the public.

The proposed license amendment does not impact or alter the FNP load drop analysis described in Subsection 9.1.7 of the FSAR.

3.2 Revised Input Assumptions for the FNP FHA Radiological Consequences Analysis

The FNP design basis FHA radiological consequences analysis has been revised to eliminate reliance on auxiliary building closure and the PRF system for containment and filtration of radioactivity during an FHA. Additionally, the MCR isolation timing is increased from one minute to two minutes to allow margin for radiation monitoring instrumentation response timing.

Table 1 herein shows a comparison of the affected FHA input assumptions previously provided to the NRC in the AST LAR as supplemented in NRC RAI response letters (Refs. 4, 8, 9, and 10) and the revised input assumptions used in the FNP FHA radiological consequences analysis of record (AOR) using AST. The revised input assumptions continue to be consistent with those described in NRC RG 1.183 (Ref. 13). Other FHA input assumptions in the FNP AOR are consistent with those documented in the AST LAR, as supplemented in NRC RAI response letters.

Table 1 – Comparison of Input Assumptions in AST LAR and Revised FHA AOR

Input	AST LAR	Revised FHA AOR
Time after shutdown (hours)	100	70
MCR Intake Isolation Delay (minutes)	1	2
MCR Pressurization Initiation (minutes)	21	22
MCR Recirculation Initiation (minutes)	21	22
FHA in Containment		
Open Equipment Hatch (EH) to MCR χ/Q*	Maximum EH-MCR	Maximum PVS-MCR

Input	AST LAR	Revised FHA AOR
Open Personnel Airlock (PAL) via plant vent stack (PVS) to MCR χ/Q*	Maximum PVS-MCR	Maximum PVS-MCR
FHA in SFP		
Release Path	PVS via PRF System	PVS via SPF Area Exhaust†
Release Flow Rate (cfm) **	5,000	16,500
Release Path Filter Efficiency	89.5%	0%
On-Site Dilution Factor for Release Point to MCR (χ/Q)†	Maximum PVS-MCR	Maximum PVS-MCR

* The PVS-to-MCR dilution factor is approximately twice the EH-to-MCR dilution factor resulting in a higher radionuclide concentration at the MCR ventilation system intake

** PVS via PRF system release rate = 125% of nominal SFP-PRF flow rate (4000 cfm)
PVS release rate via SPF area exhaust = ~125% of nominal SFP exhaust flow rate (13,100 cfm)

† Refueling hatch-to-MCR distance is greater than the PVS-MCR distance and any release from an open refueling hatch is obstructed by the containment building structure. Therefore, PVS-MCR release bounds any release from an open refueling hatch.

The off-site (EAB & LPZ) doses resulting from an FHA in containment are based on a maximum combined unfiltered release rate of 80,000 cfm from the open equipment hatch and open personnel airlock through the plant vent stack. This combined release rate bounds release rates resulting from other combinations of equipment hatch and personnel airlock configurations. Therefore, the unfiltered release rate assumed in the off-site radiological dose analysis for an FHA in the containment is not revised.

3.3 Summary of FHA Dose Results

Based on the changes to the input assumptions associated with the radiological consequences analysis for an FHA inside and outside the FNP Unit 1 and 2 containments, the analysis indicates that whether the FHA accident occurs inside the containment or in the SFP room, the dose results at the EAB and LPZ are the same because the accident occurring in these locations does not alter the activity released over the 2 hour period and the EAB and LPZ χ/Q values are not sensitive to the specific reactor building or auxiliary building release points. Table 2 herein provides a comparison between the FHA dose values specified in Table 1 of the FNP AST SE (Ref. 5) and the resulting dose values of the revised FHA AOR. The worst-case FHA dose to individuals at the EAB is calculated to be 2.8 Roentgen equivalent man (rem) TEDE and dose to individuals at the LPZ is calculated to be 1.0 rem TEDE, which represent an increase of 0.4 rem TEDE at the EAB and 0.1 rem TEDE at the LPZ. This small increase was due to the reduced fuel decay period from 100 hours to 70 hours. The resulting off-site doses remain below the radiation dose criterion of 6.3 rem TEDE specified in Table 1, "Accident Dose Criteria," of NRC NUREG-0800, Section 15.0.1 (Ref. 14) and Table 6, "Accident Dose Criteria," of NRC RG 1.183 (Ref. 13), which represents a small fraction of the 10 CFR 50.67(b)(2)(i) and (ii) radiation dose criterion of 25 rem TEDE.

The combined effects of reducing the fuel decay period and eliminating the filtered release via the PRF system results in an increase in the calculated dose to personnel in the MCR during an FHA in the SFP room. The increase in the dose results associated with an FHA in containment was due to the combined effects of reducing the fuel decay period and more conservative assumptions for: (1) a bounding dose contribution due to an unfiltered inleakage from MCR ingress/egress; and (2) a bounding dose contribution due to higher radionuclide concentrations in the unfiltered inleakage from the environment. The higher radionuclide concentration assumption is due to conservatively applying the PVS-to-MCR χ/Q to the open equipment hatch release. The worst-case FHA dose to personnel in the MCR is calculated to be 3.4 rem TEDE and is based on an FHA in the containment. This FHA dose assumes isolation, pressurization, and filtration of the MCR. The worst-case calculated FHA dose to the MCR continues to remain below the 10 CFR 50.67(b)(2)(iii) radiation dose criterion of 5 rem TEDE.

Table 2 - Comparison with AST SE Table 1 and Revised FHA AOR Dose Results

	AST SE Table 1 @ 100 hours			Revised FHA AOR @ 70 hours		
	MCR TEDE (REM)	EAB TEDE (REM)	LPZ TEDE (REM)	MCR TEDE (REM)	EAB TEDE (REM)	LPZ TEDE (REM)
FHA in Containment	2.3	2.4	0.9	3.4	2.8	1.0
FHA in SFP Room	0.1	0.5	0.2	2.9	2.8	1.0

3.4 Acceptability of the Proposed Change

Following reactor shutdown, decay of the short-lived fission products greatly reduces the fission product inventory present in irradiated fuel. The proposed change is based on the results of the FNP FHA analyses that assumes a fuel decay period of at least 70 hours reducing the radionuclide inventory available for release to the environment in the event of an FHA. Following sufficient decay occurring, the primary success path for mitigating the FHA no longer includes the functioning of the active containment systems to ensure off-site and MCR doses remain below the 10 CFR 50.67 dose limits. Additionally, SNC has reviewed historical records of previous refueling outages at FNP Units 1 and 2 and has confirmed that 70 hours is less than the time required to remove the reactor vessel head and internals and expose the irradiated fuel after a reactor shutdown. Based on these reasons, the proposed changes to the Applicability and Required Actions of the applicable TSs will continue to ensure appropriate mitigation systems are operable when required to mitigate an FHA.

When referring to movement of recently irradiated fuel in the proposed change, the term "recently" is described in the associated TS Bases, consistent with TSTF-51, as fuel that has occupied part of a critical reactor core within the previous 70 hours. This time is based on the input assumption in the FHA analysis, which shows that, following this fuel decay period, off-site and MCR doses remain below the 10 CFR 50.67 dose limits without reliance on containment closure, auxiliary building closure, or SFP room filtration from the PRF system and associated actuation instrumentation.

The operability requirements of the Technical Specifications specified herein are modified to reflect that reactor vessel water level, SFP water level, and decay time are the primary success path for mitigating an FHA. The isolation, pressurization, and filtration of the MCR continues to be assumed in the FHA analysis, and therefore, these requirements are not modified by the proposed amendment request.

As specified in Enclosure 14 of the FNP AST LAR (Ref. 4) and the NRC SE associated with FNP License Amendments 216 and 213 (Ref. 5), SNC has established administrative controls that ensure the open containment personnel airlock and any open containment penetrations can and will be promptly closed, following containment evacuation, in the event of an FHA in containment. These administrative controls will continue to be implemented in the event of an FHA in containment involving recently irradiated fuel. Enclosure 2 of this LAR revises Regulatory Commitments 1 and 3 listed in Enclosure 14 of the AST LAR (Ref. 4) to be consistent with the change to the Applicability of TS 3.9.3, "Containment Penetrations."

Additionally, as specified in Enclosure 2 of this LAR, the following guidelines specified in Sub-subsection 11.3.6 of NUMARC 93-01 (Ref. 18), will be included in the assessment of systems removed from service during fuel handling or core alterations:

- Ventilation system and radiation monitor availability should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the fuel decays away fairly rapidly. The basis of the proposed license 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.

- A single normal or contingency method to promptly close containment penetrations should be developed. Such prompt methods need not completely block the penetration or be capable of resisting pressure; rather the prompt methods should 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.

Regarding proposed deletion of TS 3.9.1, Required Action A.1, suspending core alterations has no effect on the initial conditions or mitigation of refueling mode (i.e., Mode 6) design basis accidents or transients, and this requirement applies an operational burden with no corresponding safety benefit. The purpose of maintaining boron concentration within limits in Mode 6 ensures that a core keff of ≤ 0.95 is maintained during fuel handling operations. If boron concentration is not within the required limit, the appropriate action is to immediately suspend positive reactivity additions (current Required Action A.2). There are two evolutions encompassed under the term Core Alterations that could negatively affect the shutdown margin; the addition of fuel and the withdrawal of control rods. However, Required Action A.2 (proposed Required Action A.1), requires immediate suspension of positive reactivity changes. The immediate suspension of positive reactivity changes would include both the addition of fuel to the reactor vessel and the withdrawal of control rods. Another accident considered in MODE 6 that could affect shutdown margin is a dilution event. A boron dilution accident is mitigated by stopping the dilution. Additionally, allowing continuation of some core alterations may, in fact, increase core shutdown margin. For example, removal of one or more irradiated fuel assemblies from the core in the proper sequence or inserting a reactivity control component can increase overall shutdown margin. Therefore, prohibiting core alterations in this condition is unnecessary and possibly eliminates an option to restore core shutdown margin. As a result, the requirement to immediately suspend core alterations when boron concentration is not within the required limit in Mode 6 is deleted.

Regarding the addition of the proposed Note to TS 3.9.2 Required Action A.1: the existing Required Actions A.1 and A.2, which require immediately suspending core alternations and positive reactivity additions, are unchanged. Suspending positive reactivity additions prohibits diluting the boron concentration of the coolant in the RCS, the loading of fuel assemblies or sources into the core, or the removal of reactivity control components. Suspending core alterations also prohibits any movement of fuel, sources, or reactivity control components in the reactor core. A proposed Note to Required Action A.1 permits fuel assemblies, sources, and reactivity control components to be moved, if necessary, to restore an inoperable source range neutron flux monitor. The source range neutron flux monitors are located outside the reactor core in wells in the concrete reactor shield. The radiation levels in these wells can be very high if fuel assemblies are nearby. Troubleshooting, repair, or replacement of the inoperable source range neutron flux monitors may require moving fuel, sources, or reactivity control components away from the source range neutron flux monitor location to minimize the radiation dose to the workers. Also, in accordance with the definition of Core Alterations specified in TS Section 1.1, if movement of a fuel assembly, source, or reactivity control component is in progress when it is discovered that the required source range neutron flux monitor is inoperable, the component may be placed in a safe location. Therefore, in the event one or more source range neutron flux monitors are inoperable, the required actions continue to minimize actions that could result in reactivity changes within the core, while providing the ability to safely restore source range neutron monitoring capability.

The Note to SR 3.7.12.1 is revised to correct a TS usage error. Currently, the Note only waives "performance" of the surveillance during movement of irradiated fuel assemblies in the SFP room. However, TS Section 1.4 explains that the use of "performed" and "met" convey specific meanings. The use of "performed" in the context of the Note to SR 3.7.12.1 would require the surveillance be met, but not performed, in the modes and specified conditions in the applicability, which would include Modes 1, 2, 3, and 4. This is inconsistent with the intent of the surveillance to verify that the PRF trains are aligned to the SFP room during movement of irradiated fuel assemblies in the SFP room, as described in the TS Bases of SR 3.7.12.1. Modifying the Note to use the word "met" ensures the Note is consistent with the intent that the PRF trains are only required to be aligned to the SFP room during movement of *recently* irradiated fuel in the SFP room. This proposed change is in accordance with the guidance of Section 4.1.7 of TSTF-GG-05-01, Writer's Guide for Plant-Specific Improved Technical Specifications, June 2009 (ISTS Writer's Guide) and is considered an administrative change.

Since there are three installed source range neutron flux monitor channels available to meet Limiting Conditions for Operation (LCO) 3.9.2, the word "required" was added to Conditions A and B when referring to one or two inoperable source range neutron flux monitors. This proposed change is in accordance with the guidance of Section 4.1.3 of the ISTS Writer's Guide and is considered an administrative change.

3.5 Variations from TSTF-51 and TSTF-471

The proposed amendment is based on the STS changes described in TSTF–51, Revision 2, and TSTF-471, Revision 1, but SNC proposes variations from the NUREG-1431 markups in TSTF-51 and TSTF-471, as identified below and include differing TS numbers and TS titles, where applicable.

1. The definition of CORE ALTERATIONS is being retained in TS Section 1.1, "Definitions," because this terminology continues to be used in a number of TSs, which are not being modified as a result of this amendment request. This is an administrative variation from TSTF-471.

2. The control room emergency filtration system (CREFS) actuation instrumentation and the CREFS continue to be assumed to provide isolation, pressurization, and filtration of the MCR in the event of an FHA. Since this system and associated isolation instrumentation are mitigation systems necessary to maintain dose to personnel in the MCR below the regulatory and regulatory guidance limits for an FHA, the following TSs and support TSs and associated Bases are not modified:

   - TS 3.3.7, "Control Room Emergency Filtration/Pressurization System (CREFS) Actuation Instrumentation,"
   - TS 3.7.10, "Control Room Emergency Filtration/Pressurization System (CREFS),"
   - TS 3.7.11, "Control Room Air Conditioning System (CRACS),"
   - TS 3.8.2, "AC Sources – Shutdown,"
   - TS 3.8.5, "DC Sources – Shutdown,"
   - TS 3.8.8, "Inverters – Shutdown,"
   - TS 3.8.10, "Distribution Systems – Shutdown," and
   - TS 3.9.6, "Refueling Cavity Water Level."

   This is a plant-specific variation from TSTF-51 and 471.

3. NUREG-1431 TS 3.9.2, "Unborated Water Source Isolation Valves," is not applicable to FNP Units 1 and 2 and, therefore, marked up pages of the associated TSs and Bases are not included. This is an administrative variation from TSTF-471.

4. The applicability requirements associated with the containment purge and exhaust isolation instrumentation are shown in TS Table 3.3.6-1. This is a presentation difference from the applicability requirements shown in the NUREG-1431 TS 3.3.6 marked up pages in TSTF-51. However, the proposed changes to footnotes in TS Table 3.3.6-1 are consistent with those shown in TSTF-51. Additionally, proposed deletion of Table 3.3.6-1 footnote (a) results in renumbering the remaining footnotes and associated references to the footnotes. These proposed changes are administrative variations from TSTF-51.

5. The plant-specific Note to Condition C of TS 3.3.8 is modified consistent with the changes to Condition C and Required Action C.1 and is an administrative variation from TSTF-51.

6. The proposed changes to the Applicability and Actions of TS 3.7.12, "Penetration Room Filtration (PRF) System," are consistent with the changes identified in NUREG-1431 TS 3.7.13, "Fuel Building Air Cleanup System (FBACS)." In addition, a proposed change to add the word "recently" to the Note to SR 3.7.13.1 is consistent with change to the Applicability of TS 3.7.12. These proposed differences are administrative variations from TSTF-51.

7. The Note to SR 3.7.12.1 is revised to correct a TS usage error as described in Section 3.4 herein. This proposed change is considered an administrative variation from TSTF-51.

8. TS 3.9.2, "Nuclear Instrumentation," Required Actions were not modified in accordance with TSTF-286, Revision 2 (Ref. 15), and as such are not modified consistent with TSTF-471. However, proposed Note added to Required Action A.1 is consistent with the intent of the proposed Note in TSTF-571-T, "Revise Actions for Inoperable Source Range Neutron Flux Monitor" (Ref. 16). TSTF-571-T was accepted for use by the NRC as documented in a letter to the TSTF dated October 4, 2018 (Ref. 17). Movement of fuel sources and reactivity control components within the reactor vessel is currently covered by the Core Alteration definition. Since the FNP TSs retain the definition of Core Alteration, the required action continues to require suspension of core alterations and the note was modified to use the term Core Alterations. Additionally, the word "required" was added to Conditions A and B when referring to one or two inoperable source range neutron flux monitors based on reasons discussed in Section 3.4 herein. These proposed changes are considered administrative variations from TSTF-471 and TSTF-571-T.

9. The TS Bases are revised, where applicable, consistent with TSTF-51, TSTF-471, and TSTF-571-T. Plant-specific changes are made (additions, deletions, and/or changes) to reflect the plant-specific nomenclature, number, reference, system description, analysis, or licensing basis description, including describing "recently" irradiated fuel as fuel that has occupied part of a critical reactor core within the previous 70 hours, which is based on the radioactive decay period assumed in the FHA radiological dose analysis. In addition, the word "recently" is added in the TS Bases in several locations that are not identified in TSTF-51 or TSTF-471 to reflect the applicable changes in the TS Conditions and Required Actions. These proposed changes are considered administrative variations from TSTF-51, TSTF-471, and TSTF-571-T.

10. TSTF-51 Insert N is modified for TS 3.9.3, "Containment Penetrations," to reflect the revised FHA analysis which shows an FHA involving handling non-recently irradiated fuel (i.e., fuel that has <u>not</u> occupied part of a critical reactor core within the previous 70 hours) will result in doses that are within the guideline values specified in 10 CFR 50.67 without containment closure capability. This proposed change is a plant-specific variation from TSTF-51.

11. The Bases of TS 3.7.12, "Penetration Room Filtration (PRF) System," are revised to delete inapposite information in the LCO section describing the note to the LCO. This proposed change effects uniformity with the Bases associated with NUREG-1431 3.7.13, "Fuel Building Air Cleanup System (FBACS). This proposed change is considered an administrative variation from TSTF-51.

SNC considers the differences from TSTF-51 and TSTF-471 listed herein to be either: 1) necessary variations to maintain the requirements for required safety systems assumed in the FNP FHA analysis; or 2) minor variations or deviations that are administrative in nature.

4. Regulatory Evaluation

4.1 Applicable Regulatory Requirements/Criteria

The TSs satisfy 10 CFR 50.36, "Technical specifications." The following systems and parameters meet one or more of the criteria of 10 CFR 50.36(c)(2)(ii):

- Containment and associated containment purge and exhaust isolation instrumentation,
- PRF system associated actuation instrumentation,
- Boron concentration requirement in Mode 6, and
- Neutron instrumentation requirements in Mode 6.

The proposed amendment revises the TS applicability of these systems and parameters to eliminate the requirements during core alterations, and during movement of irradiated fuel assemblies that have decayed beyond the decay period assumed in the FNP FHA analysis because these requirements are no longer assumed in the mitigation of an FHA or the potential radioactive release as a result of dropping of a non-irradiated fuel assembly, source, or reactivity control component onto the reactor core during core alterations. The proposed amendment does not alter requirements associated with the CREFS and associated instrumentation, which are assumed to mitigate the effects of a radiological release to MCR personnel due to an FHA, and continues to maintain requirements associated with structures, systems, and components that are part of the primary success path and actuate to mitigate the related design basis accidents and transients. The proposed amendment continues to provide appropriate remedial actions and shutdown requirements required by 10 CFR 50.36(c)(2)(i) for any system requiring an LCO pursuant the criteria of 10 CFR 50.36(c)(2)(ii).

10 CFR 50.67, "Accident source term" – The FNP FHA analysis of record meets the requirements of 10 CFR 50.67. Accident source terms have not been modified as a result of the proposed amendment. SNC has determined that the inputs and assumptions related to atmospheric dispersion related to the FHA analysis are not changed as a result of the proposed license amendment. Therefore, the revised FNP FHA analysis continues to meet the requirements of 10 CFR 50.67

In addition, the following 10 CFR Part 50, Appendix A General Design Criteria (GDCs) are related to the proposed change:

GDC 13: Instrumentation and control. The proposed amendment does not alter the design of the applicable instrumentation that monitor variables and systems over their anticipated ranges for normal operation for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety.

GDC 16: Containment design. The proposed amendment does not alter the containment design or the associated systems' design. The containment and associated systems, when required, will continue to establish an essentially leak-tight barrier against the uncontrolled release of radioactivity to the environment as previously licensed and approved by the NRC. During movement of recently irradiated fuel assemblies when containment integrity is relaxed, SNC, as previously committed, will continue to establish and implement administrative controls that ensure that the open personnel airlock and any open penetrations can and will be promptly closed, following containment evacuation, in the event of an FHA inside containment.

GDC 19: Control room. The proposed amendment does not alter the design or operation of the control room envelope or the CREFS. To support the proposed amendment, the input assumptions have been revised in the FHA analysis. However, FHA analysis results show that the radiological dose to the MCR personnel continues to be within the requirements of GDC-19 as updated for consistency with the TEDE criterion in 10 CFR 50.67.b.2.iii. Adequate radiation protection continues to be provided permitting access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem TEDE for the duration of the accident.

GDC 20: Protection system functions. The proposed amendment does not alter the design of reactivity control protection systems or instrumentation that sense accident conditions to initiate systems or components important to safety. The change relaxes the requirements for instrumentation of systems not assumed in the mitigation of an FHA.

GDC 21: Protection system reliability and testability. The proposed amendment does not alter the design of any protection system, including the containment purge and exhaust isolation instrumentation, and the PRF system actuation instrumentation. Therefore, the protection system design continues to provide high functional reliability and inservice testability commensurate with the safety functions to be performed and continues to be sufficient to assure that (1) no single failure results in loss of the protection function and (2) removal from service of any component or channel does not result in loss of the required minimum redundancy. The containment purge and exhaust isolation instrumentation, and the PRF system actuation instrumentation design continues to permit periodic testing of its functioning when the reactor is in operation as previously licensed and approved by the NRC.

GDC 22: Protection system independence. The proposed amendment does not alter the design of any protection system, including the containment purge and exhaust isolation instrumentation, and the PRF system actuation instrumentation. Therefore, the protection system design continues to assure that the effects of natural phenomena, and of normal operating, maintenance, testing, and postulated accident conditions on redundant channels do not result in loss of the protection function to the extent previously licensed and approved by the NRC.

GDC 23: Protection system failure modes. The proposed amendment does not alter the design of any protection system, including the containment purge and exhaust isolation instrumentation, and the PRF system actuation instrumentation. Therefore, the protection system design continues to fail into a safe state or into a state demonstrated to be acceptable as previously licensed and approved by the NRC.

GDC 24: Separation of protection and control systems. The proposed amendment does not alter the design of any protection system, including the containment purge and exhaust isolation instrumentation, and the PRF system actuation instrumentation. Therefore, the protection system design continues to be separated from control systems as previously licensed and approved by the NRC.

GDC 64: Monitoring radioactivity releases. The proposed amendment does not alter the design of any radioactivity monitoring instrumentation, including the containment purge and exhaust isolation instrumentation, and the PRF system actuation instrumentation. Means continue to be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents (e.g., FHA).

4.2 Precedent

STS Travelers TSTF-51 was approved by the NRC staff and incorporated into the STS NUREGs, Revision 2, published in June 2001, which was also approved by the NRC staff. A number of facilities have adopted, as technically practicable, TSTF-51. For example: Indian Point Nuclear Generating Unit 2, License Amendment 238 (NRC ADAMS Accession Nos. ML033160528 and ML033210260), North Anna Power Station, Units 1 and 2, License Amendments 231 and 212, respectively (NRC ADAMS Accession Nos. ML021200265, ML021220108, and ML021220166), Beaver Valley Units 1 and 2, License Amendments 278 and 161, respectively (NRC ADAMS Accession Nos. ML070160593 and ML070390284), Watts Bar Nuclear Plant, Unit 1, License Amendment 35 (NRC ADAMS Accession Nos. ML020100062 and ML020280264), and Byron Units 1 and 2, License Amendments 147 and Braidwood Units 1 and 2, License Amendments 140 (NRC ADAMS Accession No. ML062340420).

STS traveler TSTF-471 was approved for use by the NRC staff and incorporated into the applicable STS NUREGs, Revision 4, published in April 2012. Some facilities have adopted, as technically practicable, TSTF-471. For example: Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Amendments 279 and 256, respectively (NRC ADAMS Accession Nos. ML062350447 and ML062690054).

4.3 No Significant Hazards Consideration Analysis

Pursuant to 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to Farley Nuclear Plant (FNP) Unit 1 Operating License NPF-2 and Unit 2 Operating License NPF-8. The proposed amendment revises certain Technical Specifications (TSs) to remove the requirements for engineered safety feature (ESF) systems to be operable after sufficient radioactive decay of irradiated fuel has occurred following a plant shutdown. The subject ESF systems are: containment, containment purge and exhaust isolation radiation instrumentation, penetration room filtration (PRF) system, and associated PRF system actuation instrumentation associated with the spent fuel pool room. Following sufficient radioactive decay, these systems are no longer required during a fuel handling accident (FHA) to ensure main control room (MCR) personnel dose remains below the 10 CFR 50.67(b)(2)(iii) dose limit and off-site dose remains below the accident dose limit specified in the NRC standard review plan (SRP), which represent a small fraction of the 10 CFR 50.67 dose limits.

To support this proposed amendment, SNC also requests a licensing basis change to the FNP Units 1 and 2 FHA analysis in accordance with the requirements of 10 CFR 50.59(c)(2) because the dose results are more than a minimal increase in the FHA consequences. The revised FNP FHA analysis reduces the fuel decay period following plant shutdown and eliminates the reliance on auxiliary building closure and emergency filtration in the spent fuel pool room prior to radioactive release to the environment during a FHA.

The proposed amendment also revises certain TSs actions that are not needed to mitigate accidents postulated during shutdown. Specifically, the requirement to immediately suspend core alterations when boron concentration is not within the required limit in refueling condition is deleted. In addition, when one or more required source range neutron flux monitors are inoperable in the refueling condition, a note added to the actions will permit fuel assemblies, sources, and reactivity control components to be moved if necessary to restore an inoperable source range neutron flux monitor to operable status.

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

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

   Response: No

   The proposed amendment does not affect accident initiators or precursors nor adversely alter the design assumptions, conditions, and configuration of the facility. The proposed amendment does not alter any plant equipment or operating practices with respect to such initiators or precursors in a manner that the probability of an accident is increased.

   The proposed amendment does not involve a physical change to the containment or spent fuel area systems, nor does it change the safety function of the containment, containment purge and exhaust ventilation system, or PRF system, or associated instrumentation. The subject ESF systems are not assumed in the mitigation of an FHA after sufficient radioactive decay of irradiated fuel has occurred. The revised FHA dose analysis shows that MCR dose remains below the 10 CFR 50.67(b)(2)(iii) dose limit and off-site dose remains below the accident dose limit specified in the NRC SRP, which represents a small fraction of the 10 CFR 50.67 dose limits.

   Elimination of the action to suspend core alterations in the event boron concentration is not within the required limit in refueling condition does not alter the initiation or consequences of a boron dilution event and the required actions continue to prohibit positive reactivity additions until reactor core shutdown margin can be restored to within the required limit.

   Permitting fuel assemblies, sources, and reactivity control components to be moved to restore an inoperable source range neutron flux monitor to operable status when one or more required source range neutron flux monitors are inoperable does not significantly alter the probability or consequences of any previously evaluated refueling accident or transient. The required actions continue to minimize actions that could result in reactivity changes within the core, while providing the ability to safely restore source range neutron monitoring capability.

As a result, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No

   With respect to a new or different kind of accident, there are no proposed design changes to the safety related plant structures, systems, and components (SSCs); nor are there any changes in the method by which safety related plant SSCs perform their specified safety functions. The proposed amendment will not affect the normal method of plant operation or revise any operating parameters. No new accident scenarios, transient precursor, failure mechanisms, or limiting single failures will be introduced as a result of this proposed change and the failure modes and effects analyses of SSCs important to safety are not altered as a result of this proposed change. The proposed amendment does not alter the design or performance of the related SSCs, and, therefore, does not constitute a new type of test.

   No changes are being proposed to the procedures that operate the plant equipment and the change does not have a detrimental impact on the manner in which plant equipment operates or responds to an actuation signal.

   Therefore, the proposed change will not create the possibility of a new or different accident previously evaluated.

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

   Response: No.

   The margin of safety is related to the ability of the fission product barriers to perform their design functions during and following an accident. These barriers include the fuel cladding, the reactor coolant system, and the containment.

   Instrumentation safety margin is established by ensuring the limiting safety system settings (LSSSs) automatically actuate the applicable design function to correct an abnormal situation before a safety limit is exceeded. Safety analysis limits are established for reactor trip system and ESF actuation system instrumentation functions related to those variables having significant safety functions. The proposed change does not alter the design of these protection systems; nor are there any changes in the method by which safety related plant SSCs perform their specified safety functions.

   The proposed amendment does not involve a physical change to the containment or spent fuel area systems, nor does it change the safety function of the containment,

containment purge and exhaust ventilation system, or PRF system, or associated instrumentation. The subject ESF systems are not assumed in the mitigation of an FHA after sufficient radioactive decay of irradiated fuel has occurred. The revised FNP FHA dose analysis shows that MCR dose remains below the 10 CFR 50.67(b)(2)(iii) dose limit and off-site dose remains below the accident dose limit specified in the NRC SRP, which represents a small fraction of the 10 CFR 50.67 dose limits.

Elimination of the action to suspend core alterations does not reduce the margin of safety in the event boron concentration is not within the required limit in refueling condition because the remaining required actions continue to prohibit positive reactivity additions until reactor core shutdown margin can be restored to within the required limit.

Permitting fuel assemblies, sources, and reactivity control components to be moved to restore an inoperable source range neutron flux monitor to operable status when one or more required source range neutron flux monitors are inoperable does not significantly reduce the margin of safety. The required actions continue to minimize actions that could result in reactivity changes within the core, while providing the ability to safely restore source range neutron monitoring capability.

The controlling parameters established to isolate or actuate required ESF systems during an accident or transient are not affected by the proposed amendment and no design basis or safety limit is altered as a result of the proposed change. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, SNC concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

In conclusion, based on the considerations discussed herein, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5. Environmental Consideration

SNC has determined that the proposed amendment does not change a surveillance requirement and does not alter the design or operation of the normal or emergency radwaste treatment and filtration systems. The proposed amendment revises certain technical specifications to remove the requirements for engineered safety feature systems to be operable after sufficient radioactive decay of irradiated fuel has occurred. Following sufficient radioactive decay, these systems are no longer required during a fuel handling accident to ensure off-site doses and main control room personnel doses remain below the limits specified in 10 CFR 50.67. The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released off site, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need to be prepared in connection with the proposed amendment.

6. References

1. STS Change Traveler TSTF-51-A, "Revise containment requirements during handling irradiated fuel and core alterations," Revision 2, dated November 1, 1999 (NRC Agencywide Documents Access and Management System (ADAMS) Accession No. ML040400343).

2. STS Change Traveler TSTF-471-A, "Eliminate use of term CORE ALTERATIONS in ACTIONS and Notes" Revision 1, dated December 7, 2006.

3. NRC NUREG-1431, "Standard Technical Specifications – Westinghouse Plants, Volume 1 Specifications," Revision 4.0 (NRC ADAMS Accession No. ML12100A222).

4. Letter from C. R. Pierce (SNC) to Document Control Desk (NRC), "Joseph M. Farley Nuclear Plant - Units 1 and 2 Alternative Source Term License Amendment Request," dated November 22, 2016.

5. Letter from S.A. Williams (NRC) to J. J. Hutto (SNC), "Joseph M. Farley Nuclear Plant, Units 1 And 2 - Issuance of Amendments Adopting Alternative Source Term, TSTF-448, Revision 3, and TSTF-312, Revision 1 (CAC Nos. MF8861, MF8862, MF8916, MF8917, MF8918, and MF8919; EPID Nos. L-2016-LLA-0017, L-2016-LLA-0018, and L-2016-LLA-0019)," dated December 20, 2017 (NRC ADAMS Accession No. ML17271A265).

6. NRC Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," dated March 2007.

7. NRC Regulatory Guide 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," dated June 2003.

8. Letter from J. T. Wheat (SNC) to Document Control Desk (NRC), "Joseph M. Farley Nuclear Plant Units 1 and 2 Response to Request for Additional Information Regarding Alternative Source Term License Amendment Request," dated June 8, 2017.

9. Letter from J. T. Wheat (SNC) to Document Control Desk (NRC), "Joseph M. Farley Nuclear Plant Units 1 and 2 Response to Request for Additional Information Regarding Alternative Source Term License Amendment Request," dated May 23, 2017.

10. Letter from J. J. Hutto (SNC) to Document Control Desk (NRC), "Joseph M. Farley Nuclear Plant Units 1 and 2 Response to the Second Request for Additional Information Regarding Alternative Source Term License Amendment Request," dated September 7, 2017.

11. NRC Generic Letter 81-07, "Control of Heavy Loads," dated February 3, 1981.

12. NRC NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants - Resolution of Generic Technical Activity A-36," dated July 1980 (NRC ADAMS Accession No. ML070250180).

13. NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated July 2000.

14. NRC NUREG-0800, Standard Review Plan, Section 15.0.1, "Radiological Consequence Analyses Using Alternative Source Terms," Revision 0, dated July 2000 (NRC ADAMS Accession No. ML003734190).

15. STS Change Traveler TSTF-286, "Define 'Operations Involving Positive Reactivity Additions,'" Revision 2, dated April 13, 2000.

16. Letter from Technical Specification Task Force to NRC, "TSTF Input to Lifting the Suspension of Acceptance of Amendment Requests to Adopt TSTF-51, TSTF-471, and TSTF-286," dated August 9, 2018 (NRC ADAMS Accession No. ML18221A561).

17. Letter from V.G. Cusumano (NRC) to Technical Specification Task Force, "Plant-Specific Adoption of Travelers TSTF-51, Revision 2, 'Revise Containment Requirements During Handling Irradiated Fuel and Core Alterations,' TSTF-471, Revision 1, 'Eliminate Use of Term Core Alterations in Actions and Notes,' and TSTF-286, Revision 2, 'Operations Involving Positive Reactivity Additions'," dated October 4, 2018 (NRC ADAMS Accession No. ML17346A587).

18. Nuclear Energy Institute NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Revision 4A, April 2011 (NRC ADAMS Accession No. ML11116A198).

Joseph M. Farley Nuclear Plant – Units 1 and 2

Revise Technical Specification Requirements During Handling Irradiated Fuel and Core Alterations – TSTF-51 and TSTF-471

Enclosure 2

List of Regulatory Commitments

Enclosure 2 – List of Regulatory Commitments

The following table identifies the regulatory commitments in this document. Regulatory Commitments 2 and 3 listed herein are revisions to Regulatory Commitments 1 and 3 listed in Enclosure 14 of FNP Units 1 and 2 license amendment request dated November 22, 2016 (Reference 1) and supplant those commitments. Any other statements in this submittal represent intended or planned actions. They are provided for information purposes and are not considered to be regulatory commitments.

REGULATORY COMMITMENTS	TYPE		SCHEDULED COMPLETION DATE/EVENT
	One Time	Continuing Compliance	
1. The following guidelines specified in Sub-subsection 11.3.6.5, "Containment – Primary (PWR)/Secondary (BWR)," of Nuclear Energy Institute NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 4A, April 2011, will be included in the assessment of systems removed from service during fuel handling or core alterations: • Ventilation system and radiation monitor availability should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the fuel decays away fairly rapidly. The goal of maintaining ventilation system and radiation monitor availability is to reduce doses even further below that provided by the natural decay. • A single normal or contingency method to promptly close containment penetrations should be developed. Such prompt methods need not completely block the penetration or be capable of resisting pressure; rather the prompt methods should 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.		X	Prior to implementation of the license amendment

Enclosure 2 – List of Regulatory Commitments

2. Applicable FNP Unit 1 and 2 procedures will be revised to ensure administrative controls are established to ensure appropriate personnel are aware of the open status of the penetration flow path(s) during movement of recently irradiated fuel assemblies within the containment.	X		Prior to implementation of the license amendment
3. Applicable FNP Unit 1 and Unit 2 procedures will be revised to ensure that with the Personnel Airlock open during fuel handling operations involving recently irradiated fuel, the Containment Purge System will be in operation.	X		Prior to implementation of the license amendment

References

1. Letter from C. R. Pierce (SNC) to Document Control Desk (NRC), "Joseph M. Farley Nuclear Plant - Units 1 and 2 Alternative Source Term License Amendment Request," dated November 22, 2016.

Joseph M. Farley Nuclear Plant – Units 1 and 2

Revise Technical Specification Requirements During Handling Irradiated Fuel and Core Alterations – TSTF-51 and TSTF-471

Attachment 1

Technical Specification Marked-up Pages

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. ------------NOTE------------ Only applicable during ~~CORE ALTERATIONS~~ ~~or~~ movement of recently irradiated fuel assemblies within containment. -------------------------------- One or more manual channel(s) inoperable. <u>OR</u> Two radiation monitoring channels inoperable. <u>OR</u> Required Action and associated Completion Time for Condition A not met.	C.1	Place and maintain containment purge and exhaust valves in closed position.	Immediately
	<u>OR</u>		
	C.2	Enter applicable Conditions and Required Actions of LCO 3.9.3, "Containment Penetrations," for containment purge and exhaust isolation valves made inoperable by isolation instrumentation.	Immediately

Table 3.3.6-1 (page 1 of 1)
Containment Purge and Exhaust Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4, (a)~~, (b)~~	2	SR 3.3.6.6	NA
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	SR 3.3.6.2 SR 3.3.6.3 SR 3.3.6.5 SR 3.3.6.8	NA
3. Containment Radiation Gaseous (R-24A, B)	1,2,3,4 (a)~~, (b)~~	1 2	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	≤ 2.27 X 10^{-2} µCi/cc ~~(c)(d)~~ (b)(c) ≤ 4.54 X 10^{-3} µCi/cc ~~(c)(e)~~ (b)(d) ≤ 2.27 X 10^{-3} µCi/cc ~~(c)(f)~~ (b)(e)
4. Containment Isolation - Phase A	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 3.a., for all initiation functions and requirements.			

~~(a) During CORE ALTERATIONS.~~

(a) ~~(b)~~ During movement of recently irradiated fuel assemblies within containment.

(b) ~~(c)~~ Above background with no flow.

(c) ~~(d)~~ With mini-purge in operation.

(d) ~~(e)~~ With slow speed main purge in operation.

(e) ~~(f)~~ With fast speed main purge in operation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE------------- Only applicable to Functions required OPERABLE by Table 3.3.8-1 during movement of recently irradiated fuel assemblies in the spent fuel pool room. ------------------------------- Required Action and associated Completion Time for Condition A or B not met during movement of recently irradiated fuel assemblies in the spent fuel pool room.	C.1 Suspend movement of recently irradiated fuel assemblies in the spent fuel pool room.	Immediately
D. ----------NOTE------------- Only applicable to Functions required OPERABLE by Table 3.3.8-1 in MODES 1-4. ------------------------------- Required Action and associated Completion Time for Condition A or B not met in MODE 1, 2, 3, or 4.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours

Table 3.3.8-1 (page 1 of 1)
PRF Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4, (a)	2 trains	SR 3.3.8.6	NA
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.5	NA
3. Spent Fuel Pool Room Radiation Gaseous (R-25A, B)	(a)	2	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.7	$\leq 8.73 \times 10^{-3}$ μCi/cc (b)
4. Spent Fuel Pool Room Ventilation Differential Pressure (PDSL-3989A and B)	(a)	2	SR 3.3.8.6 SR 3.3.8.7	NA
5. Containment Isolation - Phase B	Refer to LCO 3.3.2, "ESFAS Instrumentation" Function 3.b, for all initiation Functions and requirements.			

recently

(a) During movement of irradiated fuel assemblies in the spent fuel pool room.
(b) Above background with no flow.

3.7 PLANT SYSTEMS

3.7.12 Penetration Room Filtration (PRF) System

LCO 3.7.12 Two PRF trains shall be OPERABLE.

-- NOTE --
The PRF and Spent Fuel Pool Room (SFPR) boundaries may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, and 4 for post LOCA mode of operation,
During movement of irradiated fuel assemblies in the SFPR for the fuel handling accident mode of operation.

recently

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One PRF train inoperable.	A.1	Restore PRF train to OPERABLE status.	7 days
B. Two PRF trains inoperable in MODE 1, 2, 3, or 4 due to inoperable PRF boundary.	B.1	Restore PRF boundary to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4. OR Two PRF trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	C.1 AND C.2	Be in MODE 3. ------------NOTE----------- LCO 3.0.4.a is not applicable when entering MODE 4. ------------------------------- Be in MODE 4.	6 hours 12 hours
D. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the SFPR. recently	D.1 OR D.2	Place OPERABLE PRF train in operation. recently Suspend movement of irradiated fuel assemblies in the SFPR.	Immediately Immediately

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. Two PRF trains inoperable during movement of recently irradiated fuel assemblies in the SFPR.	E.1	Suspend movement of recently irradiated fuel assemblies in the SFPR.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.7.12.1	-----------------------------NOTE----------------------------- Only required to be ~~performed~~ met during movement of recently irradiated fuel assemblies in the SFPR. -- Verify two PRF trains aligned to the SFPR.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.2	Operate each PRF train for ≥ 15 minutes in the applicable mode of operation (post LOCA and/or refueling accident).	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.3	Perform required PRF filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.12.4	Verify each PRF train actuates and the normal spent fuel pool room ventilation system isolates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.5	Verify one PRF train can maintain a pressure ≤ -0.125 inches water gauge with respect to adjacent areas during the post LOCA mode of operation at a flow rate ≤ 5500 cfm.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.6	Verify one PRF train can maintain a slightly negative pressure with respect to adjacent areas during the fuel handling accident mode of operation at a flow rate ≤ 5500 cfm.	In accordance with the Surveillance Frequency Control Program

3.9 REFUELING OPERATIONS

3.9.1 Boron Concentration

LCO 3.9.1 Boron concentrations of the Reactor Coolant System, the refueling canal, and the refueling cavity shall be maintained within the limit specified in the COLR.

APPLICABILITY: MODE 6.

-----------------------------------NOTE-----------------------------------
Only applicable to the refueling canal and refueling cavity when connected to the RCS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Boron concentration not within limit.	~~A.1~~ ~~Suspend CORE ALTERATIONS.~~	~~Immediately~~
	~~AND~~	
	A.~~2~~ [1] Suspend positive reactivity additions.	Immediately
	AND	
	A.~~3~~ [2] Initiate action to restore boron concentration to within limit.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Verify boron concentration is within the limit specified in COLR.	In accordance with the Surveillance Frequency Control Program

3.9 REFUELING OPERATIONS

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range neutron flux monitors and one channel of audible count rate shall be OPERABLE.

APPLICABILITY: MODE 6.

---------------NOTE-------------
CORE ALTERATIONS may continue to restore an inoperable source range neutron flux monitor.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required source range neutron flux monitor inoperable.	A.1 Suspend CORE ALTERATIONS. AND A.2 Suspend positive reactivity additions.	Immediately Immediately
B. Two required source range neutron flux monitors inoperable.	B.1 Initiate action to restore one source range neutron flux monitor to OPERABLE status. AND B.2 Perform SR 3.9.1.1.	Immediately Once per 12 hours
C. No audible count rate.	C.1. Initiate action to isolate unborated water sources.	Immediately

3.9 REFUELING OPERATIONS

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. The equipment hatch is capable of being closed and held in place by four bolts;

b. One door in each air lock is capable of being closed; and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere either:

1. closed by a manual or automatic isolation valve, blind flange, or equivalent, or

2. capable of being closed by an OPERABLE Containment Purge and Exhaust Isolation System.

-----NOTE-----
Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative control.

APPLICABILITY: ~~During CORE ALTERATIONS,~~
During movement of [recently] irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more containment penetrations not in required status.	~~A.1~~	~~Suspend CORE ALTERATIONS.~~	~~Immediately~~
	~~AND~~		
	A.~~2~~ [1]	Suspend movement of [recently] irradiated fuel assemblies within containment.	Immediately

Joseph M. Farley Nuclear Plant – Units 1 and 2

Revise Technical Specification Requirements During Handling Irradiated Fuel and Core Alterations – TSTF-51 and TSTF-471

Attachment 2

Revised Technical Specification Pages

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. ------------NOTE------------ Only applicable during movement of recently irradiated fuel assemblies within containment. -------------------------------- One or more manual channel(s) inoperable. OR Two radiation monitoring channels inoperable. OR Required Action and associated Completion Time for Condition A not met.	C.1	Place and maintain containment purge and exhaust valves in closed position.	Immediately
	OR		
	C.2	Enter applicable Conditions and Required Actions of LCO 3.9.3, "Containment Penetrations," for containment purge and exhaust isolation valves made inoperable by isolation instrumentation.	Immediately

Table 3.3.6-1 (page 1 of 1)
Containment Purge and Exhaust Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4 (a)	2	SR 3.3.6.6	NA
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	SR 3.3.6.2 SR 3.3.6.3 SR 3.3.6.5 SR 3.3.6.8	NA
3. Containment Radiation Gaseous (R-24A, B)	1,2,3,4 (a)	1 2	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7	$\leq 2.27 \times 10^{-2}$ µCi/cc (b)(c) $\leq 4.54 \times 10^{-3}$ µCi/cc (b)(d) $\leq 2.27 \times 10^{-3}$ µCi/cc (b)(e)
4. Containment Isolation - Phase A	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 3.a., for all initiation functions and requirements.			

(a) During movement of recently irradiated fuel assemblies within containment.
(b) Above background with no flow.
(c) With mini-purge in operation.
(d) With slow speed main purge in operation.
(e) With fast speed main purge in operation.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. ----------NOTE------------- Only applicable to Functions required OPERABLE by Table 3.3.8-1 during movement of recently irradiated fuel assemblies in the spent fuel pool room. ------------------------------- Required Action and associated Completion Time for Condition A or B not met during movement of recently irradiated fuel assemblies in the spent fuel pool room.	C.1	Suspend movement of recently irradiated fuel assemblies in the spent fuel pool room.	Immediately
D. ----------NOTE------------- Only applicable to Functions required OPERABLE by Table 3.3.8-1 in MODES 1-4. ------------------------------- Required Action and associated Completion Time for Condition A or B not met in MODE 1, 2, 3, or 4.	D.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	D.2	Be in MODE 5.	36 hours

Table 3.3.8-1 (page 1 of 1)
PRF Actuation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4, (a)	2 trains	SR 3.3.8.6	NA
2. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	SR 3.3.8.3 SR 3.3.8.4 SR 3.3.8.5	NA
3. Spent Fuel Pool Room Radiation Gaseous (R-25A, B)	(a)	2	SR 3.3.8.1 SR 3.3.8.2 SR 3.3.8.7	$\leq 8.73 \times 10^{-3}$ μCi/cc (b)
4. Spent Fuel Pool Room Ventilation Differential Pressure (PDSL-3989A and B)	(a)	2	SR 3.3.8.6 SR 3.3.8.7	NA
5. Containment Isolation - Phase B	Refer to LCO 3.3.2, "ESFAS Instrumentation" Function 3.b, for all initiation Functions and requirements.			

(a) During movement of recently irradiated fuel assemblies in the spent fuel pool room.
(b) Above background with no flow.

3.7 PLANT SYSTEMS

3.7.12 Penetration Room Filtration (PRF) System

LCO 3.7.12 Two PRF trains shall be OPERABLE.

-------------------------------------- NOTE --------------------------------------
The PRF and Spent Fuel Pool Room (SFPR) boundaries may be opened intermittently under administrative control.

APPLICABILITY: MODES 1, 2, 3, and 4 for post LOCA mode of operation,
During movement of recently irradiated fuel assemblies in the SFPR for the fuel handling accident mode of operation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One PRF train inoperable.	A.1 Restore PRF train to OPERABLE status.	7 days
B. Two PRF trains inoperable in MODE 1, 2, 3, or 4 due to inoperable PRF boundary.	B.1 Restore PRF boundary to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, 3, or 4. OR Two PRF trains inoperable in MODE 1, 2, 3, or 4 for reasons other than Condition B.	C.1 Be in MODE 3. AND C.2 ------------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 4. ------------------------------- Be in MODE 4.	6 hours 12 hours
D. Required Action and associated Completion Time of Condition A not met during movement of recently irradiated fuel assemblies in the SFPR.	D.1 Place OPERABLE PRF train in operation. OR D.2 Suspend movement of recently irradiated fuel assemblies in the SFPR.	Immediately Immediately

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. Two PRF trains inoperable during movement of recently irradiated fuel assemblies in the SFPR.	E.1	Suspend movement of recently irradiated fuel assemblies in the SFPR.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.12.1	---------------------------NOTE-------------------------------- Only required to be met during movement of recently irradiated fuel assemblies in the SFPR. --- Verify two PRF trains aligned to the SFPR.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.2	Operate each PRF train for ≥ 15 minutes in the applicable mode of operation (post LOCA and/or refueling accident).	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.3	Perform required PRF filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.7.12.4	Verify each PRF train actuates and the normal spent fuel pool room ventilation system isolates on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.5	Verify one PRF train can maintain a pressure ≤ -0.125 inches water gauge with respect to adjacent areas during the post LOCA mode of operation at a flow rate ≤ 5500 cfm.	In accordance with the Surveillance Frequency Control Program
SR 3.7.12.6	Verify one PRF train can maintain a slightly negative pressure with respect to adjacent areas during the fuel handling accident mode of operation at a flow rate ≤ 5500 cfm.	In accordance with the Surveillance Frequency Control Program

3.9 REFUELING OPERATIONS

3.9.1 Boron Concentration

LCO 3.9.1 Boron concentrations of the Reactor Coolant System, the refueling canal, and the refueling cavity shall be maintained within the limit specified in the COLR.

APPLICABILITY: MODE 6.

-----NOTE-----
Only applicable to the refueling canal and refueling cavity when connected to the RCS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Boron concentration not within limit.	A.1 Suspend positive reactivity additions.	Immediately
	AND	
	A.2 Initiate action to restore boron concentration to within limit.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Verify boron concentration is within the limit specified in COLR.	In accordance with the Surveillance Frequency Control Program

3.9 REFUELING OPERATIONS

3.9.2 Nuclear Instrumentation

LCO 3.9.2 Two source range neutron flux monitors and one channel of audible count rate shall be OPERABLE.

APPLICABILITY: MODE 6.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required source range neutron flux monitor inoperable.	A.1	-----------NOTE----------- CORE ALTERATIONS may continue to restore an inoperable source range neutron flux monitor. -----------------------------	
		Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2	Suspend positive reactivity additions.	Immediately
B. Two required source range neutron flux monitors inoperable.	B.1	Initiate action to restore one source range neutron flux monitor to OPERABLE status.	Immediately
	AND		
	B.2	Perform SR 3.9.1.1.	Once per 12 hours
C. No audible count rate.	C.1.	Initiate action to isolate unborated water sources.	Immediately

3.9 REFUELING OPERATIONS

3.9.3 Containment Penetrations

LCO 3.9.3 The containment penetrations shall be in the following status:

a. The equipment hatch is capable of being closed and held in place by four bolts;

b. One door in each air lock is capable of being closed; and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere either:

1. closed by a manual or automatic isolation valve, blind flange, or equivalent, or

2. capable of being closed by an OPERABLE Containment Purge and Exhaust Isolation System.

--NOTE--

Penetration flow path(s) providing direct access from the containment atmosphere to the outside atmosphere may be unisolated under administrative control.

APPLICABILITY: During movement of recently irradiated fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment penetrations not in required status.	A.1 Suspend movement of recently irradiated fuel assemblies within containment.	Immediately

Joseph M. Farley Nuclear Plant – Units 1 and 2

Revise Technical Specification Requirements During Handling Irradiated Fuel and Core Alterations – TSTF-51 and TSTF-471

Attachment 3

Technical Specification Bases Marked-up Pages (For Information Only)

TSTF-51 Insert A

Due to radioactive decay, containment is only required to isolate during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 70 hours).

TSTF-51 Insert C

involving handling recently irradiated fuel

TSTF-51 Insert D

Due to radioactive decay, the PRF actuation instrumentation 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 70 hours).

TSTF-51 Insert F

(i.e., fuel that has occupied part of a critical reactor core within the previous 70 hours)

TSTF-51 Insert G

Due to radioactive decay, the PRF System is only required to isolate during fuel handling accidents involving handling recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 70 hours).

TSTF-51 Insert M

irradiated fuel movement with containment closure capability or a minimum decay time of 70 hours without containment closure capability

TSTF-51 Insert N

Additionally, due to radioactive decay, a fuel handling accident involving handling non-recently irradiated fuel (i.e., fuel that has not occupied part of a critical reactor core within the previous 70 hours) will result in doses that are within the guideline values specified in 10 CFR 50.67 even without containment closure capability.

TSTF-571-T Insert

Required Action A.1 is modified by a Note that states that CORE ALTERATIONS may continue if necessary to facilitate repair or replacement of the inoperable source range neutron flux monitor. It may be necessary to move fuel assemblies, sources, or reactivity control components away from the locations in the core close to the source range neutron flux monitor to minimize personnel radiation dose during troubleshooting and repair.

BASES

APPLICABLE SAFETY ANALYSES (continued)

purge and exhaust isolation radiation monitors act as backup to the SI signal to ensure closing of the purge and exhaust valves. They are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown. Containment isolation in turn ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 50.67 (Ref. 1) limits. <TSTF-51 Insert A>

The containment purge and exhaust isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO requirements ensure that the instrumentation necessary to initiate Containment Purge and Exhaust Isolation, listed in Table 3.3.6-1, is OPERABLE.

1. Manual Initiation

   The LCO requires two channels OPERABLE. The operator can initiate Containment Purge Isolation at any time by using either of two valve hand switches in the control room (labeled CTMT PURGE DMPRS). Each switch actuates one train of purge/exhaust isolation valves. Actuation of either handswitch isolates the Containment Purge and Exhaust System.

   The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

   Each channel consists of one handswitch and the interconnecting wiring to the purge/exhaust isolation valves in that train.

2. Automatic Actuation Logic and Actuation Relays

   The LCO requires two trains of Automatic Actuation Logic and Actuation Relays OPERABLE to ensure that no single random failure can prevent automatic actuation.

   Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b (Paragraph 1), SI, and ESFAS Function 3.a,

(continued)

BASES

LCO

2. Automatic Actuation Logic and Actuation Relays (continued)

Containment Phase A Isolation. The Actions Conditions for the containment purge isolation portion of these Functions are different and less restrictive than those for their Phase A isolation and SI roles. If one or more of the SI or Phase A isolation Functions becomes inoperable in such a manner that only the Containment Purge Isolation Function is affected, the Conditions applicable to their SI and Phase A isolation Functions need not be entered. The less restrictive Actions specified for inoperability of the Containment Purge Isolation Functions specify sufficient compensatory measures for this case.

3. Containment Radiation

The LCO specifies one required channel of radiation monitor in MODES 1-4 and two radiation monitoring channels during ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies in containment to ensure that the radiation monitoring instrumentation necessary to initiate Containment Purge Isolation remains OPERABLE. <TSTF-51 Insert F>

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY also requires correct valve lineups and sample pump operation, as well as detector OPERABILITY.

4. Containment Isolation — Phase A

Refer to LCO 3.3.2, Function 3.a., for all initiating Functions and requirements except as described above in item 2, "Automatic Actuation Logic and Actuation Relays."

APPLICABILITY

The Automatic Actuation Logic and Actuation Relays and Containment Isolation — Phase A Functions are required OPERABLE in MODES 1, 2, 3 and 4. The Manual Initiation and Containment Radiation Functions are required OPERABLE in MODES 1, 2, 3, and 4, and during ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies <TSTF-51 Insert F> within containment. Under these conditions, the potential exists for an accident that could release significant fission product

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

A Note states that Condition C is applicable during ~~the Applicability of CORE ALTERATIONS and during~~ movement of recently irradiated fuel assemblies within containment.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which Containment Purge and Exhaust Isolation Functions.

SR 3.3.6.1

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

Agreement criteria are based on a combination of the channel instrument uncertainties, including indication and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.3.6.2

SR 3.3.6.2 is the performance of an ACTUATION LOGIC TEST. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are

(continued)

B 3.3 INSTRUMENTATION

B 3.3.8 Penetration Room Filtration (PRF) System Actuation Instrumentation

<TSTF-51 Insert C>

BASES

BACKGROUND

The PRF ensures that radioactive materials in the Spent Fuel Pool Room atmosphere following a fuel handling accident or ECCS pump rooms and penetration rooms of the auxiliary building following a loss of coolant accident (LOCA) are filtered and adsorbed prior to exhausting to the environment. The system is described in the Bases for LCO 3.7.12, "Penetration Room Filtration System." The system initiates filtered ventilation of the Spent Fuel Pool Room (including isolation of the normal ventilation) automatically following receipt of a high radiation signal (gaseous) or a low air flow signal from the normal Spent Fuel Pool Room ventilation system. In addition, the system initiates filtered ventilation of the ECCS pump rooms and penetration rooms following receipt of a Phase B Containment Isolation signal. Initiation may also be performed manually as needed from the main control room.

High gaseous radiation provides PRF initiation. Each PRF train is initiated by high radiation detected by a channel dedicated to that train. There are a total of two channels, one for each train. Each channel contains a gaseous monitor. High radiation detected by either monitor or a low air flow signal from the normal Spent Fuel Pool Room ventilation or a Phase B Containment Isolation signal from the Engineered Safety Features Actuation System (ESFAS) starts the PRF. These actions function to prevent exfiltration of contaminated air by initiating filtered ventilation, which imposes a negative pressure on the Spent Fuel Pool Room or ECCS pump rooms and penetration rooms. Since the radiation monitors include an air sampling system, various components such as sample line valves and sample pumps are required to support monitor OPERABILITY.

<TSTF-51 Insert C>

APPLICABLE SAFETY ANALYSES

The PRF ensures that radioactive materials in the Spent Fuel Pool Room atmosphere following a fuel handling accident or ECCS pump rooms and penetration rooms following a LOCA are filtered and adsorbed prior to being exhausted to the environment. This action reduces the radioactive content in the plant exhaust following a LOCA or fuel handling accident so that offsite doses remain within the limits specified in 10 CFR 50.67 (Ref. 1).

(continued)

BASES

LCO (continued)

3. Spent Fuel Pool Room Radiation

The LCO specifies two required Gaseous Radiation Monitor channels to ensure that the radiation monitoring instrumentation necessary to initiate the PRF remains OPERABLE. Each monitor will initiate the associated train of PRF and isolate the normal Spent Fuel Pool Room ventilation.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of channel electronics. OPERABILITY requires correct valve lineups, sample pump operation, and detector OPERABILITY.

4. Spent Fuel Pool Room Ventilation Differential Pressure

The LCO specifies two channels of spent fuel pool room ventilation differential pressure instrumentation to assure filtration protection is provided when insufficient normal spent fuel pool room ventilation system flow exists to ensure proper operation of the radiation monitors. When the instrumentation detects insufficient spent fuel pool room ventilation flow, the PRF is actuated and the spent fuel storage pool room ventilation isolated in the same manner as the radiation monitor actuation of the system. The differential pressure instrumentation assures filtration of the spent fuel pool room exhaust when the spent fuel pool room normal ventilation system flow is not sufficient for proper operation of the radiation monitors.

5. Containment Isolation – Phase B

Refer to LCO 3.3.2, Function 3.b for all initiation Functions and requirements except as described above in item 2, "Automatic Actuation Logic and Actuation Relays."

Only the Trip Setpoint is specified for each PRF Function in the LCO. The Trip Setpoint limits are defined in plant procedures (Ref. 2).

recently

APPLICABILITY

The manual PRF initiation must be OPERABLE in MODES 1, 2, 3, and 4 and when moving irradiated fuel assemblies in the Spent Fuel Pool Room, to ensure the PRF operates to remove fission products

(continued)

BASES

<TSTF-51 Insert C>

APPLICABILITY (continued)

associated with leakage after a LOCA or a fuel handling accident. The automatic Phase B PRF actuation instrumentation is also required in MODES 1, 2, 3, and 4 to remove fission products caused by post LOCA Emergency Core Cooling Systems leakage.

recently

High radiation and the normal Spent Fuel Pool Room ventilation system low flow signal initiation of the PRF must be OPERABLE in any MODE during movement of irradiated fuel assemblies in the Spent Fuel Pool Room to ensure automatic initiation of the PRF when the potential for a fuel handling accident exists. <TSTF-51 Insert D>

the limiting

While in MODES 5 and 6 without fuel handling in progress, the PRF instrumentation need not be OPERABLE since a fuel handling accident cannot occur.

<TSTF-51 Insert C>

<TSTF-51 Insert C>

ACTIONS

The most common cause of channel inoperability is outright failure or drift of the bistable or process module sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination is generally made during the performance of a COT, when the process instrumentation is set up for adjustment to bring it within specification. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate Condition entered.

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.8-1 in the accompanying LCO. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to the actuation logic train function of the Solid State Protection System (SSPS), the radiation monitor function, the Spent Fuel Pool Room differential pressure function, and the manual function. Condition A applies to the failure of a single actuation logic

(continued)

BASES

ACTIONS

A.1 (continued)

train, radiation monitor channel, Spent Fuel Pool Room differential pressure channel, or manual train. If one channel or train is inoperable, a period of 7 days is allowed to restore it to OPERABLE status. If the train cannot be restored to OPERABLE status, one PRF train must be placed in operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation. The 7 day Completion Time is the same as is allowed if one train of the mechanical portion of the system is inoperable. The basis for this time is the same as that provided in LCO 3.7.12.

B.1.1, B.1.2, B.2

Condition B applies to the failure of two PRF actuation logic trains, two radiation monitors, two Spent Fuel Pool Room differential pressure channels, or two manual trains. The Required Action is to place one PRF train in operation immediately. This accomplishes the actuation instrumentation function that may have been lost and places the unit in a conservative mode of operation. The applicable Conditions and Required Actions of LCO 3.7.12 must also be entered for the PRF train made inoperable by the inoperable actuation instrumentation. This ensures appropriate limits are placed on train inoperability as discussed in the Bases for LCO 3.7.12.

Alternatively, both trains may be placed in operation. This ensures the PRF Function is performed even in the presence of a single failure.

C.1

Condition C applies when the Required Action and associated Completion Time for Condition A or B have not been met and irradiated fuel assemblies are being moved in the Spent Fuel Pool Room. Movement of irradiated fuel assemblies in the Spent Fuel Pool Room must be suspended immediately to eliminate the potential for events that could require PRF actuation.

This Condition is modified by a Note which limits the applicability of this Condition to those Functions on Table 3.3.8-1 required OPERABLE during movement of irradiated fuel assemblies in the spent fuel pool room to mitigate the consequences of a fuel handling accident. This Condition does not apply to Functions which are only

(continued)

BASES

ACTIONS

C.1 (continued)

required to mitigate the consequences of a LOCA (Phase B Isolation and associated automatic actuation logic and actuation relays). These Functions are not required OPERABLE when moving irradiated fuel assemblies ~~and are~~ unrelated to the mitigation of a fuel handling accident in the spent fuel pool room. recently

D.1 and D.2

Condition D applies when the Required Action and associated Completion Time for Condition A or B have not been met and the unit is in MODE 1, 2, 3, or 4. The unit must be brought to a MODE in which the LCO requirements are not applicable. To achieve this status, the unit must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

This Condition is modified by a Note which limits the applicability of this Condition to those Functions on Table 3.3.8-1 required OPERABLE during MODES 1, 2, 3, or 4 to mitigate the consequences of a LOCA. This Condition is not intended to be applied to Functions which are only required to mitigate the consequences of a fuel handling accident in the Spent Fuel Pool Room (radiation monitors and Spent Fuel Pool Room normal ventilation differential pressure). These Functions are only required OPERABLE when moving irradiated fuel assemblies in the Spent Fuel Pool Room and are unrelated to the mitigation of the consequences of a LOCA.

recently

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.8-1 determines which SRs apply to which PRF Actuation Functions.

SR 3.3.8.1

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that

(continued)

BASES

APPLICABLE SAFETY ANALYSES

<TSTF-51 Insert C>

The PRF System design basis is established by the consequences of the limiting Design Basis Accidents (DBAs), which are a fuel handling accident and a large break loss of coolant accident (LOCA). The analysis of the fuel handling accident, given in Reference 3, assumes that all fuel rods in an assembly are damaged. The analysis of the LOCA assumes that radioactive materials leaked from the Emergency Core Cooling System (ECCS) are filtered and adsorbed by the PRF System. The PRF System also functions following a small break LOCA with a Phase B signal or manual operator actuation in those cases where the ECCS goes into the recirculation mode of long term cooling, to clean up releases of smaller leaks, such as from valve steam packing. The DBA analysis of the fuel handling accident and LOCA assumes that only one train of the PRF System is functional due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the one remaining train of this filtration system. The amount of fission products available for release from the spent fuel pool room is determined for a fuel handling accident and ECCS leakage for a LOCA. The analysis of the effects and consequences of a fuel handling accident and a LOCA are presented in Reference 3.

<TSTF-51 Insert G>

The assumptions and the analysis for the fuel handling accident follow the guidance provided in Regulatory Guide 1.183 (Ref. 4).

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

LCO

Two independent and redundant trains of the PRF System are required to be OPERABLE to ensure that at least one train is available, assuming a single failure that disables the other train, coincident with a loss of offsite power. During movement of recently irradiated fuel in the spent fuel pool room both trains of PRF are required to be aligned to the spent fuel pool room. Total system failure could result in the atmospheric release from the spent fuel pool room or ECCS pump rooms exceeding 25% of the 10 CFR 50.67 (Ref. 5) limits in the event of a fuel handling accident or LOCA respectively.

<TSTF-51 Insert C>

The PRF System is considered OPERABLE when the individual components necessary to control exposure in the spent fuel pool room, ECCS pump rooms, and penetration area are OPERABLE in both trains. A PRF train is considered OPERABLE when its associated:

a. Recirculation and exhaust fans are OPERABLE;

(continued)

LCO
(continued)

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

c. Ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

The LCO is modified by a Note allowing the PRF or spent fuel pool room (SFPR) boundary to be opened intermittently under administrative controls ~~without requiring entry into Conditions B or E for an inoperable pressure boundary~~. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, such as hatches and inspection ports, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for PRF or SFPR ventilation actuation is indicated. ~~Breaches that would prevent successful completion of SR 3.7.12.6 render the SFPR boundary inoperable. When the SFPR boundary is inoperable, Condition E will prohibit movement of irradiated fuel. For loads other than irradiated fuel, administrative controls will prevent movement of loads over irradiated fuel unless adequate decay time for the irradiated fuel has elapsed such that occurrence of a fuel handling accident without air filtration will not exceed dose limits. Calculations show that a decay time of 676 hours is sufficient.~~

APPLICABILITY

In MODE 1, 2, 3, or 4, the PRF System is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA.

In MODE 5 or 6, the PRF System is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

recently

During movement of irradiated fuel in the spent fuel pool area, two trains of PRF are required to be OPERABLE and aligned to the spent fuel pool room to alleviate the consequences of a fuel handling accident.

ACTIONS

A.1

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

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

D.1 and D.2

recently

When Required Action A.1 cannot be completed within the required Completion Time, during movement of irradiated fuel assemblies in the spent fuel pool room, the OPERABLE PRF train must be started immediately or fuel movement suspended. This action ensures that the remaining train is OPERABLE, that no undetected failures preventing system operation will occur, and that any active failure will be readily detected.

recently irradiated

recently irradiated

If the system is not placed in operation, this action requires suspension of fuel movement, which precludes a fuel handling accident. This does not preclude the movement of fuel assemblies to a safe position.

<TSTF-51 Insert C>

E.1

recently

When two trains of the PRF System are inoperable during movement of irradiated fuel assemblies in the spent fuel pool room, action must be taken to place the unit in a condition in which the LCO does not apply. Action must be taken immediately to suspend movement of irradiated fuel assemblies in the spent fuel pool room. This does not preclude the movement of fuel to a safe position.

recently

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1

recently

recently

During movement of irradiated fuel in the spent fuel pool room, the two PRF trains are required to be aligned to the spent fuel pool room. When moving irradiated fuel, periodic verification of the PRF system alignment is required. During movement of irradiated fuel the potential exists for a fuel handling accident. Verification of the PRF train alignment when moving irradiated fuel provides assurance the correct system alignment is maintained to support the assumptions of the fuel handling accident analysis regarding the OPERABILITY of the PRF System.

recently

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.12.1 (continued)

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. This surveillance is modified by a note which clarifies that the surveillance need only be ~~performed~~ met during the movement of recently irradiated fuel in the spent fuel pool room.

SR 3.7.12.2

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month provides an adequate check on this system. This Surveillance requires that the operation of the PRF System be verified in the applicable alignment (post LOCA and/or refueling accident). The surveillance is applied separately to each operating mode of the PRF System as required by plant conditions. In MODE 1-4, operational testing in the post LOCA alignment is required to verify the capability of the system to perform in this capacity. Operational testing of the PRF System in the refueling accident alignment is only required to be performed to support the movement of recently irradiated fuel in the spent fuel pool storage room (when the potential exists for a fuel handling accident <TSTF-51 Insert C>).

Systems that do not credit the operation of heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system. The system is initiated from the control room with flow through the HEPA and charcoal filters. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.12.3

This SR verifies that the required PRF System testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The PRF System filter tests are in accordance with ASME N510-1989 (Ref. 6). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the VFTP.

(continued)

BASES

LCO (continued)

boron concentration limit specified in the COLR ensures that a core k_{eff} of ≤ 0.95 is maintained during fuel handling operations. Violation of the LCO could lead to an inadvertent criticality during MODE 6.

APPLICABILITY

This LCO is applicable in MODE 6 to ensure that the fuel in the reactor vessel will remain subcritical. The required boron concentration ensures a k_{eff} ≤ 0.95. In other MODES, the LCOs for Rod Group Alignment Limits, Shutdown Bank Insertion Limits, Control Bank Insertion Limits, and SHUTDOWN MARGIN ensure that an adequate amount of negative reactivity is available to shut down the reactor and maintain it subcritical.

The Applicability is modified by a Note. The Note states that the limits on boron concentration are only applicable to the refueling canal and the refueling cavity when those volumes are connected to the Reactor Coolant System. When the refueling canal and the refueling cavity are isolated from the RCS, no potential path for boron dilution exists.

ACTIONS

A.1 ~~and A.2~~

Continuation of ~~CORE ALTERATIONS or~~ positive reactivity additions (including actions to reduce boron concentration) is contingent upon maintaining the unit in compliance with the LCO. If the boron concentration of any coolant volume in the filled portions of the RCS, the refueling canal, or the refueling cavity that has direct access to the core is less than its limit, all operations involving ~~CORE ALTERATIONS or~~ positive reactivity additions must be suspended immediately.

Suspension of ~~CORE ALTERATIONS and~~ positive reactivity additions shall not preclude moving a component to a safe position or normal cooling of the coolant volume for the purpose of maintaining system temperature.

A.~~3~~ 2

In addition to immediately suspending ~~CORE ALTERATIONS or~~ positive reactivity additions, boration to restore the concentration must be initiated immediately.

BASES

APPLICABILITY

In MODE 6, two source range neutron flux monitors must be OPERABLE to determine changes in core reactivity. There are no other direct means available to check core reactivity levels. In other MODES, the OPERABILITY requirements for the Westinghouse installed source range detectors and circuitry are addressed by LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation."

The source range neutron flux monitors have no control function in MODE 6 and are assured to alarm (visual indication and audio) only during an FSAR design basis accident or transient. The source range neutron flux monitors provide the only on-scale monitoring of the neutron flux during refueling. Therefore, they are being retained in the Technical Specifications.

In MODES 1-3, the operability requirements for the installed source range Gamma-Metrics post accident neutron flux monitor are addressed by LCO 3.3.4, "Remote Shutdown System."

ACTIONS

A.1 and A.2

With only one source range neutron flux monitor OPERABLE (providing visual indication in the control room), redundancy has been lost. Since these instruments are the only direct means of monitoring core reactivity conditions, CORE ALTERATIONS and positive reactivity additions must be suspended immediately. Performance of Required Action A.1 shall not preclude completion of movement of a component to a safe position or normal cooling of the coolant volume for the purpose of maintaining system temperature.

<TSTF-571-T Insert>

B.1

With no required source range neutron flux monitor OPERABLE (providing visual indication in the control room), action to restore a monitor to OPERABLE status shall be initiated immediately. Once initiated, action shall be continued until a source range neutron flux monitor is restored to OPERABLE status.

(continued)

BASES

ACTIONS (continued)

B.2

With no required source range neutron flux monitor OPERABLE (providing visual indication in the control room), there are no direct means of detecting changes in core reactivity. However, since CORE ALTERATIONS (except as allowed by the Note to Required Action A.1) and positive reactivity additions are not to be made, the core reactivity condition is stabilized until the source range neutron flux monitors are OPERABLE. This stabilized condition is determined by performing SR 3.9.1.1 to ensure that the required boron concentration exists.

The Completion Time of 12 hours is sufficient to obtain and analyze a reactor coolant sample for boron concentration and ensures that unplanned changes in boron concentration would be identified. The 12 hour Completion Time is reasonable, considering the low probability of a change in core reactivity during this time period.

C.1

With no audible count rate available, prompt and definite indication of a boron dilution event, consistent with the assumptions of the safety analysis, is lost. In this situation, the boron dilution event may not be detected quickly enough to assure sufficient time is available for operations to manually isolate the unborated water sources and stop the dilution prior to the loss of SHUTDOWN MARGIN. Therefore, action must be taken to prevent an inadvertent boron dilution event from occurring. This is accomplished by isolating all the unborated water flow paths to the reactor coolant system from the Reactor Makeup Water System and the Demineralized Water System. Isolating these flow paths ensures that an inadvertent dilution of the reactor coolant boron concentration is prevented. The Completion Time of "immediately" assures a prompt response by operations and requires an operator to initiate actions to isolate an affected flow path immediately. Once actions are initiated, they must be continued until all the necessary flow paths are isolated. Movement of fuel may continue provided two channels of visual indication are available in the control room.

B 3.9 REFUELING OPERATIONS

B 3.9.3 Containment Penetrations

BASES

BACKGROUND

During ~~CORE ALTERATIONS or~~ movement of recently irradiated fuel assemblies within containment, a release of fission product radioactivity within containment will be limited to maintain dose consequences within regulatory limits when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The LCO requirements are referred to as "refueling integrity" rather than "containment OPERABILITY." Refueling integrity means that all potential escape paths are closed or capable of being closed. Since there is no potential for containment pressurization, the 10 CFR 50, Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained well within the requirements of 10 CFR 50.67. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. If closed, the equipment hatch must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced. Alternatively, the equipment hatch can be open provided it can be installed with a minimum of four bolts holding it in place.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 unit operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown

(continued)

BASES

recently

BACKGROUND (continued)

when refueling integrity is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for extended periods when frequent containment entry is necessary. During ~~CORE ALTERATIONS or~~ movement of irradiated fuel assemblies within containment, refueling integrity is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain capable of being closed.

The requirements for refueling integrity ensure that a release of fission product radioactivity within containment will be limited to maintain dose consequences within regulatory limits.

The Containment Purge and Exhaust System includes two subsystems. The normal subsystem includes a 48-inch purge penetration and a 48-inch exhaust penetration. The second subsystem, a minipurge system, includes an 8-inch purge and an 8 inch exhaust line that utilize the 48-inch penetrations. During MODES 1, 2, 3, and 4, the two 48-inch purge valves in each of the normal purge and exhaust penetrations are secured in the closed position. The two 8-inch minipurge valves in each of the two minipurge lines may be opened in these MODES in accordance with LCO 3.6.3, "Containment Isolation Valves," but are closed automatically by the Engineered Safety Features Actuation System (ESFAS) instrumentation specified in LCO 3.3.6, "Containment Purge and Exhaust Isolation Instrumentation." Neither of the subsystems is subject to a Specification in MODE 5.

In MODE 6, large air exchanges are necessary to conduct refueling operations. The normal 48-inch purge system is used for this purpose, and all four valves are closed by the ESFAS instrumentation specified in LCO 3.3.6, "Containment Purge and Exhaust Isolation Instrumentation."

The minipurge system is not normally used in MODE 6. However, if the minipurge valves are opened they are capable of being closed automatically by the instrumentation specified in LCO 3.3.6, "Containment Purge and Exhaust Isolation Instrumentation."

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by a closed automatic

(continued)

BASES

BACKGROUND (continued)

isolation valve, a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods allowed under the provisions of 10 CFR 50.59 may include use of a material that can provide a temporary, atmospheric pressure, ventilation barrier for the other containment penetrations during ~~CORE ALTERATIONS or~~ movement of [recently] irradiated fuel assemblies within containment (Ref. 1).

<TSTF-51 Insert C>

APPLICABLE SAFETY ANALYSES

During ~~CORE ALTERATIONS or~~ movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel (Ref. 2). The fuel handling accident analyzed includes dropping a single irradiated fuel assembly. The requirements of LCO 3.9.6, "Refueling Cavity Water Level," ~~and the~~ [in conjunction with a] minimum[s] decay time of ~~100~~ [70] hours prior to ~~CORE ALTERATIONS~~ ensure that the release of fission product radioactivity, [<TSTF-51 Insert M>] subsequent to a fuel handling accident, results in doses that are less than the dose limits specified in 10 CFR 50.67, and the more restrictive offsite exposure criteria of Standard Review Plan, Section 15.0.1 (Ref. 3).

<TSTF-51 Insert C>

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

LCO

This LCO limits the consequences of a fuel handling accident ~~in~~ containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere to be closed except for the OPERABLE containment purge and exhaust penetrations, the equipment hatch and the personnel air locks. For the OPERABLE containment purge and exhaust penetrations, this LCO ensures that these penetrations are isolable by the Containment Purge and Exhaust Isolation System. For the equipment hatch and personnel air locks, closure capability is provided by a designated trained closure crew and the necessary equipment. The OPERABILITY requirements for LCO 3.3.6, "Containment Purge and Exhaust Isolation Instrumentation," ensure that the automatic purge and exhaust valve closure times specified in the FSAR can be achieved and, therefore, meet the assumptions used in the safety achieved and, therefore, meet the assumptions used in the safety analysis to ensure that releases through the valves

(continued)

BASES

LCO (continued)

are terminated, such that radiological doses are within the acceptance limit.

The equipment hatch and personnel air locks are considered isolable when the following criteria are satisfied:

1. the necessary equipment required to close the hatch and personnel air locks is available,

2. at least 23 feet of water is maintained over the top of the reactor vessel flange in accordance with Specification 3.9.6,

3. a designated trained closure crew is available.

The equipment hatch and personnel air locks door openings must be capable of being cleared of any obstruction so that closure can be achieved as soon as possible.

The containment personnel air lock and emergency personnel air lock doors may be open during movement of [recently] irradiated fuel in the containment ~~and during CORE ALTERATIONS~~ provided that one door in each air lock is capable of being closed in the event of a fuel handling accident. Should a fuel handling accident occur inside containment, one door in each personnel air lock will be closed following an evacuation of containment.

The closure of the equipment hatch and the personnel air locks will be completed promptly following a fuel handling accident within containment.

The LCO is modified by a Note allowing penetration flow paths with direct access from the containment atmosphere to the outside atmosphere to be unisolated under administrative controls. Administrative controls ensure 1) appropriate personnel are aware of the open status of the penetration flow path during ~~CORE ALTERATIONS or~~ movement of [recently] irradiated fuel assemblies within containment, and 2) special individuals are designated and readily available to isolate the flow path in the event of a fuel handling accident. <TSTF-51 Insert C>

APPLICABILITY

The containment penetration requirements are applicable during ~~CORE ALTERATIONS or~~ movement of [recently] irradiated fuel assemblies within containment because this is when there is a potential for ~~a~~ [the limiting] fuel handling accident. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1. In MODES 5 and 6, when

(continued)

<TSTF-51 Insert N>

BASES

APPLICABILITY (continued)

~~CORE ALTERATIONS or~~ movement of irradiated fuel assemblies within containment ~~are~~ is not being conducted, the potential for a fuel handling accident does not exist. Therefore, under these conditions no requirements are placed on containment penetration status.

ACTIONS

A.1 ~~and A.2~~

If the containment equipment hatch, air locks, or any containment penetration that provides direct access from the containment atmosphere to the outside atmosphere is not in the required status, including the Containment Purge and Exhaust Isolation System not capable of automatic actuation when the purge and exhaust valves are open, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending ~~CORE ALTERATIONS and~~ movement of recently irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

This Surveillance demonstrates that each of the containment penetrations required to be in its closed position is in that position. The Surveillance on the open purge and exhaust valves will demonstrate that the valves are not blocked from closing. Also, the Surveillance will demonstrate that each valve operator has motive power, which will ensure that each valve is capable of being closed by an OPERABLE automatic containment purge and exhaust isolation signal.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.9.3.2

This Surveillance demonstrates that each containment purge and exhaust valve actuates to its isolation position on manual initiation or on an actual or simulated high radiation signal from each of the containment purge radiation monitoring instrumentation channels. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program. Any change in the components being tested by this SR will require reevaluation of STI Evaluation Number 558904 in accordance with the Surveillance Frequency Control

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.9.3.2 (continued)

Program. SR 3.6.3.4 demonstrates that the isolation time of each valve is in accordance with the INSERVICE TESTING PROGRAM requirements. These Surveillances performed during MODE 6 will ensure that the valves are capable of closing after a postulated fuel handling accident to limit a release of fission product radioactivity from the containment. This SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring automatic actuation capability.

<TSTF-51 Insert C>

SR 3.9.3.3

The equipment hatch is provided with a set of hardware, tools, and equipment for moving the hatch from its storage location and installing it in the opening. The required set of hardware, tools, and equipment shall be inspected to ensure that they can perform the required functions.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The SR is modified by a Note which only requires that the surveillance be met for an open equipment hatch. If the equipment hatch is installed in its opening, the availability of the means to install the hatch is not required.

REFERENCES

1. GPU Nuclear Safety Evaluation SE-0002000-001, Rev. 0, May 20, 1988.
2. FSAR, Section 15.4.5.
3. NUREG-0800, Section 15.0.1, Rev. 0, July 2000.
4. Regulatory Guide 1.195, "Methods and Assumptions for Evaluating Radiological Consequences of Design Basis Accidents at Light-Water Nuclear Power Reactors," May 2003.