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**Advanced Passive 1000 (AP1000)  
Generic Technical Specification Traveler (GTST)**

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**Title: Revision and Renumbering of AP1000 GTS Subsection 3.9.7 to be STS 3.9.5,  
Decay Time**

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**I. Technical Specifications Task Force (TSTF) Travelers, Approved Since Revision 2 of  
STS NUREG-1431, and Used to Develop this GTST**

**TSTF Number and Title:**

None

**STS NUREGs Affected:**

Not applicable

**NRC Approval Date:**

Not applicable

**TSTF Classification:**

Not applicable

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**II. Reference Combined License (RCOL) Standard Departures (Std. Dep.), RCOL COL Items, and RCOL Plant-Specific Technical Specifications (PTS) Changes Used to Develop this GTST**

**RCOL Std. Dep. Number and Title:**

None

**RCOL COL Item Number and Title:**

Not applicable

**RCOL PTS Change Number and Title:**

The Vogtle Electric Generating Plant Units 3 and 4 License Amendment Request (VEGP LAR) proposed the following changes to the initial version of the PTS (referred to as the current TS by the VEGP LAR).

These changes include Administrative Changes (A), Relocation Changes (R), and Less Restrictive Changes (L), and are discussed in enumerated discussions of change (DOCs). These changes are discussed in Sections VI and VII of this GTST.

DOC A038: Editorial/clarification change

DOC L05: Elimination of LCO 3.0.8

DOC R1: Relocate GTS 3.9.5

DOC R2: Relocate GTS 3.9.6

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### **III. Comments on Relations Among TSTFs, RCOL Std. Dep., RCOL COL Items, and RCOL PTS Changes**

This section discusses the considered changes that are: (1) applicable to operating reactor designs, but not to the AP1000 design; (2) already incorporated in the GTS; or (3) superseded by another change.

This subsection (GTS 3.9.7) with its title does not exist in WOG STS Rev. 4 and it is renumbered by this GTST as subsection 3.9.5 in AP1000 STS, Rev. 0.

DOC A038 makes a minor editorial change for GTS SR 3.9.7.1 (STS SR 3.9.5.1) by eliminating the word 'that' under Surveillance.

DOC L05 eliminates the Actions table Note regarding an exception to GTS LCO 3.0.8 from GTS Subsection 3.9.7 Actions table, and the related discussion from the "Actions" section of Bases for GTS Subsection 3.9.7 (STS Subsection 3.9.5).

DOC R1 and R2 relocates GTS 3.9.5 and GTS 3.9.6. Accordingly, this subsection AP1000 GTS 3.9.7 is renumbered by this GTST as STS 3.9.5 in AP1000 STS Rev. 0.

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#### IV. Additional Changes Proposed as Part of this GTST (modifications proposed by NRC staff and/or clear editorial changes or deviations identified by preparer of GTST)

##### APOG Recommended Changes to Improve Bases for GTS 3.9.7

Delete the text “within containment or in the fuel handling area inside the auxiliary building” in the first sentence of Background section of Bases. (APOG #502)

Change “Chapter 15” to “FSAR Chapter 15 (Ref. 3)” at the end of Background section of Bases. (SPSB for APOG #502)

Insert FSAR Chapter 15, “Accident Analysis” as Reference 3 in the list of References of Bases. (SPSB for APOG #502)

Modify the “Applicability” section of Bases as follows: (where the crossed out text is removed and the bold text is inserted)

Radioactive decay time is applicable when moving irradiated fuel assemblies in ~~containment or in the fuel handling area inside the auxiliary building~~ **the reactor pressure vessel**. The LCO minimizes the possibility of radioactive release due to a fuel handling accident that is beyond the assumptions of the safety analysis. If irradiated fuel assemblies are not being moved, there can be no significant radioactivity release as a result of a postulated fuel handling accident. **If irradiated fuel assemblies are being moved outside of the reactor pressure vessel, then they were previously assured of having been subcritical for more than 48 hours before being moved from the reactor pressure vessel.** Requirements for fuel handling accidents in the spent fuel pool are also covered by LCO 3.7.5, “Spent Fuel Pool Water Level.” (APOG #503)

Modify the first paragraph in “Actions” section of Bases under heading “A.1” as follows: (where the crossed out text is removed and the bold text is inserted)

With a decay time of less than 48 hours, all operations involving movement of irradiated fuel assemblies within ~~containment or in the fuel handling area inside the auxiliary building~~ **the reactor pressure vessel** shall be suspended immediately to ensure that a fuel handling accident cannot occur **without the assumed fission product decay time**. (APOG #504)

Modify the text in the “Surveillance Requirements” section of Bases as follows: (where the crossed out text is removed and the bold text is inserted)

Verification that the reactor has been subcritical for ~~at least~~ **≥** 48 hours prior to movement of irradiated fuel in the reactor pressure vessel ~~to the refueling cavity in containment or to the fuel handling area inside the auxiliary building~~ ensures that the design basis for the analysis of the postulated fuel handling accident during refueling operations is met. Specifying **a minimum** radioactive decay time limits the consequences of ~~damaged fuel rods that are~~ **fuel rod damage that is** postulated to result from a fuel handling accident (Ref. 2). (APOG #505 and SPSB)

## **V. Applicability**

### **Affected Generic Technical Specifications and Bases:**

Section 3.9.7, Decay Time

### **Changes to the Generic Technical Specifications and Bases:**

Renumber this subsection AP1000 GTS 3.9.7 to be STS 3.9.5 in AP1000 STS Rev. 0. (DOC R1and R2)

Eliminate LCO 3.0.8 from LCO 3.9.4 Actions and from Bases 3.9.4 Actions. (DOC L05)

Delete the word ‘that’ under Surveillance for GTS SR 3.9.7.1 (STS SR 3.9.5.1). (DOC A038)

Delete the text “within containment or in the fuel handling area inside the auxiliary building” in the first sentence of Background section of Bases. (APOG #502)

Change “Chapter 15” to “FSAR Chapter 15 (Ref. 3)” at the end of Background section of Bases. (SPSB for APOG #502)

Add Reference 3 to the list of References of Bases. (SPSB for APOG #502)

Modify the “Applicability” section of Bases. (APOG #503)

Modify the first paragraph in “Actions” section of Bases under heading “A.1.” (APOG #504)

Modify the text in “Surveillance Requirements” section of Bases. (APOG #505 and SPSB)

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**VI. Traveler Information****Description of TSTF changes:**

Not applicable

**Rationale for TSTF changes:**

Not applicable

**Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:**

Administrative Changes (A):

DOC A038:

In SR 3.9.7.1, the Surveillance is revised by eliminating the word 'that' from the phrase "Verify that refueling cavity water level is" where the word 'that' is underlined.

Less Restrictive Changes (L):

DOC L05:

The reference to LCO 3.0.8 is eliminated in TS LCO Actions Note and Bases Actions for this subsection. The changes are highlighted later in the Markup of this subsection at the end of this GTST.

Relocation Changes (R):

DOC R1 and R2:

DOCs R1 and R2 relocate GTS 3.9.5 and 3.9.6 respectively. Accordingly, subsection AP1000 GTS 3.9.7 is renumbered as STS 3.9.5 in AP1000 STS Rev. 0.

**Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:**

According to VEGP LAR A038 "deletion of 'that' from Surveillances is consistent with the guidance DOC provided in TSTF-GG-05-01, subsection 3.1.1.g, that states: "Avoid the use of 'that' in the Specifications if the statement is clear without it." Deleting 'that' from the current SRs does not reduce the clarity of the SRs."

In reference to the elimination of LCO 3.0.8, DOC L05 indicates that "current TS LCO 3.0.8 applies in Modes 5 and 6 when the associated Actions are not met or an associated Action is not provided. In some cases, LCO 3.0.8 is explicitly excluded from applying by way of a Note. In conjunction with the change to eliminate LCO 3.0.8, these Notes are no longer necessary and are administratively eliminated." VEGP TSU DOC concludes that, "removing LCO 3.0.8 (and references to it) will not adversely impact public health and safety."

Accordingly, the changes made by DOC A038 and DOC L05 are acceptable. Therefore, these changes are implemented by this GTST in AP1000 STS 3.9.5, Rev. 0.

Technical discussion for the changes proposed by DOC R1 is covered in another GTST (AP1000-A24-3.9.5). Also technical discussion for the changes proposed by DOC R2 is covered in another GTST (AP1000-A25-3.9.6). Please also refer to VEGP Units 3 and 4, Technical Specification Upgrade LAR Enclosure 1 Attachment 2, DOC for more technical evaluation.

**Description of additional changes proposed by NRC staff/preparer of GTST:**

None

**Rationale for additional changes proposed by NRC staff/preparer of GTST:**

None

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**VII. GTST Safety Evaluation****Technical Analysis:**

Technical discussion for the changes proposed by DOC A038, DOC L05, and DOCs R1 and R2 are covered in section VI under “Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes.”

The remaining changes are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

Having found that this GTST’s proposed changes to the GTS and Bases are acceptable, the NRC staff concludes that AP1000 STS Subsection 3.9.5 is an acceptable model Specification for the AP1000 standard reactor design.

**References to Previous NRC Safety Evaluation Reports (SERs):**

None

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**VIII. Review Information****Evaluator Comments:**

None

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**Review Information:**

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on 5/21/2014.

**APOG Comments (Ref. 7) and Resolutions:**

1. (Internal #500) GTS 3.9.7 (STS 3.9.5): APOG requests changing SR 3.9.4.1” to “SR 3.9.7.1” in the GTST. This issue is resolved by distinguishing the modifier GTS 3.9.7 from STS 3.9.5 in the text. To eliminate this ambiguity, SPSB recommends revising the first and second paragraph (see Section III in this updated traveler) for editorial clarification. These changes are made as recommended to improve the Bases.
2. (Internal #501) GTS 3.9.7 (STS 3.9.5): APOG requests correcting the Accession number for Reference 1 from (ML@11171A500) to (ML11171A500). This is an inadvertent error and is resolved as recommended.
3. (Internal #502, #503, #504, #505) GTS 3.9.7 (STS 3.9.5): APOG recommends modifying the text of Background, Applicability, Required Action A.1, and SR 3.9.5.1 for consistency with TS Applicability. APOG comments that these sections discuss movement of irradiated fuel assemblies in the containment or the auxiliary building. The TS applies to irradiated fuel movement in the reactor pressure vessel and not these other two areas. The Background more generally covers any irradiated fuel handling, while the Applicability discusses the rationale for the TS being applied only to movement within the RPV.

SPSB suggested additional edits for consistency with subsection 3.9.4 and for additional clarification. Also SPSB suggested adding Reference (3) to the list of references and the phrase “Chapter 15” is changed to “FSAR Chapter 15 (Ref. 3)” in the “Background” section of Bases.

These changes are made as recommended to improve the Bases.

**NRC Final Approval Date:** 12/14/2015

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**IX. Evaluator Comments for Consideration in Finalizing Technical Specifications and Bases**

DOCs R1 and R2 relocate GTS 3.9.5 and GTS 3.9.6 respectively. Accordingly, subsection AP1000 GTS 3.9.7 is renumbered as AP1000 STS 3.9.5 in Rev. 0.

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**X. References Used in GTST**

1. AP1000 DCD, Revision 19, Section 16, "Technical Specifications," June 2011 (ML11171A500).
2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).
3. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013, ADAMS Package Accession No. ML13238A337, which contains:

ML13238A355	Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).
ML13238A359	Enclosure 1 - Amendment No. 13 to COL No. NPF-91
ML13239A256	Enclosure 2 - Amendment No. 13 to COL No. NPF-92
ML13239A284	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)
ML13239A287	Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms
ML13239A288	SE Attachment 2 - Table A - Administrative Changes
ML13239A319	SE Attachment 3 - Table M - More Restrictive Changes
ML13239A333	SE Attachment 4 - Table R - Relocated Specifications
ML13239A331	SE Attachment 5 - Table D - Detail Removed Changes
ML13239A316	SE Attachment 6 - Table L - Less Restrictive Changes

The following documents were subsequently issued to correct an administrative error in Enclosure 3:

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|-------------|---|
| ML13277A616 | Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4-Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402) |
| ML13277A637 | Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)  |
4. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005.
  5. RAI Letter No. 01 Related to License Amendment Request (LAR) 12-002 for the Vogtle Electric Generating Plant Units 3 and 4 Combined Licenses, September 7, 2012 (ML12251A355).
  6. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360).

7. APOG-2014-008, APOG (AP1000 Utilities) Comments on AP1000 Standardized Technical Specifications (STS) Generic Technical Specification Travelers (GTSTs), Docket ID NRC-2014-0147, September 22, 2014 (ML14265A493).
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**XI. MARKUP of the Applicable GTS Subsection for Preparation of the STS NUREG**

The entire section of the Specifications and the Bases associated with this GTST is presented next.

Changes to the Specifications and Bases are denoted as follows: Deleted portions are marked in strikethrough red font, and inserted portions in bold blue font.

Decay Time  
3.9.75

## 3.9 REFUELING OPERATIONS

## 3.9.75 Decay Time

LCO 3.9.75 The reactor shall be subcritical for  $\geq 48$  hours.

APPLICABILITY: During movement of irradiated fuel in the reactor pressure vessel.

## ACTIONS

~~NOTE~~~~LCO 3.0.8 is not applicable.~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Reactor subcritical < 48 hours.	A.1 Suspend all operations involving movement of irradiated fuel in the reactor pressure vessel.	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.9.75.1 Verify <del>that</del> the reactor has been subcritical for $\geq 48$ hours by verification of the date and time of subcriticality.	Prior to movement of irradiated fuel in the reactor vessel

## B 3.9 REFUELING OPERATIONS

## B 3.9.75 Decay Time

## BASES

BACKGROUND	The movement of irradiated fuel assemblies <del>within containment or in the fuel handling area inside the auxiliary building</del> requires allowing at least 48 hours for radioactive decay time before fuel assembly handling can be initiated. During fuel handling, this ensures that sufficient radioactive decay has occurred in the event of a fuel handling accident (Refs. 1 and 2). Sufficient radioactive decay of short-lived fission products would have occurred to limit offsite doses from the accident to within the values reported in <b>FSAR Chapter 15 (Ref. 3)</b> .
APPLICABLE SAFETY ANALYSES	<p>During movement of irradiated fuel assemblies, the radioactivity decay time is an initial condition design parameter in the analysis of a fuel-handling accident inside containment or in the fuel handling area inside the auxiliary building, as postulated by Regulatory Guide 1.183 (Ref. 1).</p> <p>The fuel handling accident analysis inside containment or in the fuel handling area inside the auxiliary building is described in Reference 2. This analysis assumes a minimum radioactive decay time of 48 hours.</p> <p>Radioactive decay time satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii),</p>
LCO	A minimum radioactive decay time of 48 hours is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment or in the fuel handling area inside the auxiliary building are within the values calculated in Reference 2.
APPLICABILITY	Radioactive decay time is applicable when moving irradiated fuel assemblies in <del>containment or in the fuel handling area inside the auxiliary building</del> <b>the reactor pressure vessel</b> . The LCO minimizes the possibility of radioactive release due to a fuel handling accident that is beyond the assumptions of the safety analysis. If irradiated fuel assemblies are not being moved, there can be no significant radioactivity release as a result of a postulated fuel handling accident. <b>If irradiated fuel assemblies are being moved outside of the reactor pressure vessel, then they were previously assured of having been subcritical for more than 48 hours before being moved from</b>



## BASES

## APPLICABILITY (continued)

**the reactor pressure vessel.** Requirements for fuel handling accidents in the spent fuel pool are also covered by LCO 3.7.5, "Spent Fuel Pool Water Level."

## ACTIONS

~~LCO 3.0.8 is applicable while in MODE 5 or 6. Since movement of irradiated fuel assemblies with less than 48 hours of decay time can occur in MODE 6 after removing the reactor vessel head following the reactor shutdown, the ACTIONS have been modified by a Note stating that LCO 3.0.8 is not applicable. If moving irradiated fuel assemblies while in MODE 6, the fuel movement is independent of shutdown reactor operations since the reactor is already shutdown. Entering LCO 3.0.8 while in MODE 6 would not specify any action.~~

A.1

With a decay time of less than 48 hours, all operations involving movement of irradiated fuel assemblies within ~~containment or in the fuel handling area inside the auxiliary building~~ **the reactor pressure vessel** shall be suspended immediately to ensure that a fuel handling accident cannot occur **without the assumed fission product decay time.**

The suspension of fuel movement shall not preclude completion of movement to safe position.

SURVEILLANCE  
REQUIREMENTSSR 3.9.75.1

Verification that the reactor has been subcritical for ~~at least~~ **≥** 48 hours prior to movement of irradiated fuel in the reactor pressure vessel ~~to the refueling cavity in containment or to the fuel handling area inside the auxiliary building~~ ensures that the design basis for the analysis of the postulated fuel handling accident during refueling operations is met. Specifying **a minimum** radioactive decay time, limits the consequences of ~~damaged fuel rods that are~~ **fuel rod damage that is** postulated to result from a fuel handling accident (Ref. 2).

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BASES

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- REFERENCES
1. Regulatory Guide 1.183, "Alternate Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors."
  2. **FSAR** Section 15.7.4, "Fuel Handling Accident."
  3. **FSAR Chapter 15, "Accident Analyses."**
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**XII. Applicable STS Subsection After Incorporation of this GTST's Modifications**

The entire subsection of the Specifications and the Bases associated with this GTST, following incorporation of the modifications, is presented next.

## 3.9 REFUELING OPERATIONS

## 3.9.5 Decay Time

LCO 3.9.5            The reactor shall be subcritical for  $\geq 48$  hours.

APPLICABILITY:    During movement of irradiated fuel in the reactor pressure vessel.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Reactor subcritical < 48 hours.	A.1    Suspend all operations involving movement of irradiated fuel in the reactor pressure vessel.	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.9.5.1    Verify the reactor has been subcritical for $\geq 48$ hours by verification of the date and time of subcriticality.	Prior to movement of irradiated fuel in the reactor vessel

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B 3.9 REFUELING OPERATIONS

## B 3.9.5 Decay Time

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BASES

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BACKGROUND	The movement of irradiated fuel assemblies requires allowing at least 48 hours for radioactive decay time before fuel assembly handling can be initiated. During fuel handling, this ensures that sufficient radioactive decay has occurred in the event of a fuel handling accident (Refs. 1 and 2). Sufficient radioactive decay of short-lived fission products would have occurred to limit offsite doses from the accident to within the values reported in FSAR Chapter 15 (Ref. 3).
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APPLICABLE SAFETY ANALYSES	<p>During movement of irradiated fuel assemblies, the radioactivity decay time is an initial condition design parameter in the analysis of a fuel-handling accident inside containment or in the fuel handling area inside the auxiliary building, as postulated by Regulatory Guide 1.183 (Ref. 1).</p> <p>The fuel handling accident analysis inside containment or in the fuel handling area inside the auxiliary building is described in Reference 2. This analysis assumes a minimum radioactive decay time of 48 hours.</p> <p>Radioactive decay time satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii),</p>
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LCO	A minimum radioactive decay time of 48 hours is required to ensure that the radiological consequences of a postulated fuel handling accident inside containment or in the fuel handling area inside the auxiliary building are within the values calculated in Reference 2.
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APPLICABILITY	Radioactive decay time is applicable when moving irradiated fuel assemblies in the reactor pressure vessel. The LCO minimizes the possibility of radioactive release due to a fuel handling accident that is beyond the assumptions of the safety analysis. If irradiated fuel assemblies are not being moved, there can be no significant radioactivity release as a result of a postulated fuel handling accident. If irradiated fuel assemblies are being moved outside of the reactor pressure vessel, then they were previously assured of having been subcritical for more than 48 hours before being moved from the reactor pressure vessel. Requirements for fuel handling accidents in the spent fuel pool are also covered by LCO 3.7.5, "Spent Fuel Pool Water Level."
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BASES

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## ACTIONS

A.1

With a decay time of less than 48 hours, all operations involving movement of irradiated fuel assemblies within the reactor pressure vessel shall be suspended immediately to ensure that a fuel handling accident cannot occur without the assumed fission product decay time.

The suspension of fuel movement shall not preclude completion of movement to safe position.

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SURVEILLANCE  
REQUIREMENTSSR 3.9.5.1

Verification that the reactor has been subcritical for  $\geq 48$  hours prior to movement of irradiated fuel in the reactor pressure vessel ensures that the design basis for the analysis of the postulated fuel handling accident during refueling operations is met. Specifying a minimum radioactive decay time, limits the consequences of fuel rod damage that is postulated to result from a fuel handling accident (Ref. 2).

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REFERENCES

1. Regulatory Guide 1.183, "Alternate Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors."
  2. FSAR Section 15.7.4, "Fuel Handling Accident."
  3. FSAR Chapter 15, "Accident Analyses."
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