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May 31, 1990

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Improved Technical Specification
Development Program
AECM-90/0102

System Energy Resources, Inc. (SERI) is currently involved with the General Electric Boiling Water Reactor (BWR) Owners Group as the BWR-6 lead plant for the development of Improved Technical Specifications (ITS). SERI is in the process of developing a plant specific technical specification (PSTS) and subsequent license amendment application based on the BWR Owners' Group Improved BWR Technical Specifications (NEDC-31681). The process involves review of the PSTS by a team of individuals from nuclear and design engineering, licensing and plant operations organizations as well as review by the Plant Safety Review Committee and the Safety Review Committee.

In recent discussions with the NRC-OTSB, SERI was requested to provide to the Staff preliminary drafts of the PSTS in order to facilitate the Staff's validation of the BWR Owners' Group ITS. Pursuant to that request, SERI is providing for your information and preliminary review draft technical specifications for the Reactivity Control Systems (3.1), Refueling Operations (3.9) and Special Operations (3.10) prepared under the SERI program for Development of Improved Plant Specific Technical Specifications for Grand Gulf Nuclear Station (GGNS).

Along with each Limiting Condition for Operation (LCO), you will find 1) A Revision Summary Sheet which describes the changes from the current GGNS Technical Specification to the PSTS and 2) A draft bases section for each LCO.

This submittal is made, of course, with the understanding that the drafts provided are only for information at this time and that formal review of the license amendment within SERI has not been completed. Changes, therefore, are likely to occur as the formal application for an amendment is reviewed and certified.

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It is our understanding that SERI and the NRC staff will meet the week of July 16, 1990 to discuss the results of the NRC-OTSB review of the attached sections.

Yours truly,

WTC:mtc
Attachment

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ATTACHMENT TO AECM-90/0102

SYSTEM ENERGY RESOURCES, INC.
GRAND GULF NUCLEAR STATION

TECHNICAL SPECIFICATIONS IMPROVEMENT PROGRAM

PLANT SPECIFIC TECHNICAL SPECIFICATIONS

CHAPTERS 3.1, 3.9, AND 3.10

REVISION SUMMARY SHEET CATEGORY KEY

A. CATEGORIES

1. **ADMINISTRATIVE** - a change which is editorial in nature, involves the movement of requirements within the Technical Specifications without affecting their technical content, simply reformats a requirement, or clarifies the Technical Specification (such as deleting a footnote no longer applicable due to a technical change to a requirement).

2. **RELOCATED** - a change which moves requirements from the Technical Specifications to the Bases, the UFSAR, procedures or other documents.

3A. **TECHNICAL CHANGE, MORE RESTRICTIVE** - a change which adds a requirement to the Technical Specifications or revises an existing requirement to be more stringent.

3B. **TECHNICAL CHANGE, LESS RESTRICTIVE** - a change which revises an existing requirement such that more restoration/completion time is provided or fewer compensatory measures are necessary.

4. **DELETED** - a change which removes requirements from the Technical Specifications without being relocated and without an adequate justification in the BWROG comparison document. Most of the changes in this category are expected to be GGNS-specific requirements which are not in the BWR/6 Standard Technical Specifications. Justification can be provided to support deletion of the requirement or a recommendation made to place the requirement back into the Technical Specifications or to relocate the requirement to another controlled document as discussed in A.2 above.

B. <u>CONVENTIONS</u>

1. A change in which a requirement is moved from an LCO to an LCO other than its associated LCO in the proposed Tech Specs will be included in two LCO review packages (e.g., a requirement moved from LCO 3.1.2 to LCO 3.3.1 will appear in both packages). If the change is **ADMINISTRATIVE**, it will appear as a Category 1 change in both packages. If the change involves a **TECHNICAL CHANGE**, it will appear as a Category 3A or 3B change in the LCO package associated with its new location and as a Category 1 change in the LCO package for its previous location. This convention will result in the change only being technically justified one time.

2. References to the existing Tech Specs and the proposed Tech Specs can be distinguished as follows:

   a. **CONDITIONS, REQUIRED ACTIONS** and **COMPLETION TIMES** always refer to the proposed Tech Specs.

   b. **ACTION** or **ACTIONS** always refers to the existing Tech Specs.

   c. **SR 3.x.x** always refers to the proposed Tech Specs while **SR 4.x.x** always refers to the existing Tech Specs.

CHAPTER 3.1

REACTIVITY CONTROL SYSTEMS

CHAPTER 3.1
REACTIVITY CONTROL SYSTEMS
TABLE OF CONTENTS

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.1.1 Rev. 1 Shutdown Margin

Item	Change Description	Category
1	LCO 3.1.1 and applicability are reformatted from LIMITING CONDITION FOR OPERATION 3.1.1 and the CTS applicability.	1
2	CONDITION A is reformatted from ACTION a except that the HOT SHUTDOWN provision is moved to CONDITION B (see Item 3).	1
3	CONDITION B is reformatted from the HOT SHUTDOWN provision of ACTION a.	1
4	CONDITION C is reformatted from ACTION b.	1
5	REQUIRED ACTIONs C.1 and D.1 require all insertable rods to be inserted. The "other activities that could reduce the SHUTDOWN MARGIN" provision in ACTION b is deleted.	3B
6	REQUIRED ACTIONs C.1 and D.1 require all insertable control rods to be inserted within 1 hour. ACTION b required all insertable control rods to be inserted immediately in MODES 3 and 4.	3B
7	CONDITION D is reformatted from ACTION b except as discussed above and below.	1
8	REQUIRED ACT[illegible]S D.2, D.3 and D.4 replace the requirement in ~~is reformatted from~~ ACTION b to establish SECONDARY CONTAINMENT INTEGRITY.	+3B
9	REQUIRED ACTIONS D.2, D.3 and D.4 require~~s~~ the secondary containment ~~integrity to be established~~ to be OPERABLE as soon as practicable. ACTION b provided up to 8 hours.	3A
10	CONDITION E is reformatted from ACTION c except as discussed below.	1
11	DELETED	
12	REQUIRED ACTION E.2 limits the control rod insertion requirement to control cells with one or more fuel assemblies. ACTION c required all insertable control rods to be inserted.	3B
13	REQUIRED ACTIONS E.3, E.4 and E.5 replace the requirement in ~~is reformatted from~~ ACTION c to establish SECONDARY CONTAINMENT INTEGRITY.	+3B

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.1.1 Rev. 1 Shutdown Margin

Item	Change Description	Category
14	REQUIRED ACTIONS E.3, E.4 and E.5 ~~requires~~ require the secondary containment to be OPERABLE ~~integrity to be established~~ as soon as practicable. ACTION c provided up to 8 hours.	3A
15	SR 3.1.1.1 is reformatted from SR 4.1.1.a	1
16	SR 3.1.1.1 requires SHUTDOWN MARGIN to be measured within 4 hours after criticality.	3A
17	A NOTE with SR 3.1.1.1 requires SHUTDOWN MARGIN to be measured following startup after a non-refueling outage in which a control rod is replaced.	3A
18	SR 3.1.1.2 is added to define surveillance requirements for SHUTDOWN MARGIN during refueling.	3A+
19	CROSS REFERENCES are added.	1
20	SR 4.1.1.b is deleted. The SHUTDOWN MARGIN limits and demonstration method adequately account for uncertainties and biases. It is unnecessary to perform an additional surveillance if the predicted SHUTDOWN MARGIN equals the limit.	3B
21	SR 4.1.1.c is moved to LCO 3.1.2.	1
22	REQUIRED ACTION E.2 requires all insertable control rods in core cells containing one or more fuel assemblies to be inserted as soon as practicable. ACTION c required all insertable control rods to be inserted within 1 hour.	3A
23	REQUIRED ACTION E.1 requires that CORE ALTERATIONS that could reduce SHUTDOWN MARGIN to be suspended immediately. Action c required CORE ALTERATIONS to be suspended within 1 hour.	3A
24	SR 3.1.1.2 frequency is established as prior to fuel movement.	3A+

3.1 REACTIVITY CONTROL SYSTEMS

3.1.1 SHUTDOWN MARGIN

LCO 3.1.1 SHUTDOWN MARGIN shall be:

A. $\geq$ 0.38 % $\Delta k/k$, with the highest worth control rod analytically determined,

OR

B. $\geq$ 0.28 % $\Delta k/k$, with the highest worth control rod determined by test.

APPLICABILITY: MODES 1, 2, 3, 4, and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SHUTDOWN MARGIN less than specified in MODE 1 or 2.	A.1 Restore SHUTDOWN MARGIN to required limits.	6 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	12 hours
C. SHUTDOWN MARGIN less than specified in MODE 3.	C.1 Fully insert all insertable control rods.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. SHUTDOWN MARGIN less than specified in MODE 4.	D.1 Fully insert all insertable control rods. AND D.2 Establish SECONDARY CONTAINMENT INTEGRITY.	1 hour As soon as practicable

Replace with INSERT 1

(continued)

INSERT 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. SHUTDOWN MARGIN less than specified in MODE 4.	D.1 Fully insert all insertable control rods.	1 hour
	AND	
	D.2 Ensure Secondary Containment is OPERABLE.	As soon as practicable
	AND	
	D.3 Ensure the SGTS is in compliance with the MODE 1, 2 and 3 requirements of Specification 3.6.4.3.	As soon as practicable
	AND	
	D.4 Ensure Secondary Containment Isolation Valves are in compliance with the MODE 1, 2 and 3 requirements of Specification 3.6.4.2 and Secondary Containment Actuation Instrumentation is in compliance with the MODE 1, 2 and 3 requirements of Specification 3.3.6.2.	As soon as practicable

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. SHUTDOWN MARGIN less than specified in MODE 5.	E.1	Suspend CORE ALTERATIONS that could reduce SHUTDOWN MARGIN.	Immediately
	AND		
	E.2	Fully insert all insertable control rods in core cells containing one or more fuel assemblies.	As soon as practicable
	AND		
	E.3	Establish SECONDARY CONTAINMENT INTEGRITY.	As soon as practicable

Replace with INSERT 2

INSERT 2

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. SHUTDOWN MARGIN less than specified in MODE 5.	E.1 Suspend CORE ALTERATIONS that could reduce SHUTDOWN MARGIN.	Immediately
	AND	
	E.2 Fully insert all insertable control rods in core cells containing one or more fuel assemblies.	As soon as practicable
	AND	
	E.3 Ensure Secondary Containment is OPERABLE.	As soon as practicable
	AND	
	E.4 Ensure the SGTS is in compliance with the MODE 1, 2 and 3 requirements of Specification 3.6.4.3.	As soon as practicable
	AND	
	E.5 Ensure Secondary Containment Isolation Valves are in compliance with the MODE 1, 2 and 3 requirements of Specification 3.6.4.2 and Secondary Containment Actuation Instrumentation is in compliance with the MODE 1, 2 and 3 requirements of Specification 3.3.6.2.	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Demonstrate SHUTDOWN MARGIN.	-----NOTE----- Only required after fuel movement or control rod replacement within the RPV. -------------- Once within 4 hours after criticality
SR 3.1.1.2	Demonstrate SHUTDOWN MARGIN of each fuel movement during fuel loading sequence.	Prior to fuel movement

CROSS-REFERENCES

TITLE	NUMBER
Reactor Protection System Shorting Links	3.3.1.3
Secondary Containment ~~Isolation~~ Actuation Instrumentation	3.3.6.2
Secondary Containment	3.6.4.1
Secondary Containment Isolation Valves	3.6.4.2
Standby Gas Treatment System	3.6.4.3
Single Control Rod Withdrawal - Hot Shutdown	3.10.3
Single Control Rod Withdrawal - Cold Shutdown	3.10.4
Single Control Rod Drive Removal - Refueling	3.10.5

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.1 **SHUTDOWN MARGIN**

BASES

BACKGROUND

SHUTDOWN MARGIN is specified to ensure:

a. The reactor can be made subcritical from all operating conditions.

b. The reactivity transients associated with postulated accident conditions are controllable within acceptable limits.

c. The reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

General Design Criterion (GDC) 26 requires the reactivity control systems be capable of holding the core subcritical under cold conditions.

APPLICABLE SAFETY ANALYSES

SHUTDOWN MARGIN is an explicit assumption in several of the evaluations in FSAR Chapter 15, Accident Analyses. SHUTDOWN MARGIN is assumed as an initial condition for the Control Rod Removal Error During Refueling (Ref. 1) accidents. The analysis of these reactivity insertion events assumes the refueling interlocks are OPERABLE when the reactor is in the REFUELING mode of operation. These interlocks prevent the withdrawal of more than one control rod from the core during refueling. (Special consideration and requirements for multiple control rod withdrawal during refueling are covered in Special Operations LCO 3.10.6, Multiple Control Rod Withdrawal - Refueling.) The analysis assumes this condition is acceptable since the core will be shutdown with the highest worth control rod withdrawn, if adequate SHUTDOWN MARGIN has been demonstrated. Also, the Control Rod Drop Accident (CRDA) analysis (Ref. 2 and 3) assumes the core is subcritical with the highest worth control rod withdrawn. Typically, the first control rod withdrawn has a very high reactivity worth and, should the core be critical during the withdrawal of the first control rod, the consequences of a CRDA could exceed the fuel damage limits for a CRDA (see Bases for LCO 3.1.7, Rod Pattern Control).

(continued)

Bases (continued)

APPLICABLE SAFETY ANALYSES (continued)

Prevention or mitigation of reactivity insertion events is necessary to limit energy deposition in the fuel to prevent significant fuel damage which could result in undue release of radioactivity (see Bases for LCO 3.1.7). Adequate SHUTDOWN MARGIN ensures against inadvertent criticalities, thus potential CRDAs involving high worth control rods will not cause significant fuel damage.

SHUTDOWN MARGIN satisfies the requirements of Selection Criterion 2 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 6.

LCO

The specified SHUTDOWN MARGIN accounts for the uncertainty in the demonstration of SHUTDOWN MARGIN thereby ensuring the reactor can be held subcritical during shutdown conditions and during refueling with the highest worth control rod withdrawn. Separate SHUTDOWN MARGIN limits are provided for demonstrations where the highest worth control rod is determined analytically or by measurement. This is due to the reduced uncertainty in the SHUTDOWN MARGIN demonstration when the highest worth control rod is determined by measurement (Ref. 4). To assure adequate SHUTDOWN MARGIN, an additional design margin is included in the design process to account for uncertainties in the design calculations (Ref. 5).

APPLICABILITY

Adequate shutdown margin must be provided during all operational modes to ensure the reactor can be brought and held subcritical with the control system alone. The SHUTDOWN MARGIN specification is applicable during MODES 1 and 2 because: a) GDC 26 requires the reactor to be held subcritical from hot to cold conditions, and b) it is an assumption in the CRDA analysis (Ref. 3). For operation in MODES 3 and 4, the SHUTDOWN MARGIN specification is required to ensure the reactor will be held subcritical with margin for a single withdrawn control rod. The SHUTDOWN MARGIN specification is applied to MODE 5 to prevent an open vessel, inadvertent criticality during the withdrawal of a single control rod from a core cell containing one or more fuel assemblies.

(continued)

BASES (continued)

ACTIONS

A.1

During MODE 1 or 2, failure to meet the specified SHUTDOWN MARGIN may be caused by a control rod that cannot be inserted. Because the reactor can still be shutdown assuming no failures of additional control rods to insert, operation is allowed to continue for a short time to allow restoration of SHUTDOWN MARGIN.

B.1

If the SHUTDOWN MARGIN cannot be restored promptly, the reactor must be in MODE 3 to prevent the potential for further reductions in available SHUTDOWN MARGIN (e.g. additional stuck control rods).

C.1

With SHUTDOWN MARGIN less than specified in MODE 3 the operator must insert all insertable control rods. This action results in the least reactive condition for the core.

D.1, D.2, D.3, D.4

With SHUTDOWN MARGIN less than specified in MODE 4, the operator must insert all insertable control rods. This action results in the least reactive condition for the core. Actions are also taken to provide means for control of potential radioactive releases caused by an inadvertent reactivity excursion. ~~which includes ensuring SECONDARY CONTAINMENT INTEGRITY is maintained (LCO 3.6.4.1)~~.

Add Insert 3

(continued)

INSERT 3

This includes ensuring Secondary Containment is OPERABLE (LCO 3.6.4.1), the Standby Gas Treatment System (SGTS) is in compliance with its Specification (LCO 3.6.4.3) and the Secondary Containment Isolation Valves and Secondary Containment Actuation Instrumentation are in compliance with their Specifications (LCO 3.6.4.2 and 3.3.6.2 respectively).

Bases (continued)

ACTIONS (continued)

E.1, E.2, E.3, E.4, E.5

With SHUTDOWN MARGIN less than specified in MODE 5, the operator must suspend CORE ALTERATIONS that could reduce SHUTDOWN MARGIN such as the insertion of fuel in the core or the withdrawal of control rods. The requirement that the activities be suspended immediately is not intended to prohibit the completion of an action that would improve or not affect SHUTDOWN MARGIN (e.g. complete the insertion of a control rod). All control rods in core cells containing one or more fuel assemblies must be inserted to place the core in the least reactive condition. Control rods in core cells with no fuel assemblies are not required to be inserted since they have a negligible impact on core reactivity. Actions are also taken to provide means for control of potential radioactive releases caused by an inadvertent reactivity excursion, ~~which includes ensuring SECONDARY CONTAINMENT INTEGRITY is maintained (LCO 3.6.4.1)~~.

ADD INSERT 4

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Actions.

SURVEILLANCE REQUIREMENTS

SR 3.1.1.1

Adequate SHUTDOWN MARGIN must be demonstrated for the entire cycle length and must be performed before or during the first startup following CORE ALTERATIONS which involve changes in the core reactivity. Since core reactivity will vary during the cycle as a function of fuel depletion and poison burnup, the beginning of cycle demonstration must also account for changes in core reactivity during the cycle. Therefore, the specified SHUTDOWN MARGIN must be increased by a factor, R, which is the difference between the calculated value of maximum core reactivity during the operating cycle and the calculated beginning of cycle core reactivity. If the value of R is negative (that is, beginning of cycle is the most reactive point in the cycle), no correction to the beginning of cycle SHUTDOWN MARGIN is required.

(continued)

INSERT 4

This includes ensuring Secondary Containment is OPERABLE (LCO 3.6.4.1), the Standby Gas Treatment System (SGTS) is in compliance with its Specification (LCO 3.6.4.3) and the Secondary Containment Isolation Valves and Secondary Containment Actuation Instrumentation are in compliance with their Specifications (LCO 3.6.4.2 and 3.3.6.2 respectively).

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.1.1 (continued)

The SHUTDOWN MARGIN may be demonstrated during an in-sequence control rod withdrawal in which the highest worth control rod is analytically determined or during local criticals where the highest worth control rod is determined by testing. Local critical tests require the withdrawal of out-of-sequence control rods. This testing would therefore required bypassing of the rod pattern control systems to allow the out-of-sequence withdrawal and additional requirements must be met (see LCO 3.10.7, Control Rod Testing - Operating).

Four hours after reaching criticality is provided to allow a reasonable time to perform the required calculations and have appropriate verification.

SR 3.1.1.2

During MODE 5 adequate SHUTDOWN MARGIN is also required. An evaluation of each fuel movement during fuel loading shall be performed to ensure adequate SHUTDOWN MARGIN is maintained during refueling. This ensures the intermediate loading patterns are bounded by the safety analyses for the final core loading pattern. For example, bounding analyses which demonstrate adequate SHUTDOWN MARGIN for the most reactive configurations during the refueling may be performed to demonstrate acceptability of the entire fuel movement sequence. Spiral offload/reload sequences inherently satisfy the surveillance requirement provided the fuel assemblies are reloaded in the same configuration analyzed for the new cycle. Removing fuel from the core will always result in an increase in SHUTDOWN MARGIN.

Surveillance Frequencies

In general, surveillance frequencies are based on industry accepted practice and engineering judgement considering the unit conditions required to perform the test, the ease of performing the test and a likelihood of a change in the system/component status.

(continued)

BASES (continued)

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.

2. Grand Gulf Unit 1 FSAR, Section 15.4.9.

3. NEDO-21231, "Banked Position Withdrawal Sequence," January 1977, Section 4.1.

4. Hatch Unit 1, FSAR, Amendment 24, December 1972, Question 3.6.7.

5. Grand Gulf Unit 1 FSAR, Section 4.3.2.4.1.

6. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.1.2 Rev. 1 Control Rod OPERABILITY

Item	Change Description	Category
1	LCO 3.1.2 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.3.1.	1
2	A NOTE is added stating that CONDITIONS A through F may be concurrently applicable.	1
3	CONDITION A is added to address a single stuck withdrawn control rod. The 1 hour restoration time is consistent with the times in LCO 3.1.3.1.	3B+
4	CONDITION B is reformatted from ACTIONs a.1, a.2, and a.3 except as discussed below and in item 29.	1
5	REQUIRED ACTION B.2 only applies when less than or equal to 10% RTP because the separation requirements are associated with the Control Rod Drop Accident and are not necessary at higher power levels.	3B
6	A COMPLETION TIME of 24 hours is specified for REQUIRED ACTION B.3 which is consistent with the time in SR 4.1.3.1.2.b except only once.	3B
7	REQUIRED ACTION B.3 is only applicable above the LPSP because the control rod movement below the LPSP is constrained by BPWS.	3B
8	A COMPLETION TIME of 72 hours is provided for REQUIRED ACTION B.4 rather than the 12 hours in ACTION a.2.	3B
9	CONDITION C is reformatted from ACTION a.4 with the exception of that addressed in item 28.	1
10	CONDITION D is added to address requirements with more than one stuck control rod.	3B+
11	CONDITION E is reformatted from ACTION b except as discussed in items 12, 22 and 30.	1
12	REQUIRED ACTION E.3 is developed from ACTION b.1.a and LIMITING CONDITION FOR OPERATION 3.1.4.2 ACTION b.2.b except that the separation verification is changed to apply only to those inoperable rods not in compliance with BPWS.	3A
13	CONDITION F is reformatted from ACTIONs b.2 and c.	1
14	SR 3.1.2.1 is developed from LIMITING CONDITION FOR OPERATION 3.1.3.5, ACTION a and SR 4.1.3.5.a.	3B
15	SR 3.1.2.2 for fully withdrawn control rods is reformatted from SR 4.1.3.1.2.a.	1

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.1.2 Rev. 1 Control Rod OPERABILITY

Item	Change Description	Category
16	SR 3.1.2.3 for partially withdrawn control rods is reformatted from SR 4.1.3.1.2.a except the frequency is relaxed to 31 days.	3B
17	CROSS REFERENCES are added.	1
18	The "immovable, as a result of excessive friction or mechanical interference" wording in ACTION a is replaced by the term "stuck" in CONDITIONS A and D to make the failure mode non-mechanistic.	1
19	The "untrippable" rod of ACTION a is forced by LCO 3.1.3 to be declared inoperable and treated per CONDITION E.	3A
20	The procedure for disarming a control rod is relocated to the BASES.	2
21	DELETED	
22	ACTION b.1.b is deleted because inoperable control rods which are not stuck must be fully inserted within 1 hour by CONDITION E.1.	3A
23	Footnote '*' to page 3/4 1-3 is deleted because stuck control rods must be disarmed per REQUIRED ACTIONS B.1 and D.1 to prevent withdrawal and other inoperable control rods must be fully inserted per REQUIRED ACTION E.1.	3B
24	NOTES to REQUIRED ACTION B.1 and D.1 are reformatted from footnote '**' to page 3/4 1-3. LCO 3.0.5 also provides this capability.	1
25	ACTIONS d, e, and f and SR 4.1.3.1.1 are moved to LCO 3.1.9.	1
26	SR 4.1.3.1.2.b has been incorporated into REQUIRED ACTION B.3 which requires the OPERABILITY of control rods to be verified once within 24 hours of discovery of a stuck control rod. Continued testing of control rod OPERABILITY at the normal frequencies provides an adequate surveillance of control rod insertion capability.	3B
27	SR 4.1.3.1.3 is deleted. LCOs 3.1.3, 3.1.4, 3.1.5 and 3.1.7 dictate when a control rod should be declared inoperable.	1

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.1.2 Rev. 1 Control Rod OPERABILITY

Item	Change Description	Category
28	The requirement in ACTION a.4 to restore the stuck control rod to OPERABLE status in 48 hours is deleted. Continued operation with a stuck control rod is allowed provided REQUIRED ACTIONs B.1 through B.5 are met.	3B
29	The requirement in Action a.1.a to verify rod separation is changed to apply to only those inoperable rods not in compliance with BPWS instead of withdrawn rods.	3A+
30	The exemption to 3.0.4 in ACTION b.3 is removed.	3B
31	REQUIRED ACTION B.1 is developed from ACTION a.1.b.	1
32	REQUIRED ACTION B.2 is developed from ACTIONS a.1.a and b.1.a.	3B
33	LIMITING CONDITION FOR OPERATION 3.1.4.2 ACTION b.2.c is deleted.	4
34	NOTE to REQUIRED ACTION A.1 is developed from LIMITING CONDITION FOR OPERATION 3.1.4.2 ACTION b.1.	3B
35	REQUIRED ACTIONS E.1 and E.2 are reformatted from LIMITING CONDITION FOR OPERATION 3.1.4.2 ACTION b.2.a.	1

3.1 REACTIVITY CONTROL SYSTEMS

3.1.2 **Control Rod OPERABILITY**

LCO 3.1.2 All control rods shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

------------------------NOTE------------------------
Conditions A through F may be concurrently applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One withdrawn control rod stuck.	A.1 ----------NOTE---------- A stuck control rod may be bypassed in RACS as allowed by LCO 3.1.7, if required, to allow continued operation. ---------------------- Restore stuck control rod to OPERABLE status.	1 hour
B. Required Action and associated Completion Time of Condition A not met.	B.1 ----------NOTE---------- May be rearmed intermittently under administrative controls to permit testing associated with restoring the control rod to OPERABLE status. ---------------------- Disarm the associated control rod drive. AND (continued)	1 hour

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 ----------NOTE--------- Not applicable when > 10% of RTP. ----------------------- Verify all inoperable control rods not in compliance with BPWS are separated by ≥ two OPERABLE control rods.	1 hour
	AND	
	B.3 ----------NOTE--------- Not applicable when ≤ the LPSP of the RPCS. ----------------------- Perform SR 3.1.2.2 and SR 3.1.2.3 for each withdrawn OPERABLE control rod.	24 hours
	AND	
	B.4 Demonstrate SHUTDOWN MARGIN is within the limits of LCO 3.1.1.	72 hours
C. Required Actions and associated Completion Times of Condition B not met	C.1 Be in MODE 3.	12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. More than one withdrawn control rod stuck.	D.1 --------NOTE---------- May be rearmed intermittently under administrative controls to permit testing associated with restoring the control rod to OPERABLE status. ----------------------- Disarm the associated control rod drive.	1 hour
	AND	
	D.2 Be in MODE 3.	12 hours
E. Less than or equal to eight control rods inoperable for reasons other than Conditions A or D.	E.1 ----------NOTE--------- Inoperable control rods may be bypassed in RACS as allowed by LCO 3.1.7, if required to allow insertion of inoperable control rod(s) and continued operation. ----------------------- Fully insert inoperable control rod(s).	1 hour
	AND	
	E.2 Disarm the associated control rod drive(s).	2 hours
	AND	
	(continued)	

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. (continued)	E.3	----------NOTE--------- Not applicable when > 10% of RTP. ----------------------- Verify all inoperable control rods not in compliance with BPWS are separated by $\geq$ two OPERABLE control rods.	3 hours
F. Required Actions and associated Completion Times of Condition E not met. OR Greater than eight inoperable control rods.	F.1	Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.1.2.1	Determine position of all control rods.	24 hours
SR 3.1.2.2	Insert each fully withdrawn control rod at least one notch.	7 days when greater than the LPSP of the RPCS
SR 3.1.2.3	Insert each partially withdrawn control rod at least one notch.	31 days when greater than the LPSP of the RPCS

CROSS-REFERENCES

TITLE	NUMBER
SHUTDOWN MARGIN	3.1.1
Rod Pattern Control	3.1.7
Control Rod Block Instrumentation	3.3.2.1

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.2 **Control Rod OPERABILITY**

BASES

BACKGROUND

Control rods are components of the Control Rod Drive (CRD) system, which is the primary reactivity control system for the reactor. In conjunction with the Reactor Protection System (RPS), the CRD system provides the means for the reliable control of reactivity changes to ensure under conditions of normal operation, including anticipated operational occurrences, specified acceptable fuel design limits are not exceeded. In addition, the control rods provide the capability to hold the reactor core subcritical under all conditions and to limit the potential amount and rate of reactivity increase caused by malfunction in the CRD system. The CRD system is designed to satisfy the requirements of General Design Criteria 26, 27, 28 and 29.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in the evaluations involving control rods are presented in References 1, 2, 3, 4 and 7. The control rods provide the primary means for rapid reactivity control (reactor scram), for maintaining the reactor subcritical and for limiting the potential effects of reactivity insertion events caused by malfunctions in the CRD system.

The capability to insert the control rods ensures the assumptions for scram reactivity in the design basis transient and accident analyses are not violated. Since the SHUTDOWN MARGIN ensures the reactor will be subcritical with the strongest control rod withdrawn (assumed dingle failure), the additional failure of a second control rod to insert, if required, could invalidate the demonstrated SHUTDOWN MARGIN and potentially limit the ability of the control rod drive system to hold the reactor subcritical. If the control rod is stuck at an inserted position and becomes decoupled from the control rod drive, a Control Rod Drop Accident (CRDA) can possibly occur. Therefore, the requirement that all control rods are OPERABLE ensures the CRD system can perform its intended function.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

The control rods also protect the fuel from damage which could result in release of radioactivity. The limits protected are the Safety Limit MINIMUM CRITICAL POWER RATIO (MCPR) (see Bases for LCO 3.2.2, MCPR), the 1% cladding plastic strain fuel design limit (see Bases for LCO 3.2.3, LINEAR HEAT GENERATION RATE) and the fuel damage limit (see Bases for LCO 3.1.7, Rod Pattern Control) during reactivity insertion events.

The negative reactivity insertion (scram) provided by the CRD system provides the analytical basis for determination of plant thermal limits and provides protection against fuel damage limits during a CRDA. Bases for LCOs 3.1.3, 3.1.4, 3.1.6 and 3.1.7 discuss in more detail how the Safety Limits are protected by the CRD system.

Control Rod OPERABILITY satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 6.

LCO

OPERABILITY of an individual control rod is based on a combination of factors, primarily the scram insertion times, the associated control rod accumulator status, the control rod coupling integrity and the ability to determine the control rod position. Although not all control rods are required to be OPERABLE to satisfy the intended reactivity control requirements, strict control over the number and distribution of inoperable control rods is required to satisfy the assumptions of the design basis transient and accident analyses.

APPLICABILITY

The control rod OPERABILITY requirements are applicable during MODES 1 and 2 whenever control rods may be withdrawn. In MODE 5, the OPERABILITY of withdrawn control rods is controlled by LCO 3.9.5. In MODES 3 and 4, control rods are only allowed to be withdrawn under Special Operations LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) and LCO 3.10.4 (Single Control Rod Withdrawal - Cold Shutdown) which provide adequate requirements for control rod OPERABILITY during these conditions.

(continued)

BASES (continued)

ACTIONS

A.1

A control rod is considered stuck if it will not insert by either CRD drive water or scram pressure. The failure of a single control rod to insert is assumed in the design basis transient and accident analyses and therefore, with one withdrawn control rod stuck, some time is allowed to make the control rod insertable. With a fully inserted control rod stuck, no actions are required as long as the control rod remains fully inserted. As noted, a stuck control rod may be bypassed in the Rod Action Control System (RACS) to allow continued operation. LCO 3.1.7 provides additional requirements when control rods are bypassed in RACS to ensure compliance with the CRDA analysis.

B.1, B.2, B.3, B.4

With one withdrawn control rod stuck for more than the allowed time, the control rod must be disarmed. Isolating the control rod from scram prevents damage to the CRD mechanism. The control rod can be isolated from scram by isolating the hydraulic control unit from scram and normal insert/withdraw pressure yet still maintaining cooling water to the CRD.

Below 10% of RTP, the generic Banked Position Withdrawal sequence (BPWS) analysis requires inserted control rods not in compliance with BPWS to be separated by at least two OPERABLE control rods in all directions including the diagonal. Out-of-sequence controls rods may increase the potential reactivity worth of a dropped control rod. This could result in a corresponding increase in the consequences of a CRDA. Therefore the distribution of inoperable control rods must be controlled.

In addition, monitoring of the insertion capability of withdrawn control rods must be performed. SR 3.1.2.2 and SR 3.1.2.3 perform periodic tests of the control rod insertion capability of withdrawn control rods. Testing within 24 hours ensures a generic problem does not exist. This requirement is not applicable when below the actual Low Power Setpoint (LPSP) of the Rod Pattern Controller (RPC) since the notch insertions may not be compatible with the requirements of Rod Pattern Control (LCO 3.1.7) and the RPC (LCO 3.3.2.1).

(continued)

BASES (continued)

ACTIONS (continued)

B.1, B.2, B.3, B.4 (continued)

To allow continued operation with a withdrawn control rod stuck, an evaluation of adequate SHUTDOWN MARGIN is also required. Should a design basis transient or accident require a shutdown, to preserve the single failure criterion, an additional control rod would have to be assumed to fail to insert when required. Therefore, the original SHUTDOWN MARGIN demonstration may not be valid. The SHUTDOWN MARGIN must therefore be evaluated (by measurement or analysis) with the stuck control rod at its stuck position and the highest worth movable control rod assumed to be fully withdrawn.

With a single control rod stuck in a withdrawn position, the remaining OPERABLE control rods are capable of providing the required scram and shutdown reactivity. Failure to reach MODE 4 is only likely if an additional control rod adjacent to the stuck control rod also fails to insert during a required scram. Even with the postulated additional single failure of an adjacent control rod to insert, sufficient reactivity control remains to reach and maintain MODE 3 conditions. Required Action B.3 of LCO 3.1.2 performs a notch test on each remaining withdrawn control rod to ensure that no additional control rods are stuck. Therefore, 72 hours is allowed to perform the analysis or test in Required Action B.4.

C.1

If the Required Actions and associated Completion Times of Condition B cannot be met, the reactor must be in MODE 3 within 12 hours. Insertion of the remainder of the control rods eliminates the possibility of an additional failure of a control rod to insert. Prior demonstration of adequate SHUTDOWN MARGIN ensures the reactor can be held subcritical with only a single control rod withdrawn.

D.1, D.2

With more than one withdrawn control rod stuck, the stuck control rods should be isolated from scram pressure and the reactor must be in MODE 3 within 12 hours. The occurrence of more than one control rod without insertion capability may be an indication of a generic problem in the control rod drive system that could potentially cause additional failures of control rods to insert. Insertion of all insertable control rods eliminates the possibility of an additional failure of a control rod to insert.

(continued)

BASES (continued)

ACTIONS (continued)

E.1, E.2, E.3

With less than or equal to 8 control rods inoperable for any of the reasons discussed in LCO 3.1.3 through LCO 3.1.5 and LCO 3.1.7, operation may continue provided the control rods are fully inserted and disarmed (electrically or hydraulically). Inserting a control rod ensures the shutdown and scram capabilities are not adversely affected. The control rod is disarmed to prevent inadvertent withdrawal during subsequent operations. Below 10% of RATED THERMAL POWER, the generic BPWS analysis requires inserted control rods, not in compliance with BPWS, to be separated by at least two OPERABLE control rods in all directions including the diagonal (Ref. 5). Inserted out-of-sequence control rods may increase the potential reactivity worth of a dropped control rod. This could result in a corresponding increase in the consequences of a CRDA. Therefore the number and distribution of inserted inoperable control rods must be controlled. As noted, the control rods may be bypassed in the Rod Action Control System (RACS) if required to allow insertion of the inoperable control rods and continued operation. LCO 3.1.7 provides additional requirements when the control rods are bypassed to ensure compliance with the CRDA analysis.

F.1

If the Required Actions and associated Completion Times of Condition E are not met or more than 8 inoperable control rods exist, the reactor is required to be in MODE 3 within 12 hours. This ensures all insertable control rods are inserted and places the reactor in a condition that does not require the active function (i.e., scram or insertion) of the control rods. The number of control rods permitted to be inoperable when operating above 10% of RATED THERMAL POWER (i.e. no CRDA considerations) could be more than the value specified, but the occurrence of a large number of inoperable control rods could be indicative of a generic problem and investigation and resolution of the potential problem should be done.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.2.1

Determining the position of each control rod is required to ensure adequate information on control rod position is available to the operator for determining CRD OPERABILITY and controlling rod patterns. Control rod position may be determined by the use of OPERABLE position indicators, by moving control rods to a position with an OPERABLE indicator, or by the use of other appropriate methods.

SR 3.1.2.2, SR 3.1.2.3

Control rod insertion capability is demonstrated by inserting each partially or fully withdrawn control rod at least one notch and observing that the control rod moves. The control rod may then be returned to its original position. These surveillances are not required when below the actual LPSP of the RPC since the notch insertions may not be compatible with the requirements of Rod Pattern Control (LCO 3.1.7) and the RPC (LCO 3.3.2.1). Partially withdrawn control rods are not tested weekly because of the potential power reduction required to allow the control rod movement.

Surveillance Frequencies

In general, surveillance frequencies are based on industry accepted practice and engineering judgement considering the unit conditions required to perform the test, the ease of performing the test and a likelihood of a change in the system/component status.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 4.3.2.5.5.
2. Grand Gulf Unit 1 FSAR, Section 4.6.1.1.2.5.3.
3. Grand Gulf Unit 1 FSAR, Section 5.2.2.2.3.
4. Grand Gulf Unit 1 FSAR, Section 15.4.1.
5. NEDO-21231, "Banked Position Withdrawal Sequence", January 1977, Section 7.2.
6. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.
7. Grand Gulf Unit 1 FSAR, Section 15.4.9.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.3 Rev. 1 Scram Times

Item	Change Description	Category
1	LCO 3.1.3 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.3.2	1
2	The LCO statement is revised to refer to the maximum scram insertion times in new Table 3.1.3-1.	1
3	CONDITION A is reformatted from ACTION a.	1
4	REQUIRED ACTION A.1 is developed from ACTION b.1 and ACTION C.2, except as discussed below.	3A
5	REQUIRED ACTION A.2 is reformatted from ACTION c.1.	1
6	REQUIRED ACTION A.3 is developed from ACTION a.3. The "fast" rod limit is eliminated and the "slow" rod limit increased to 14 from 7.	3B
7	REQUIRED ACTION A.4 is developed from ACTION a.4. The "fast" rod limit is eliminated.	3B
8	COMPLETION TIMES are specified for the REQUIRED ACTIONS in CONDITION A.	3A
9	CONDITION B is reformatted from the "otherwise" provisions in ACTIONS a, b and c.	1
10	A NOTE under the Surveillance Requirements section is reformatted from SR 4.1.3.2.	1
11	SR 3.1.3.1 is reformatted from SR 4.1.3.2.a.	1
12	SR 3.1.3.1 is revised to specify fuel movement in the RPV rather than CORE ALTERATIONS as a surveillance trigger.	3B
13	SR 3.1.3.2 is reformatted from SR 4.1.3.2.c.	1
14	The "rotating basis" requirement of SR 4.1.3.2.c is relocated to the Bases for LCO 3.1.3 and relaxed.	2*
15	DELETED	
16	SR 3.1.3.3 is reformatted from SR 4.1.3.2.b.	1
17	A CROSS REFERENCE to LCO 3.1.2 is added.	1
18	Table 3.1.3-1 is developed from LCO 3.1.3.2. The pressure dependent insertion criteria are developed from ACTION a.2 and ACTION a.1 criteria.	3A

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Proposed LCO/Section: 3.1.3 Rev. 1 Scram Times

Item	Change Description	Category
19	DELETED	
20	Note to new Table 3.1.3-1 is reformatted from the wording in LCO 3.1.3.2.	1
21	Note to new Table 3.1.3-1 is reformatted from footnote '*' to LCO 3.1.3.2.	1
22	DELETED	
23	LCO 3.1.3.2 ACTION b.2 is deleted.	3B
24	DELETED	
25	LCO 3.1.3.2 ACTION c.3 is deleted. REQUIRED ACTION A.4 requires "slow" OPERABLE rods to be separated. The increased surveillance in ACTION c.3(a) is not necessary as explained in the Bases for ACTIONS A.3, A.4.	3B
26	LCO 3.1.3.2 ACTION c.4 is deleted. The number of "slow" rods is specified in REQUIRED ACTIONS A.2 and A.3.	3B
27	LCO 3.1.3.2 ACTION d is deleted. SR 3.1.3.1 and SR 3.1.3.3 are "once per" surveillances.	3B
28	Footnote '*' on page 3/4 1-7 is deleted. This footnote excluded normal control rod movements from CORE ALTERATIONS requiring scram time testing. SR 3.1.3.1 (see item 12) no longer uses CORE ALTERATIONS as a trigger.	1
29	Footnote '**' on page 3/4 1-7 is deleted. This footnote and LCO 3.1.3.2 ACTION d (see item 27) addressed 3.0.4/4.0.4 requirements.	1
30	Slow control rods have been redefined as rods slower than those times in Line I of Table 3.1.3-1 of PSTS instead of times in CTS LCO 3.1.3.2. The times are shorter. They are the same times as in CTS ACTION a.2. (See item 4). This requirement eliminates the need for verifying average scram times of the "fast" rods.	3A

3.1 REACTIVITY CONTROL SYSTEMS

3.1.3 **Control Rod Scram Times**

LCO 3.1.3 All control rods shall have scram times less than or equal to the limits shown in Line I of Table 3.1.3-1.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more control rods "slow" with scram times greater than the limits shown in Line I of Table 3.1.3-1.	A.1 Declare control rod(s) with scram times greater than the Line II limits of Table 3.1.3-1 inoperable.	Immediately
	AND	
	A.2 Verify ≤ 20% of the control rods tested in SR 3.1.3.2 are "slow".	12 hours
	AND	
	A.3 Verify ≤ 14 OPERABLE "slow" control rods.	12 hours
	AND	
	A.4 Verify no two OPERABLE "slow" control rods occupy adjacent locations.	12 hours
B. Required Actions and associated Completion Times of Condition A not met.	B.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
-----NOTE----- During single control rod scram time tests, the CRD pumps shall be isolated from the associated scram accumulator.		
SR 3.1.3.1	Measure all control rod scram times with reactor steam dome pressure ≥ 950 psig.	-----NOTE----- Only required after fuel movement within the RPV or after each reactor shutdown > 120 days. Once prior to exceeding 40% of RTP
SR 3.1.3.2	Measure control rod scram times with reactor steam dome pressure ≥ 950 psig for ≥ 10% of the control rods.	120 days of cumulative operation in MODE 1

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.3.3	------------------NOTE------------------ Performance of this SR satisfies SR 3.1.3.1 for affected control rods. -- Measure affected control rod scram times at reactor steam dome pressure ≥ 950 psig.	-----NOTE----- Only required when work on control rod or CRD system could affect scram times. ------------- Once prior to entering MODE 1 OR Once prior to declaring the affected control rod(s) OPERABLE

CROSS-REFERENCES

TITLE	NUMBER
Control Rod OPERABILITY	3.1.2

TABLE 3.1.3-1 (Page 1 of 1)

Control Rod Scram Times

	Reactor Vessel Dome Pressure (psig)	Maximum Scram Insertion Times to Notch Position (seconds) 43	29	13
Line 1	950	0.30	0.78	1.40
	1050	0.31	0.84	1.53
Line II	950	0.38	1.09	2.09
	1050	0.39	1.14	2.22

------------------------------------NOTE------------------------------------

For intermediate Reactor Vessel Dome Pressure, the scram time criteria are determine by linear interpolation at each notch position.

------------------------------------NOTE------------------------------------

Maximum Scram Insertion Times are measured from the fully withdrawn position, based on de-energization of the scram pilot valve solenoids as time zero.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.3 **Control Rod Scram Times**

BASES

BACKGROUND

The scram function of the Control Rod Drive (CRD) system reliably controls reactivity changes during abnormal operational transients to ensure specified acceptable fuel design limits are not exceeded (Ref. 1). The control rods are scrammed by positive means using hydraulic pressure exerted on the control rod drive piston.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the control rod scram function are presented in References 2, 3, 4 and 5. The design basis transient and accident analyses assume all of the control rods scram with a specified length of time. The resulting negative scram reactivity forms the basis for the determination of plant thermal limits (e.g., MINIMUM CRITICAL POWER RATIO (MCPR)). Other distributions of scram times (e.g., several control rods scramming slower than the average time with several control rods scramming faster than the average time) can also provide sufficient scram reactivity. Surveillance of each individual control rod's scram time ensures the scram reactivity assumed in the design basis transient and accident analyses can be met.

The scram function of the CRD system protects the Safety Limit MCPR (see Bases for LCO 3.2.2) and the 1% cladding plastic strain fuel design limit (see Bases for LCO 3.2.1 and LCO 3.2.3) which ensure no fuel damage if the limits are not exceeded. Above 950 psig the scram function is designed to insert negative reactivity at a rate fast enough to prevent the MCPR from becoming less than the Safety Limit MCPR during the limiting power transient analyzed in FSAR Chapter 15. Below 950 psig the scram function is assumed to function during the Control Rod Drop Accident (CRDA) (Ref. 6) and therefore also provides protection against violating fuel damage limits during reactivity insertion accidents (see Bases for LCO 3.1.7). For the FSAR Chapter 5 vessel overpressure protection analysis, the scram function along with the safety/relief valves ensures the peak vessel pressure is maintained within the ASME Code limits.

Control Rod Scram Times satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 7.

(continued)

BASES (continued)

LCO

The scram times specified in Table 3.1.3-1 are required to ensure the scram reactivity assumed in the design basis transient and accident analysis is met. To account for single failures and "slow" scramming control rods, the times specified in Table 3.1.3-1 are faster than those assumed in the design basis analysis. The scram times have margin to allow up to 7.5% of the control rods to have scram times exceeding the limits (i.e., "slow" control rods) and also account for a single stuck control rod (as allowed by LCO 3.1.2) and an additional control rod (single failure criterion) failing to scram (7.5% x 193 ≈ 14). The scram times as specified as a function of reactor steam dome pressure to account for the pressure dependence of scram times.

APPLICABILITY

The CRD scram function is applicable during MODES 1 and 2 since a scram is only required when control rods are withdrawn, and is assumed to function during transients and accidents analyzed in these conditions. These events are assumed to occur during startup and power operation. In MODE 5, the scram capability of withdrawn control rods is specified by LCO 3.9.5. In MODES 3 and 4, control rods are only allowed to be withdrawn under Special Operations LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) and LCO 3.10.4 (Single Control Rod Withdrawal - Cold Shutdown) which provide adequate requirements for control rod scram capability during these conditions.

ACTIONS

A.1

For a control rod with excessive scram times (greater than the Line limits of Table 3.1.3-1) the control rod must be declared inoperable and therefore the control rod would be fully inserted and disarmed as required by LCO 3.1.2. Insertion of the control rod ensures the scram reactivity is not adversely affected by the failure of the control rod to scram. An example of a control rod with excessive scram times would be a control rod with a scram solenoid pilot valve that fails to open upon receipt of a scram signal.

(continued)

BASES (continued)

ACTIONS (continued)

A.2

SR 3.1.3.2 is a periodic test to sample the control rod scram times during the cycle to ensure the scram times have not degraded. Because only a sample of the control rods is tested (≥ 10%), a separate limit on the number of allowed "slow" control rods in the sample (20%) is specified. This limit is chosen such that if it is exceeded, it is an indication the total population of control rods, if tested, would exceed the allowed number of "slow" control rods. Therefore, following the completion of SR 3.1.3.2 during which one or more control rods are discovered to be "slow", the number of "slow" control rods in the sample must be determined and verified to be less than the sample limit. More than 10% of the control rods may be tested in SR 3.1.3.2 to provide a more representative sample. If a control rod is discovered "slow" by means other than SR 3.1.3.2, this Required Action is not required.

A.3, A.4

With a control rod whose scram time exceeds the Line I scram time limits in Table 3.1.3-1 (a "slow" control rod) but is less than the Line II limits in Table 3.1.3-1, continued operation is justified if the number and distribution of "slow" control rods is consistent with the assumptions of the design basis transient and accident analyses. The scram times of Table 3.1.3-1 are based on 14 "slow" control rods, of which no two may occupy adjacent locations in any direction and therefore no degradation of the design basis scram reactivity exists if these conditions are met. If scram time data already exist for the surrounding control rods, no additional testing is required to determine if adjacent control rods are "slow". Control rods determined to be "slow" may alternatively be declared inoperable and the actions of LCO 3.1.2 followed. Inoperable control rods are not include in determining compliance with the requirements of Required Action A.3 and A.4.

B.1

Multiple adjacent "slow" control rods or an excessive number of "slow" control rods can reduce the local scram reactivity relative to that assumed in the design basis transient and accident analyses. Therefore, the reactor is required to be in MODE 3 within 12 hours. Also, if an unacceptable number of control rods are determined to be "slow" during SR 3.1.3.2, sufficient degradation of scram reactivity may be present and the reactor must be in MODE 3 within 12 hours. Insertion of all control rods places the reactor in a condition that does not require the scram function.

(continued)

BASES (continued)

ACTIONS (continued)

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

SURVEILLANCE REQUIREMENTS

SR 3.1.3.1

The scram reactivity used in design basis transient and accident analyses is based on an assumed scram time. Measurement of the scram times with reactor steam dome pressure greater than 950 psig demonstrates acceptable scram times for the transients analyzed in References 4 and 5. Scram insertion times increase with increasing reactor pressure because of the effects of reactor steam dome pressure and stored accumulator energy. Therefore, demonstration of adequate scram times at reactor steam dome pressure greater than 950 psig ensures the scram times will be within the specified limits at higher pressure. Limits are specified as a function of reactor pressure to account for the sensitivity of scram insertion times with pressure and to allow a range of pressures during which scram time testing can be performed. To ensure scram time testing is performed in a reasonable time following a refueling or after a shutdown greater than 120 days, all control rods are required to be tested before exceeding 40% of RATED THERMAL POWER following the shutdown.

SR 3.1.3.2

Additional testing of at least a 10% sample of control rods is required every 120 days of cumulative operation in MODE 1. For planned testing, the control rods selected for the 10% sample should be different for each test. Data from inadvertent scrams should be used if possible to avoid unnecessary testing at power even if the control rods with data may have been previously tested in a 10% sample. This frequency and number of tested control rods is based on engineering judgement considering the desire to minimize disturbances to normal plant operation, experience which shows scram times do not significantly change over an operating cycle, and the additional surveillances done on the control rod drives at more frequent intervals (LCO 3.1.2 and LCO 3.1.4). Testing of more than 10% of the control rods may be done to obtain a more representative sample.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.3.2 (continued)

When possible, scram insertion time data can be determined from full reactor core scram. Otherwise, the scram time data is obtained during single rod scrams. As noted, for testing during single rod scrams, the test shall be performed with the charging valve closed so that the influence of the CRD pump head does not affect the single control rod (during a full core scram, the CRD pump head would be seen by all control rods and would have a negligible effect on the scram insertion times).

SR 3.1.3.3

Should work on a control rod or the CRD system potentially affect the scram insertion time, testing must be done to demonstrate adequate scram performance. Specific examples of work that could affect the scram times are (but not limited to) the following: removal of any control rod drive for maintenance or modification, replacement of a control rod, and maintenance or modification of a scram solenoid pilot valve, scram valve, accumulator or isolation/check valves in the piping required for scram.

For work done that could affect scram time, the scram testing must be performed with the reactor steam dome pressure greater than or equal to 950 psig before declaring the control rod OPERABLE. This testing ensures the control rod scram function is demonstrated for continued operation. Scram testing during hydrostatic pressure testing can also satisfy the requirements. To account for the variability in scram times at different reactor pressures, specific scram time limits are specified in Table 3.1.3-1 as a function of reactor pressure.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

Surveillance Frequencies

In general, surveillance frequencies are based on industry accepted practice and engineering judgement considering the unit conditions required to perform the test, the ease of performing the test and a likelihood of a change in the system/component status.

REFERENCES

1. 10 CFR Part 50, Appendix A, General Design Criterion 10.
2. Grand Gulf Unit 1 FSAR, Section 4.3.2.5.5.
3. Grand Gulf Unit 1 FSAR, Section 4.6.1.1.2.5.3.
4. Grand Gulf Unit 1 FSAR, Section 5.2.2.2.2.3.
5. Grand Gulf Unit 1 FSAR, Section 15.4.
6. Grand Gulf Unit 1 FSAR, Section 15.4.9.
7. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.4 Rev. 1 Scram Accumulators

Item	Change Description	Category
1	LCO 3.1.4 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.3.3.	1
2	The applicability in MODE 5 is moved to LCO 3.9.5.	1
3	CONDITIONS A and B are reformatted from ACTION a.	1
4	DELETED	
5	DELETED	
6	DELETED	
7	REQUIRED ACTIONS A.1 and A.2 are reformatted from ACTION~~S~~ a.1. ~~and a.2.~~	1
8	DELETED	
9	DELETED	
10	REQUIRED ACTION B.1 verifies CRD pump operation (from ACTION a.2(a)) using charging water header pressure indication rather than inserting a withdrawn control rod one notch.	3B
11	REQUIRED ACTIONS B.2.1 and B.2.2 are reformatted from ACTIONS a.1 and a.2.	1
12	The COMPLETION TIME for REQUIRED ACTIONS B.2.1 and B.2.2 is 1 hour.	3A
13	CONDITION C replaces the HOT SHUTDOWN provision of ACTION a. It requires immediate shutdown if REQUIRED ACTION B.1 cannot be met.	3A
14	A NOTE is provided with REQUIRED ACTION C.1 to permit inoperable accumulators for fully inserted control rods.	3B
15	SR 3.1.4.1 is reformatted from SR 4.1.3.3.a.	1
16	The accumulator "alarm setpoint" in SR 4.1.3.3.a is specified to be 1520 psig in SR 3.1.4.1.	3A

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Revision Summary Sheet

Proposed LCO/Section: 3.1.4 Rev. 1 Scram Accumulators

Item	Change Description	Category
17	The "inserted and disarmed or scrammed" provision of SR 4.1.3.3.a is deleted because inserted and disarmed rods are inoperable per LCO 3.1.2 and do not require surveillance testing per LCO 3.0.1 and scrammed rods must have adequate accumulator pressure demonstrated before being considered OPERABLE.	3B
18	CROSS REFERENCES are added.	1
19	ACTION a.2(b) is deleted because LCO 3.1.4 requires rods to be declared inoperable and inoperable rods are handled per LCO 3.1.2.	1
20	ACTION b is deleted because it provides requirements for MODE 5 and applicability in MODE 5 for LCO 3.1.4 is deleted per Item 2.	1
21	Footnote '*' to page 3/4 1-8 is deleted because it refers to a MODE 5 condition and MODE 5 applicability is deleted by Item 2.	1
22	ACTION c is deleted because it is covered by LCO 3.0.4.	1
23	ACTIONS d and e are deleted.	4
24	SR 4.1.3.3.b is relocated.	2
25	Condition D replaces the HOT SHUTDOWN provision of ACTION a.1 and a.2. It requires shutdown within 12 hours if Required Actions and associated completion times of A.1, A.2, B.2.1 or B.2.2 are not met.	1

3.1 REACTIVITY CONTROL SYSTEMS

3.1.4 Control Rod Scram Accumulators

LCO 3.1.4 All control rod scram accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One of the required control rod scram accumulators inoperable.	A.1 Restore inoperable control rod scram accumulator to OPERABLE status. OR A.2 Declare the associated control rod inoperable.	8 hours
B. More than one of the required control rod scram accumulators inoperable.	B.1 Verify pressure supplied to charging water header is ≥ 1520 psig. AND B.2.1 Restore inoperable control rod scram accumulator(s) to OPERABLE status. OR B.2.2 Declare the associated control rod(s) inoperable.	Immediately 1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action B.1 and associated Completion Time not met	C.1 ----------NOTE---------- Not applicable if all inoperable control rod scram accumulators are associated with fully inserted control rods. ---------------------- Place the Reactor Mode Switch in the Shutdown position.	Immediately
D. Required Actions A.1, A.2, B.2.1 or B.2.2 and associated Completion Times not met.	D.1 Be in ~~Mode~~ MODE 3	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.4.1	Verify control rod scram accumulator pressure is ≥ 1520 psig.	7 days

CROSS-REFERENCES

TITLE	NUMBER
Control Rod OPERABILITY	3.1.2
Control Rod Scram Times	3.1.3

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.4 Control Rod Scram Accumulators

BASES

BACKGROUND

The control rod drive (CRD) scram accumulators are part of the CRD system and are provided to ensure the control rods scram under varying reactor conditions. The control rod scram accumulators store sufficient energy to fully insert a control rod at any reactor vessel pressure. The accumulator is a hydraulic cylinder with a free floating piston. The piston separates the water used to scram the control rods from the nitrogen which provides the required energy. The scram accumulators are necessary to scram the control rods within the required insertion times of LCO 3.1.3.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the control rod scram function are presented in References 1, 2, 3 and 4. The design basis transient and accident analyses assume all of the control rods scram at a specified insertion rate. OPERABILITY of each individual control rod scram accumulator ensures (along with LCO 3.1.2, LCO 3.1.3 and LCO 3.1.5) the scram reactivity assumed in the design basis transient and accident analyses can be met. The existence of an inoperable accumulator may invalidate prior scram time measurements for the associated control rod.

The scram function of the CRD system, and therefore the OPERABILITY of the accumulators, protects the Safety Limit MINIMUM CRITICAL POWER RATIO (MCPR) (see Bases for LCO 3.2.2) and the 1% cladding plastic strain fuel design limit (see Bases for LCO 3.2.1) which ensure no fuel damage if the limit is not exceeded (see Bases for LCO 3.1.3).

Control Rod Scram Accumulators satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 5.

LCO

The OPERABILITY of the control rod scram accumulators is required to ensure adequate scram insertion capability exists when needed over the entire range of reactor pressures.

(continued)

BASES (continued)

APPLICABILITY

The control rod scram accumulators are required to be OPERABLE during MODES 1 and 2 whenever control rods are withdrawn and the scram function may be required. In MODE 5, the required OPERABILITY of accumulators associated with withdrawn control rods is specified in LCO 3.9.5. In MODES 3 and 4, control rods are only allowed to be withdrawn under Special Operations LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) and LCO 3.10.4 (Single Control Rod Withdrawal - Cold Shutdown) which provide adequate requirements for control rod scram accumulator OPERABILITY during these conditions.

ACTIONS

B.1

With more than one control rod scram accumulator inoperable, continued operation can only be justified if at least one CRD pump is operating and supplying adequate pressure to the charging water header to maintain accumulators charged. With inadequate charging water pressure, all of the accumulators could become inoperable resulting in a potentially severe degradation of the scram performance.

C.1

If a CRD pump is not operating and adequate pressure is not supplied to the charging water header, each accumulator will become inoperable as its charging pressure is lost. With more than one accumulator associated with a withdrawn control rod inoperable, the Reactor Mode Switch must be placed in the Shutdown position. This ensures all insertable control rods are inserted and the reactor is in a condition that does not require the active function (scram and insertion) of the control rods.

A.1, A.2, B.2.1, B.2.2

The accumulator provides the primary scram force during operation at any reactor steam dome pressure. Because of the large number of control rods available for scram and the assumed single failure of a control rod to scram in the safety analysis, time is allowed to restore the accumulator to OPERABLE status.

If the accumulator cannot be restored to OPERABLE status within the required Completion Time, the associated control rod must be declared inoperable and the requirements of LCO 3.1.2 followed. This will require insertion of the control rod thereby completing the intended function of the control rod.

(continued)

BASES (continued)

ACTIONS (continued)

D.1

If the accumulator cannot be restored to OPERABLE status and the associated control rod is not declared inoperable within the required Completion Time, there is no assurance that the associated control rod will insert within the insertion time assumed in the safety analysis. ~~Because the safety analysis assumes an additional single failure of a control rod to scram,~~ continued operation cannot be justified. Therefore the reactor must be brought to the Mode 3 condition within the required Completion Time. This ensures all insertable control rods are inserted and the reactor is in a condition that does not require the active function (scram and insertion) of the control rods.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

SURVEILLANCE REQUIREMENTS

SR 3.1.4.1

The primary indicator of accumulator OPERABILITY is the accumulator pressure. A minimum accumulator pressure is specified, below which the capability of the accumulator to perform its intended function becomes degraded and the accumulator is considered inoperable. The minimum accumulator pressure of 1520 psig is well below the expected pressure of 1750 to 2000 psig (Ref. 2). Declaring the accumulator inoperable when the minimum pressure is not maintained ensures significant degradation in scram times does not occur. SR 3.1.4.1 requires the accumulator pressure be checked weekly to ensure adequate accumulator pressure exists to provide sufficient scram force. Operating experience has demonstrated that a seven day frequency for this surveillance is adequate.

(continued)

BASES (continued)

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 4.3.2.5.5.
2. Grand Gulf Unit 1 FSAR, Section 4.6.1.1.2.5.3.
3. Grand Gulf Unit 1 FSAR, Section 5.2.2.2.2.3.
4. Grand Gulf Unit 1 FSAR, Section 15.4.1.
5. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.5 Rev. 1 Control Rod Drive Coupling

Item	Change Description	Category
1	LCO 3.1.5 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.3.4.	1
2	The applicability in MODE 5 is deleted because only one control rod can be withdrawn from a control cell containing fuel assemblies and the probability and consequences of a single control rod dropping out are negligible.	3B
3	CONDITION A is reformatted from ACTION a.	1
4	REQUIRED ACTION A.1 is reformatted from ACTION a.1.	1
5	REQUIRED ACTION A.2 is reformatted from ACTION a.2.	1
6	The method for recoupling and coupling verification is relocated.	2
7	The actions to be taken for an inoperable control rod are provided by LCO 3.1.2 and therefore are not duplicated in REQUIRED ACTION A.2.	1
8	Because of the limited time to recouple a control rod, the number of attempts does not need to be restricted in CONDITION A as in ACTION a.2.	3B
9	The RPCS provisions in ACTIONS a.1 and a.2 are not necessary in CONDITION A because an uncoupled withdrawn rod must be inserted even if it requires bypassing RPCS and operation with an out of sequence rod pattern.	3B
10	The HOT SHUTDOWN requirement of ACTION a is not necessary for LCO 3.1.5. REQUIRED ACTION A.1 or A.2 can always be satisfied.	3B
11	ACTION b is deleted because it addresses MODE 5 requirements. Applicability in MODE 5 was deleted by Item 2.	3B
12	ACTION c is deleted because it is covered by LCO 3.0.4.	1
13	SR 3.1.5.1 is reformatted from SR 4.1.3.4.b and SR 4.1.3.4.c.	1

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Revision Summary Sheet

Proposed LCO/Section: 3.1.5 Rev. 1 Control Rod Drive Coupling

Item	Change Description	Category
14	The observation of nuclear instrumentation response in SR 4.1.3.4 is deleted from SR 3.1.5.1 because it does not provide a positive means of determining rod coupling. A control rod could be uncoupled and still follow its drive out.	3B
15	SR 4.1.3.4.a is deleted. Coupling must be verified prior to declaring control rods OPERABLE.	3B
16	A CROSS REFERENCE is added.	1
17	Footnote '*' to page 3/4 1-10 is deleted because it refers to a MODE 5 condition and MODE 5 applicability is deleted by Item 2.	3B
18	Footnote '**' to page 3/4 1-10 is reformatted as a NOTE to REQUIRED ACTION A.2.	1
19	The REQUIRED ACTION A.2 allows 2 hours to declare the affected control rod inoperable. The REQUIRED ACTION of 3.1.2 allows an additional 2 hours to insert and disarm the control rod (effective action time of 4 hours). The present TS Action a.2 allows only 2 hours total time.	3B

3.1 REACTIVITY CONTROL SYSTEMS

3.1.5 **Control Rod Drive Coupling**

LCO 3.1.5 All control rods shall be coupled to their drive.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more control rod(s) not coupled to its drive.	A.1 Recouple control rod. OR A.2 Declare the control rod inoperable. ----------NOTE--------- Control Rod may be rearmed intermittently, under administrative controls, to permit testing associated with restoring the control rod to OPERABLE status. -----------------------	2 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Demonstrate each control rod does not go to the overtravel position.	Once each time the control rod is withdrawn to "Full Out" position AND Once prior to declaring control rod(s) OPERABLE when work on control rod or CRD system could affect coupling

CROSS-REFERENCES

TITLE	NUMBER
Control Rod OPERABILITY	3.1.2

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.5 Control Rod Drive Coupling

BASES

BACKGROUND

The control rod drive (CRD) and control rod are coupled through a coupling spud at the top end of the CRD index tube that locks into a mating socket at the base of the control rod. This positive means of coupling the control rod to the index tube allows the position of the control rod to be varied and detected through the movement of the index tube. CRD coupling is a requirement for control rod OPERABILITY since the lack of coupling could result in loss of control rod position information and potentially result in a large reactivity insertion should the uncoupled control rod become stuck and later drop from the core.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the CRD system are presented in References 1 and 2. The CRD system provides the negative scram reactivity required to ensure specified acceptable fuel design limits are not exceeded during abnormal operational transients (see Bases for LCO 3.1.3).

Also, if a control rod is not coupled, the position of the control rod cannot necessarily be determined. The control rod position (specifically the control rod pattern) is an initial condition of the Control Rod Drop Accident (CRDA) analysis (References 2 and 3). The CRDA analysis assumes a control rod has become uncoupled from its drive, stuck in the core and then drops from the core after the control rod drive has been fully withdrawn. Demonstrating coupling of all control rods reduces the probability a CRDA will occur and therefore provides protection against violating fuel damage limits during reactivity initiated accidents (see Bases for LCO 3.1.7).

Control Rod Drive Coupling satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 4.

LCO

The requirement for all control rods to be coupled to their drive mechanisms is required to ensure OPERABILITY of the control rods such that their intended reactivity control functions can be performed.

(continued)

BASES (continued)

APPLICABILITY The CRD coupling requirements are applicable during MODES 1 and 2 since under these conditions control rods can be withdrawn and criticality achieved. The CRDA is not applicable during MODES 3, 4 and 5 since only a single control rod can be withdrawn from a core cell containing fuel assemblies and SHUTDOWN MARGIN ensures the reactor is subcritical under these conditions.

ACTIONS

A.1, A.2

Continued operation with an uncoupled control rod should not be allowed because of the increased probability of a CRDA and therefore only a short period of time is allowed to establish and verify recoupling. Since the allowable time with an uncoupled control rod is short, and control rods do not always recouple on the first try, multiple attempts to recouple a control rod may be necessary.

If recoupling cannot be achieved, the control rod must be declared inoperable and the requirements of LCO 3.1.2 must be satisfied. This will ensure that if the control rod cannot be recoupled in a short time, it will be inserted and disarmed, thereby maintaining the shutdown capabilities of the control rod and precluding a CRDA involving this uncoupled control rod. Subsequent recoupling attempts are permitted under administrative controls.

To prevent potential damage to the coupling spud, after insertion, the control rod should be isolated from scram. The control rod can be isolated from scram by isolating the hydraulic control unit from scram and normal insert/withdraw pressure yet still maintaining cooling water to the CRD. During this isolation process, the accumulator pressure is depleted (Ref. 5).

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.5.1

Coupling verification is performed by verifying a control rod does not go to the overtravel position when it is fully withdrawn. The overtravel position feature provides a positive check on the coupling integrity since only an uncoupled CRD can reach the overtravel position. The verification is required to be performed any time a control rod is withdrawn to the "Full Out" (notch position 48) position or prior to declaring the control rod OPERABLE when work on the control rod or CRD system could affect coupling. This includes control rods inserted one notch and then returned to the "Full Out" position during the performance of SR 3.1.2.2.

REFERENCES

1. Grand Gulf Unit 1, FSAR Section 4.6.1.
2. Grand Gulf Unit 1, FSAR Section 15.4.9.
3. XN-NF-80-19 (P)(A), "Exxon Nuclear Methodology for Boiling Water Reactors: Neutronic Methods for Design and Analysis," Vol. 4, Rev. 1, 6/86, Section 6.2.
4. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.
5. GEK-73675, "Operations and Maintenance Instructions, Control Rod Drive Hydraulic System," Section 4-30.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.6 Rev. 0 CRD Housing Support

Item	Change Description	Category
1	LCO 3.1.6 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.3.6.	1
2	The LCO statement is revised to require the CRD housing support to be "OPERABLE" rather than "in place."	1
3	The applicability in MODE 3 is removed.	3B
4	CONDITION A is reformatted from the ACTION statement.	1
5	The ACTION requirement to be in MODE 4 is deleted.	3B
6	SR 3.1.6.1 is reformatted from SR 4.1.3.6.	1
7	CROSS REFERENCES are added.	1
8	The visual inspection provision of SR 4.1.3.6 is deleted.	3B
9	The post maintenance surveillance requirement in SR 4.1.3.6 is deleted and replaced by the "once prior to OPERABLE" frequency in SR 3.1.6.1.	1

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Rod Drive Housing Support

LCO 3.1.6 The control rod drive housing support shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Control rod drive housing support inoperable.	A.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify control rod drive housing support is in place.	Once prior to declaring OPERABLE

CROSS-REFERENCES

TITLE	NUMBER
Single Control Rod Withdrawal - Hot Shutdown	3.10.3
Single Control Rod Withdrawal - Cold Shutdown	3.10.4

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Control Rod Drive Housing Support

BASES

BACKGROUND

The control rod drive (CRD) housing support is provided to prevent any significant reactivity excursion if a CRD housing breaks or separates from the bottom of the reactor pressure vessel (RPV). The CRD housing support consists of a grid like structure that will support each individual CRD housing during the postulated event. A description of the CRD housing support is presented in Reference 1. In the postulated CRD housing failure event, the CRD housing support is loaded when the lower surface of the CRD flange contacts the support grid. The grid structure effectively limits the distance a single control rod can be ejected during this event to a small fixed distance thereby minimizing the amount of positive reactivity that can be added.

The CRD housing support is provided to satisfy General Design Criterion 28 requirements for limiting reactivity insertion rates.

APPLICABLE SAFETY ANALYSES

The CRD housing support limits the downward travel of a control rod during a failure of a single CRD housing (control rod ejection event). For purposes of mechanical design, the postulated failure resulting in the highest forces applied to the housing support is assumed. This corresponds to an instantaneous circumferential separation of the CRD housing from the RPV with an internal pressure of 1086 psig (RPV design pressure) acting on the area of the separated housing.

Prevention or mitigation of positive reactivity insertion events is necessary to limit energy deposition in the fuel to prevent significant fuel damage which could result in undue release of radioactivity (see Bases for LCO 3.1.7). By design, the CRD housing limits the ejection distance to less than 6 inches (Ref. 2). Actual ejection distance is less depending on reactor temperature and failure mechanism. The amount of positive reactivity inserted by this distance does not produce a reactivity excursion sufficient to exceed the fuel damage limits discussed in the Bases for LCO 3.1.7.

CRD Housing Support satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 3.

(continued)

BASES (continued)

LCO

The CRD housing support is required to be OPERABLE to ensure during a postulated control rod housing break, the rod ejection distance for a single control rod is limited to an acceptable distance that will not result in a significant reactivity excursion.

APPLICABILITY

The CRD housing support specification is applicable in MODES where the reactor may become critical during a control rod ejection with the reactor pressure vessel pressurized. Under these conditions, a control rod ejection event is postulated. During MODES 1 and 2, the reactor may be critical with the RPV pressurized. In MODES 3 and 4, control rods are only allowed to be withdrawn under Special Operations LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) and LCO 3.10.4 (Single Control Rod Withdrawal - Cold Shutdown) which provide requirements for the CRD housing supports to be in place if the vessel is pressurized. During MODE 5, although a control rod may be withdrawn, the reactor pressure vessel is not sufficiently pressurized and the control rod ejection event is not a concern.

ACTIONS

A.1

With the CRD housing support not in place continued plant operation cannot be justified and the reactor must be in MODE 3. Insertion of all control rods places the reactor in a shutdown condition during which the consequences of a control rod ejection event are not significant when adequate SHUTDOWN MARGIN has previously been demonstrated. The 12 hour Completion Time allows for a controlled shutdown of the reactor without placing undue stress on plant operators or plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

The CRD housing support must be removed for inspection and maintenance of the CRDs. SR 3.1.6.1 ensures when the support structure is reinstalled, it is inspected for correct assembly with particular attention to maintaining the correct gap between the CRD flange and the grid. The housing support is required to be checked before startup any time a housing support has been disassembled.

(continued)

BASES (continued)

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 4.5.1.2.3.
2. Grand Gulf Unit 1 FSAR, Section 4.6.2.3.3.
3. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.7 Rev. 1 Rod Pattern Control

Item	Change Description	Category
1	LCO 3.1.7 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.4.2 except as noted below.	1
2	The LCO is reworded to address only conformance with BPWS. The RPC and RWL requirements have been moved to LCO 3.3.2.1.	3B
3	The applicability is limited to MODES 1 and 2 with THERMAL POWER less than or equal to 10% RTP.	3B
4	CONDITION A is provided to permit up to 8 control rods not in compliance with BPWS to be handled.	3A+
5	CONDITION B is developed from ACTION a.1 with added requirement for reactor scram within 1 hour.	3A
6	SR 3.1.7.1 is provided to require conformance with BPWS requirements to be verified every 24 hours.	3A
6A	SR 3.1.7.2 is reformated from LCO 3.1.4.2 ACTION b.4.	1
7	CROSS REFERENCES are added.	1
8	ACTION a.1 is revised in CONDITION A to permit control rod movement(s) to correct out-of-sequence patterns. Requirements for a limited number of out-of-sequence OPERABLE control rods have been added to avoid forced scrams when not required.	3B
9	ACTION a.2 is deleted because the revised applicability (see Item 3) eliminates the need for higher power level conditions.	1
10	ACTION b.1 is deleted. The requirements for inoperable control rods are addressed in LCO 3.1.2.	1
10A	ACTION b.2.c requiring ≤ 3 inoperable rods/group deleted.	3B
11	ACTION b.2 is deleted. The requirements for inoperable control rods are addressed in LCO 3.1.2.	1
12	ACTION b.3 is deleted.	4
13	ACTION b.4 is deleted. SR 3.1.7.2 provides the equivalent requirement.	1

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Revision Summary Sheet

Proposed LCO/Section: 3.1.7 Rev. 1 Rod Pattern Control

Item	Change Description	Category
14	SR 4.1.4.2.a and 4.1.4.2.b have been included in LCO 3.3.2.1 except as noted below.	1
15	SR 4.1.4.2.c is deleted. The rod pattern must be verified to conform with BPWS every 24 hours per SR 3.1.7.1, but RPCS bypass switch positions are not covered.	4
16	SR 4.1.4.2.a.3 is deleted.	3B

3.1 REACTIVITY CONTROL SYSTEMS

3.1.7 Rod Pattern Control

LCO 3.1.7 All control rods shall comply with the requirements of the Banked Position Withdrawal Sequence (BPWS).

APPLICABILITY: MODES 1 and 2 with THERMAL POWER ≤ 10% of RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Less than or equal to eight control rods not in compliance with the prescribed sequence of BPWS.	A.1 ----------NOTE--------- Affected control rods may be bypassed in RACS in accordance with SR 3.1.7.2. ----------------------- Move affected control rod(s) to correct position. OR A.2 Declare affected control rod(s) inoperable.	8 hours
B. More than eight control rods not in compliance with the prescribed sequence of BPWS.	B.1 Suspend withdrawal of control rods. AND B.2 Place the Reactor Mode Switch in the Shutdown position.	Immediately 1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.7.1	Verify all control rods comply with BPWS.	24 hours
SR 3.1.7.2	Verify the bypassing and movement of control rods required to be bypassed in RACS by a second licensed operator or other qualified member of the technical staff.	Prior to and during the movement of controls rods bypassed in RACS.

CROSS-REFERENCES

TITLE	NUMBER
Control Rod OPERABILITY	3.1.2
Control Rod Block Instrumentation	3.3.2.1
Control Rod Testing - Operating	3.10.7

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.7 **Rod Pattern Control**

BASES

BACKGROUND

Control rod patterns during startup conditions are controlled by the operator and the Rod Pattern Controller (RPC) (LCO 3.3.2.1), such that only specified control rod sequences and relative positions are allowed over the operating range from all control rods inserted to 10% of RATED THERMAL POWER. The sequences effectively limit the magnitude of potential positive reactivity insertion that would occur during a Control Rod Drop Accident (CRDA).

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the CRDA are summarized in References 1, 2, and 3. CRDA analyses assume the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the CRDA analysis. The RPC (LCO 3.3.2.1) provides backup to operator control of the withdrawal sequences to ensure the initial conditions of the CRDA analysis are not violated.

Prevention or mitigation of positive reactivity insertion events is necessary to limit energy deposition in the fuel to prevent significant fuel damage which could result in undue release of radioactivity. The fuel damage limit of 280 cal/gm provides a margin of safety to significant core damage which would result in release of radioactivity (Refs. 4 and 5). Generic evaluations (Ref. 1 and 6) of a design basis CRDA (i.e., a CRDA resulting in a peak fuel energy deposition of 280 cal/gm) have shown if the peak fuel enthalpy remains below 280 cal/gm, then the maximum reactor pressure will be less than the required ASME Code limits (Ref. 5) and the calculated offsite doses will be well within the required limits (Ref. 7).

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

Control rod patterns analyzed in Reference 1 follow the Banked Position Withdrawal Sequence (BPWS) described in Reference 8. The BPWS is applicable from the condition of all control rods fully inserted to 10% of RATED THERMAL POWER (Ref. 2). For BPWS, the control rods are required to be moved in groups, with all control rods assigned to a specific group required to be within specified banked positions (e.g., between notch 08 and 12). The banked positions are defined to minimize the maximum incremental control rod worths without being overly restrictive during normal plant operation. Generic analysis of the BPWS (Ref. 8) has demonstrated the 280 cal/gm fuel damage limit will not be violated during a CRDA while following the BPWS mode of operation. The generic BPWS analysis (Ref. 8) also evaluated the effect of fully inserted inoperable control rods not in compliance with the sequence to allow a limited number (8) and distribution of fully inserted inoperable control rods.

Rod Pattern Control satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 9.

LCO

Compliance with the prescribed control rod sequences minimizes the potential consequences of a CRDA by limiting the initial conditions to those consistent with BPWS. This LCO applies to all control rods. For inoperable control rods required to be inserted, additional requirements are specified in LCO 3.1.2, which are consistent with the allowances for inoperable control rods in BPWS.

APPLICABILITY

Compliance with BPWS is required in MODES 1 and 2 when THERMAL POWER is less than or equal to 10% of RATED THERMAL POWER. When THERMAL POWER is greater than 10% of RATED THERMAL POWER, there is no credible control rod configuration that results in a control rod worth that could exceed the 280 cal/gm fuel damage limit during a CRDA (Ref's. 2 and 8). In MODES 3, 4 and 5, the reactor is shutdown and the consequences of CRDA are acceptable since adequate SHUTDOWN MARGIN ensures the reactor will remain subcritical at all times.

(continued)

BASES (continued)

ACTIONS

A.1, A.2

With a limited number of control rods not in compliance with the prescribed control rod sequence, actions may be taken to correct the control rod pattern. Noncompliance with the prescribed sequence may be the result of "double notching", drifting from a CRD cooling water transient, leaking scram valves or a power reduction below 10% of RATED THERMAL POWER before establishing the correct control rod pattern. The number of control rods not in compliance with the prescribed sequence is limited to 8 to prevent the operator from attempting to correct a control rod pattern that significantly deviates from the prescribed sequence. When the control rod pattern is not in compliance with the prescribed sequence, all control rod movement should be stopped except for scram or those moves needed to correct the rod pattern. As noted, control rods may be bypassed in RACS to allow the affected control rods to be returned to their correct position. Alternatively, if the affected control rod is not moved to its correct position in the Required Completion Time, it may be declared inoperable and the requirements of LCO 3.1.2 followed. A control rod not in compliance with the prescribed sequence is not considered inoperable except as required by Required Action A.2. OPERABILITY of control rods is determined by compliance with LCO 3.1.2 through LCO 3.1.5.

B.1, B.2

More than 8 out-of-sequence control rods indicates the control rod pattern significantly deviates from the prescribed sequence. Control rod withdrawal should be suspended to prevent the potential for further deviation from the prescribed sequence. Any control rod found to be withdrawn past its in-sequence position is allowed to be inserted to or beyond its in-sequence position. This adjustment is allowed as it reduces the scram time for the given rod. A limited time (1 hour) for control rod insertion to correct control rods withdrawn beyond their allowed position is allowed because of the relatively low probability of a CRDA during this time. If the control rod pattern requirements cannot be restored within 1 hour, the Reactor Mode Switch must be placed in the Shutdown position.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1

The primary check on compliance with BPWS is performed by the RPC (LCO 3.3.2.1) which provides control rod blocks to enforce the required sequence. The RPC is required to be OPERABLE when operating at less than or equal to 10% of RATED THERMAL POWER. Should a control rod be bypassed in RACS, the RPC will not block movement of this control rod and therefore LCO 3.3.2.1 requires the bypassing and movement of the bypassed control rod to be verified under these conditions to ensure the bypassed control rod is returned to its correct position. Therefore, a daily check of the control rod pattern compliance with BPWS is adequate.

SR 3.1.7.2

LCO 3.1.2 and LCO 3.1.7 may require individual control rods to be bypassed in RACS to allow insertion of an inoperable control rod or correction of a control rod pattern not in compliance with BPWS. With these control rods bypassed in RACS, the RPC will not control the movement of these bypassed control rods but will continue to control the movement of all other control rods independent of the movement of the bypassed control rods. To ensure the proper bypassing and movement of those affected control rods, a second licensed operator or other qualified member of the technical staff must verify the bypassing and movement of these control rods. Compliance with this SR allows RPCS to be OPERABLE with these control rods bypassed.

(continued)

BASES (continued)

REFERENCES

1. Grand Gulf Unit 1 Current Cycle Safety Analysis (CCSA).

2. "Modifications to the Requirements for Control Rod Drop Accident Mitigating Systems", BWR Owners' Group, July 1986.

3. Grand Gulf Unit 1 UFSAR Section 15.4.9.

4. NUREG-0979, NRC Safety Evaluation Report for GESSAR II BWR/6 Nuclear Island Design, Docket No. 50-447, April 1983, Section 4.2.1.3.2.

5. NUREG-0800, Revision 2, Standard Review Plan, July 1981, Section 15.4.9.

6. NEDO-21778-A, "Transient Pressure Rises Affected Fracture Toughness Requirements for Boiling Water Reactors", December 1978.

7. 10 CFR Part 100, Paragraph 11.

8. NEDO-21231, "Banked Position Withdrawal Sequence", January 1977.

9. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.1.8 Rev. 1 SLCS

Item	Change Description	Category
1	LCO 3.1.8 is reformatted from LIMITING CONDITION FOR OPERATION 3.1.5.	1
2	The applicability in MODE 5 is eliminated based upon SDM requirements of LCO 3.1.1 and the one-rod-out interlock of the reactor mode switch in REFUEL position.	3B
3	CONDITION A is reformatted from ACTION a.1 except the shutdown requirement is addressed by CONDITION C.	1
4	CONDITION B is reformatted from ACTION a.2 except the shutdown requirement is addressed by CONDITION C.	1
5	REQUIRED ACTION B.2 is added to require the initial SLCS subsystem to be restored within 7 days.	3A+
6	CONDITION C is reformatted from the shutdown requirements of ACTIONs a.1 and a.2.	1
7	*SR 3.1.8.1 is reformatted from SR 4.1.5.a.2.	1
8	*SR 3.1.8.2 is reformatted from SR 4.1.5.a.1.	1
9	*SR 3.1.8.3 is reformatted from SR 4.1.5.a.3. Heat tracing circuit operability is removed from the surveillance requirement since pump suction piping temperature is the parameter monitored.	3B
10	SR 3.1.8.4 is reformatted from SR 4.1.5.b.2.	1
11	*SR 3.1.8.5 is reformatted from SR 4.1.5.b.3 and footnote '*' to page 3/4 1-19 except as noted below.	1
12	SR 3.1.8.6 is reformatted from SR 4.1.5.b.4.	1
13	SR 3.1.8.7 is reformatted from SR 4.1.5.c except as noted below.	1
14	SR 3.1.8.8 is reformatted from SR 4.1.5.d.1 except as noted below	1
15	*SR 3.1.8.9 is reformatted from SR 4.1.5.d.3 except as noted below.	1

* Except as modified by AECM-89/0063.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.8 Rev. 1 SLCS

Item	Change Description	Category
16	DELETED	
17	ACTION b and footnote '*' to page 3/4 1-18 are deleted based upon the revision to the applicability (see Item 2).	1
18	SR 4.1.5.b.1 is relocated.	2
19	The requirement that the pump relief valve not actuate in SR 4.1.5.c is deleted from SR 3.1.8.7.	4
20	The requirements for replacing the explosive valve are relocated.	2
21	SR 4.1.5.d.2 is relocated.	2
22	SR 4.1.5.d.4 is deleted because the daily check on solution temperature per SR 3.1.8.2 provides adequate assurance that a tank heater failure can be detected.	3B
23	The requirement to determine the available weight of soduim penetaborate in SR 4.1.5.b.3 is deleted.	3B
24	The method of performing SR 4.1.5.d.3 is relocated.	2
25	The scope of SR 4.1.5.d.3 has been reduced to only cover heat tracing between the storage tank and the pump suction.	3B
26	The "**" footnote allowance to perform SR 4.1.5.d.3 by any series of sequential, overlapping or total flow path steps is deleted.	3A

3.1 REACTIVITY CONTROL SYSTEMS

3.1.8 Standby Liquid Control System

LCO 3.1.8 The Standby Liquid Control System (SLCS) shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SLCS subsystem inoperable.	A.1 Restore inoperable subsystem to OPERABLE status.	7 days from discovery of inoperable subsystem
B. Both SLCS subsystems inoperable.	B.1 Restore at least one subsystem to OPERABLE status.	8 hours
	AND	
	B.2 Restore the initial inoperable subsystem to OPERABLE status.	7 days from discovery of initial inoperable subsystem
C. Required Actions and associated Completion Times of Condition A or B not met.	C.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.1.8.1	Verify available volume of sodium pentaborate solution is within the limits of Figure 3.1.8-1.	24 hours
SR 3.1.8.2	Verify temperature of sodium pentaborate solution is ≥ 75°F and ≤ 130°F	24 hours
SR 3.1.8.3	Verify temperature of pump suction piping is ≥ 75°F and ≤ 130°F.	24 hours
SR 3.1.8.4	Verify continuity of explosive charge.	31 days
SR 3.1.8.5	Demonstrate by chemical analysis the concentration of boron in solution is within the limits of Figure 3.1.8-1.	31 days AND Once within 24 hours after water or boron added to solution AND Once within 24 hours after solution temperature is restored ≥ 75°F.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.1.8.6	Verify each valve in flow path not locked, sealed or secured in position, is in its correct position.	31 days
SR 3.1.8.7	Demonstrate each pump develops a flow rate ≥ 41.2 gpm at a discharge pressure ≥ 1300 psig.	92 days
SR 3.1.8.8	Demonstrate the flow path through one SLCS subsystem from pump to reactor pressure vessel is available by initiating one explosive valve and pumping demineralized water to the reactor pressure vessel.	18 months on a STAGGERED TEST BASIS
SR 3.1.8.9	Demonstrate all heat-traced piping between storage tank and pump suction is unblocked.	18 months

CROSS-REFERENCES: None

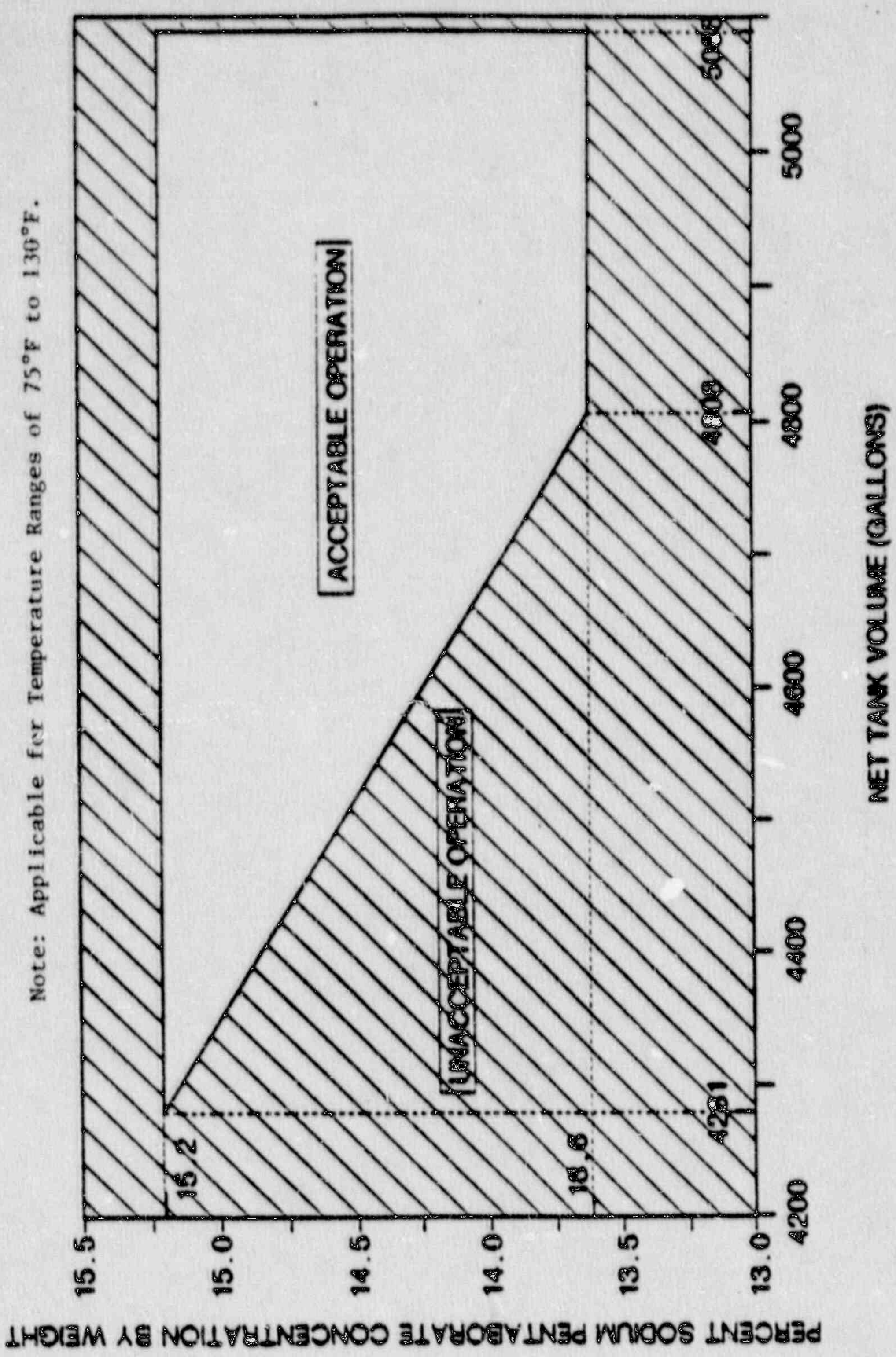

Figure 3.1.8-1 (Page 1 of 1)

Sodium Pentaborate Solution Concentration/
Available Volume Requirements

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.8 **Standby Liquid Control System**

BASES

BACKGROUND

The Standby Liquid Control System (SLCS) is designed to bring the reactor, from rated power to a subcritical, xenon free, room temperature condition at any time in the core life. The system is designed for the conditions when no control rods can be inserted from full power conditions.

The SLCS consists of a boron solution storage tank, two positive displacement pumps, two explosive valves which are provided in parallel for redundancy and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel (RPV). The borated solution is discharged through the High Pressure Core Spray (HPCS) system sparger.

Compliance with the NRC ATWS Rule 10CFR50.62 has been demonstrated by means of the equivalent control capacity concept using the plant specific minimum parameters. This concept requires that each boiling water reactor must have a standby liquid control system with a minimum flow capacity and boron content equivalent in control capacity to 86 gpm for 13% weight sodium pentaborate solution (natural boron enrichment) used for 251-inch diameter reactor vessel studied in NEDE-24222, Reference 4. The described minimum system parameters (82.4 gpm, 13.6% weight with natural boron enrichment) provides an equivalent control capacity to the 10CFR 50.62 requirement. The techniques of the analysis are presented in a licensing topical report NEDE-31096-P, Reference 5.

Only one subsystem is needed to fulfill the system design basis, and two subsystems are needed to fulfill ATWS rule requirements. An SLCS subsystem consists of the storage tank, one divisional pump, one explosive type valve, and associated piping and valves necessary to inject neutron absorbing solution into the reactor.

APPLICABLE SAFETY ANALYSES

The SLCS is manually initiated from the main control room as directed by the Emergency Operating Procedures. The SLCS is used in the highly improbable event that not enough control rods can be inserted to accomplish shutdown and cooldown in the normal manner. The SLCS provides borated water to the reactor core to compensate for the various reactivity effects during the required conditions. To meet this objective, it is necessary to inject a quantity of boron which produces a concentration of 660 ppm of natural boron in the reactor core at 68°F. To allow for

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

potential leakage and imperfect mixing in the reactor system, an additional 25% is added to the above requirement (Ref. 1). The volume and concentration limits in Figure 3.1.8-1 are calculated such that the required concentration is achieved accounting for dilution in the RPV with normal water level and including the volumes in the Residual Heat Removal shutdown cooling piping and the recirculation loop piping. This quantity of solution is the amount which is above tank instrument zero. Tank instrument zero is located at the top of the suction line outlet on the tank, thus, no credit is taken for the tank volume which cannot be injected.

The NRC Interim Policy Statement (Ref. 2) requires the SLCS be retained in the technical specifications even though none of the Selection Criteria were satisfied (Ref. 3).

LCO

The OPERABILITY of the SLCS is required to provide backup capability for reactivity control independent of normal reactivity control provisions from the control rods. The OPERABILITY of the SLCS is based on the conditions of the borated solution in the storage tank and the availability of a flow path to the reactor pressure vessel, including the OPERABILITY of the pumps and valves. Two SLCS subsystems are required OPERABLE, each containing an OPERABLE pump, an explosive valve and associated piping and valves to ensure an OPERABLE flow path.

APPLICABILITY

The SLCS specifications are applicable during MODES 1 and 2 since during these conditions the reactor can be critical. In MODES 3 and 4, control rods are only allowed to be withdrawn under Special Operations LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) and LCO 3.10.4 (Single Control Rod Withdrawal - Cold Shutdown) which provide adequate controls to ensure only a single control rod can be withdrawn. In MODE 5, only a single control rod can be withdrawn from a core cell containing fuel assemblies, and demonstration of adequate SHUTDOWN MARGIN (LCO 3.1.1) ensures the reactor will not be critical. Therefore the SLCS is not required to be OPERABLE during these conditions when only a single control rod can be withdrawn.

(continued)

BASES (continued)

ACTIONS

A.1

With one SLCS subsystem inoperable, the remaining OPERABLE subsystem is adequate to perform the shutdown function. However, the overall reliability is reduced because a single failure in the remaining OPERABLE subsystem can result in no SLCS shutdown capability. For this reason, continued operation is permitted for a limited time only, 7 days.

B.1, B.2

With both SLCS subsystems inoperable, no SLCS shutdown capability remains to handle the postulated event. Continued operation is justified because of the low probability of an event which would require SLCS. However, continued operation of the plant is permitted for only a limited period of time, 8 hours, during which time at least one subsystem must be restored to OPERABLE status. Additionally, the initial inoperable subsystem must be restored to OPERABLE status within 7 days from initial discovery consistent with the Completion Time of Required Action A.1.

C.1

With one or both SLCS subsystems not restored to OPERABLE status and the associated Completion Times not met, the reactor must be in MODE 3 within 12 hours.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

SURVEILLANCE REQUIREMENTS

SR 3.1.8.1, SR 3.1.8.2, SR 3.1.8.3

SR 3.1.8.1 through SR 3.1.8.3 are daily surveillances verifying portions of the SLCS OPERABILITY without disturbing normal plant operation. The surveillances ensure the proper solution volume and temperature (including the temperature of the pump suction piping) are maintained. The SLCS pump suction piping is provided with redundant heat tracing circuits. The primary circuit activates when the piping temperature reaches 85°F falling. The backup circuit activates at 80°F falling. These setpoints provide margin to the 75°F minimum boron solution temperature. The heat tracing is maintained operable in all

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

modes by administrative controls to provide additional assurance that the boron remains in solution during periods when the containment ambient temperature may fall below the minimum solution temperature.

The minimum volume of Figure 3.1.8-1 places a restraint on concentration to ensure that adequate margin exists to maintain the boron in solution. The maximum volume restrains the concentration to the lowest allowed to show satisfactory compliance with the ATWS Rule, 10CFR 50.62. The limits on temperature ensure that the maximum allowed tank/suction piping concentration will remain in solution (75°F) and that the temperature remains below the maximum value assumed in the calculation for NPSH (130°F) with both pumps operating. The solution temperature is important in ensuring the boron remains in solution and does not precipitate out in the storage tank or pump suction piping. Failure to meet SR 3.1.8.1, SR 3.1.8.2 or SR 3.1.8.3 will make both SLCS subsystems inoperable since the storage tank and the majority of the pump suction piping is common to both subsystems.

SR 3.1.8.4, SR 3.1.8.5, SR 3.1.8.6

SR 3.1.8.4 through SR 3.1.8.6 provide additional demonstration of the OPERABILITY of the SLCS. SR 3.1.8.4 verifies the continuity of the explosive charges in the injection valves to ensure proper operation will occur if required. SR 3.1.8.5 provides a detailed examination of the sodium pentaborate solution by using chemical analysis to ensure the proper concentration of boron solution exists in the tank. In order to establish a nominal concentration of 14.4% (midpoint of curve of Figure 3.1.8-1) at 80°F, 5803 lbs. of sodium pentaborate are required in the tank low level volume (4530 gallons). The concentration limits provide operational flexibility, yet, ensure that the concentration is restricted to minimum required to show compliance with 10 CFR 50.62, and ensure that concentration is restricted to provide adequate margin to prevent boron precipitation. SR 3.1.8.6 verifies each valve in the system (not otherwise locked, sealed or secured in position) is in its correct position to ensure the flow path is available to support operation of the subsystem.

SR 3.1.8.5 must be performed anytime boron or water is added to the tank solution to establish acceptability of the new values for the solution concentration. Also, SR 3.1.8.5 must be performed anytime the temperature is restored to within the limits of Figure 3.1.8-1 to ensure no significant boron precipitation occurred.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.1.8.7

SR 3.1.8.7 demonstrates proper operation of the SLCS pumps and requires each pump be demonstrated to meet the minimum flow rate requirement of 41.2 gpm at a discharge pressure of 1300 psig. The minimum pump flow rate requirement ensures that when combined with the sodium pentaborate solution concentration requirements, the rate of negative reactivity insertion from the SLCS will adequately compensate for the positive reactivity effects encountered during power reduction, cooldown of the moderator and xenon decay.

SR 3.1.8.8, SR 3.1.8.9

SR 3.1.8.8 and SR 3.1.8.9 ensure a complete flow path from the storage tank to the reactor pressure vessel including the firing of an explosive valve. The replacement charge for the explosive valve shall be from the same manufactured batch as the one fired or from another batch which has been certified by having one of that batch successfully fired. The pump and explosive valve tested should be alternated such that both complete flow paths are tested every 36 months.

Surveillance Frequencies

In general, surveillance frequencies are based on industry accepted practice and engineering judgement considering the unit conditions required to perform the test, the ease of performing the test and a likelihood of a change in the system/component status.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 9.3.5.3.
2. 52FR3788, "Proposed Policy Statement on Technical Specification Improvements for Nuclear Power Reactors," February 6, 1987.
3. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment", November 1987.
4. NEDE-24222, "Assessment of BWR Mitigation of ATWS, Volume II," December 1979.
5. NEDE-31096-P, "Anticipated Transient Without Scram, Response to NRC ATWS Rule 10CFR50.62," December 1985.

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Revision Summary Sheet

Proposed LCO/Section: 3.1.9 Rev. 1 SDV Vent and Drain Valves

Item	Change Description	Category
1	LCO 3.1.9 is reformatted from portions of LIMITING CONDITION FOR OPERATION 3.1.3.1.	1
2	CONDITIONS A and B are reformatted from ACTIONS d, e and f from LCO 3.1.3.1.	1
3	REQUIRED ACTION A.1.1 is added to provide a verification of OPERABILITY for the redundant valve in the affected line.	3A+
4	REQUIRED ACTION A.1.2 is added to require the affected line to be isolated within 8 hours.	3B+
5	A NOTE is added with REQUIRED ACTION A.1.2 to permit isolated lines to be opened under administrative controls to drain the SDV.	3B+
6	REQUIRED ACTION A.2 provides up to 7 days to restore inoperable SDV vent and drain valve(s) to OPERABLE status. LCO 3.1.3.1 ACTIONS d, e, and f provided 24 hours, 16 hours and 8 hours respectively.	3B
7	REQUIRED ACTION B.1 provides 12 hours to be in MODE 3. LCO 3.1.3.1 ACTIONS d, e and f provided 12 hours.	1
8	SR 3.1.9.1 is reformatted from SR 4.1.3.1.1.a.	1
9	SR 3.1.9.2 is reformatted from SR 4.1.3.1.1.b.	1
10	SR 3.1.9.3.A is reformatted from SR 4.1.3.1.4.a.1.	1
11	DELETED.	
12	The provision in SR 4.1.3.1.4.a.1 to test the SDV valves from a normal control rod configuration of less than or equal to 50% rod density is deleted. SDV valve performance is not dependent upon the control rod pattern, therefore this test requirement is not necessary.	3B
13	SR 3.1.9.3.B is reformatted from SR 4.1.3.1.4.a.2.	1
14	Testing of scram instrumentation of SR 4.1.3.1.4.b is moved to LCO 3.3.1.1.	1
15	Testing of rod block instrumentation of SR 4.1.3.1.4.b is relocated.	2

Grand Gulf Nuclear Station
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Revision Summary Sheet

Proposed LCO/Section: 3.1.9 Rev. 1 SDV Vent and Drain Valves

Item	Change Description	Category
16	Footnote "*" on page 3/4 1-5 is deleted. This provision is not needed if the scram requirement of 4.1.3.1.4.a is deleted.	3B

3.1 REACTIVITY CONTROL SYSTEMS

3.1.9 Scram Discharge Volume Vent and Drain Valves

LCO 3.1.9 All Scram Discharge Volume (SDV) vent and drain valves shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required SDV vent and drain valves inoperable.	A.1.1 Verify the redundant valve in the associated line is OPERABLE. OR A.1.2 ----------NOTE---------- Valves in an isolated line may be opened under administrative control to allow draining and venting of the SDV. ------------------------ Isolate the associated line. AND A.2 Restore inoperable valve(s) to OPERABLE status.	Immediately 8 hours 7 days
B. Required Actions and associated Completion Times of Condition A not met.	B.1 Be in MODE 3.	12 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.1.9.1	Verify each required SDV vent and drain valve is open.	31 days
SR 3.1.9.2	Cycle each required SDV vent and drain valve to the fully closed and fully open position.	92 days
SR 3.1.9.3	Demonstrate each required SDV vent and drain valve: A. Closes in ≤ 30 seconds after receipt of a simulated test signal or scram signal. B. Opens when the simulated test signal or scram signal is reset.	18 months

CROSS-REFERENCES: None

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.9 Scram Discharge Volume Vent and Drain Valves

BASES

BACKGROUND

The scram discharge volume (SDV) consists of header piping which connects to each hydraulic control unit (HCU) and drains into an instrument volume. The two sets of headers each receive approximately one-half of the CRD discharges. The scram discharge instrument volume (SDIV) is the low point of the header. The large diameter pipe of the SDIV thus serves as a vertical extension of the SDV (though no credit is taken for it in determining SDV requirements). The two instrument volumes are connected to a common drain line with two valves in series. Each header is connected to a common vent line with two valves in series also. The header piping is sized to receive and contain all the water discharged by the CRDs during a scram, independent of the SDIV. The SDV vent and drain valves are normally open and discharge any accumulated water in the SDV to ensure that sufficient volume is available at all times to allow a complete scram. During a scram, the SDV vent and drain valves close to contain reactor water. The design and functions of the SDV are described in Reference 1.

APPLICABLE SAFETY ANALYSES

The primary function of the SDV is to limit the amount of reactor coolant discharged during a scram. Isolation of the SDV can also be accomplished by manual (control switch) closure of the SDV valves. Additionally, the discharge of reactor coolant to the SDV can be terminated by scram reset or closure of the hydraulic control unit manual isolation valves. The SDV vent and drain valves also allow continuous drainage of the SDV during normal plant operation to ensure the SDV has sufficient capacity to contain the reactor coolant discharge during a full core scram. To automatically ensure this capacity, a reactor scram (LCO 3.3.1.1) is initiated if the SDV water level exceeds a specified setpoint. The setpoint is chosen such that all control rods are inserted before the SDV has insufficient volume to accept a full scram.

SDV Vent and Drain Valves satisfy Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 2.

(continued)

BASES (continued)

LCO

The OPERABILITY of all SDV vent and drain valves ensures during a scram the SDV vent and drain valves will close to contain reactor water discharged to the SDV piping. Since the vent and drain lines are provided with two valves in series, the single failure of one valve in the open position will not impair the isolation function of the system. Additionally, the valves are required to be open to ensure a path is available for the SDV piping to drain freely at all times.

APPLICABILITY

The SDV vent and drain valve requirements are applicable during MODES 1 and 2 since during these conditions the scram may be required. In MODES 3 and 4, control rods are only allowed to be withdrawn under Special Operations LCO 3.10.3 (Single Control Rod Withdrawal - Hot Shutdown) and LCO 3.10.4 (Single Control Rod Withdrawal - Cold Shutdown) which provide adequate controls to ensure only a single control rod can be withdrawn. Also, during MODE 5, only a single control rod can be withdrawn from a core cell containing fuel assemblies. Therefore, the reactor will remain subcritical under these conditions.

ACTIONS

A.1.1, A.1.2, A.2

With any SDV vent and/or drain valve inoperable (i.e. any combination of vent and drain valves) the isolation function of the SDV is not impaired if the redundant valve in the affected line is verified OPERABLE or the line is isolated. The redundant valve may be verified OPERABLE by an administrative check, examining logs or other information to determine if the required SDV vent or drain valves are out of service for maintenance or other reasons. This does not require performing surveillances needed to demonstrate OPERABILITY of the valves. Should a scram be required, the OPERABLE valve in the vent and drain path will close and contain the reactor water. If both valves in a line are inoperable in the open position, the line must be isolated to ensure the reactor coolant leakage past the control rod drive seals during a scram will be limited. During periods when one SDV vent and/or drain valve is inoperable and not in the closed position, the single failure criterion will not be preserved and the potential to allow reactor water out of the primary system during a scram exists. In addition, with a line isolated, the potential for an inadvertent scram due to high SDV level is increased. Therefore, only a limited time is allowed to restore the inoperable valves to OPERABLE status. As noted, with a line isolated, periodic draining of the SDV may be required. During these periods the valves in the line may be opened.

(continued)

BASES (continued)

ACTIONS (continued)

B.1

With any SDV vent or drain valve not restored to OPERABLE status and the associated Completion Time not met, the reactor must be in MODE 3 within 12 hours.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

SURVEILLANCE REQUIREMENTS

SR 3.1.9.1

During normal operation, the SDV vent and drain valves should be in the open position (except when performing SR 3.1.9.2) to allow for drainage of the SDV piping. Verifying each valve is in the open position ensures the SDV vent and drain valves will perform their intended function during normal operation.

SR 3.1.9.2

During a scram, the SDV vent and drain valves should close to contain the reactor water discharged to the SDV piping. Cycling each valve through its complete range of motion (closed and open) ensures the valve will function properly during a scram.

SR 3.1.9.3

SR 3.1.9.3 is an integrated test of the SDV vent and drain valves to demonstrate total system performance. After receipt of a simulated isolation test or scram signal, the closure and subsequent opening of the SDV vent and drain valves is verified.

Surveillance Frequencies

In general, surveillance frequencies are based on industry accepted practice and engineering judgement considering the unit conditions required to perform the test, the ease of performing the test and a likelihood of a change in the system/component status.

(continued)

BASES (continued)

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 4.6.1.1.2.4.2.6.

2. Letter, T. E. Murley (USNRC) to R. F. Janecek (BWROG), May 9, 1988.

CHAPTER 3.9

REFUELING OPERATIONS

CHAPTER 3.9
REFUELING OPERATIONS
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Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.9.1 Rev. 0 Refueling Equipment Interlocks

Item	Change Description	Category
1	LCO 3.9.1 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.1.	1
2	Reactor mode switch OPERABILITY is included as part of the OPERABILITY of the associated interlocks.	3B
3	Reactor mode switch position is dictated by the MODE definition table and is removed from this LCO.	3B
4	The one-rod-out interlock requirements (LCO 3.9.1 items a and b.1 and ACTION b) are moved to LCO 3.9.2.	1
5	The all-rods-in interlock is added.	3A+
6	The applicability is limited to when required for use.	3B
7	CONDITION A is reformatted from ACTION c.	1
8	ACTION a is deleted. (See Item 3.)	3B
9	Footnote '*' to page 3/4 9-1 is deleted. References to Special Test Exceptions are not made in individual specificatons in the Improved Tech Specs.	1
10	Footnote '#' to page 3/4 9-1 is deleted. This requirement is adequately covered by the MODE definition table.	1
11	Footnote '##' is deleted.	4
12	SR 3.9.1.1 is developed from SR 4.9.1.2. The frequency conditions, other than 7 days, are deleted.	3B
13	A CROSS REFERENCE is added.	1
14	SR 4.9.1.1 is deleted. Mode switch position is controlled by the MODE definition table and is not included as a surveillance.	3B
15	SR 4.9.1.3 is deleted. Post maintenance surveillance requirements are not explicitly defined in the Improved Tech Specs.	3B

3.9 REFUELING OPERATIONS

3.9.1 Refueling Equipment Interlocks

LCO 3.9.1 The following Refueling Equipment Interlocks shall be OPERABLE:

A. All-rods-in.
B. Refuel platform position.
C. Refuel platform main hoist fuel-loaded.

APPLICABILITY: MODE 5 when handling fuel assemblies over the reactor vessel using equipment associated with the interlocks.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the required Refueling Equipment Interlocks inoperable.	A.1 Suspend CORE ALTERATIONS with equipment associated with the inoperable interlock.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.1.1	Perform a CHANNEL FUNCTIONAL TEST.	7 days

CROSS-REFERENCES

TITLE	NUMBER
Single Control Rod Drive Removal - Refueling	3.10.5

B 3.9 REFUELING OPERATIONS

B 3.9.1 Refueling Equipment Interlocks

BASES

BACKGROUND

Refueling interlocks restrict the movement of control rods and the operation of the refueling equipment to reinforce operational procedures to prevent the reactor from achieving criticality during refueling operations.

The refueling interlock circuitry senses the condition of the refueling equipment and the control rods. Depending on the sensed condition, interlocks are actuated to prevent the movement of the refueling equipment or withdrawal of control rods (control rod block). Instrumentation is provided to sense the refueling platform position, refueling platform main hoist condition (fuel loaded) and whether all control rods are fully inserted. With the Reactor Mode switch in the Refuel position, the indicated conditions are combined in logic circuits to determine if all restrictions on refueling equipment operations and control rod movement are satisfied.

The refueling interlocks prevent operation of the refueling equipment (when fuel loaded) over the core whenever any control rod is withdrawn and also prevent control rod withdrawal whenever refueling equipment (fuel loaded) is over the core (Ref. 1).

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The refueling interlocks are explicitly assumed in the FSAR analysis for the Control Rod Removal Error During Refueling (Ref. 2) These analyses evaluate the consequences of control rod withdrawal during refueling and also fuel assembly insertion with a control rod withdrawn. A reactivity excursion during refueling could potentially result in fuel failure with subsequent release of radioactive material to the environment. Criticality is prevented during the insertion of fuel, provided all control rods are fully inserted during the fuel insertion. The refueling interlocks accomplish this by preventing loading of fuel into the core with any control rod withdrawn.

Refueling Equipment Interlocks satisfy the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 3.

LCO

To prevent criticality during refueling, the refueling interlocks ensure that fuel assemblies are not loaded with any control rod withdrawn. To prevent these conditions from developing, the all-rods-in, refueling platform position and refueling platform main hoist fuel loaded interlocks are required OPERABLE. These interlocks provide equipment and control rod blocks to prevent operations that could result in criticality during refueling operations.

APPLICABILITY

The refueling interlocks provide protection against inadvertent criticality during MODE 5. The interlocks are only required to be OPERABLE when the refueling equipment is being used to handle fuel over the reactor vessel. In all other MODES, the refueling interlocks are not required to be OPERABLE. During these other conditions, the Reactor Protection System Instrumentation (LCO 3.3.1.1), Control Rod Block Instrumentation (LCO 3.3.2.1) and Control Rod OPERABILITY (LCO 3.1.2) provide mitigation of potential reactivity excursions.

(continued)

BASES (continued)

ACTIONS

A.1

With any of the required refueling equipment interlocks inoperable, performance of CORE ALTERATIONS with the affected refueling equipment should be immediately suspended. This action ensures that operations are not performed with equipment that would potentially not be blocked from unacceptable operations (e.g., loading fuel into a cell with a withdrawn control rod). Suspension of CORE ALTERATIONS shall not preclude completion of the movement of a component to a safe conservative position. CORE ALTERATIONS normally performed with other equipment not affected by these refueling interlocks is not prohibited.

SURVEILLANCE REQUIREMENTS

SR 3.9.1.1

Performance of a CHANNEL FUNCTIONAL TEST demonstrates the associated refueling interlock will function properly when a simulated or actual signal indicative of a required condition is injected into the logic. The CHANNEL FUNCTIONAL TEST may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is tested. Operating experience has demonstrated that a seven day frequency for this surveillance is adequate.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 7.6.2.1.1.

2. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.

3. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

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Revision Summary Sheet

Proposed LCO/Section: 3.9.2 Rev. 1 One-Rod-Out Interlock

Item	Change Description	Category
1	LCO 3.9.2 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.1.a.	1
2	The applicability is limited to when the mode switch is in Refuel with any control rod withdrawn.	3B
3	CONDITION A is developed from ACTION b. The mode switch does not have to be locked in the Shutdown position as per ACTION b.	3B
4	SR 3.9.2.1 is developed from SR 4.9.1.2. The 7 day frequency is retained. The requirement to perform the SR within 24 hours prior to start of control rod withdrawal or CORE ALTERATIONS is changed to within one hour of withdrawal of the first control rod.	3B
5	SR 4.9.1.3 is deleted. Post maintenance surveillance requirements are not explicitly included in the Improved Tech Specs.	3B
6	CROSS REFERENCES are added.	1
7	LIMITING CONDITION FOR OPERATION 3.9.1.b.1 is deleted.	3B

3.9 REFUELING OPERATIONS

3.9.2 **Refuel Position One-Rod-Out Interlock**

LCO 3.9.2 The Refuel position one-rod-out interlock shall be OPERABLE.

APPLICABILITY: MODE 5 with the Reactor Mode Switch in the Refuel position and any control rod withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Refuel position one-rod-out interlock inoperable.	A.1 Suspend control rod withdrawal.	Immediately
	AND	
	A.2 Fully insert all insertable control rods in core cells containing one or more fuel assemblies.	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.9.2.1 Perform a CHANNEL FUNCTIONAL TEST.	-----NOTE----- Within 1 hour of withdrawal of the first control rod ------------- 7 days

CROSS-REFERENCES

TITLE	NUMBER
Single Control Rod Withdrawal - Hot Shutdown	3.10.3
Single Control Rod Withdrawal - Cold Shutdown	3.10.4
Single Control Rod Drive Removal - Refueling	3.10.5

B 3.9 REFUELING OPERATIONS

B 3.9.2 **Refuel Position One-Rod-Out Interlock**

BASES

BACKGROUND

Refueling interlocks restrict the movement of control rods and the operation of the refueling equipment to reinforce operational procedures which prevent the reactor from becoming critical during refueling operations. During refueling operations, for all core cells within the reactor that contain one or more fuel assemblies, no more than one control rod can be withdrawn from the core. This is enforced by a logic circuit consisting of redundant channels that uses the all-rods-in signal (which receives input from the control rod full in position inputs) and a rod selection signal to prevent the selection of a second control rod for movement when any other control rod is not fully inserted (Ref. 1).

APPLICABLE SAFETY ANALYSES

The refueling one-rod-out interlock is explicitly assumed in the FSAR analysis for the Control Rod Removal Error During Refueling (Ref. 2). This analysis, which takes credit for the OPERABILITY of the one-rod-out interlock, concludes that there are no radiological consequences of a control rod withdrawal during refueling. The Refuel position one-rod-out interlock prevents the withdrawal of more than one control rod. This, together with the requirements for adequate SHUTDOWN MARGIN (LCO 3.1.1), prevents inadvertent criticality. With only one control rod withdrawn, the core will remain subcritical.

Refuel Position One-Rod-Out Interlock satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 3.

(continued)

BASES (continued)

LCO

To prevent criticality during MODE 5, the Refuel position one-rod-out interlock ensures no more than one control rod may be withdrawn. To prevent this condition from developing, both channels of the Refuel Position one-rod-out interlock are required to be OPERABLE.

APPLICABILITY

The Refuel position one-rod-out interlock provides protection against inadvertent criticality only when the Reactor Mode Switch is in the Refuel position. With the Reactor Mode Switch in other positions, the Refuel position one-rod-out interlock is bypassed and not required to be OPERABLE. During these conditions, the Reactor Protection System (LCO 3.3.1.1) and Control Rod OPERABILITY (LCO 3.1.2) provide mitigation of potential reactivity excursions. With the Reactor Mode Switch in the Shutdown position, all control rods are inserted and a control rod block (LCO 3.3.2.1) prevents control rod withdrawal, thereby preventing criticality during refueling or shutdown conditions.

ACTIONS

A.1, A.2

With the one-rod-out interlock inoperable the refueling interlocks may not be capable of preventing more than one control rod from being withdrawn. These conditions may lead to criticality and therefore control rod withdrawal must be suspended and any control rod withdrawn from core cells that contain one or more fuel assemblies must be fully inserted as soon as practicable. Control rods in core cells containing no fuel assemblies have a negligible affect on the reactivity of the core and therefore do not have to be inserted. The Completion Time of "as soon as practicable" is provided to allow some judgement to determine the quickest and safest method to complete the Required Action or restore compliance with the LCO. In general, under these conditions only a single control rod will be withdrawn from a core cell containing one or more fuel assemblies.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.9.2.1

Performance of a CHANNEL FUNCTIONAL TEST demonstrates the associated Refuel position one-rod-out interlock will function properly when a simulated or actual signal indicative of a required condition is injected into the logic. The CHANNEL FUNCTIONAL TEST may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is tested. An allowance is provided to withdraw a single control rod for the purpose of testing the interlocks. Operating experience has demonstrated that a seven day frequency for this surveillance is adequate.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 7.6.1.1.
2. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.
3. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

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Proposed LCO/Section: 3.9.3 Rev. 0 Control Rod Position

Item	Change Description	Category
1	LCO 3.9.3 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.3.	1
2	The applicability is revised to be during fuel loading.	3B
3	CONDITION A is based upon the ACTION statement. Instead of suspending CORE ALTERATIONS, only fuel loading must be stopped.	3B
4	SR 3.9.3.1 is reformatted from SR 4.9.3.b.	1
5	SR 4.9.3.a is deleted. SR 4.9.3.b and the one-rod-out interlock are considered adequate to fulfill the LCO conditions.	3B
6	Footnote '*' to page 3/4 9-5 is deleted. LCOs 3.9.10.1 and 3.9.10.2 have been moved to LCOs 3.10.5 and 3.10.6. References to Special Operations are not made in individual specifications in the Improved Tech Specs.	1
7	Footnote '**' to page 3/4 9-5 is deleted. References to Special Test Exceptions are not included in individual specifications in the Improved Tech Specs.	1

3.9 REFUELING OPERATIONS

3.9.3 Control Rod Position

LCO 3.9.3 All control rods shall be fully inserted.

APPLICABILITY: When loading fuel assemblies into the core and not following an approved spiral reload sequence.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. All control rods not fully inserted.	A.1 Suspend loading fuel assemblies into the core.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.3.1	Verify all control rods are fully inserted.	12 hours

CROSS-REFERENCES: None

B 3.9 REFUELING

B 3.9.3 **Control Rod Position**

BASES

BACKGROUND

Control rods provide the capability to maintain the reactor subcritical under all conditions and to limit the potential amount and rate of reactivity increase caused by a malfunction in the CRD system. During refueling, movement of control rods is limited by the refueling interlocks (LCO 3.9.1 and 3.9.2) or the control rod block function of the Reactor Mode Switch Shutdown position (LCO 3.3.2.1). Multiple control rods may be withdrawn as allowed in LCO 3.10.6, however, it is necessary to preclude loading fuel assemblies into the core during a fuel shuffle or to follow fuel loading sequences specifically designed to minimize the probability of criticality during refueling to prevent an inadvertent criticality. Requiring all control rods to be inserted when loading fuel assemblies into the core during a fuel shuffle provides this protection.

APPLICABLE SAFETY ANALYSES

Prevention and mitigation of inadvertent criticality during refueling is provided by refueling interlocks (LCO 3.9.1 and 3.9.2), SHUTDOWN MARGIN (LCO 3.1.1), Intermediate Range Monitor (IRM) neutron flux scram (LCO 3.3.1.1), Average Power Range Monitor (APRM) neutron flux scram (LCO 3.3.1.1) and control rod block instrumentation (LCO 3.3.2.1). Explicit safety analyses in the FSAR (Ref. 1) only assume the functioning of the refueling interlocks and adequate SHUTDOWN MARGIN. However, the control rod Full In position inputs are allowed to be simulated in accordance with LCO 3.10.6 if all fuel assemblies are removed from the associated core cell. With more than one control rod Full In position input simulated, the control rods could be withdrawn and the refueling interlocks would not prevent fuel loading. Therefore, prior to fuel reload, all control rods must be fully inserted to ensure an inadvertent criticality does not occur consistent with the analysis of Reference 1. An exception to this requirement is allowed if fuel is being loaded in an approved spiral reload sequence that does not use a complete set of blade guides. The approved spiral reload sequence typically involves reloading such that fuel is always being loaded on the periphery of the fueled zone. During the spiral reloading, all control rods in core cells containing fuel are fully inserted and the control rod in the next cell to be loaded is

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

fully inserted. This minimizes the reactivity insertion of each loaded fuel assembly and greatly reduces the probability of a reactivity excursion.

Control Rod Position satisfies the requirements of Selection Criterion 2 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 2.

LCO

All control rods must be fully inserted during a fuel reload not following an approved spiral reload sequence to prevent an inadvertent criticality during refueling.

APPLICABILITY

Loading fuel into core cells with the associated control rods withdrawn may result in inadvertent criticalities during refueling. Therefore, prior to loading fuel into a core cell, the associated control rod must be inserted. To ensure that a fuel loading error does not result in loading fuel into a core cell with the associated control rod withdrawn, all control rods must be inserted prior to loading fuel. This requirement is not applicable when fuel is being loaded while following an approved spiral reload sequence which is specifically designed to minimize the probability of an inadvertent criticality.

ACTIONS

A.1

With all control rods not fully inserted during the applicable conditions, an inadvertent criticality could occur that is not analyzed in the FSAR. All fuel loading operations must be immediately suspended. All control rods would have to be fully inserted before resuming fuel loading operations. Suspension of these activities shall not preclude the completion of movement of a component to a safe, conservative position.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.9.3.1

During refueling, to ensure the reactor remains subcritical, all control rods must be fully inserted prior to and during fuel loading. Periodic checks of the control rod position ensures this condition is maintained. Operating experience had demonstrated that a 12 hour frequency for this surveillance is adequate.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.

2. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

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Revision Summary Sheet

Proposed LCO/Section: 3.9.4 Rev. 1 Control Rod Position Indication

Item	Change Description	Category
1	DELETED	
2	DELETED	
3	DELETED	
4	DELETED	
5	DELETED	
6	DELETED	

NOTE: Section 3.9.4 has been deleted per CRS 111.

3.9 REFUELING OPERATIONS

3.9.4 Section Deleted

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B 3.9.4 Section Deleted

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Revision Summary Sheet

Proposed LCO/Section: 3.9.5 Rev. 0 Control Rod OPERABILITY

Item	Change Description	Category
1	LCO 3.9.5 is reformatted from LIMITING CONDITIONS FOR OPERATION 3.1.3.1, 3.1.3.4 and 3.1.3.3.	1
2	The applicability is limited to control rods withdrawn from a cell containing fuel.	3B
3	CONDITION A is provided to address inoperability actions.	3B
4	SR 3.9.5.1 is reformatted from SR 4.1.3.1.2.a.	1
5	SR 3.9.5.2 is reformatted from SR 4.1.3.3.a.	1
6	CROSS REFERENCES are added.	1

3.9 REFUELING OPERATIONS

3.9.5 Control Rod OPERABILITY - Refueling

LCO 3.9.5 Each control rod withdrawn from a core cell containing one or more fuel assemblies shall be OPERABLE.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required control rods inoperable.	A.1 Fully insert inoperable control rods.	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.5.1	Insert each required withdrawn control rod at least one ~~each~~ notch.	7 days
SR 3.9.5.2	Verify each required control rod scram accumulator pressure is ≥ 1520 psig.	7 days

CROSS-REFERENCES

TITLE	NUMBER
Single Control Rod Withdrawal - Hot Shutdown	3.10.3
Single Control Rod Withdrawal - Cold Shutdown	3.10.4
Single control Rod Drive Removal - Refueling	3.10.5

B 3.9 REFUELING

B 3.9.5 **Control Rod OPERABILITY - Refueling**

BASES

BACKGROUND

Control rods are components of the Control Rod Drive (CRD) system, which is the primary reactivity control system for the reactor. In conjunction with the Reactor Protection System (RPS), the CRD system provides the means for the reliable control of reactivity changes during normal operation and during anticipated abnormal events. In addition, the control rods provide the capability to maintain the reactor subcritical under all conditions and to limit the potential amount and rate of reactivity increase, including those caused by a malfunction in the CRD system.

APPLICABLE SAFETY ANALYSES

Prevention and mitigation of inadvertent criticality during refueling is provided by refueling interlocks (LCO 3.9.1 and 3.9.2), SHUTDOWN MARGIN (LCO 3.1.1), Intermediate Range Monitor (IRM) neutron flux scram (LCO 3.3.1.1), Average Power Range Monitor (APRM) neutron flux scram (LCO 3.3.1.1) and control rod block instrumentation (LCO 3.3.2.1). Explicit safety analyses in the FSAR (Ref. 1) only assume the functioning of the refueling interlocks and adequate SHUTDOWN MARGIN. Control rod scram provides backup protection should an inadvertent criticality occur.

Control rod OPERABILITY - Refueling satisfies the requirements of Selection Criterion 3 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 2.

LCO

Each control rod withdrawn from a core cell containing one or more fuel assemblies must be OPERABLE. The control rod is considered OPERABLE if the associated CRD scram accumulator is properly charged and the withdrawn control rod is capable of insertion upon receipt of a scram signal. Inserted control rods have already completed their reactivity control function. Control rods withdrawn from control cells which do not contain fuel assemblies have a negligible impact on reactivity control an are therefore not required to be OPERABLE.

(continued)

BASES

APPLICABILITY

During MODE 5, control rods withdrawn from a core cell containing one or more fuel assemblies must be OPERABLE to ensure during a scram, the control rods will insert and provide the required negative reactivity to maintain the reactor subcritical. Control rod requirements in MODES 1 and 2 are located in LCOs 3.1.2, 3.1.3, 3.1.4 and 3.1.5.

ACTION STATEMENTS

A.1

With a required control rod inoperable, the control rod must be fully inserted as soon as practicable. Inserting the control rod ensures the shutdown and scram capabilities are not adversely affected since inserted control rods have completed their required reactivity control function.

SURVEILLANCE REQUIREMENTS

SR 3.9.5.1, SR 3.9.5.2

During MODE 5, the OPERABILITY of control rods is primarily required to ensure a withdrawn control rod will automatically insert if a signal requiring a reactor shutdown occurs. Because no explicit analyses exist for automatic shutdown during refueling, the shutdown function is considered satisfied if the associated CRD scram accumulator is properly charged and the withdrawn control rod is capable of insertion. Operating experience has demonstrated that the seven day frequency for these surveillances is adequate.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.

2. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

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Proposed LCO/Section: 3.9.6 Rev. 1 Water Level - RPV

Item	Change Description	Category
1	LCO 3.9.6 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.8.	1
2	The ACTION, applicability and SR 4.9.8 are revised to relocate the control rod restrictions. The movement of control rods is relocated to administrative controls on movement of non-fuel loads over irradiated fuel.	2
3	CONDITION A is reformatted from the ACTION statement.	1
4	SR 3.9.6.1 is reformatted from SR 4.9.8.	1
5	The 2 hour condition in SR 4.9.8 is relocated. If the surveillance has not been performed within 24 hours, fuel movement cannot begin.	4
6	CROSS REFERENCES are added.	1

3.9 REFUELING OPERATIONS

3.9.6 <u>Water Level - Reactor Pressure Vessel</u>

LCO 3.9.6 Water level shall be ≥ 22'8" over the top of the Reactor Pressure Vessel (RPV) flange.

APPLICABILITY: MODE 5,
When handling irradiated fuel assemblies over or within the RPV,
When handling fuel assemblies over or within the RPV with irradiated fuel assemblies seated within the RPV.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Water level < 22'8" over the top of the RPV flange.	A.1 Suspend handling fuel assemblies over or within the RPV after placing the fuel assemblies in a safe condition	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.6.1	Verify water level in the RPV is ≥ 22'8" over the top of the RPV flange.	24 hours

CROSS-REFERENCES

TITLE	NUMBER
ECCS - Shutdown	3.5.2
Residual Heat Removal - High Water Level	3.9.8
Residual Heat Removal - Low Water Level	3.9.9

B 3.9 REFUELING OPERATIONS

B 3.9.6 Water Level - Reactor Pressure Vessel

BASES

BACKGROUND

Fuel movement and reactor servicing operations that consist of handling various loads such as fuel assemblies, control rods, fuel channels or other reactor equipment are performed within the Reactor Pressure Vessel (RPV), during refueling, from platforms above the RPV cavity. The water level of 22'8" above the RPV flange provides a level greater than the required 23' above the top of the core, assumed in the fuel handling accident analyses. The specific value of 22'8" was selected to be consistent with plant design and LCOs 3.9.8 and 3.9.9. In addition, maintaining this water level will provide minimum water shielding, to maintain exposure ALARA, over an irradiated fuel assembly during transit with the fuel grapple in its fully retracted position.

APPLICABLE SAFETY ANALYSES

A depth of 23' of water above the damaged fuel is an explicit assumption of the fuel handling accident (Ref. 1). A fuel handling accident is evaluated to ensure the radiological consequences (calculated whole-body and thyroid doses at the exclusion area and low population zone boundaries) are ≤ 25% of the 10 CFR Part 100 exposure guidelines (Ref. 2). A fuel handling accident could release a fraction of the fission product inventory by breaching the fuel rod cladding (Ref. 3). The 23' of water above the damaged elements is assumed in the fuel handling accident analysis (Ref. 1) and provides for decontamination of the fission products which must pass through the water before being released to the containment atmosphere. This decontamination reduces the potential radioactivity of the release during a fuel handling accident.

Water Level - Reactor Pressure Vessel satisfies the requirements of Selection Criterion 2 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 4.

LCO

A depth of ≥ 22'8" of water over the top of the RPV flange exceeds the 23' of water required to ensure that adequate decontamination of the fission products is available so offsite doses will meet the acceptance criteria of Reference 2 in the event of a fuel handling accident within the RPV. This depth also ensures that radiation exposures are maintained ALARA during the handling of irradiated fuel.

(continued)

BASES (continued)

APPLICABILITY

A fuel handling accident within the RPV is postulated to occur only during MODE 5 when operations requiring handling of fuel assemblies in or over the RPV are performed. During other conditions, handling of fuel within or over the RPV is not possible and therefore the fuel handling accident is not a concern. Requirements for fuel handling accidents in the Spent Fuel and Upper Containment Fuel Storage Pools are covered by LCO 3.9.7.

ACTION STATEMENTS

A.1

With inadequate water above the RPV flange, all handling of fuel assemblies must be suspended immediately. Suspending further movement of fuel assemblies reduces the possibility of a fuel handling accident from an unanalyzed condition. Suspension of fuel handling shall not preclude completion of movement to a safe, conservative position.

SURVEILLANCE REQUIREMENTS

SR 3.9.6.1

The minimum required water level, 22'8", above the top of the RPV flange is verified periodically to ensure the decontamination factor assumptions of the fuel handling accident analysis are maintained so that if the fuel handling accident occurs, radiation exposures will be maintained ≤ 25% of the limits specified in 10 CFR Part 100. Operating experience has demonstrated that the 24 hour frequency for this surveillance is adequate.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 15.7.6.
2. NRC Standard Review Plan 15.7.4.
3. NRC Regulatory Guide 1.25.
4. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

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Proposed LCO/Section: 3.9.7 Rev. 1 Water Level - Spent Fuel and Upper Containment Fuel Pools

Item	Change Description	Category
1	LCO 3.9.7 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.9.	1
2	CONDITION A is reformatted from the ACTION statement.	1
3	DELETED	
4	SR 3.9.7.1 is reformatted from SR 4.9.9.	1

3.9 REFUELING OPERATIONS

3.9.7 <u>Water Level - Spent Fuel And Upper Containment Fuel Storage Pools</u>

LCO 3.9.7 Water level shall be ≥ 23' ~~feet~~ over the top of irradiated fuel assemblies seated in the Spent Fuel and Upper Containment Fuel Storage Pool racks.

APPLICABILITY: When irradiated fuel assemblies are stored in the Spent Fuel or Upper Containment Fuel Storage Pools.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Water level < 23' ~~feet~~ over the top of irradiated fuel assemblies in the Spent Fuel and Upper Containment Fuel Storage Pool racks.	A.1 ----------NOTE---------- Provisions of LCO 3.0.3 are not applicable. ------------------------ Suspend all movement of fuel assemblies in the Spent Fuel or Upper Containment Fuel Storage Pools, as applicable. <u>AND</u> A.2 Suspend all crane operations with loads over irradiated fuel assemblies in the Spent Fuel or Upper Containment Fuel Storage Pools, as applicable.	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.7.1	Verify water level is > 23' ~~feet~~ over the top of irradiated fuel assemblies seated in the Spent Fuel and Upper Containment Fuel Storage Pool racks.	7 days

CROSS-REFERENCES: None

B 3.9 REFUELING OPERATIONS

B 3.9.7 <u>Water Level - Spent Fuel and Upper Containment Fuel Storage Pools</u>

<u>BASES</u>

BACKGROUND

The spent fuel storage racks in the Spent Fuel and Upper Containment Fuel Storage Pools store irradiated fuel assemblies received from the reactor pressure vessel (RPV). Refueling operations consist of handling various loads such as fuel assemblies, control rods, fuel channels and reactor servicing equipment over the fuel assemblies stored in the Spent Fuel and Upper Containment Fuel Storage Pool racks. The water level above the top of the stored fuel in the Spent Fuel and Upper Containment Fuel Storage Pools is maintained at a depth of 23 feet to provide adequate radiological shielding for radiation protection under normal and accident conditions.

APPLICABLE SAFETY ANALYSES

The water level above the irradiated fuel assemblies is an implicit assumption of the fuel handling accident (Ref. 1). A fuel handling accident is evaluated to ensure the radiological consequences (calculated whole-body and thyroid doses at the exclusion area and low population zone boundaries) are $\leq$ 25% of the 10 CFR 100 exposure guidelines (Ref. 2). A fuel handling accident could release a fraction of the fission product inventory by breaching the fuel rod cladding (Ref. 3). The water level in the Spent Fuel and Upper Containment Fuel Storage Pools provides for decontamination of the fission products which must pass through the water before being released to the Primary and Secondary Containment atmosphere. This decontamination reduces the potential radioactivity of the release during a fuel handling accident.

Water Level - Spent Fuel and Upper Containment Fuel Storage Pools satisfies the requirements of Selection Criterion 2 of the NRC Interim Policy Statement on Technical Specification Improvements as documented in Reference 4.

LCO~~s~~

A depth of $\geq$ 23' ~~feet~~ of water over the top of the stored spent fuel is required to ensure adequate decontamination is provided so offsite doses will meet the acceptance criteria of Reference 3 in the event of a fuel handling accident in the Spent Fuel and Upper Containment Fuel Storage Pools.

(continued)

BASES (continued)

APPLICABILITY A fuel handling accident is postulated to occur whenever loads are being handled over irradiated fuel assemblies that are being stored in the Spent Fuel or Upper Containment Fuel Storage Pools.

ACTION STATEMENTS

A.1, A.2

With inadequate water above the spent fuel, all movement of fuel assemblies within the Spent Fuel or Upper Containment Fuel Storage Pools must be suspended as soon as practicable. Also, with inadequate water above the spent fuel, all crane operations with loads over irradiated fuel assemblies in the spent fuel or upper containment fuel storage pools must be suspended as soon as practicable. Suspending further movement of fuel assemblies and loads precludes the possibility of a fuel handling accident occurring from an unanalyzed condition. Suspension of fuel and load handling shall not preclude completion of the movement to a safe, conservative position.

SURVEILLANCE REQUIREMENTS

SR 3.9.7.1

The minimum required water level, 23' ~~feet~~ above the top of the stored spent fuel, is verified periodically to ensure that the water soluble fission product gases removal assumptions of the fuel handling accident analyses (Ref. 1) are maintained so that if the fuel handling accident occurs, radiation exposure will be maintained $\leq$ 25% of the limits specified in 10 CFR Part 100. Operating experience has demonstrated that the 7 day frequency for this surveillance is adequate.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Sections 15.7.4 and 15.7.6.
2. NRC Standard Review Plan 15.7.4.
3. NRC Regulatory Guide 1.25.
4. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.9.8 Rev. 1 RHR - High Water Level

Item	Change Description	Category
1	LCO 3.9.8 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.11.1.	1
2	Details of system operability requirements are relocated to the Bases.	2
3	The applicability is revised to delete the irradiated fuel condition (since the definition of MODE 5 covers it) and to require RHR SDC only when decay heat removal capability is necessary to maintain the MODE 5 temperature limit.	3B
4	CONDITIONS A and B are reformatted from ACTION a except as discussed below.	1
5	The restoration time in CONDITION A is increased to 8 hours from 1 hour based upon the inherent heat sink available at the high water level condition.	3B
6	The methods by which alternate methods of decay heat removal are controlled are relocated.	2
7	ACTION a allowed 4 hours to establish SECONDARY CONTAINMENT INTEGRITY. CONDITION B requires the secondary containment to be OPERABLE ~~integrity to be established~~ as soon as practicable.	3A
8	ACTION b is deleted. Action no longer applicable (see Item 10).	1
9	Footnote '#' to page 3/4 9-18 is deleted.	4
10	LCO 3.9.11.1 requires the RHR SDC to be in operation. LCO 3.9.8 requires the subsystem to be OPERABLE, but not necessarily in operation. The intent of the LCO is to ensure the MODE 5 temperature limit can be maintained. This can be assured with one OPERABLE RHR SDC subsystem in either continuous operation or operating intermittently as required.	3B
11	SR 3.9.8.1 replaces SR 4.9.11.1. The 7 day frequency is based upon ECCS surveillance intervals.	3B
12	CROSS REFERENCES are added.	1
13	Footnote '*' to page 3/4 9-18 is deleted based upon the revision to the LCO (see Item 10).	1

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.9.8 Rev. 1 RHR - High Water Level

Item	Change Description	Category
14	Footnote '**' to page 3/4 9-18 is deleted as it is no longer applicable.	1
15	Required Actions B.3 and B.4 are added since the definition of secondary contianment Integrity has been deleted. The completion time has been changed from 4 hours to as soon as practicable.	3A+
16	Required Action B.5 is added to provide action to take when an alternate decay heat removal method is not provided within the 8 hour completion time of ACTION A.1.	3A+

3.9 REFUELING OPERATIONS

3.9.8 Residual Heat Removal - High Water Level

LCO 3.9.8 One Residual Heat Removal (RHR) shutdown cooling subsystem shall be OPERABLE.

APPLICABILITY: MODE 5 with water level ≥ 22'8" over the top of the RPV flange and heat losses to ambient not sufficient to maintain average reactor coolant temperature ≤ 140°F.

---NOTE---
Provisions of LCO 3.0.4 are not applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. No RHR shutdown cooling subsystem OPERABLE.	A.1 Provide an alternate method capable of decay heat removal.	8 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Suspend operations that could increase reactor decay heat load.	Immediately
	AND	
	B.2 Establish SECONDARY CONTAINMENT INTEGRITY.	As soon as practicable
	AND	
	B.3 Provide an alternate method capable of decay heat removal.	As soon as practicable

Replace With Insert 1

INSERT 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of of Condition A not met.	B.1 Suspend operations that could increase reactor decay heat load.	Immediately
	AND	
	B.2 Ensure Secondary Containment is OPERABLE.	As soon as practicable
	AND	
	B.3 Ensure the SGTS is in compliance with the requirements of Specification 3.6.4.3.	As soon as practicable
	AND	
	B.4 Ensure Secondary Containment Isolation Valves are in compliance with the requirements of Specification 3.6.4.2 and Secondary Containment Actuation Instrumentation is in compliance with the requirements of Specification 3.3.6.2.	As soon as practicable
	AND	
	B.5 Provide an alternate method capable of decay heat removal.	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.9.8.1	Verify for the required RHR shutdown cooling subsystem each manual, power operated, or automatic valve in a flow path not locked, sealed or otherwise secured in position, is in the correct position or is capable of being manually aligned in the correct position.	7 days

CROSS-REFERENCES

TITLE	NUMBER
Secondary Containment ~~Isolation~~ Actuation Instrumentation	3.3.6.2
ECCS - Shutdown	3.5.2
Secondary Containment	3.6.4.1
Secondary Containment Isolation Valves	3.6.4.2
Standby Gas Treatment System	3.6.4.3

B 3.9 REFUELING OPERATIONS

B 3.9.8 Residual Heat Removal - High Water Level

BASES

BACKGROUND

Refueling operations in the secondary containment are performed by personnel working above the reactor pressure vessel (RPV) cavity. The irradiated fuel in the RPV generates decay heat which is transferred to the reactor coolant and building air in the vicinity of the surface of the water in the reactor cavity. OPERABLE subsystems are therefore required for removing this decay heat to maintain the temperature of reactor coolant such that personnel can perform refueling operations inside the secondary containment. The subsystems may also be required to prevent the onset of boiling in the reactor vessel with resulting loss of visual clarity, possibility of fission product release into the building environment, and degradation of fuel cooling ability.

Each of the two shutdown cooling loops of the Residual Heat Removal (RHR) system can provide the required decay heat removal. Both loops have a common suction from the same recirculation loop. Each pump discharges the reactor coolant, after it has been cooled by circulation through the respective heat exchangers, to the reactor via separate return paths. The RHR heat exchangers transfer heat to the Standby Service Water System (LCO 3.7.2). The RHR shutdown cooling mode is a manually controlled system.

In addition to the RHR shutdown cooling subsystems, the volume of water above the RPV flange provides a heat sink for decay heat removal.

APPLICABLE SAFETY ANALYSES

Decay heat removal by operation of a shutdown cooling mode of the RHR system or any other method (e.g. volume of water above the RPV flange) is not required for mitigation of any transients or accidents evaluated for refueling in the safety analyses. However, the NRC Interim Policy Statement (Ref. 1) requires the Shutdown Cooling Subsystem of the RHR system be retained in the Technical Specifications even though none of the selection criteria were satisfied (Ref. 2).

(continued)

BASES (continued)

LCO

During MODE 5 with water level ≥ 22'8" above the RPV flange, one RHR shutdown cooling subsystem is required to be OPERABLE. Only one subsystem is required because the volume of water above the RPV flange provides the required redundant decay heat removal capability. An OPERABLE RHR shutdown cooling subsystem consists of one RHR pump, one heat exchanger train and the associated piping and valves. Additionally, each shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in a shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required.

APPLICABILITY

In MODE 5, the irradiated fuel in the RPV generates decay heat that may cause an increase in the temperature of the reactor coolant and the environment around the RPV. OPERABILITY of a decay heat subsystem is therefore required. When heat losses to the ambient are sufficient to remove the decay heat, no residual heat removal systems are required. Decay heat removal requirements in MODES 3 and 4 are located in LCO 3.4.7. Decay heat removal requirements in MODE 5 when the water level is < 22'8" above the RPV flange are located in LCO 3.9.9.

ACTIONS

A.1

With no RHR Shutdown Cooling Subsystem OPERABLE, the volume of water above the RPV flange provides adequate capability to remove decay heat from the reactor core for a time sufficient for alternate methods to be placed in service. Therefore, a limited time is allowed to provide for an alternate method capable of decay heat removal, or to restore at least one RHR shutdown cooling system to OPERABLE, such that adequate decay heat removal is available if needed.

(continued)

BASES

ACTIONS (continued)

B.1, B.2, B.3, B.4, B.5

If an alternate method cannot be provided and the associated Completion Time is not met, all operations that can potentially increase reactor decay heat generation (e.g. loading irradiated fuel bundles in the core) shall be suspended to preclude increasing the amount of heat being added to the reactor coolant. Actions are also taken to provide means for control of potential radioactive releases. ~~This includes ensuring SECONDARY CONTAINMENT INTEGRITY is established~~. Ensuring the OPERABLE status of the components involves administrative checks, such as examining logs or other information, to determine if the components are out of service for maintenance or other reasons. It does not required performing surveillances needed to demonstrate the OPERABILITY of the components. If however, any required component is inoperable, then it must be restored to OPERABLE status. In this case, surveillance requirements may need to be performed to restore the component to OPERABLE status. Additionally, actions must continue to establish an alternate decay heat removal method as soon as practicable.

ADD INSERT 2.

SURVEILLANCE REQUIREMENTS

SR 3.9.8.1

Verification that all valves of the required RHR shutdown cooling subsystems are in the correct position ensures a proper flow path. Valves not in the correct position must be capable of manual realignment either from the control room or at the valve location. Verification of proper alignment is provided by observation, examining logs or other information.

REFERENCES

1. 52FR3788, Commission Policy Statement on Technical Specification Improvements for Nuclear Power Reactors, February 6, 1987.

2. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment, "November 1987.

INSERT 2

This includes ensuring Secondary Containment is OPERABLE (LCO 3.6.4.1), the Standby Gas Treatment System (SGTS) is in compliance with its Specification (LCO 3.6.4.3) and the Secondary Containment Isolation Valves and Secondary Containment Actuation Instrumentation are in compliance with their Specifications (LCO 3.6.4.2 and 3.3.6.2 respectively).

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.9.9 Rev. 1 RHR - Low Water Level

Item	Change Description	Category
1	LCO 3.9.9 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.11.2.	1
2	LCO 3.9.11.2 requires at least one RHR SDC subsystem to be in operation. LCO 3.9.9 requires two RHR SDC subsystems to be OPERABLE, but not necessarily in operation. The intent of the LCO is to ensure the MODE 5 temperature limit can be maintained. This can be assured with one RHR SDC subsystem in either continuous operation or operating intermittently as required. The second RHR SDC subsystem is required for single failure reasons.	3B
3	Details of system operability requirements are relocated to the Bases.	2
4	The applicability is revised to delete the irradiated fuel condition (since the definition of MODE 5 covers it) and to require RHR SDC only when decay heat removal capability is necessary to maintain the MODE 5 temperature limit.	3B
5	CONDITIONS A and B are reformatted from ACTION a except as discussed below.	1
6	CONDITION A provides 8 hours to take action when one RHR SDC subsystem is inoperable because the remaining OPERABLE RHR SDC subsystem is capable of providing adequate decay heat removal.	3B
7	CONDITION B provides 2 hours for the alternate method of decay heat removal. ACTION a only permits 1 hour.	3B
8	The methods by which alternate methods of decay heat removal are controlled are relocated.	2
9	CONDITION C is added to define appropriate actions if RHR SDC cannot be restored.	3A+
10	ACTION b is deleted. Action no longer applicable (see Item 2).	1
11	Footnote '#' to page 3/4 9-19 is deleted as it is no longer applicable.	1

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.9.9 Rev. 1 RHR - Low Water Level

Item	Change Description	Category
12	SR 3.9.9.1 replaces SR 4.9.11.2. The 7 day frequency is based upon ECCS surveillance intervals.	3B
13	CROSS REFERENCES are added.	1
14	Footnote '*' to page 3/4 9-19 is deleted based upon the revision to the LCO (see Item 2).	1
15	Footnote '**' to page 3/4 9-19 is deleted as it is no longer applicable.	1
16	The NOTE in the applicability statement is reformatted from ACTION c.	1

3.9 REFUELING OPERATIONS

3.9.9 Residual Heat Removal - Low Water Level

LCO 3.9.9 Two Residual Heat Removal (RHR) shutdown cooling subsystems shall be OPERABLE.

APPLICABILITY: MODE 5 with water level < 22'8" over the top of the RPV flange and heat losses to ambient not sufficient to maintain average reactor coolant temperature ≤ 140°F.

---------------------------NOTE---------------------------
Provisions of LCO 3.0.4 are not applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One RHR shutdown cooling subsystem inoperable.	A.1 Provide an alternate method capable of decay heat removal. OR A.2 Raise water level to ≥ 22'8" over the top of the RPV flange.	8 hours
B. Both RHR shutdown cooling subsystems inoperable.	B.1 Provide an alternate method capable of decay heat removal.	2 hours

(continued)

ACTIONS (continued)

Replace With Insert 1

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Required Actions and associated Completion Times of Condition B not met.	C.1	Suspend operations that could increase reactor decay heat load.	Immediately
	<u>AND</u>		
	C.2	Establish SECONDARY CONTAINMENT INTEGRITY.	As soon as practicable
	<u>AND</u>		
	C.3	Provide at least one alternate method capable of decay heat removal.	As soon as practicable

INSERT 1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of of Condition B not met.	C.1 Suspend operations that could increase reactor decay heat load.	Immediately
	AND	
	C.2 Ensure Secondary Containment is OPERABLE.	As soon as practicable
	AND	
	C.3 Ensure the SGTS is in compliance with the requirements of Specification 3.6.4.3.	As soon as practicable
	AND	
	C.4 Ensure Secondary Containment Isolation Valves are in compliance with the requirements of Specification 3.6.4.2 and Secondary Containment Actuation Instrumentation is in compliance with the requirements of Specification 3.3.6.2.	As soon as practicable
	AND	
	C.5 Provide at least one alternate method capable of decay heat removal.	As soon as practicable

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.9.9.1	Verify for the required RHR shutdown cooling subsystem each manual, power operated, or automatic valve in a flow path not locked, sealed or otherwise secured in position, is in the correct position or is capable of being manually aligned in the correct position.	7 days

CROSS-REFERENCES

TITLE	NUMBER
Secondary Containment ~~Isolation~~ Actuation Instrumentation	3.3.6.2
ECCS - Shutdown	3.5.2
Secondary Containment	3.6.4.1
Secondary Containment Isolation Valves	3.6.4.2
Standby Gas Treatment System	3.6.4.3

B 3.9 REFUELING OPERATIONS

B 3.9.9 Residual Heat Removal - Low Water Level

BASES

BACKGROUND	A description of the Shutdown Cooling Subsystem of the Residual Heat Removal (RHR) System is provided in the Bases for LCO 3.9.8.
APPLICABLE SAFETY ANALYSES	Decay heat removal by operation of a shutdown cooling mode of the RHR system is not required for mitigation of any transients or accidents evaluated for refueling in the safety analyses. However, the NRC Interim Policy Statement (Ref. 1) requires the Shutdown Cooling Subsystem of the RHR system be retained in the Technical Specifications even though none of the selection criteria were satisfied (Ref. 2).
LCOs	During MODE 5, with water level < 22'8" above the RPV flange, two RHR shutdown cooling subsystems are required to be OPERABLE. The low volume of water above the flange may not provide an adequate heat sink for decay heat removal. An OPERABLE RHR shutdown cooling subsystem consists of one RHR pump, one heat exchanger train and the associated piping and valves. Additionally, each shutdown cooling subsystem is considered OPERABLE if it can be manually aligned (remote or local) in a shutdown cooling mode for removal of decay heat. Operation (either continuous or intermittent) of one subsystem can maintain and reduce the reactor coolant temperature as required. Any other subsystem used for decay heat removal is considered OPERABLE when it is capable of maintaining or reducing reactor coolant temperature as required.
APPLICABILITY	In MODE 5 the irradiated fuel in the RPV generates decay heat that may be cause an increase in the temperature of the reactor coolant and the environment around the RPV. OPERABILITY of a decay heat removal subsystem is therefore required. When heat losses to the ambient are sufficient to remove the decay heat, no residual heat removal systems are required. Decay heat removal requirements in MODES 3 and 4 are located in LCO 3.4.7. Decay heat removal requirements in MODE 5 when the water level is ≥ 22'8" above the RPV flange are located in LCO 3.9.8.

(continued)

BASES (continued)

ACTION STATEMENTS

A.1, A.2, B.1

With only one shutdown cooling subsystem OPERABLE, the remaining OPERABLE shutdown cooling subsystem is capable of providing the required decay heat removal. However, the overall system reliability is reduced and a limited time is allowed to restore the inoperable loop or provide an alternate method of decay heat removal. As an alternative, the RPV water level can be increased to be ≥ 22'8" such that LCO 3.9.9 is no longer applicable and the provisions of LCO 3.9.8 are satisfied. With no RHR Shutdown Cooling Subsystem OPERABLE, the capability of the RHR shutdown cooling system to provide decay heat removal is potentially lost and an alternate decay heat removal method for each inoperable subsystem shall be provided to maintain the average reactor coolant temperature as required and provide redundancy. Because of the decay heat levels during these conditions a short time is provided.

C.1, C.2, C.3, C.4, C.5

If both shutdown cooling subsystems of RHR are not OPERABLE and an alternate method cannot be provided and the associated Completion Time not met, all operations that can potentially increase reactor decay heat generation (e.g. loading irradiated fuel bundles in the core) shall be suspended to preclude increasing the amount of heat being added to the reactor coolant. Actions are also taken to provide means for control of potential radioactive releases. ~~This includes ensuring SECONDARY CONTAINMENT INTEGRITY is established (LCO 3.6.4.1).~~ Additionally, actions must continue to establish an alternate decay heat removal method as soon as practicable.

ADD INSERT 2

(continued)

INSERT 2

This includes ensuring Secondary Containment is OPERABLE (LCO 3.6.4.1), the Standby Gas Treatment System (SGTS) is in compliance with its Specification (LCO 3.6.4.3) and the Secondary Containment Isolation Valves and Secondary Containment Actuation Instrumentation are in compliance with their Specifications (LCO 3.6.4.2 and 3.3.6.2 respectively).

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.9.9.1

The bases provided for SR 3.9.8.1 are applicable.

REFERENCES

1. 52FR3788, Commission Policy Statement on Technical Specification Improvements for Nuclear Power Reactors, February 6, 1987.

2. NEDO-31466, "Technical Specification Screening Criteria Application and Risk Assessment," November 1987.

CHAPTER 3.10

SPECIAL OPERATIONS

CHAPTER 3.10
SPECIAL OPERATIONS
TABLE OF CONTENTS

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.1 Rev. 1 Inservice Leak and Hydro Test

Item	Change Description	Category
1	DELETED	
2	DELETED	
3	DELETED	
4	DELETED	
5	DELETED	

NOTE

PSTS LCO 3.10.1 was deleted per CRS 132. See CRS 132 for justification.

3.10 SPECIAL OPERATIONS

3.10.1 Section Deleted

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B 3.10 SPECIAL OPERATIONS

B 3.10.1 Section Deleted

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Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.2 Rev. 0 Reactor Mode Switch Interlock Testing

Item	Change Description	Category
1	DELETED	
2	LCO 3.10.2 is based upon footnote '#' to page 1-11 and footnote '##' to page 3/4 9-1. The independent verification that all control rods remain fully inserted is deleted. A requirement to suspend CORE ALTERATIONS is added.	3B
3	The applicability is based upon Table 1.2.	3B
4	CONDITION A provides actions to be taken if the LCO is not met.	3B+
5	SR 3.10.2.1 and SR 3.10.2.2 are added.	3B+

3.10 SPECIAL OPERATIONS

3.10.2 Reactor Mode Switch Interlock Testing

LCO 3.10.2 The Reactor Mode Switch position specified in Table 1.1-1 for MODES 3, 4 and 5 operation may be changed to include the Run, Startup/Hot Standby, and Refuel position to allow testing of instrumentation associated with the Reactor Mode Switch interlock functions provided all insertable control rods remain fully inserted and no CORE ALTERATIONS are in progress.

APPLICABILITY: MODES 3 and 4 with the Reactor Mode Switch in the Run, Startup/Hot Standby, or Refuel position, for the purpose of testing the Reactor Mode Switch,
MODE 5 with the Reactor Mode Switch in the Run or Startup/Hot Standby position for the purpose of testing the Reactor Mode Switch.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Suspend CORE ALTERATIONS except for control rod insertion.	Immediately
	AND	
	A.2 Fully insert all insertable control rods in control cells that contain one or more assemblies.	1 hour
	AND	
	A.3.1 Place the Reactor Mode Switch in the Shutdown Position.	1 hour
	OR	
	A.3.2 ---------NOTE--------- Not applicable in MODES 3 and 4. --------------------- Place the Reactor Mode Switch in the Refuel position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.10.2.1	Verify all control rods are fully inserted in control cells that contain one or more fuel assemblies.	12 hours
SR 3.10.2.2	Verify no CORE ALTERATIONS are in progress.	24 hours

CROSS-REFERENCES: None

B 3.10 SPECIAL OPERATIONS

B 3.10.2 **Reactor Mode Switch Interlock Testing**

BASES

BACKGROUND

The Reactor Mode Switch is a conveniently located multiposition, keylock switch provided to select the necessary scram functions for various plant conditions (Ref. 1). The Reactor Scram Mode Switch selects the appropriate trip relays for scram functions and provides appropriate bypasses. The mode switch positions and related scram interlock functions are summarized as follows:

a. SHUTDOWN - Initiates a reactor scram; bypasses main steam line isolation and reactor high water level scrams.

b. REFUEL - Selects Neutron Monitoring System (NMS) scram for low neutron flux level operation (but does not disable the Average Power Range Monitor (APRM) scram); bypasses main steam line isolation and reactor high water level scrams.

c. STARTUP - Selects NMS scram for low neutron flux level operation (Intermediate Range Monitors (IRMs)); bypasses main steam line isolation and reactor high water level scrams.

d. RUN - Selects NMS scram for power range operation.

The Reactor Mode Switch also provides interlocks for such functions as control rod blocks, scram discharge volume trip bypass, refueling interlocks, suppression pool makeup and MSIV isolations.

Operation of the Reactor Mode Switch from one position to another may be required to confirm certain aspects of these various interlocks during periodic tests and calibrations.

APPLICABLE SAFETY ANALYSES

The interlock functions of the Reactor Mode Switch in MODES 3, 4 and 5 are provided to preclude inadvertent criticality. With all control rods inserted and no CORE ALTERATIONS in progress there are no credible mechanisms for inadvertent criticality.

(continued)

BASES (continued)

LCO

As described in LCO 3.0.8, compliance with this Special Operations LCO is optional. MODE 3, 4 and 5 operations not specified in Table 1.1-1 can be performed in accordance with other LCOs (i.e., LCO 3.10.3, LCO 3.10.4, LCO 3.10.7) without meeting this LCO or its ACTIONS. If testing which involves the Reactor Mode Switch interlocks and required its repositioning beyond that specified in Table 1.1-1 for the current MODE of operation, is desired, it can be performed provided all interlock functions potentially defeated are administratively controlled. In MODES 3, 4 and 5 with the Reactor Mode Switch in Shutdown per Table 1.1-1, all insertable control rods are fully inserted and a control rod block initiated. Therefore, all insertable control rods must be verified fully inserted while in MODES 3, 4 and 5 with the Reactor Mode Switch in other than Shutdown. The additional LCO requirement to preclude CORE ALTERATIONS is appropriate for MODE 5 operations, as discussed below, and is inherently met in MODES 3 and 5 by the definition of CORE ALTERATIONS which do not exist with the vessel head in place.

In MODE 5, with the Reactor Mode Switch in Refuel, only one control rod can be withdrawn under the Refuel Position one-rod-out interlock (LCO 3.9.2) and the refueling equipment interlocks (LCO 3.9.1) appropriately control other CORE ALTERATIONS. Due to the increased potentially for error in controlling these multiple interlocks and the limited duration of tests involving Reactor Mode Switch position, conservative controls are required consistent with MODE 3 and 4 operations. These controls will adequately ensure the reactor does not become critical during these tests.

APPLICABILITY

Periodic Reactor Mode Switch related interlock testing required while in MODES 1 and 2 is intended to be capable of being performed without the need for Special Operations exceptions. Mode switch manipulations in these MODES would likely result in plant trips. In MODES 3, 4 and 5 the interlock functions provided by the Reactor Mode Switch in Shutdown (i.e., all insertable control rods inserted and incapable of withdrawal), and Refueling (i.e., refueling interlocks to prevent inadvertent criticality during CORE ALTERATIONS) can be adequately administratively controlled during the performance of certain tests.

(continued)

BASES (continued)

ACTIONS

A.1, A.2, A.3.1, A.3.2

These Required Actions are provided to restore compliance with the Technical Specifications changed by this Special Operations LCO. Restoring complianc_ will also result in concurrently exiting the Applicability of Special Operations LCO 3.10.2.

CORE ALTERATIONS are immediately (refer to Section 1.3, Completion Times for discussion of immediately) suspended if in progress. This will preclude potential mechanisms which could lead to criticality. One hour is allowed to fully insert all insertable control rods. Placing the Reactor Mode Switch to Shutdown will ensure all inserted control rods remain inserted and result in operation in accordance with Table 1.1-1. Alternatively, if in MODE 5, the Reactor Mode Switch must be placed in the Refuel position, which will also result in operation in accordance with Table 1.1-1.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

SURVEILLANCE REQUIREMENTS

SR 3.10.2.1, SR 3.10.2.2

Meeting the requirements of the Special Operations LCO maintains operation consistent with or conservative to operation with the Reactor Mode Switch in Shutdown or Refuel. The function of the Reactor Mode Switch interlocks which are not in effect due to the testing in progress are adequately compensated for by the Special Operations LCO requirements. The administrative controls to ensure the operational requirements continue to be met, are to be periodically verified. The Surveillance performed at the 12 hour and 24 hour Frequency are intended to provide appropriate assurance that each operating shift is aware of and verifies compliance with the Special Operations LCO requirements.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 7.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.3 Rev. 0 Single Control Rod Withdrawal-MODE 3

Item	Change Description	Category
1	DELETED	
2	LCO 3.10.3 is added based upon footnote '***' to page 1-11 which allows the reactor mode switch to be placed in the Refuel position in MODE 3 while a single control rod is being recoupled. LCO 3.10.3 expands the scope to a single control rod withdrawn for any reason.	3B
3	LCO 3.10.3 requires other LCOs to be met prior to placing the reactor mode switch in the Refuel position. Footnote '***' to page 1-11 only required the one-rod-out interlock (LCO 3.9.2) to be OPERABLE.	3A
4	LCO 3.10.3 provides actions to be taken if the LCO is not met as CONDITION A.	3A+
5	SR 3.10.3.1, SR 3.10.3.2 and 3.10.3.3 are added to define surveillance requirements for the LCO.	3A+
6	CROSS REFERENCES are added.	1

3.10 SPECIAL OPERATIONS

3.10.3 Single Control Rod Withdrawal - Hot Shutdown

LCO 3.10.3 The Reactor Mode Switch position specified in Table 1.1-1 for MODE 3 operation may be changed to include the Refuel position to allow withdrawal of a single control rod provided the following requirements are met:

A. LCO 3.9.2, Refuel Position One-Rod-Out Interlock.

B. With reactor coolant pressure greater than atmospheric, LCO 3.1.6, Control Rod Drive Housing Support.

C. All other control rods are fully inserted.

D. 1. LCO 3.3.1.1, MODE 5, Reactor Protection System Instrumentation, Functions 1.a, 1.b, 2.a, 2.d, 12 and 13 of Table 3.3.1.1-1.

LCO 3.3.8.2, MODE 5, Reactor Protection System Electric Power Monitoring.

LCO 3.9.5, Control Rod OPERABILITY - Refueling.

<u>OR</u>

2. All other control rods in a five-by-five array centered on the control rod being withdrawn are disarmed.

LCO 3.1.1, MODE 5, SHUTDOWN MARGIN, except the single control rod to be withdrawn may be assumed to be the highest worth control rod.

APPLICABILITY: MODE 3 with the Reactor Mode Switch in the Refuel position and a single control rod withdrawn.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the above requirements not met.	A.1 ----------NOTE--------- Required Actions to fully insert all insertable control rods include placing the Reactor Mode Switch in the Shutdown position. ------------------------- Enter the applicable Condition of the affected LCOs.	Immediately
	OR	
	A.2.1 Fully insert all insertable control rods. AND A.2.2 Place the Reactor Mode Switch in the Shutdown position.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.10.3.1	Perform the applicable SRs for the required LCOs.	According to the applicable SRs
SR 3.10.3.2	Verify all other control rods in a five-by-five array centered on the control rod being withdrawn are disarmed when required by LCO 3.10.3.D.2.	24 hours
SR 3.10.3.3	Verify all other control rods are fully inserted.	24 hours

CROSS-REFERENCES

TITLE	NUMBER
SHUTDOWN MARGIN	3.1.1
Control Rod Drive Housing Support	3.1.6
Reactor Protection System Instrumentation	3.3.1.1
Reactor Protection System Electric Power Monitoring	3.3.8.2
Refuel Position One-Rod-Out Interlock	3.9.2
Control Rod OPERABILITY - Refueling	3.9.5

B 3.10 SPECIAL OPERATIONS

B 3.10.3 Single Control Rod Withdrawal - Hot Shutdown

BASES

BACKGROUND

In MODE 3 the Reactor Mode Switch is in Shutdown, all control rods are inserted and blocked from withdrawal. Many systems and functions are not required in these conditions due to the designed interlocks associated with the Reactor Mode Switch in Shutdown. However, circumstances arise while in MODE 3 which present the need to withdraw a single control rod for various tests, e.g., friction tests, scram timing, coupling integrity checks, etc. These single control rod withdrawals can be accomplished by selecting the Refuel position for the Reactor Mode Switch. This Special Operations LCO provides the appropriate additional controls to allow a single control rod withdrawal in MODE 3.

APPLICABLE SAFETY ANALYSES

With the Reactor Mode Switch in Refuel the analyses for control rod withdrawal during refueling are applicable and, provided the assumptions are met in MODE 3, these analyses will bound the consequences. Explicit safety analyses in the FSAR (Ref. 1) only assume the functioning of the refueling interlocks and adequate SHUTDOWN MARGIN to preclude inadvertent criticality.

The One-Rod-Out interlock restricts the withdrawn of more than one control rod to reinforce operational procedures which prevent the reactor from becoming critical. The analyses assume this condition is acceptable since the core will be subcritical with the highest worth control rod withdrawn if adequate SHUTDOWN MARGIN exists.

The control rod scram function provides backup protection to the refueling interlocks which prevent inadvertent criticalities when the reactor mode switch is in the Refuel position. Alternate backup protection can be obtained by assuring that a five-by-five array of control rods, centered on the withdrawn control rod, are inserted and incapable of withdrawal.

(continued)

BASES (continued)

LCO

As described in LCO 3.0.8, compliance with this Special Operations LCO is optional. MODES 3 and 4 operation with the Reactor Mode Switch in Refuel can be performed in accordance with other LCOs (i.e., LCO 3.10.2, LCO 3.10.4) without meeting this Special Operations LCO or its ACTIONS. If a single control rod withdrawal is desired in MODE 3, controls consistent with those required during Refueling must be implemented and this Special Operations LCO applied. Additionally, due to reactor pressure being greater than atmospheric, the CRD Housing Support (LCO 3.1.6) must be in place to satisfy assumptions of the CRD housing failure event.

To back up the One-Rod-Out interlock (LCO 3.9.2), the ability to scram the withdrawn control rod in the event of an inadvertent criticality is provided by this LCO's D.1 requirements. Alternately, provided a sufficient number of control rods in the vicinity of the withdrawn control rod are known to be inserted and incapable of withdrawal, the possibility of criticality on withdrawal of this control rod is sufficiently precluded so as not to require scram capability of the withdrawn control rod.

APPLICABILITY

Control rod withdrawals are adequately controlled in MODES 1, 2 and 5 by existing LCOs. In MODES 3 and 4 control rod withdrawal is only allowed if performed in accordance with Special Operations LCO 3.10.3 or Special Operations LCO 3.10.4 and if limited to one control rod. This allowance is only provided with the Reactor Mode Switch in Refuel. During these conditions the One-Rod-Out interlock (LCO 3.9.2), the Control Rod Drive Housing Support (LCO 3.1.6), and scram functions (LCO 3.3.1.1, LCO 3.3.8.2 and LCO 3.9.5) or added administrative controls in D.2 of the Special Operations LCO provide mitigation of potential inadvertent criticality.

(continued)

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2

If an LCO specified in Special Operations LCO 3.10.3 is not met, the ACTIONS applicable to the stated requirements are entered as directed by Required Action A.1. The Note to Required Action A.1 clarifies the intent of any other LCO's Required Action to insert all control rods to also require exiting this Special Operations Applicability by returning the Reactor Mode Switch to Shutdown.

If a specified LCO is not met and its ACTIONS as required by this Special Operations LCO's Required Action A.1 are not met, Required Action A.2.1 and A.2.2 are provided to restore compliance with the normal MODE 3 and 4 requirements and exit this Special Operations LCO's Applicability. One hour is allowed to fully insert all insertable control rods. Placing the Reactor Mode Switch in Shutdown will ensure all inserted rods remain inserted and restore operation in accordance with Table 1.1-1.

Completion Times

All Completion Times are based on industry accepted practice and engineering judgement considering the number of available systems and the time required to reasonably complete the Required Action.

SURVEILLANCE REQUIREMENTS

SR 3.10.3.1, SR 3.10.3.2, SR 3.10.3.3

The LCOs made applicable are required to have their Surveillances met to establish the Special Operations LCO is being met. If the local array of control rods is inserted and disarmed while the scram function for the withdrawn rod is not available, periodic verification is required to ensure the possibility of criticality remains precluded.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.4 Rev. 1 Single Control Rod Withdrawal - MODE 4

Item	Change Description	Category
1	DELETED	
2	LCO 3.10.4 is based upon footnote '***' to page 1-11 and LCO 3.9.10.1 which allows the reactor mode switch to be placed in the Refuel position in MODE 4 while a single control rod is being recoupled. LCO 3.10.4 expands this scope to a single control rod withdrawn for any reason, including removal of its control rod drive.	3B
3	LCO 3.10.4 requires other LCOs to be met in order for the reactor mode switch to be placed in Refuel. Footnote '***' to page 1-11 only required the one-rod-out interlock (LCO 3.9.2) to be OPERABLE. LCO 3.9.10.1 provides similar requirements.	3A
4	CONDITIONS A and B are added to provide actions to be taken if the LCO is not met.	3A+
5	SR 3.10.4.1, SR 3.10.4.2, SR 3.10.4.3 and SR 3.10.4.4 are added to define surveillance requirements for the LCO.	3A+
6	CROSS REFERENCES are added.	1

3.10 SPECIAL OPERATIONS

3.10.4 Single Control Rod Withdrawal - Cold Shutdown

LCO 3.10.4 The Reactor Mode Switch position specified in Table 1.1-1 for MODE 4 operation may be changed to include the Refuel position to allow withdrawal of a single control rod or withdrawal and subsequent removal of the associated control rod drive provided the following requirements are met:

A. With reactor coolant pressure greater than atmospheric, LCO 3.1.6, Control Rod Drive Housing Support.

B. All other control rods are fully inserted.

C. 1. LCO 3.9.2, Refuel Position One-Rod-Out Interlock.

<u>OR</u>

2. A control rod withdrawal block is inserted after withdrawal of the control rod.

D. 1. LCO 3.3.1.1, MODE 5, Reactor Protection System Instrumentation, Functions 1. a, 1.b, 2.a, 2.d, 12 and 13 of Table 3.3.1.1-1.

LCO 3.3.8.2, MODE 5, Reactor Protection System Electric Power Monitoring.

LCO 3.9.5, Control Rod OPERABILITY - Refueling.

<u>OR</u>

2. All other control rods in a five-by-five array centered on the control rod being withdrawn are disarmed.

LCO 3.1.1, MODE 5, SHUTDOWN MARGIN, except the single control rod to be withdrawn may be assumed to be the highest worth control rod.

APPLICABILITY: MODE 4 with the Reactor Mode Switch in the Refuel position.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more of the above requirements not met with the affected control rod insertable.	A.1	----------NOTE---------- Required Actions to fully insert all insertable control rods include placing the Reactor Mode Switch in the Shutdown position. ---------------------- Enter the applicable Condition of the affected LCOs.	Immediately
	<u>OR</u>		
	A.2.1	Fully insert all insertable control rods.	1 hour
		<u>AND</u>	
	A.2.2	Place the Reactor Mode Switch in the Shutdown position.	1 hour
B. One or more of the above requirements not met with the affected control rod not insertable.	B.1	Suspend withdrawal of the control rod and removal of associated control rod drive.	Immediately
	<u>AND</u>		
	B.2.1	Fully insert all control rods.	As soon as practicable
		<u>OR</u>	
	B.2.2	Satisfy the requirements of the LCO.	As soon as practicable

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.10.4.1	Perform the applicable SRs for the required LCOs.	According to the applicable SRs
SR 3.10.4.2	Verify all other control rods in a five-by-five array centered on the control rod being withdrawn are disarmed when required by LCO 3.10.4.D.2.	24 hours
SR 3.10.4.3	Verify all other control rods are fully inserted.	24 hours
SR 3.10.4.4	Verify a control rod withdrawal block is inserted when required by LCO 3.10.4.C.2.	24 hours

CROSS-REFERENCES

TITLE	NUMBER
SHUTDOWN MARGIN	3.1.1
Control Rod Drive Housing Support	3.1.6
Reactor Protection System Instrumentation	3.3.1.1
Reactor Protection System Electric Power Monitoring	3.3.8.2
Refuel Position One-Rod-Out Interlock	3.9.2
Control Rod OPERABILITY - Refueling	3.9.5

B 3.10 SPECIAL OPERATIONS

B 3.10.4 Single Control Rod Withdrawal - Cold Shutdown

BASES

BACKGROUND

In MODE 4, the Reactor Mode Switch is in Shutdown, all control rods are inserted and blocked from withdrawal. Many systems and functions are not required in this condition due to the designed interlocks associated with the Reactor Mode Switch in Shutdown. However, circumstances arise while in MODE 4 which present the need to withdraw a single control rod for various tests, e.g., friction tests, scram timing, coupling integrity checks, etc. Situations may also require the removal of the associated control rod drive. These single control rod withdrawals and possible subsequent removal can be accomplished by selecting the Refuel position for the Reactor Mode Switch. This Special Operations LCO provides the appropriate additional controls to allow a single control rod withdrawal in MODE 4.

APPLICABLE SAFETY ANALYSES

With the Reactor Mode Switch in the Refuel position the analyses for control rod withdrawal during Refueling are applicable and, provided the assumptions are met in MODE 4, these analyses will bound the consequences. Explicit safety analyses in the FSAR (Ref. 1) only assume the functioning of the refueling interlocks and adequate SHUTDOWN MARGIN to preclude inadvertent criticality.

The One-Rod-Out interlock restricts the withdrawal of more than one control rod to reinforce operational procedures which prevent the reactor from becoming critical. The analyses assume this condition is acceptable since the core will be subcritical with the highest worth control rod withdrawn if adequate SHUTDOWN MARGIN exists.

The control rod scram function provides backup protection to the refueling interlocks which prevent inadvertent criticalities when the reactor mode switch is in the Refuel position. Alternate backup protection can be obtained by assuring that a five-by-five array of control rods, centered on the withdrawn control rod, are inserted and incapable of withdrawal.

(continued)

BASES (continued)

LCO

As described in LCO 3.0.8, compliance with this Special Operations LCO is optional. MODE 4 operation with the Reactor Mode Switch in Refuel can be performed in accordance with other LCOs (i.e., LCO 3.10.2) without meeting this Special Operations LCO or its ACTIONS. If a single control rod withdrawal is desired in MODE 4, controls consistent with those required during Refueling must be implemented and this Special Operations LCO applied.

The One-Rod-Out interlock of LCO 3.9.2 will ensure only one control rod can be withdrawn. After a control rod is withdrawn, a control rod withdrawal block will be inserted to ensure no additional control rods can be withdrawn and compliance with the Special Operations LCO is maintained.

To back up the One-Rod-Out interlock (LCO 3.9.2) or control rod withdrawal block, the ability to scram the withdrawn control rod in the event of an inadvertent criticality is provided by this LCO's D.1 requirement. Alternatively, when the scram function is not OPERABLE or when the CRD is to be removed, a sufficient number of rods in the vicinity of the withdrawn control rod are required to be inserted and incapable of withdrawal. This precludes the possibility of criticality on withdrawal of this control rod, including its control rod drive.

APPLICABILITY

Control rod withdrawals are adequately controlled in MODES 1, 2 and 5 by existing LCOs. In MODES 3 and 4 control rod withdrawal is only allowed if performed in accordance with Special Operations LCO 3.10.3 or Special Operations LCO 3.10.4 and if limited to one control rod. This allowance is only provided with the reactor mode switch in Refuel. During these conditions the One-Rod-Out interlock (LCO 3.9.2), the Control Rod Drive Housing Support (LCO 3.1.6) and scram functions (LCO 3.3.1.1, LCO 3.3.8.2 and LCO 3.9.5) or added administrative controls in D.2 of the Special Operations LCO provide mitigation of potential inadvertent criticality.

(continued)

BASES (continued)

ACTIONS

A.1, A.2.1, A.2.2

If Special Operations LCO 3.10.4 requirements are not met, these Required Actions restore operation consistent with normal MODE 4 conditions (all rods inserted) or with the allowances of this Special Operations LCO. The actions are specified based on the condition of the control rod being withdrawn. If the control rod is still insertable, the actions require the control rod to be inserted and the Reactor Mode Switch placed in Shutdown. If the control rod drive has been removed such that the control rod is not insertable, the actions require the most expeditious action be taken to either restore the CRD and insert its control rod, or restore compliance with the Special Operations LCO.

SURVEILLANCE REQUIREMENTS

SR 3.10.4.1, SR 3.10.4.2, SR 3.10.4.3, SR 3.10.4.4

The LCOs made applicable are required to have their Surveillances met to establish the Special Operations LCO is being met. If the local array of control rods is inserted and disarmed while the scram function for the withdrawn rod is not available, periodic verification is required to ensure the possibility of criticality remains precluded.

REFERENCES

1. Grand Gulf Unit 1 FSAR, Section 15.4.1.1.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.5 Rev. 0 Single Control Rod (Drive) Removal

Item	Change Description	Category
1	LCO 3.10.5 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.10.1.	1
2	The LCO is revised as follows: (A) reactor mode switch is controlled by the MODE 5 definition and LCO 3.10.2 (B) SRM requirements are deleted (C) LCO only applies to a single control rod withdrawn from a control cell containing fuel bundle(s) (D) the "immovable or untrippable" requirement in LCO 3.9.10.1.c.2 is deleted (E) a control rod withdrawal block requirement is added (F) a restriction against other CORE ALTERATIONS is added.	3B
3	The MODE 4 applicability is moved to LCO 3.10.4.	1
4	CONDITION A is reformatted from the ACTION statement except as discussed below.	1
5	REQUIRED ACTION A.2.1 is added to require all control rods to be inserted.	3A+
6	SR 3.10.5.1, SR 3.10.5.2, SR 3.10.5.3, SR 3.10.5.4 and SR 3.10.5.5 are reformatted from SR 4.9.10.1 except as discussed below.	1
7	The 4 hour frequency in SR 4.9.10.1 is deleted. If the surveillance(s) has not been performed within the 24 hour interval, it must be performed prior to entering the LCO.	3B
8	Surveillance requirements in SR 4.9.10.1 have been deleted if not applicable per the revision to the LCO (see Item 2).	1
9	SR 3.10.5.3 and SR 3.10.5.5 are added based upon the revision to the LCO (see Item 2).	3A+
10	CROSS REFERENCES are added.	1

3.10 SPECIAL OPERATIONS

3.10.5 Single Control Rod Drive Removal - Refueling

LCO 3.10.5 The requirements of LCO 3.3.1.1, LCO 3.3.1.3, LCO 3.3.8.2, LCO 3.9.1, LCO 3.9.2, and LCO 3.9.5 may be suspended during MODE 5 operation to allow the withdrawal of a single control rod from a core cell containing one or more fuel assemblies and withdrawal and subsequent removal of the associated control rod drive provided the following requirements are met:

A. All other control rods are fully inserted.

B. All other control rods in a five-by-five array centered on the control rod being removed are disarmed.

C. A control rod withdrawal block is inserted after withdrawal of a control rod.

D. LCO 3.1.1, MODE 5, SHUTDOWN MARGIN, except the single control rod to be withdrawn may be assumed to be the highest worth control rod.

E. No other CORE ALTERATIONS are in progress.

APPLICABILITY: MODE 5 with LCO 3.9.5 not met.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the above requirements not met.	A.1 Suspend removal of the control rod and associated control rod drive mechanism.	Immediately
	<u>AND</u>	
	A.2.1 Fully insert all control rods.	As soon as practicable
	<u>OR</u>	
	A.2.2 Satisfy the requirements of the LCO.	As soon as practicable

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.10.5.1	Verify all other control rods are fully inserted.	24 hours
SR 3.10.5.2	Verify all control rods in a five-by-five array centered on the control rod being removed are disarmed.	24 hours
SR 3.10.5.3	Verify a control rod withdrawal block is inserted.	24 hours
SR 3.10.5.4	Verify the applicable SRs for LCO 3.1.1 are satisfied.	According to the applicable SRs
SR 3.10.5.5	Verify no other CORE ALTERATIONS are in progress.	24 hours

CROSS-REFERENCES

TITLE	NUMBER
SHUTDOWN MARGIN	3.1.1
Reactor Protection System Instrumentation	3.3.1.1
Reactor Protection System Shorting Links	3.3.1.3
Reactor Protection System Electric Power Monitoring	3.3.8.2
Refueling Equipment Interlocks	3.9.1
Refuel Position One-Rod-Out Interlock	3.9.2
Control Rod OPERABILITY - Refueling	3.9.5

B 3.10 SPECIAL OPERATIONS

B 3.10.5 **Single Control Rod Drive Removal - Refueling**

BASES

BACKGROUND

Refueling interlocks restrict the movement of control rods and the operation of the refueling equipment to reinforce operational procedures which prevent the reactor from becoming critical during refueling operations. During refueling operations, for all core cells within the reactor that contain one or more fuel assemblies, no more than one control rod can be withdrawn from its core cell. The refueling interlocks use full in position inputs to determine the position of all control rods. If a full in position signal is not present for every control rod, then the all-rods-in permissive for the refueling equipment interlocks is not present and fuel loading is prevented. Also, the Refuel position one-rod-out interlock will not allow the withdrawal of a second control rod.

Normally, the control rod scram function provides backup protection to normal refueling procedures and the refueling interlocks described above which prevent inadvertent criticalities during refueling. The requirement for this function to be OPERABLE precludes the possibility of removing the control rod drive (CRD) once a control rod is withdrawn from a core cell containing one or more fuel assemblies. However, this Special Operations LCO provides controls sufficient to ensure the possibility of an inadvertent criticality is precluded while allowing the removal of the single CRD from its core cell when that core cell contains one or more fuel assemblies and ensuring that this is the only CRD removed. The removal of the CRD involves removal of the position indication probe and isolation from the hydraulic control unit which affects LCO 3.9.1, LCO 3.9.2 and LCO 3.9.5.

APPLICABLE SAFETY ANALYSES

With the reactor mode switch in Refuel the analyses for control rod withdrawal during refueling are applicable and, provided the assumptions are met, these analyses will bound the consequences. Explicit safety analyses in the FSAR (Ref. 1) only assume the functioning of the refueling interlocks and adequate SHUTDOWN MARGIN to preclude inadvertent criticality.

Refueling and the one-rod-out interlocks restrict the movement of control rods and the operation of the refueling equipment to reinforce operational procedures which prevent the reactor from becoming critical. These interlocks prevent the withdrawal of more than one control rod. The analyses assume this condition

(Continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES (continued)

is acceptable since the core will be subcritical with the highest worth control rod withdrawn if adequate SHUTDOWN MARGIN exists. By requiring all other control rods to be inserted and a control rod withdrawal block initiated, the function of the one-rod-out interlock (LCO 3.9.2) is effectively maintained. The Special Operations LCO requirement to suspend all CORE ALTERATIONS adequately compensates for the all-rods-in permissive for the refueling equipment interlock (LCO 3.9.1).

Normal refueling procedures and the refueling interlocks prevent inadvertent criticalities during refueling. Protection can be obtained by assuring that a five-by-five array of control rods, centered on the withdrawn control rod, are inserted and incapable of withdrawal.

LCO

As described in LCO 3.0.8, compliance with this Special Operations LCO is optional. MODE 5 operation with LCO 3.9.1, 3.9.2, or 3.9.5 not met can be performed in accordance with those LCOs ACTIONS without meeting this Special Operations LCO or its ACTIONS. If the removal of a single CRD is desired in MODE 5 and the associated control rod is in a core cell containing one or more fuel assemblies, controls consistent with those required by LCOs 3.9.1, 3.9.2 and 3.9.5 must be implemented.

By requiring all other control rods to be inserted and a control rod withdrawal block initiated the function of the one-rod-out interlock (LCO 3.9.2) is effectively maintained. The Special Operations LCO requirement to suspend all CORE ALTERATIONS adequately compensates for the all-rods-in permissive for the refueling equipment interlock (LCO 3.9.1). Assuring the five-by-five array of control rods, centered on the withdrawn control rod, are inserted and incapable of withdrawal adequately satisfies the protection which LCOs 3.3.1.1 and 3.9.5 would have provided.

The allowance to assume this withdrawn control rod to be the highest worth control rod to satisfy LCO 3.1.1 and the inability to withdraw another control rod during this operation without additional SHUTDOWN MARGIN demonstrations is conservative (i.e., the withdrawn control rod may not be the highest worth control rod).

(continued)

BASES (continued)

APPLICABILITY

MODE 5 operations are controlled by existing LCOs. The allowance to comply with this Special Operations LCO in lieu of the ACTIONS of LCO 3.9.1, 3.9.2, or 3.9.5 is appropriately controlled with the additional administrative controls required by Special Operations LCO 3.10.5 which provide mitigation of potential inadvertent criticality.

ACTIONS

A.1, A.2.1, A.2.2

If Special Operations LCO 3.10.5 requirements are not met, these Required Actions restore operation consistent with the normal requirements for failure to meet LCOs 3.3.1.1, 3.9.1, 3.9.2, and 3.9.5 (all control rods inserted) or with the allowances of this Special Operations LCO. The Completion Time for Required Actions A.2.1 and A.2.2 are intended to require the most expeditious action be taken to either restore the CRD and insert its control rod, or restore compliance with the Special Operations LCO.

SURVEILLANCE REQUIREMENTS

SR 3.10.5.1, SR 3.10.5.2, SR 3.10.5.3, SR 3.10.5.4, SR 3.10.5.5

Periodic verification of the administrative controls established by the LCO is prudent to ensure the possibility of an inadvertent criticality remains precluded.

REFERENCES

1. Grand Gulf Unit 1 FSAR, 15.4.1.1.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.6 Rev. 1 Multiple Control Rod Removal

Item	Change Description	Category
1	LCO 3.10.6 is reformatted from LIMITING CONDITION FOR OPERATION 3.9.10.2.	1
2	The LCO is revised as follows: (A) reactor mode switch is controlled by the MODE 5 definition and LCO 3.10.2 (B) SRM requirements are deleted (C) the SHUTDOWN MARGIN requirement is deleted (D) the full in position inputs may be simulated (E) the restriction against fuel loading is deleted.	3B
3	CONDITION A is reformatted from the ACTION statement.	1
4	SR 3.10.6.1 and SR 3.10.6.2 are reformatted from SR 4.9.10.2.1 except as discussed below.	1
5	The 4 hour frequency in SR 4.9.10.2.1 is deleted. If the surveillances are not performed within the 24 hour interval, they must be performed prior to entering the LCO.	3B
6	Surveillance requirements in SR 4.9.10.2.1 have been deleted if not applicable per the revision to the LCO (see Item 2).	1
7	SR 4.9.10.2.2 is deleted. Any time the OPERABILITY of a component is affected, testing is required prior to declaring the component OPERABLE. This requirement is therefore implicitly covered in LCO 3.9.4.	3B
8	CROSS REFERENCES are added.	1

3.10 SPECIAL OPERATIONS

3.10.6 Multiple Control Rod Withdrawal - Refueling

LCO 3.10.6 Full in position inputs may be simulated for any number of control rods during MODE 5 operation to allow withdrawal of those control rods, removal of associated control rod drives or both provided the following requirements are met:

A. The four fuel assemblies are removed from the core cells associated with each control rod or control rod drive to be removed.

B. All other control rods in core cells containing one or more fuel assemblies are fully inserted.

APPLICABILITY: MODE 5 with one or more full in position inputs simulated.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Suspend withdrawal of control rods and removal of associated control rod drives.	Immediately
	AND	
	A.2.1 Fully insert all control rods in core cells containing one or more fuel assemblies.	As soon as practicable
	OR	
	A.2.2 Satisfy the requirements of the LCO.	

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.10.6.1	Verify the four fuel assemblies are removed from core cells associated with a control rod or control rod drive to be removed.	24 hours
SR 3.10.6.2	Verify all other control rods in core cells containing one or more fuel assemblies are fully inserted.	24 hours

CROSS-REFERENCES

TITLE	NUMBER
Shutdown Margin	3.1.1
Reactor Mode Switch Interlock Testing	3.10.2

B 3.10 SPECIAL OPERATIONS

B 3.10.6 **Multiple Control Rod Withdrawal - Refueling**

BASES

BACKGROUND

Refueling and One-Rod-Out interlocks restrict the movement of control rods and the operation of the refueling equipment to reinforce operational procedures which prevent the reactor from becoming critical during refueling operations. To protect against inadvertent criticality during refueling operations, only one control rod which is immediately adjacent to fuel may be withdrawn from the core. When all four fuel assemblies are removed from a control cell, the control rod may be withdrawn. Control rods withdrawn from cells which do not contain fuel assemblies have a negligible impact on reactivity control and are therefore not required to be OPERABLE (LCO 3.9.5). Any number of such control rods may be withdrawn in this manner.

The refueling and One-Rod-Out interlocks use full in position inputs to determine the position of all control rods. If a full in position signal is not present for every control rod, then the all-rods-in permissive for the refueling equipment interlocks is not present and fuel loading is prevented. Also, the Refuel position one-rod-out interlock will not allow the withdrawal of a second control rod.

To allow more than one control rod to be withdrawn during refueling, these interlocks must be defeated. This Special Operations LCO establishes the necessary controls to allow simulating the full in position inputs.

APPLICABLE SAFETY ANALYSES

Explicit safety analyses in the FSAR (Ref. 1) only assume the functioning of the refueling interlocks and adequate SHUTDOWN MARGIN for the prevention of inadvertent criticality during refueling. To allow multiple control rod withdrawals, control rod removals, associated control rod drive (CRD) removal or any combination, the full in position input is allowed to be simulated for each withdrawn control rod if all fuel has been removed from the control cell. With no fuel assemblies in the core cell, the control rod had negligible impact on reactivity control function and is not required to remain inserted. Prior to reloading fuel into the control cell, the control rod must be fully inserted to ensure an inadvertent criticality does not occur, as evaluated in the Reference 1 analysis.

(continued)

BASES (continued)

LCO	As described in LCO 3.0.8 compliance with this Special Operations LCO is optional. If multiple control rod withdrawal or removal or CRD removal is desired, all four fuel assemblies are required to be removed from the associated cells. (Note - one cell with a withdrawn control rod is allowed to have fuel remaining in accordance with other MODE 5 applicable LCOs.)
APPLICABILITY	MODE 5 operations are controlled by existing LCOs. The allowance to comply with this Special Operations LCO is appropriately controlled by requiring all fuel to be removed from cells with full in signals simulated.
ACTIONS	A.1, A.2.1, A.2.2 If Special Operations LCO 3.10.6 requirements are not met, these Required Actions restore operation consistent with the normal requirements for refueling (all control rods inserted or OPERABLE in core cells containing one or more fuel assemblies) or with the allowances of this Special Operations LCO. The Completion Time for Required Actions A.2.1 and A.2.2 are intended to require the most expeditious action be taken to either restore the CRD and insert its control rod, or restore compliance with the Special Operations LCO.
SURVEILLANCE REQUIREMENTS	SR 3.10.6.1, SR 3.10.6.2 Periodic verification of the administrative controls established by the Special Operations LCO is prudent to ensure the possibility of an inadvertent criticality remains precluded.
REFERENCES	1. Grand Gulf Unit 1 FSAR, Section 15.4.1.

Grand Gulf Nuclear Station
Technical Specification Improvement Program

Revision Summary Sheet

Proposed LCO/Section: 3.10.7 Rev. 1 Control Rod Testing-Operating

Item	Change Description	Category
1	LCO 3.10.7 is reformatted from LIMITING CONDITION FOR OPERATION 3.10.2.	1
2	The LCO is revised to include the independent verification from SR 4.10.2.b.	3A
3	The applicability is restricted to when LCO 3.1.7 is not met.	3B
4	CONDITION A replaces the ACTION statement. Suspending the test is intended to require entry into LCOs 3.1.7 and 3.3.2.1 for further required actions. NOTE: It is not clear from the applicability for LCO 3.10.7 that the CONDITIONS of LCO 3.1.7 would apply if LCO 3.10.7 is not met and the test is suspended.	3B
5	SR 3.10.7.1 is reformatted from SR 4.10.2.a.	1
6	SR 3.10.7.2 is reformatted from SR 4.10.2.b.	1
7	CROSS REFERENCES are added.	1
8	Footnote "*" to page 3/4 10-2 is deleted.	4
9	The restriction of "... less than 20% of RATED THERMAL POWER." of LCO 3.10.2.d has been deleted.	4

3.10 SPECIAL OPERATIONS

3.10.7 Control Rod Testing - Operating

LCO 3.10.7 The requirements of LCO 3.1.7 may be suspended and control rods bypassed in RACS to allow performance of SHUTDOWN MARGIN demonstrations, control rod scram time testing, control rod friction testing, and the Startup Test Program provided conformance with the control rod sequence for the specified test is verified by a second licensed operator or other qualified member of the technical staff.

APPLICABILITY: MODES 1 and 2 with LCO 3.1.7 not met.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Requirements of the LCO not met.	A.1 Suspend performance of the test.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.10.7.1	Verify movement of control rods is in compliance with the approved control rod sequence for the specified test.	During control rod movement
SR 3.10.7.2	Verify the bypassing and movement of control rods required to be bypassed in RACS by a second licensed operator or other qualified member of the technical staff.	Prior to and during the movement of control rods bypassed in RACS

CROSS-REFERENCES

TITLE	NUMBER
Rod Pattern Control	3.1.7
Control Rod Block Instrumentation	3.3.2.1

B 3.10 SPECIAL OPERATIONS

B 3.10.7 **Control Rod Testing - Operating**

BASES

BACKGROUND

Control rod patterns during startup conditions are controlled by the operator and the Rod Pattern Controller (RPC) (LCO 3.3.2.1) such that only specified control rod sequences (LCO 3.1.7) and relative position are allowed over the operating range from all control rods inserted to the Low Power Setpoint (LPSP) of the RPC. The sequences effectively limit the magnitude of the potential positive reactivity insertion that would occur during a Control Rod Drop Accident (CRDA). Control rod testing is sometimes required that may result in control rod patterns not in compliance with the prescribed sequences of LCO 3.1.7. These tests may include SHUTDOWN MARGIN demonstrations, control rod scram time testing, control rod friction testing and testing performed during Startup Testing (ie., physics testing and post refueling testing). This Special Operations LCO provides the necessary the exemption to the requirements and provides additional controls to allow the deviations from the prescribed sequences.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the CRDA are summarized in References 1, 2, and 3. CRDA analyses assume the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the CRDA analyses. The RPC provides backup to operator control of the withdrawal sequences to ensure the initial conditions of the CRDA analyses are not violated. For special sequences developed for control rod testing, the initial control rod patterns assumed in the safety analysis of References 1, 2, and 3 may not be preserved and therefore special CRDA analyses are required to demonstrate the special sequence will not result in unacceptable consequences should a CRDA occur during the testing. These analyses are dependent on the specific test being performed.

(continued)

BASES (continued)

LCO

As described in LCO 3.0.8, compliance with this Special Operations LCO is optional. Control rod testing may be performed in compliance with the prescribed sequences of LCO 3.1.7 and during these tests no exemptions to the requirements of LCO 3.1.7 are necessary. For testing performed with a sequence not in compliance with LCO 3.1.7, the requirements of LCO 3.1.7 may be suspended provided additional controls are placed on the test to ensure the assumptions of the special safety analysis for the test sequence are satisfied. When deviating from the prescribed sequences of LCO 3.1.7, individual control rods must be bypassed in the Rod Action Control System (RACS). Assurances that the test sequence is followed can be provided by verifying conformance to the approved test sequence by a second licensed operator or other qualified member of the technical staff. These controls are consistent with those normally applied to operation in the startup range as defined in the SR 3.3.2.1.9 when it is necessary to deviate from the prescribed sequence (e.g., an inoperable control rod that must be fully inserted).

APPLICABILITY

Control rod testing during MODES 1 and 2 with THERMAL POWER greater than the LPSP of the RPC is adequately controlled by the existing LCOs on power distribution limits. Control rod movement during these conditions is not restricted to prescribed sequences and can be performed within the constraints of LCO 3.2.1, LCO 3.2.2, LCO 3.2.3 and LCO 3.3.2.1. With THERMAL POWER less than or equal to the LPSP of the RPC, the provisions of this Special Operations LCO are necessary to perform special tests which are not in conformance with the prescribed sequences of LCO 3.1.7. During MODES 3 and 4, control rod withdrawal is only allowed if performed in accordance with Special Operations LCO 3.10.3 or Special Operations LCO 3.10.4 which provide adequate controls to ensure the assumptions of the safety analysis of References 1, 2, and 3 are satisfied. During these special operations and during MODE 5, the One-Rod-Out interlock (LCO 3.9.2 and LCO 3.9.4) and scram functions (LCO 3.3.1.1, LCO 3.3.8.2 and LCO 3.9.5) or added administrative controls prescribed in the applicable Specials Operations LCOs provide mitigation of potential reactivity excursions.

(continued)

BASES (continued)

ACTIONS

A.1

With the requirements of the Special Operations LCO not met (e.g., control rod pattern is not in compliance with the special test sequence), the testing is required to be immediately suspended. Upon suspension of the special test, the provisions of LCO 3.1.7 are no longer exempted and appropriate actions are specified to restore the control rod sequence to the prescribed sequence of LCO 3.1.7, or shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.10.7.1, SR 3.10.7.2

During performance of the special test, a second licensed operator or other qualified member of the technical staff is required to verify conformance with the approved sequence for the test. This verification must be performed during control rod movement to prevent deviations from the specified sequence. As such, a periodic frequency is not appropriate for this surveillance. This surveillance provides adequate assurance that the specified test sequence is being followed and is also supplemented by SR 3.10.7.2 which requires verification of the bypassing of control rods in RACS and subsequent movement of these control rods.

REFERENCES

1. Grand Gulf Unit 1 Current Cycle Safety Analysis (CCSA).

2. "Modifications to the Requirements for Control Rod Drop Accident Mitigating Systems", BWR Owner's Group, July 1986.

3. Grand Gulf Unit 1 UFSAR Section 15.4.9.