Nuclear Operating Company

South Texas Project Electric Generating Station 4000 Avenue F – Suite A Bay City, Texas 77414

September 24, 2009
U7-C-STP-NRC-090152

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Rockville MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Request for Additional Information

Attached are the responses to the NRC staff questions included in Request for Additional Information (RAI) letter number 220, related to Combined License Application (COLA) Part 2, Tier 2, Chapter 16, Technical Specifications. This submittal completes the response to RAI letter number 220.

The nine (9) attachments provide the responses to the RAI questions listed below:

RAI 16-54	RAI 16-57	RAI 16-60
RAI 16-55	RAI 16-58	RAI 16-61
RAI 16-56	RAI 16-59	RAI 16-62

When a change to the COLA is indicated, it will be incorporated into the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions, please contact Scott Head at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

STI 32537197

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NRO

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 9/24/09

Mark McBurnett
Vice President, Oversight and Regulatory Affairs
South Texas Project Units 3 & 4

gsc

Attachments:

1. RAI 16-54
2. RAI 16-55
3. RAI 16-56
4. RAI 16-57
5. RAI 16-58
6. RAI 16-59
7. RAI 16-60
8. RAI 16-61
9. RAI 16-62

cc: w/o attachment except*
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RAI 16-54

QUESTION:

STD DEP 16.3-78 removes the containment water level parameter from Post Accident Monitor technical specifications because the parameter does not meet the criteria for inclusion (i.e., Drywell water level is classified as Regulatory Guide 1.97 (revision 3) Category 2 non-type A, and sump level is classified as Category 3 non-type A). Also, the Bases only require that PAM instrumentation for parameters that are classified as Regulatory Guide 1.97 Type A or Category I non-type A be included in TS. The departure states that "Lower drywell level instrumentation is described as 'not warranted' in the DCD" but does not state a specific DCD section for this quote.

10 CFR 52.79(a)(17) requires that information with respect to compliance with technically relevant positions of the Three Mile Island requirements of 50.34(f) must be provided in a final safety analysis report, with three exceptions; 10 CFR 50.34(f)(1)(xii), 10 CFR 50.34(f)(2)(ix) (ix), and 10 CFR 50.34(f)(3)(v). The three exceptions to 50.34(f) deal with hydrogen control and containment integrity. The relevant requirements of 50.34(f) dealing with accident monitoring instrumentation, specifically 50.34(f) (2) (xvii), is retained by 52.79(a) (17).

Additional explanation needs to be provided to justify the removal of the Containment Water Level function from the PAM Instrumentation specification. The explanation should include why the Drywell Water Level is classified as Category 2 and Drywell Sump Level is classified as Category 3 and the specific parts of the documents, standards, guides or regulations that are cited for the justification. Additional explanation should be provided for this Departure before the acceptability of this Departure can be concluded.

RESPONSE:

The reference ABWR DCD Subsection 7.5.2.1(2)(e) provides justification for Drywell Sump Level being classified as a Category 3 variable. DCD Subsection 7.5.2.1(2)(o) provides a description of instrumentation for monitoring of containment water level, referred to as Drywell Water Level monitoring. Drywell Water Level monitoring consists of separate instrumentation for monitoring the wetwell water level (suppression pool water level) and the upper drywell water level. The suppression pool water level is a Category I variable, and is included in Technical Specification LCO 3.3.6.1. DCD Chapter 7, Table 7.5-2 ABWR PAM Variable List, indicates that Drywell Water Level is classified as Category 2. Therefore, in accordance with RG 1.97 Rev. 3, Drywell Sump Level and Drywell Water Level are not included in Technical Specification LCO 3.3.6.1 because these variables are not Category I or Category I non-Type A variables.

COLA Part 7, Section 2.2 will be revised in a future revision as a result of this RAI. Gray highlighting shows the changes.

STD DEP 16.3-78, LCO 3.3.6.1, Post Accident Monitoring (PAM) Instrumentation

Description

The containment water level parameter has been removed from Post Accident Monitor technical specifications. The instrumentation does not meet the ~~Bases'~~ criteria for inclusion (i.e., Drywell water level is classified as Cat. 2 and sump level is classified as Cat 3). ~~Also, the Bases only require that Post-Accident Monitoring instruments that are classified as Regulatory Guide 1.97 Type A or Category I be included. Lower drywell level instrumentation is described as "not warranted" in the DCD~~ The reference ABWR DCD Subsection 7.5.2.1(2)(e) provides justification for Drywell Sump Level being classified as a Category 3 variable. DCD Subsection 7.5.2.1(2)(o) provides a description of instrumentation for monitoring of containment water level, referred to as Drywell Water Level monitoring. Drywell Water Level monitoring consists of separate instrumentation for monitoring the wetwell water level (suppression pool water level) and the upper drywell water level. The suppression pool water level is a Category I variable, and is included in Technical Specification LCO 3.3.6.1. DCD Chapter 7, Table 7.5-2 ABWR PAM Variable List, indicates that Drywell Water Level is classified as Category 2. Therefore, in accordance with RG 1.97 Rev. 3, Drywell Sump Level and Drywell Water Level are not required to be included in Technical Specification LCO 3.3.6.1 because these variables are not Category I or Category I non-Type A variables.

Evaluation Summary

This departure was evaluated per Section VIII.C.4 of Appendix A to 10 CFR Part 52, which requires that 1) the exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security; and 2) special circumstances are present as specified in 10 CFR 50.12(a)(2); As shown below, both of these two criteria are satisfied.

The exemption is not inconsistent with the Atomic Energy Act or any other statute and therefore is authorized by law. As discussed above, the Bases only require that Post-Accident Monitoring instruments that are classified as Type A or Category I be included and so will not present an undue risk to the public health and safety, and the departure does not relate to security and does not otherwise pertain to the common defense and security.

Special circumstances are present as specified in 10 CFR 50.12(a)(2). Specifically, special circumstance (ii) is present, since it is unnecessary to include the deleted provisions in the Technical Specifications in order to ensure that they reflect DCD design and regulatory guidance.

As demonstrated above, this exemption complies with the requirements in Section VIII.C.4 of Appendix A to 10 CFR Part 52. Therefore, STPNOC requests that the NRC approve this exemption.

RAI 16-55

QUESTION:

In the Background section of the bases for plant-specific TS 3.3.1.1, the discussion of the Automatic Depressurization System (ADS) is changed by STD DEP 16.3-85 to correct the ADS accumulators' capacity to operate the safety relief valves with no external source of nitrogen.

The revised text, which is supported by DCD Section 7.3.1.1.1.2(3), paragraph 2, and Section 5.2.2.4.1, states that the ADS accumulators have sufficient capacity to operate the safety relief valve one time at drywell design pressure or five times at normal drywell pressure with no external source of nitrogen.
The revised text proposed by STD DEP 16.3-85 does correct the Bases to be consistent with the text given in FSAR Section 7.3.1.1.2. However, the departure does not explain why sizing the ADS accumulator capacity to operate the SRV "once at drywell design pressure or five times at normal drywell pressure" instead of "twice at 70% drywell design pressure" does not change the intent of GTS 3.3.1.1 for sensor instrumentation functions that support the ADS (e.g., Function 9). The applicant is requested to explain in the departure the technical basis for the revised text and why it does not change the intent of GTS 3.3.1.1.

RESPONSE:

The reference ABWR DCD Subsections 5.2.2.4.1 and 7.3.1.1.1.2(3) are correct in stating the design requirements for the ADS accumulators as "once at drywell design pressure or five times at normal drywell pressure" rather than "twice at 70% drywell design pressure," as stated in the GTS 3.3.1.1 Bases.

ABWR DCD Subsection 6.7.2 reiterates the design requirement as follows:

> Flow rate and capacity requirements are divided into an initial requirement and a continuous supply. An initial requirement for each ADS SRV provides for actuations of the valve against drywell pressure. Two hundred liter accumulators are supplied for each main steam ADS SRV actuator. The continuous supply is divided into safety and nonsafety portions. Calculations shall be performed to confirm that an accumulator capacity of 200 liters, with the minimum required pneumatic supply pressure is sufficient for one actuation at drywell design pressure, or five actuations at normal drywell pressure with nominal pneumatic supply pressure. The analysis methods used to confirm that the accumulator capacity is sufficient are provided in Subsection 6.7.6.

These statements are all consistent with the Tier 1 design requirement that "the ADS accumulator capacity can open the SRV with the drywell pressure at design pressure following failure of the pneumatic supply to the accumulator," and the Tier 1 ITAAC requirements as stated below:

a. The SRV ADS accumulators have the capacity to lift the stem of the SRVs to the full open position one time with the drywell pressure at, or above the drywell design pressure, or

b. The SRV ADS accumulators have the capacity to lift the stem of the SRVs to the full open position five times with the drywell at atmospheric pressure, and an analysis that shows that five SRV lifts at atmospheric pressure demonstrates the capability to open one time with the drywell at the drywell design pressure.

The design information regarding number of lifts at various pressures more appropriately belongs in the Bases for LCO 3.5.1, Emergency Core Cooling Systems (ECCS) – Operating (SR 3.5.1.3 to verify ADS nitrogen supply pressure is adequate, in particular) rather than in the Safety System Logic and Control (SSLC) Sensor Instrumentation (TS 3.3.1.1) Bases Background section. In fact, the SR 3.5.1.3 Bases state that:

> The designed pneumatic supply pressure requirements for the accumulator are such that, following a failure of the pneumatic supply to the accumulator, at least one valve actuation can occur with the drywell at design pressure, or five valve actuations can occur with the drywell at atmospheric pressure (Ref. 10). The ECCS safety analysis assumes only one actuation to achieve the depressurization required for operation of the low pressure ECCS.

Thus, departure STD DEP 16.3-85 was written to identify this discrepancy and to correct the GTS 3.3.1.1 Bases Background section. This departure does not change the intent of the instrumentation specifications (TS 3.3.1.1) in any way, it simply corrects factual information that, although present, is not needed in the TS 3.3.1.1 Bases.

No additional COLA revision is required as a result of this RAI response.

RAI 16-56

QUESTION:

STD DEP 16.3-86 revises generic TS SR 3.3.1.4.7 from "Perform Manual initiation CHANNEL FUNCTIONAL TEST" to "Perform CHANNEL FUNCTIONAL TEST," and Footnote (d) of generic TS Table 3.3.1.4-1 from "These are manual initiation channel functions" to "These are manual channel functions."

Table 3.3.1.4-1, "ESF Actuation Instrumentation," in both generic and plant-specific TS 3.3.1.4, specifies that SR 3.3.1.4.7 and Footnote (d) apply to the following ESF actuation instrumentation Functions:

1.e - LPFL Manual Initiation of the LPCF Actuation,
2.f - HPCF B Manual Initiation of the HPCF Actuation,
2.g - HPCF C Diverse Logic Manual initiation of the HPCF Actuation,
3.e - RCIC Manual Initiation of the RCIC Actuation,
4.c - ADS Manual Initiation of ADS,
4.f - ATWS Manual ADS Inhibit of ADS,
5.e - DG Manual Initiation of Diesel-Generator Actuation,
7.c - RCW/RSW Manual Initiation of RBCW/SW Actuation,
9.c - SPC Manual Initiation of SPC Cooling Actuation,
11 - CIV Division Manual Initiation,
12.c - RCIC Manual Isolation Initiation of RCIC Isolation Actuation.

This departure appears to address the apparent inconsistency of using the word "initiation" in the SR and Footnote while applying the SR and Footnote to Function 4.f, which uses the word "inhibit." Since a CFT is specified regardless of the inclusion of the word "initiation", the intent of the GTS is not changed. Therefore this departure is administrative and acceptable. The applicant is requested to confirm the staff's understanding of the purpose of this departure and to clarify in the departure why the intent of GTS 3.3.1.4 is not changed.

RESPONSE:

The NRC Staff's interpretation of the purpose for STD DEP 16.3-86 is correct. and the departure could have been considered administrative because it is a clarification of a surveillance requirement. The intent of the departure STD DEP 16.3-86 is to clarify that SR 3.3.1.4.7 applies to both the manual initiation and the manual inhibit functions in Table 3.3.1.4-7.

COLA Part 7, Section 2.2, departure STD DEP 16.3-86 will be revised in a future COLA revision as follows:

COLA Part 7, Section 2.2

STD DEP 16.3-86, LCO 3.3.1.4, ESF Actuation Instrumentation

This departure addresses an inconsistency concerning use of the word "initiation" in SR 3.3.1.4.7 and in Footnote d to Table 3.3.1.4-1. There is no defined term "Manual Initiation CHANNEL FUNCTIONAL TEST," as shown in DCD SR 3.3.1.4.7. The defined term is "CHANNEL FUNCTIONAL TEST." SR 3.3.1.4-7 is the CHANNEL FUNCTIONAL TEST, and this test applies to functions:

1.e - LPFL Manual Initiation of the LPCF Actuation,
2.f - HPCF B Manual Initiation of the HPCF Actuation,
2.g - HPCF C Diverse Logic Manual initiation of the HPCF Actuation,
3.e - RCIC Manual Initiation of the RCIC Actuation,
4.c - ADS Manual Initiation of ADS,
4.f - ATWS Manual ADS Inhibit of ADS,
5.e - DG Manual Initiation of Diesel-Generator Actuation,
7.c - RCW/RSW Manual Initiation of RBCW/SW Actuation,
9.c - SPC Manual Initiation of SPC Cooling Actuation,
11 - CIV Division Manual Initiation, and
12.c - RCIC Manual Isolation Initiation of RCIC Isolation Actuation

Table 3.3.1.4-1. Function 4.f is an "inhibit" function, while the others are initiation functions. It is clear from the Table that SR 3.3.1.4.7 applies to both "manual initiation" as well as to "manual inhibit" functions.

The text of SR 3.3.1.4.7 is changed to ~~apply~~ clarify that the surveillance applies to both the manual inhibit as well as to the manual initiation channels in Table 3.3.1.4-1. ~~for ADS. Table 3.3.1.4-1, Functions 4.c and 4.f both reference this surveillance requirement.~~ Footnote (d) to Table 3.3.1.4-1 is also changed to reflect both the manual initiation as well as the manual inhibit channel Functions.

RAI 16-57

QUESTION:

Justify the testing requirements of Surveillance Requirements (SR) contained in Section 3.6.1 in order to validate Departure STD DEP 16.3-44.

The Bases states, "Maintaining the primary containment OPERABLE requires compliance with the visual examinations and leakage rate test requirements of 10 CFR 50, Appendix J (Ref. 3), as modified by approved exceptions. Failure to meet air lock leakage testing (SR 3.6.1.2.1), [resilient seal primary containment purge valve leakage testing (SR 3.6.1.3.7),] or main steam isolation valve leakage (SR 3.6.1.3.13), or hydrostatically tested valve leakage (SR 3.6.1.3.12) does not necessarily result in a failure of this SR. The impact of the failure to meet these SRs must be evaluated against the Type A, B, and C acceptance criteria of 10 CFR 50, Appendix J."

Departure STD DEP 16.3-44 deleted the phrase "main steam isolation valve leakage (SR 3.6.1.3.13)" from Bases B 3.6.1.1 SR 3.6.1.1.1. The explanation for this change is that the containment analysis assumes a specific leakage limit for La and a specific leakage limit for main steam isolation valve leakage. It is unclear how assuming a specific leakage limit for main steam isolation valve leakage justifies its exclusion from leakage rate testing in accordance with 10 CFR 50, Appendix J. This information is required in order to determine that leakage rate testing will be performed in accordance with 10 CFR 50, Appendix J.

RESPONSE:

STD DEP 16.3-44 has been determined to be unnecessary; therefore, it is being deleted. COLA Part 2, Tier 2, Section 16B.3.6.1.1 and Part 7, Section 2.2 will be revised in a future COLA revision as shown below.

The corresponding changes will also be made to COLA Part 4.

B 3.6 CONTAINMENT SYSTEMS

B 3.6.1.1 Primary Containment

BASES

The information in this section of the reference ABWR DCD, including all subsections, is incorporated by reference with the following departure and supplements. The site-specific supplements partially address COL License Information Item 16.1.

STD DEP 6.2-2
STD DEP 16.3-43
~~STD DEP 16.3-44~~
STD DEP 16.3-45

BACKGROUND

The isolation devices for the penetrations in the primary containment boundary are a part of the containment leak tight barrier. To maintain this leak tight barrier:

a. All penetrations required to be closed during accident conditions are either:

1. capable of being closed by an OPERABLE automatic Containment Isolation System, or

2. closed by manual valves, blind flanges, or de-activated automatic valves secured in their closed positions, except as provided in LCO 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)";

STD DEP 16.3-43

b. The primary containment air locks are OPERABLE, except as provided in LCO 3.6.1.2, "Primary Containment Air Locks";

c. The sealing mechanism associated with a penetration (e.g., welds, bellows, or o-rings) is OPERABLE.

APPLICABLE SAFETY ANALYSES

The safety design basis for the primary containment is that it must withstand the pressures and temperatures of the limiting DBA without exceeding the design leakage rate.

The DBA that postulates the maximum release of radioactive material within primary containment is a LOCA. In the analysis of this accident, it is assumed that primary containment is OPERABLE such that release of fission products to the environment is controlled by the rate of primary containment leakage.

Analytical methods and assumptions involving the primary containment are presented in References 1 and 2. The safety analyses assume a nonmechanistic fission product release following a DBA, which forms the basis for determination of offsite doses. The fission product release is, in turn, based on an assumed leakage rate from the primary containment. OPERABILITY of the primary containment ensures that the leakage rate assumed in the safety analyses is not exceeded.

STD DEP 6.2-2

The maximum allowable leakage rate for the primary containment (La) is 0.5% by weight of the containment air per 24 hours at the ~~maximum~~ calculated peak containment pressure (Pa) of ~~0.269 MPaG~~ 281.8 kPaG or [0.257]% by weight of the containment air per 24 hours at the reduced pressure of Pt of [144.8] ~~MPaG~~kPaG (Ref. 1).

SURVEILLANCE REQUIREMENTS

SR 3.6.1.1.1

~~STD DEP 16.3-44~~

Maintaining the primary containment OPERABLE requires compliance with the visual examinations and leakage rate test requirements of 10 CFR 50, Appendix J (Ref. 3), as modified by approved exemptions. Failure to meet air lock leakage testing (SR 3.6.1.2.1), [resilient seal primary containment purge valve leakage testing (SR 3.6.1.3.~~7~~6),] main steam isolation valve leakage (SR 3.6.1.3.13), or hydrostatically tested valve leakage (SR 3.6.1.3.12~~1~~11) does not necessarily result in a failure of this SR. The impact of the failure to meet these SRs must be evaluated against the Type A, B, and C acceptance criteria of 10 CFR 50, Appendix J. The Frequency is required by 10 CFR 50, Appendix J (Ref. 3), as modified by approved exemptions. Thus, SR 3.0.2 (which allows Frequency extensions) does not apply.

STD DEP 6.2-2
STD DEP 16.3-45

REFERENCES

1. ~~*DCD Tier 2, Section 6.2.*~~WCAP-17058, June 2009
2. *DCD Tier 2, Section ~~15.1~~*15.6.
3. *10 CFR 50, Appendix J.*

STP COLA Part 7, Section 2.2

~~STD DEP 16.3-44, LCO 3.6.1.1, Primary Containment~~

~~The Bases states, "Maintaining the primary containment OPERABLE requires compliance with the visual examinations and leakage rate test requirements of 10 CFR 50, Appendix J (Ref. 3), as modified by approved exemptions. Failure to meet air lock leakage testing (SR 3.6.1.2.1), [resilient seal primary containment purge valve leakage testing (SR 3.6.1.3.7),] or main steam isolation valve leakage (SR 3.6.1.3.13), or hydrostatically tested valve leakage (SR 3.6.1.3.12) does not necessarily result in a failure of this SR. The impact of the failure to meet these SRs must be evaluated against the Type A, B, and C acceptance criteria of 10 CFR 50, Appendix J."~~

~~The main steam isolation valve leakage SR has been eliminated from this list since the containment analyses assumes a specific leakage limit for L_a and a specific leakage limit for main steam isolation valve leakage. Therefore, main steam line leakage is excluded from the L_a term.~~

RAI 16-58

QUESTION:

These are questions that apply to STD DEP 16.3-71.

a) Provide justification for deleting the exception for purge valve penetration flows from Note 1 in 3.6.1.3 LCO Action, Note 1. This part of Departure STD DEP 16.3-71 deletes the exception for purge valve penetration flow paths and would allow purge valve penetration flow paths to be insolated intermittently under administrative controls. No explanation has been provided to justify this change.

b) Provide justification for adding "main steam line isolation valve leakage, or hydrostatically tested line leakage" to Condition A in 3.6.1.3 LCO Condition A and B 3.6.1.3 LCO Action A.1 and A.2, 1st Sentence, 1st Paragraph. This part of Departure STD DEP 16.3-71 adds "main steam line isolation valve leakage, or hydrostatically tested line leakage" to Condition A. No explanation has been provided to justify this change.

c) Provide justification for adding "main steam line isolation valve leakage, or hydrostatically tested line leakage" to Condition B in 3.6.1.3 LCO Condition B and B 3.6.1.3 LCO Action B.1, 1st Sentence, 1st Paragraph. This part of Departure STD DEP 16.3-71 adds "main steam line isolation valve leakage, or hydrostatically tested line leakage" to Condition B. No explanation has been provided to justify this change.

d) Provide justification for deleting original Surveillance Requirement 3.6.1.3.1 and its associated Note in 3.6.1.3 SR 3.6.1.3.1. This part of Departure STD DEP 16.3-71 deletes SR 3.6.1.3.1 including its associated Note. In the Original Wording of this part of Departure STD DEP 16.3-71, SR 3.6.1.3.1 is required only while in Condition D of the LCO. In both the Original Wording and the Departure Wording of Condition D of the LCO, SR 3.6.1.3.1 would have to be done when (Original Wording) "One or more penetration flow paths with one or more containment purge valves not within purge valve leakage limits." or (Departure Wording) "Pure valve leakage rate, main steam isolation valve leakage, or hydrostatically tested line leakage not within limit." The explanation to this change states "Utilizing the Note in SR 3.6.1.3.2 would always be a failure to meet SR 3.6.1.3.1. The ABWR utilizes an inerted containment and therefore, SR 3.6.1.3.2 is the appropriate SR for the design." As the Original Wording of SR 3.6.1.3.1 applies only in Condition D, the conflict with SR 3.6.1.3.2 is not apparent. Note 2 to SR 3.6.1.3.2 allows the primary containment purge valves to be opened for inerting, deinerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open.

e) Provide justification for deleting the phrase "maintained seal closed or" from the 2nd paragraph of Bases B 3.6.1.3 LCO in B 3.6.1.3 LCO, 2nd Paragraph. This part of Departure STD DEP 16.3-71 deleted the phrase that eliminated the requirement to maintain sealed closed the 550 mm purge valves. No explanation has been provided to justify this change.

f) Provide justification for eliminating the phrase "Due to the size of the primary containment purge line penetration and the fact that those penetration exhausts directly from the containment atmosphere to the environment, the penetration flow path containing these valves is not allowed to be opened under administrative controls. A single purge valve in a penetration flow path may

be opened to effect repairs to an inoperable valve as allowed by SR 3.6.1.3.1." in B 3.6.1.3 LCO Actions, 1st Paragraph.

This part of Departure STD DEP 16.3-71 deleted the phrase that allows the primary containment purge line penetration to be opened under administrative controls. No explanation has been provided to justify this change.

This information is required in order to validate STD DEP 16.3-71.

RESPONSE:

It has been determined that departure STD DEP 16.3-71 is unnecessary; therefore, it is being deleted.

COLA Part 2, Chapter 16.3.6.1.3 and Bases and COLA Part 7, STD DEP 16.3-71 will be revised as shown below. The associated COLA Part 4 changes will also be made.

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

The information in this section of the reference ABWR DCD, including all subsections, is incorporated by reference with the following departures and site-specific supplements. The site-specific supplements partially address COL License Information Item 16.1.

STD DEP 16.3-71
STD DEP 16.3-72

ACTIONS

NOTES

STD DEP 16.3-71

1. *Penetration flow paths except for purge valve penetration flow paths may be unisolated intermittently under administrative controls.*
2. *Separate Condition entry is allowed for each penetration flow path.*
3. *Enter applicable Conditions and Required Actions for systems made inoperable by PCIVs.*
4. *Enter applicable Conditions and Required Actions of LCO 3.6.1.1, "Primary Containment," when PCIV leakage results in exceeding overall containment leakage rate acceptance criteria.*

CONDITION	*REQUIRED ACTION*	*COMPLETION TIME*
A. NOTE *Only applicable to penetration flow paths with two PCIVs* . STD DEP 16.3-71 *One or more penetration flow paths with one PCIV inoperable except for purge valve leakage,* main steam line isolation valve leakage, or hydrostatically tested line leakage, *not within limit.*	*A.1* *Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.* *AND*	*4 hours except for main steam line* *AND* *8 hours for main steam line*

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 NOTE Valves and blind flanges in high radiation areas may be verified by use of administrative means. Verify the affected penetration flow path is isolated.	Once per 31 days for isolation devices outside primary containment, drywell, and steam tunnel AND Prior to entering MODE 2 or 3 from MODE 4, if primary containment was deinerted while in MODE 4, if not performed within the previous 92 days, for isolation devices inside primary containment
B. NOTE Only applicable to penetration flow paths with two PCIVs. STD DEP 16.3-71 One or more penetration flow paths with two PCIVs inoperable except for purge valve leakage, main steam isolation valve leakage, or hydrostatically tested line leakage not within limit.	B.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.	1 hour

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~C. ----------NOTE---------- Only applicable to penetration flow paths with only one PCIV. ---------- One or more penetration flow paths with one PCIV inoperable~~	~~C.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.~~ ~~AND~~ ~~C.2 ----------NOTE---------- Valves and blind flanges in high radiation areas may be verified by use of administrative means. ----------~~ ~~Verify the affected penetration flow path is isolated.~~	~~4 hours except for excess flow check valves (EFCVs)~~ ~~AND~~ ~~12 hours for EFCVs~~ ~~Once per 31 days~~
~~STD DEP 16.3-71~~ D. One or more penetration flow paths with one or more containment purge valves not within purge valve leakage limits.	D.1 Isolate the affected penetration flow path by use of at least one [closed and deactivated automatic valve, closed manual valve, or blind flange]. AND D.2 ----------NOTE---------- Valves and blind flanges in high radiation areas may be verified by use of administrative means. ---------- Verify the affected penetration flow path is isolated. AND	24 hours Once per 31 days for isolation devices outside containment AND

CONDITION	REQUIRED ACTION	COMPLETION TIME
		Prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days for isolation devices inside containment
	D.3 Perform SR 3.6.1.3.7 for the resilient seal purge valves closed to comply with Required Action D.1.	Once per [92] days
STD DEP 16.3-71 D. Purge valve leakage rate, main steam isolation valve leakage, or hydrostatically tested line leakage not within limit.	D.1 Restore leakage to within limit.	[4 hours except for main steam line isolation valve leakage AND 8 hours for main steam line isolation valve leakage]
STD DEP 16.3-71 E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1 Be in MODE 3 AND E.2 Be in MODE 4	12 hours 36 hours
F. Required Action and associated Completion Time of Condition A, B, or C, or D not met for PCIV(s) required to be OPERABLE during movement of irradiated fuel assemblies in the secondary containment.	NOTE LCO 3.0.3 is not applicable. F.1 Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
G. Required Action and associated Completion Time of Condition A, B, or C, or D not met for PCIV(s) required to be OPERABLE during CORE ALTERATIONS.	G.1 Suspend CORE ALTERATIONS.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~H. Required Action and associated Completion Time of Condition A, B, or C, or D not met for PCIV(s) required to be OPERABLE during MODE 4 or 5 or during operations with a potential for draining the reactor vessel (OPDRVs).~~	~~H.1 Initiate action to suspend OPDRVs.~~ ~~OR~~ ~~H.2 Initiate action to restore valve(s) to OPERABLE status.~~	~~Immediately~~ ~~Immediately~~

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	*FREQUENCY*
~~STD DEP 16.3-71~~ ~~*SR 3.6.1.3.1*~~ ~~NOTE~~ ~~*Only required to be met in MODES 1, 2, and 3*~~ ~~*Verify each 550 mm primary containment purge valve is sealed closed except for one purge valve in a penetration flow path while in Condition D of this LCO.*~~	~~*31 days*~~
~~*SR 3.6.1.3.21*~~ ~~*NOTES*~~ ~~*1. Only required to be met in MODES 1, 2, and 3.*~~ ~~*2. Not required to be met when the 550 mm primary containment purge valves are open for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open.*~~ ~~*Verify each 550 mm primary containment purge valve is closed.*~~	~~*31 days*~~
~~*SR 3.6.1.3.32*~~ ~~*NOTES*~~ ~~*1. Valves and blind flanges in high radiation areas may be verified by use of administrative means.*~~ ~~*2. Not required to be met for PCIVs that are open under administrative controls.*~~ ~~*Verify each primary containment isolation manual valve and blind flange that is located outside primary containment and is required to be closed during accident conditions is closed.*~~	~~*31 days*~~

~~SR 3.6.1.3.43~~	~~NOTES~~ ~~1. Valves and blind flanges in high radiation areas may be verified by use of administrative means.~~ ~~2. Not required to be met for PCIVs that are open under administrative controls.~~ ~~Verify each primary containment isolation manual valve and blind flange that is located inside primary containment and is required to be closed during accident conditions is closed.~~	~~Prior to entering MODE 2 or 3 from MODE 4, if primary containment was deinerted while in MODE 4, if not performed within the previous 92 days~~
~~SR 3.6.1.3.54~~	~~Verify continuity of the automatic traversing incore probe (ATIP) shear isolation valve explosive charge.~~	~~31 days~~
~~SR 3.6.1.3.65~~	~~Verify the isolation time of each power operated and each automatic PCIV, except MSIVs, is within limits.~~	~~In accordance with the Inservice Testing Program~~
SR 3.6.1.3.7	*NOTES* *1 Only required to be met in MODES 1, 2, and 3.* *2. Results shall be evaluated against acceptance criteria of SR 3.6.1.1.1 in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions.* *Perform leakage rate testing for each primary containment purge valve with resilient seals*	*184 days* *AND* *Once within 92 days after opening the valve*
~~SR 3.6.1.3.87~~	~~Verify the isolation time (i.e., total closure time exclusive of electrical delays) of each MSIV is ≥ 3 seconds and ≤ 4.5 seconds.~~	~~3 months~~
~~SR 3.6.1.3.98~~	~~Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.~~	~~18 months~~
~~SR 3.6.1.3.109~~	~~Verify each reactor instrumentation line EFCV~~	~~18 months~~

	actuates on a simulated instrument line break to restrict flow to ≤ 1.05 cm³/s.	
SR 3.6.1.3.1110	Remove and test the explosive squib from each shear isolation valve of the ATIP System.	18 months on a STAGGERED TEST BASIS
SR 3.6.1.3.1211	NOTES 1. Only required to be met in MODES 1, 2, and 3. 2. Results shall be evaluated against acceptance criteria of SR 3.6.1.1.1 in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions.	
	Verify the combined leakage rate of 0.277 cm³/hr times the total number of PCIVs through hydrostatically tested lines that penetrate the primary containment is not exceeded when these isolation valves are tested at ≥ 0.294 MPaG.	18 months
STD DEP 16.3.72		
SR 3.6.1.3.1312	NOTE Results shall be evaluated against acceptance criteria of SR 3.6.1.1.1 in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions.	NOTE SR 3.0.2 is not applicable
	Verify leakage rate through each MSIV is ≤ 1 m3/h when tested at ≥ 0.170 MPaG.	In accordance with 10 CFR 50, Appendix J, as modified by approved exemptions
SR 3.6.1.3.14	----------NOTE---------- Only required to be met in MODES 1, 2, and 3. ----------	
	Verify each [550 mm] primary containment purge valve is blocked to restrict the valve from opening > [50] %.	18 months

B 3.6 CONTAINMENT SYSTEMS

B 3.6.1.3 Primary Containment Isolation Valves (PCIVs)

BASES

The information in this section of the reference ABWR DCD, including all subsections, is incorporated by reference with the following departures and site-specific supplements. The site-specific supplements partially address COL License Information Item 16.1.

~~STD DEP 16.3-71~~
~~STD DEP 16.3-72~~
STD DEP 16.3-73
STD DEP 16.3-74

STD DEP 16.3-73

BACKGROUND

The primary containment purge lines are 550 mm in diameter; vent lines are 550 mm in diameter. The 550 mm primary containment purge valves are normally maintained closed in MODES 1, 2, and 3 to ensure leak tightness. The isolation valves on the 550 mm vent lines from the drywell *have 50 mm bypass lines around them for use during normal reactor operation.* ~~*Two additional redundant excess flow isolating dampers are provided on the vent line upstream of the Standby Gas Treatment (SGT) System filter trains. These isolation dampers, together with the*~~The *PCIVs*~~*,*~~ *will* close before fuel failure and *prevent high pressure from reaching the SGT System filter trains in the unlikely event of a loss of coolant accident (LOCA) during venting.* ~~*Closure of the excess flow isolation dampers will not prevent the SGT System from performing its design function (that is, to maintain a negative pressure in the secondary containment). To ensure that a vent path is available, a 50 mm bypass line is provided around the dampers.*~~

STD DEP 16.3-73

APPLICABLE SAFETY ANALYSES

The DBAs that result in a release of radioactive material within primary containment are a LOCA and a main steam line break (MSLB). In the analysis for each of these accidents, it is assumed that PCIVs are either closed or close within the required isolation times following event initiation. This ensures that potential leakage paths to the environment through PCIVs (and primary containment purge valves) are minimized. Of the events analyzed in Reference 1, the MSLB is the most limiting event due to radiological consequences. The closure time of the main steam isolation valves (MSIVs) is the most significant variable from a radiological standpoint. The MSIVs are required to close within 3 to 4.5

seconds; therefore, the 4.5 second closure time is assumed in the analysis. The safety analyses do not make any explicit assumptions concerning ~~*assume that*~~ *the purge valves* ~~*were closed*~~ *at event initiation. Likewise, it is assumed that the primary containment is isolated such that release of fission products to the environment is controlled by the rate of primary containment leakage.*

STD DEP 16.3-73

~~*The DBA analysis assumes that within 60 seconds of the accident, isolation of the primary containment is complete and leakage is terminated, except for the maximum allowable leakage, La. The primary containment isolation total response time of 60 seconds includes signal delay, diesel generator startup (for loss of offsite power), and PCIV stroke times.*~~

The single failure criterion required to be imposed in the conduct of unit safety analyses was considered in the original design of the primary containment purge valves. Two valves in series on each purge line provide assurance that both the supply and exhaust lines could be isolated even if a single failure occurred.

~~*The primary containment purge valves may be unable to close in the environment following a LOCA. Therefore, each of the purge valves is required to remain sealed closed during MODES 1, 2, and 3. In this case, the single failure criterion remains applicable to the primary containment purge valve due to failure in the control circuit associated with each valve. Again, the primary containment purge valve design precludes a single failure from compromising primary containment OPERABILITY as long as the system is operated in accordance with this LCO.*~~

PCIVs satisfy Criterion 3 of the NRC Policy Statement.

LCO

~~*PCIVs form a part of the primary containment boundary. The PCIV safety function is related to control of primary containment leakage rates during a DBA.*~~

~~STD DEP 16.3-71~~

~~*The power operated, automatic isolation valves are required to have isolation times within limits and actuate on an automatic isolation signal. The 550 mm purge valves must be maintained sealed closed or blocked to prevent full opening. The valves covered by this LCO are listed with their associated stroke times in Reference 2.*~~

STD DEP 16.3-74

The normally closed isolation valves are considered OPERABLE when manual valves are closed, automatic valves are de-activated and secured in their closed position, blind flanges are in place, and closed systems are intact. These passive isolation valves and devices are those listed in Reference 2. Purge valves with resilient seals, ~~secondary bypass valves,~~ MSIVs, and hydrostatically tested valves must meet additional leakage rate requirements. Other PCIV leakage rates are addressed by LCO 3.6.1.1, "Primary Containment," as Type C testing.

~~This LCO provides assurance that the PCIVs will perform their designed safety functions to control leakage from the primary containment during accidents.~~

~~STD DEP 16.3-71~~

~~APPLICABILITY~~

~~In MODES 1, 2, and 3, a DBA could cause a release of radioactive material to primary containment. In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, most PCIVs are not required to be OPERABLE and the primary containment purge valves are not required to be sealed closed in MODES 4 and 5. Certain valves, however, are required to be OPERABLE to prevent inadvertent reactor vessel draindown. These valves are those whose associated instrumentation is required to be OPERABLE per LCO 3.3.1.1, "SSLC Sensor Instrumentation," and LCO 3.3.1.4, "ESF Actuation Instrumentation." (This does not include the valves that isolate the associated instrumentation.)~~

~~STD DEP 16.3-71~~

ACTIONS

~~The ACTIONS are modified by a Note allowing penetration flow path(s) except for the purge valve flow path(s) to be unisolated intermittently under administrative controls. These controls consist of stationing a dedicated operator at the controls of the valve, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for primary containment isolation is indicated. Due to the size of the primary containment purge line penetration and the fact that those penetrations exhaust directly from the containment atmosphere to the environment, the penetration flow path containing these valves is not allowed to be opened under administrative controls. A single purge valve in a penetration flow path may be opened to effect repairs to an inoperable valve, as allowed by SR 3.6.1.3.1.~~

~~A second Note has been added to provide clarification that, for the purpose of this LCO, separate Condition entry is allowed for each penetration flow path.~~

~~The ACTIONS are modified by a third Note, which ensures that~~

~~*appropriate remedial actions are taken, if necessary, if the affected system(s) are rendered inoperable by an inoperable PCIV (e.g., an Emergency Core Cooling Systems subsystem is inoperable due to a failed open test return valve).*~~

~~*Note 4 ensures appropriate remedial actions are taken when the primary containment leakage limits are exceeded. Pursuant to LCO 3.0.6, those actions are not required even when the associated LCO is not met. Therefore, Notes 3 and 4 are added to require that the proper actions are taken.*~~

~~STD DEP 16.3-71~~

A.1 and A.2

~~*With one or more penetration flow paths with one PCIV inoperable except for purge valve leakage, main steam isolation valve leakage, or hydrostatically tested line leakage not within limit, the affected penetration flow paths must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and deactivated automatic valve, a closed manual valve, a blind flange, and a check valve with flow through the valve secured. For penetration isolated in accordance with Required Action A.1, the valve used to isolate the penetration should be the closest available valve to the primary containment. The Required Action must be completed within the 4 hour Completion Time (8 hours for main steam lines). The Completion Time of 4 hours is reasonable considering the time required to isolate the penetration and the relative importance of supporting primary containment OPERABILITY during MODES 1, 2, and 3. For main steam lines, an 8 hour Completion Time is allowed. The Completion Time of 8 hours for the main steam lines allows a period of time to restore the MSIVs to OPERABLE status given the fact that MSIV closure will result in isolation of the main steam line(s) and a potential for plant shutdown.*~~

STD DEP 16.3-74

For affected penetrations that have been isolated in accordance with Required Action A.1, the affected penetration flow path(s) must be verified to be isolated on a periodic basis. This is necessary to ensure that primary containment penetrations required to be isolated following an accident, and no longer capable of being automatically isolated, will be in the isolation position should an event occur. This Required Action does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those valves outside containment and capable of potentially being mispositioned are in the correct position. The Completion Time of "once per 31 days for isolation devices outside primary containment, drywell, and steam tunnel" is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low. For valves

inside primary containment, the time period specified "prior to entering MODE 2 or 3 from MODE 4, if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the valves and other administrative controls ensuring that valve misalignment is an unlikely possibility.

Condition A is modified by a Note indicating that this Condition is only applicable to those penetration flow paths with two PCIVs. For penetration flow paths with one PCIV, Condition C provides the appropriate Required Actions.

Required Action A.2 is modified by a Note that applies to valves and blind flanges located in high radiation areas, and allows them to be verified by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is low.

STD DEP 16.3-71

B.1

With one or more penetration flow paths with two PCIVs inoperable except for purge valve leakage, main steam isolation valve leakage, or hydrostatically tested line leakage, *either the inoperable PCIVs must be restored to OPERABLE status or the affected penetration flow path must be isolated within 1 hour. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and deactivated automatic valve, a closed manual valve, and a blind flange. The 1 hour Completion Time is consistent with the ACTIONS of LCO 3.6.1.1.*

Condition B is modified by a Note indicating this Condition is only applicable to penetration flow paths with two PCIVs.

For penetration flow paths with one PCIV, Condition C provides the appropriate Required Actions.

C.1 and C.2

With one or more penetration flow paths with one PCIV inoperable, the inoperable valve must be restored to OPERABLE status or the affected penetration flow path must be isolated. The method of isolation must include the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a closed and de-activated automatic valve, a closed manual valve, and a blind flange. A check valve may not be used to isolate the affected penetration. Required Action C.1 must be completed within the 4 hour Completion Time. The Completion Time of 4 hours is reasonable

~~considering the relative stability of the closed system (hence, reliability) to act as a penetration isolation boundary and the relative importance of supporting primary containment OPERABILITY during MODES 1, 2, and 3. The Completion Time of 12 hours is reasonable considering the instrument and the small pipe diameter of penetration (hence, reliability) to act as a penetration isolation boundary and the small pipe diameter of the affected penetrations. In the event the affected penetration flow path is isolated in accordance with Required Action C.1, the affected penetration must be verified to be isolated on a periodic basis. This is necessary to ensure that primary containment penetrations required to be isolated following an accident are isolated. The Completion Time of once per 31 days for verifying each affected penetration is isolated is appropriate because the valves are operated under administrative controls and the probability of their misalignment is low.~~

~~Condition C is modified by a Note indicating that this Condition is only applicable to penetration flow paths with only one PCIV. For penetration flow paths with two PCIVs, Conditions A and B provide the appropriate Required Actions.~~

~~Required Action C.2 is modified by a Note that applies to valves and blind flanges located in high radiation areas and allows them to be verified by use of administrative means. Allowing verification by administrative means is considered acceptable, since access to these areas is typically restricted. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is low.~~

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

In the event one or more containment purge valves are not within the purge valve leakage limits, purge valve leakage must be restored to within limits or the affected penetration must be isolated. The method of isolation must be by the use of at least one isolation barrier that cannot be adversely affected by a single active failure. Isolation barriers that meet this criterion are a [closed and deactivated automatic valve, closed manual valve, and blind flange]. A purge valve with resilient seals utilized to satisfy Required Action D.1 must have been demonstrated to meet the leakage requirements of SR 3.6.1.3.7. The specified Completion Time is reasonable, considering that one containment purge valve remains closed (refer to the SR 3.6.1.3.1), so that a gross breach of containment does not exist.

In accordance with Required Action D.2, this penetration flow path must be verified to be isolated on a periodic basis. The periodic verification is necessary to ensure that containment penetrations required to be isolated following an accident, which are no longer capable of being automatically isolated, will be in the isolation position should an event occur. This Required Action does not require any testing or valve

manipulation. Rather, it involves verification, through a system walkdown, that those isolation devices outside containment and potentially capable of being mispositioned are in the correct position. For the isolation devices inside containment, the time period specified as "prior to entering MODE 4 from MODE 5 if not performed within the previous 92 days" is based on engineering judgment and is considered reasonable in view of the inaccessibility of the isolation devices and other administrative controls that will ensure that isolation device misalignment is an unlikely possibility.

[For the containment purge valve with resilient seal that is isolated in accordance with Required Action D.1, SR 3.6.1.3.7 must be performed at least once every [92] days. This provides assurance that degradation of the resilient seal is detected and confirms that the leakage rate of the containment purge valve does not increase during the time the penetration is isolated. The normal Frequency for SR 3.6.1.3.7, 184 days, is based on an NRC initiative addressing the issue of resilient seal reliability in these purge valves. Since more reliance is placed on a single valve while in this Condition, it is prudent to perform the SR more often. Therefore, a Frequency of once per [92] days was chosen and has been shown to be acceptable based on operating experience.]

~~D.1~~

~~With purge valve leakage rate, main steam isolation valve leakage, or hydrostatically tested line leakage not within limit the assumptions of the safety analysis may not be met. Therefore, the leakage must be restored to within limit within 4 hours except for main steam line leakage and 8 hours for main steam line leakage. Restoration can be accomplished by isolating the penetration that caused the limit to be exceeded by use of one closed and de-activated automatic valve, closed manual valve, or blind flange. When a penetration is isolated, the leakage rate for the isolated penetration is assumed to be the actual pathway leakage through the isolation device. If two isolation devices are used to isolate the penetration, the leakage rate is assumed to be the lesser actual pathway leakage of the two devices. The 4 hour Completion Time is reasonable considering the time required to restore leakage by isolating the penetration and the relative importance of the leakage to the overall containment function. The Completion Time of 8 hours for MSIV leakage allows a period of time to restore the MSIV leakage and is acceptable given the fact that MSIV closure will result in isolation of the main steam line(s) and a potential for plant shutdown.~~

~~*E.1 and E.2*~~

~~*If any Required Action and associated Completion Time cannot be met in MODE 1, 2, or 3, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The*~~

~~allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.~~

~~F.1, G.1, H.1, and H.2~~

~~If any Required Action and associated Completion Time cannot be met, the unit must be placed in a condition in which the LCO does not apply. If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies must be immediately suspended. Suspension of these activities shall not preclude completion of movement of a component to a safe condition. Also, if applicable, action must be immediately initiated to suspend operations with a potential for draining the reactor vessel (OPDRVs) to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended and valve(s) are restored to OPERABLE status. If suspending an OPDRVs would result in closing the residual heat removal (RHR) shutdown cooling isolation valves, an alternative Required Action is provided to immediately initiate action to restore the valve(s) to OPERABLE status. This allows RHR to remain in service while actions are being taken to restore the valve.~~

SURVEILLANCE REQUIREMENTS

~~SR 3.6.1.3.1~~

~~Each 550 mm primary containment purge valve is required to be verified sealed closed at 31 day intervals. This SR is designed to ensure that a gross breach of primary containment is not caused by an inadvertent or spurious opening of a primary containment purge valve. Primary containment purge valves that are sealed closed must have motive power to the valve operator removed. This can be accomplished by de-energizing the source of electric power or removing the air supply to the valve operator. In this application, the term "sealed" has no connotation of leak tightness. The 31 day Frequency is a result of an NRC initiative related to primary containment purge valve use during unit operations.~~

~~This SR allows a valve that is open under administrative controls to not meet the SR during the time the valve is open. Opening a purge valve under administrative controls is restricted to one valve in a penetration flow path at a given time (refer to discussion for Note 1 of the ACTIONS) in order to effect repairs to that valve. This allows one purge valve to be opened without resulting in a failure of the Surveillance and resultant entry into the ACTIONS for this purge valve, provided the stated restrictions are met. Condition D must be entered during this allowance, and the valve opened only as necessary for effecting repairs. Each purge valve in the penetration flow path may be alternately opened, provided one remains sealed closed, if necessary, to complete repairs on the penetration.~~

~~*The SR is modified by a Note stating that primary containment purge valves are only required to be sealed closed in MODES 1, 2, and 3. If a LOCA inside primary containment occurs in these MODES, the purge valves may not be capable of closing before the pressure pulse affects systems downstream of the purge valves or the release of radioactive material will exceed limits prior to the closing of the purge valves. At other times when the purge valves are required to be capable of closing (e.g., during handling of irradiated fuel), pressurization concerns are not present and the purge valves are allowed to be open.*~~

~~*SR 3.6.1.3.21*~~

~~*This SR ensures that the primary containment purge valves are closed as required or, if open, open for an allowable reason.*~~

~~*The SR is also modified by a Note (Note 1), stating that primary containment purge valves are only required to be closed in MODES 1, 2, and 3. If a LOCA inside primary containment occurs in these MODES, the purge valves may not be capable of closing before the pressure pulse affects systems downstream of the purge valves, or the release of radioactive material will exceed limits prior to the purge valves closing. At other times when the purge valves are required to be capable of closing (e.g., during handling of irradiated fuel), pressurization concerns are not present and the purge valves are allowed to be open.*~~

~~*The SR is modified by a Note (Note 2) stating that the SR is not required to be met when the purge valves are open for the stated reasons. The Note states that these valves may be opened for inerting, de-inerting, pressure control, ALARA, or air quality considerations for personnel entry, or Surveillances that require the valves to be open. The 550 mm purge valves are capable of closing in the environment following a LOCA. Therefore, these valves are allowed to be open for limited periods of time. The 31 day Frequency is consistent with other PCIV requirements discussed in SR 3.6.1.3.32.*~~

~~*SR 3.6.1.3.32*~~

~~*This SR verifies that each primary containment isolation manual valve and blind flange that is located outside primary containment, and is required to be closed during accident conditions, is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside the primary containment boundary is within design limits. This SR does not require any testing or valve manipulation. Rather, it involves verification, through a system walkdown, that those valves outside primary containment, and capable of being mispositioned, are in the correct position. Since verification of valve position for valves outside primary containment is relatively easy, the 31 day Frequency was chosen to provide added assurance that the valves are in the correct positions.*~~

~~Two Notes have been added to this SR. The first Note allows valves and blind flanges located in high radiation areas to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable, since the primary containment is inerted and access to these areas is typically restricted during MODES 1, 2, and 3 for ALARA reasons. Therefore, the probability of misalignment of these valves, once they have been verified to be in the proper position, is low. A second Note has been included to clarify that valves that are open under administrative controls are not required to meet the SR during the time that the valves are open.~~

~~SR 3.6.1.3.43~~

~~This SR verifies that each primary containment manual isolation valve and blind flange that is located inside primary containment, and is required to be closed during accident conditions, is closed. The SR helps to ensure that post accident leakage of radioactive fluids or gases outside the primary containment boundary is within design limits. For valves inside primary containment, the Frequency defined as "prior to entering MODE 2 or 3 from MODE 4, if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days," is appropriate since these valves and flanges are operated under administrative controls and the probability of their misalignment is low.~~

~~Two Notes have been added to this SR. The first Note allows valves and blind flanges located in high radiation areas to be verified by use of administrative controls. Allowing verification by administrative controls is considered acceptable since the primary containment is inerted and access to these areas is typically restricted during MODES 1, 2, and 3 for ALARA reasons. Therefore, the probability of misalignment of these valves, once they have been verified to be in their proper position, is low. A second Note has been included to clarify that valves that are open under administrative controls are not required to meet the SR during the time that the valves are open.~~

~~SR 3.6.1.3.54~~

~~The automatic traversing incore probe (ATIP) shear isolation valves are actuated by explosive charges. Surveillance of explosive charge continuity provides assurance that ATIP valves will actuate when required. Other administrative controls, such as those that limit the shelf life of the explosive charges, must be followed. The 31 day Frequency is based on operating experience that has demonstrated the reliability of the explosive charge continuity.~~

~~SR 3.6.1.3.65~~

~~Verifying the isolation time of each power operated and each automatic PCIV is within limits is required to demonstrate OPERABILITY. MSIVs~~

~~may be excluded from this SR since MSIV full closure isolation time is demonstrated by SR 3.6.1.3.87. The isolation time test ensures that the valve will isolate in a time period less than or equal to that assumed in the safety analyses. The isolation time and Frequency of this SR are in accordance with the requirements of the Inservice Testing Program or 92 days (Refs. 2 and 5).~~

~~SR 3.6.1.3.76~~

~~For primary containment purge valves with resilient seals, additional leakage rate testing beyond the test requirements of 10 CFR 50, Appendix J (Ref. 3), is required to ensure OPERABILITY. Operating experience has demonstrated that this type of seal has the potential to degrade in a shorter time period than do other seal types. Based on this observation, and the importance of maintaining this penetration leak tight (due to the direct path between primary containment and the environment), a Frequency of 184 days was established as part of the NRC resolution of the resilient seal issue. Additionally, this SR must be performed once within 92 days after opening the valve. The 92 day Frequency was chosen recognizing that cycling the valve could introduce additional seal degradation (beyond that which occurs to a valve that has not been opened). Thus, decreasing the interval (from 184 days) is a prudent measure after a valve has been opened.~~

~~The SR is modified by a Note stating that the primary containment purge valves are only required to meet leakage rate testing requirements in MODES 1, 2, and 3. If a LOCA inside primary containment occurs in these MODES, purge valve leakage must be minimized to ensure offsite radiological release is within limits. At other times when the purge valves are required to be capable of closing (e.g., during handling of irradiated fuel), pressurization concerns are not present and the purge valves are allowed to be open.~~

~~A second Note has been added to this SR requiring that the results be evaluated against the acceptance criteria of SR 3.6.1.1.1. This ensures that primary containment purge valve leakage is properly accounted for in determining the overall primary containment leakage rate.~~

~~SR 3.6.1.3.87~~

~~Verifying the total closure time of each MSIV exclusive of electrical delay is within the specified limits is required to demonstrate OPERABILITY. The isolation time test ensures that the MSIV will isolate in a time period that does not exceed the times assumed in the DBA analyses. This ensures that the calculated radiological consequences of those events remain within 10 CFR 100 limits. The Frequency of this SR is 3 months.~~

SR 3.6.1.3.9

STD DEP 16.3-74

Automatic PCIVs close on a primary containment isolation signal to

prevent leakage of radioactive material from primary containment following a DBA. This SR ensures that each automatic PCIV will actuate to its isolation position on a primary containment isolation signal. The ~~LOGIC SYSTEM FUNCTIONAL TEST~~ testing in LCO 3.3.1.1 and LCO 3.3.1.4 ~~in SR 3.3.6.3.6~~ overlaps this SR to provide complete testing of the safety function. The 18 month Frequency was developed considering it is prudent that this Surveillance be performed only during a unit outage since isolation of penetrations would eliminate cooling water flow and disrupt the normal operation of many critical components. For some PCIVs, the Inservice Testing Program allows this surveillance to be performed during cold shutdown, as opposed to a unit outage, provided the Frequency is no greater than 18 months. Operating experience has shown that these components usually pass this Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

~~*SR 3.6.1.3.109*~~

~~*This SR requires a demonstration that each reactor instrumentation line excess flow check valve (EFCV) is OPERABLE by verifying that the valve reduces flow to ≤ 1.05 cm3/sec on a simulated instrument line break. This SR provides assurance that the instrumentation line EFCVs will perform so that predicted radiological consequences will not be exceeded during the postulated instrument line break event evaluated in Reference 4. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass this Surveillance when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.*~~

~~*SR 3.6.1.3.1110*~~

~~*The ATIP shear isolation valves are actuated by explosive charges. An in place functional test is not possible with this design. The explosive squib is removed and tested to provide assurance that the valves will actuate when required. The replacement charge for the explosive squib shall be from the same manufactured batch as the one fired or from another batch that has been certified by having one of the batch successfully fired. The Frequency of 18 months on a STAGGERED TEST BASIS is considered adequate given the administrative controls on replacement charges and the frequent checks of circuit continuity (SR 3.6.1.3.54).*~~

~~*SR 3.6.1.3.1211*~~

~~*Surveillance of hydrostatically tested lines provides assurance that the*~~

~~calculation assumptions of Reference 2 are met. Note also that dual function valves must pass all applicable SRs, including the Type C leakage rate test (SR 3.6.1.1.1), if appropriate. The combined leakage rates must be demonstrated in accordance with the leakage rate test requirements of 10 CFR 50, Appendix J (Ref. 3), as modified by approved exemptions.~~

~~This SR has been modified by two Notes. Note 1 states that these valves are only required to meet the combined leakage rate in MODES 1, 2, and 3, since this is when the Reactor Coolant System is pressurized and primary containment is required. In some instances, the valves are required to be capable of automatically closing during MODES other than MODES 1, 2, and 3. However, their leak tightness under accident conditions is not required in these other MODES or conditions. Note 2 has been added to this SR requiring the results to be evaluated against the acceptance criteria of SR 3.6.1.1.1. This ensures that these valves are properly accounted for in determining the overall primary containment leakage rate.~~

~~STD DEP 16.3-72~~

~~SR 3.6.1.3.1312~~

~~The analyses in References 2 and 4 are based on leakage that is less than the specified leakage rate. Leakage through each MSIV must be ≤ 1 m3/h when tested at ≥ Pt of 0.173 MPaG. The MSIV leakage rate must be verified to be in accordance with the leakage test requirements of 10 CFR 50, Appendix J (Ref. 3), as modified by approved exemptions. A Note has been added to this SR requiring the results to be evaluated against the acceptance criteria of SR 3.6.1.1.1. This ensures that MSIV leakage is properly accounted for in determining the overall primary containment leakage rate. The Frequency is required by 10 CFR 50, Appendix J, as modified by approved exemptions; thus, SR 3.0.2 (which allows Frequency extensions) does not apply.~~

SR 3.6.1.3.14

~~Reviewer's Note: This SR is only required for those plants with purge valves with resilient seals allowed to be open during [MODE 1, 2, 3, or 4] and having blocking devices that are not permanently installed on the valves.~~

Reviewer's Note: This SR is only required for those plants with purge valves with resilient seals allowed to be open during [MODE 1, 2 or ~~3, or~~ 4] and having blocking devices that are not permanently installed on the valves.

Verifying each 550 mm primary containment purge valve is blocked to restrict opening to ≤ [50]% is required to ensure that the valves can close under DBA conditions within the times assumed in the analysis of References 2 and 4.

[The SR is modified by a Note stating that this SR is only required to be met in MODES 1, 2, and 3.] If a LOCA occurs, the purge valves must close to maintain containment leakage within the values assumed in the accident analysis. At other times when purge valves are required to be capable of closing (e.g., during movement of irradiated fuel assemblies), pressurization concerns are not present, thus the purge valves can be fully open. The 18 month Frequency is appropriate because the blocking devices are typically removed only during a refueling outage.

COLA Part 7, Section 2.2

STD DEP 16.3-71, LCO 3.6.1.3, Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3 includes two Surveillance concerning the status of the containment purge valves. SR 3.6.1.3.1 requires the primary containment purge valves to be "closed and sealed." SR 3.6.1.3.2 requires the same valves to be "closed" however a Note allows the valves to be opened when the valves are being used for inerting, de-inerting, pressure control, ALARA, or air quality considerations for personnel entry, or Surveillances that require the valves to be open.

Utilizing the Note in SR 3.6.1.3.2 would always be a failure to meet SR 3.6.1.3.1. The ABWR utilizes an inerted containment and therefore, SR 3.6.1.3.2 is the appropriate SR for the design.

This change results in a number of changes:

- SR 3.6.1.3.1 is deleted and subsequent SRs have been renumbered;
- 3.6.1.3 ACTION D has been replaced with a new Condition to cover Purge valve leakage rate, main steam isolation valve leakage, or hydrostatically tested line leakage not within limit. The Completion Time for the Condition has been bracketed until some operating experience is reviewed to determine whether the Completion Times are appropriate;
- Conditions A, B, F, G, and H have been revised to cover changes to Condition D;
- The Actions Note 1 has been modified to allow purge valve penetrations to be unisolated intermittently under administrative controls;
- Changes have been made to the Bases descriptions in the LCO, Applicability, ACTIONS, and Surveillances.

RAI 16-59

QUESTION:

Provide justification for deleting the Note "Results shall be evaluated against acceptance criteria of SR 3.6.1.1.1 in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions." in plant-specific TS SR 3.6.1.3.12 and bases.

Departure STD DEP 16.3-72 deletes the Note "Results shall be evaluated against acceptance criteria of SR 3.6.1.1.1 in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions." The explanation for the deletion of this Note is that the Containment Radiological Analysis takes into account MSIV leakage separately from La. It is not clear how the Containment Radiological Analysis taking into account MSIV separately from La eliminates the need for the Note to SR 3.6.1.3.12.

This information is needed to validate STD DEP 16.3-72 by ensuring that the acceptance criteria of 10 CFR 50, App J are being properly addressed, and that the intent of generic TS SR 3.6.1.3.12 is not changed by removing the note.

RESPONSE:

It has been determined that Departure STD DEP 16.3-72 is unnecessary; therefore, it is being deleted.

COLA Part 2, Chapter 16.3.6.1.3 and Bases will be revised as shown in the response to RAI 16-58. COLA Part 7, STD DEP 16.3-72 will be revised as shown below. The associated COLA Part 4 changes will also be made.

COLA Part 7, Section 2.2

~~**STD DEP 16.3-72, LCO 3.6.1.3, Primary Containment Isolation Valves (PCIVs)**~~

~~ABWR DCD SR 3.6.1.3.13 specifies leakage rate limits for the main steam isolation valves. This SR contains a Note that states the results shall be evaluated against acceptance criteria of SR 3.6.1.1.1 in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions. This Note has been deleted since the Containment Radiologial Analysis takes into account MSIV leakage separately from La. Corresponding changes are made to the SR 3.6.1.3.13 Bases.~~

RAI 16-60

QUESTION:

STD DEP 16.3-71 deletes Action D from GTS 3.6.1.3. GTS Condition D addresses containment purge valves not within purge valve leakage limits. Required Action D.1 requires isolating the affected penetration flow path within 24 hours. Required Action D.2 requires verifying the affected flow path is isolated once per 31 days for isolation devices outside containment and prior to entering Mode 4 from Mode 5 if not performed within the previous 92 days for isolation devices inside containment. Bracketed Required Action D.3 requires performing bracketed SR 3.6.1.3.7 for resilient seal purge valves closed to comply with Required Action D.1 once per [92] days; SR 3.6.1.3.7 requires performing leakage rate testing for each purge valve with resilient seals with a Frequency of once per 184 days and once within 92 days after opening the valve.

STD DEP 16.3-71 also added a new Action D to plant-specific TS 3.6.1.3. New Condition D addresses purge valve leakage, main steam isolation valve (MSIV) leakage, and hydrostatically tested line leakage not within limits, the second and third leakages having been moved from GTS Conditions A and B. New Required Action D.1 requires restoring leakage to within limit in 4 hours, except for MSIV leakage, which has an 8-hour completion time. Staff notes that PTS Required Action A.2 now requires verifying MSIV and hydrostatically tested line penetration flow paths to be isolated, whereas the GTS specified this action in Required Action D.2. Also, new Required Action D.1 appears to accomplish the purpose of GTS Required Action D.3. Therefore it appears that the new Actions maintain the intent of the previous Actions and in addition also require restoring MSIV and hydrostatically tested line leakage, as well as purge valve leakage, to within limits in a shorter time than required by GTS 3.6.1.3.

However, the 4 hours and 8 hours (MSIV) Completion Time for Required Action D.1 is in brackets which indicates that this time interval is not the final submittal. If 4 hours and 8 hours (MSIV) Completion Time for new Required Action D.1 is the final site-specific times, then new Required Action D.1 is acceptable (See RAI 16-21). Provide a clearer explanation and justification for deleting GTS 3.6.1.3 Required Actions D.2 and D.3 from 3.6.1.3 Action D.

RESPONSE:

As stated in the response to RAI 16-58, it has been determined that Departure STD DEP 16.3-71 is unnecessary; therefore, it is being deleted.

COLA Part 2, Chapter 16.3.6.1.3 and Bases and COLA Part 7, STD DEP 16.3-71 will be revised as shown in the response to RAI 16-58. The associated COLA Part 4 changes will also be made.

RAI 16-61

QUESTION:

STD DEP 16.3-89 proposes to omit a reference to the rod drop accident from the Applicable Safety Analysis section of the bases for PTS 3.1.2, because ABWR DCD Section 15.4.10.3.1 states, in part, that there is no basis for the control rod drop event to occur.

Section 15.4.1 of the ABWR FSER restates the DCD position that the control rod drop accident is an event that is extremely unlikely for the ABWR. The Staff, however, performed an evaluation of this accident, which is included in the ABWR FSER. The Staff stated, in the ABWR FSER, that this accident "evaluation should establish a reference for comparison of future applications incorporating the ABWR design."

Please provide additional justification for removing the reference to rod drop accident from the bases.

RESPONSE:

STD DEP 16.3-89 has been determined to be unnecessary; therefore, it is being deleted. The following changes to COLA, Part 2, Tier 2, Section 16B.3.1.2 and Part 7, Section 2.2 will be included in a future revision as a result of this RAI.

The corresponding changes will also be made to COLA Part 4.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.2 Reactivity Anomalies

BASES

The information in this section of the reference ABWR DCD, including all subsections, is incorporated by reference with no departures or supplements ~~the following departure~~.

~~STD DEP 16.3-89~~

~~APPLICABLE SAFETY ANALYSES~~

~~*Accurate prediction of core reactivity is either an explicit or implicit assumption in the accident analysis evaluations. Every accident evaluation (Ref. 2) is, therefore, dependent upon accurate evaluation of core reactivity. In particular, SDM and reactivity transients, such as control rod withdrawal events or rod drop accidents, are very sensitive to accurate prediction of core reactivity. These accident analysis evaluations rely on computer codes that have been qualified against available test data, operating plant data, and analytical benchmarks. Monitoring reactivity anomaly provides additional assurance that the nuclear methods provide an accurate representation of the core reactivity.*~~

STP COLA Part 7, Section 2.2 is being changed as shown below, with gray shading showing the changes.

~~STD DEP 16.3-89, LCO 3.1.2, Reactivity Anomalies~~

~~Reference to the rod drop accident has been deleted from the Applicable Safety Analyses of TS Bases 3.1.2, Reactivity Anomalies. The event is not postulated to occur for the ABWR. This is consistent in the discussion in the ABWR DCD Section 15.4.10.3.1. This Section states, in part, there is no basis for the control rod drop event to occur.~~

RAI 16-62

QUESTION:

STD DEP 16.3-90 departure proposes to omit Reference 5, which is the ABWR DCD Section 15.4.9, "Rod Ejection Accident," from the Applicable Safety Analyses (ASA) and References sections of the bases for PTS 3.1.3 because the reference states that the rod ejection accident is not postulated to occur. The ASA bases section states that the analytical methods and assumptions used in the evaluations involving control rods are presented in References 2, 3, 4, and 5. Please provide additional justification for removal of the rod ejection accident from the bases.

RESPONSE:

STD DEP 16.3-90 has been determined to be unnecessary; therefore, it is being deleted. COLA Part 2, Tier 2, Section 16B.3.1.3, Control Rod OPERABILITY, is being changed as shown below.

The corresponding changes will also be made to COLA Part 4.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.3 Control Rod OPERABILITY

BASES

The information in this section of the reference ABWR DCD, including all subsections, is incorporated by reference with the following departures and site-specific supplement. The site-specific supplement partially addresses COL License Information Item 16.1.

~~STD DEP 16.3-90~~
STD DEP 16.3-68
~~STD DEP 16.3-90~~

BACKGROUND

This Specification, along with LCO 3.1.4, "Control Rod Scram Times," and LCO 3.1.5, "Control Rod Scram Accumulators," ensure that the performance of the control rods in the event of a Design Basis Accident (DBA) or transient meets the assumptions used in the safety analyses of References ~~.~~ 2, 3, ~~and~~ 4, and 5.

~~STD DEP 16.3-90~~

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in the evaluation involving control rods are presented in References 2, 3, ~~and~~ 4, and 5. The control rods provide the primary means for rapid reactivity control (reactor scram), for maintaining the reactor subcritical, and for limiting potential effects of reactivity insertion events caused by malfunctions in the CRD System.

STD DEP 16.3-68

ACTIONS

A.1, A.2, and A.3

A control rod is considered stuck if it will not insert by either FMCRD drive motor torque or scram pressure. The failure of a control rod to insert during SR 3.1.3.2 or SR 3.1.3.3 alone, however, does not necessarily mean that the control rod is stuck, since failure of the motor drive would also result in a failure of these tests. Verification of a stuck rod can be made by attempting to withdraw the rod. If the motor is working and the rod is actually stuck, the traveling nut will back down from the bottom of the drive and a rod separation alarm and rod block will result (~~see LCO 3.3.5.1~~). Conversely, if the motor drive is known to be failed, the rod is not necessarily inoperable since it is probably still capable of scram. However, at the next required performance of SR 3.1.3.2 or 3.1.3.3, there would be no way of verifying insertability, except by scram. In this case, an individual scram should be attempted. If the rod scrams, the rod is not stuck but should be considered

inoperable and bypassed in RCIS since it cannot be withdrawn and a separation situation will exist until the motor is repaired and the traveling nut is run-in to the full in position. If the rod fails to insert by individual scram, it should be considered stuck and the appropriate ACTIONS taken. The failure of a control rod pair 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.

SR 3.1.3.4

Verifying the scram time for each control rod to 60% rod insertion position is ≤ { 1.44 } seconds provides reasonable assurance that the control rod will insert when required during a DBA or transient, thereby completing its shutdown function. This SR is performed in conjunction with the control rod scram time testing of SR 3.1.4.1, SR 3.1.4.2, SR 3.1.4.3, and SR 3.1.4.4. SRs in LCO 3.3.1.1, "SSLC Sensor Instrumentation", and LCO 3.3.1.2, "RPS and MSIV Actuation", overlap this Surveillance to provide complete testing of the assumed safety function. The associated Frequencies are acceptable, considering the more frequent testing performed to demonstrate other aspects of control rod OPERABILITY and operating experience, which shows scram times do not significantly change over an operating cycle.

~~STD DEP 16.3-90~~

REFERENCES

1. *10 CFR 50, Appendix A, GDC 26, GDC 27, GDC 28, and GDC 29.*
2. *DCD Tier 2, Section 4.6.2.*
3. *DCD Tier 2, Section 5.2.2.*
4. *DCD Tier 2, Section 15.4.1.*
5. *DCD Tier 2, Section 15.4.9.* ~~Not used~~
6. *NEDO-21231, "Banked Position Withdrawal Sequence," Section 7.2, January 1977.*

COLA Part 7, Section 2.2

~~**STD DEP 16.3-90, LCO 3.1.3, Control Rod OPERABILITY**~~

~~The Applicable Safety Analyses states that the analytical methods and assumptions used in the evaluations involving control rods are presented in References 2, 3, 4, and 5. Reference 5 is the rod ejection accident. In accordance with Reference 5 the event is not postulated to occur, therefore it has been deleted.~~