STP Nuclear Operating Company

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

August 10, 2009
U7-C-STP-NRC-090099

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
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 numbers 147, 154 and 164 related to Combined License Application (COLA) Part 2, Tier 2, Chapter 16, Technical Specifications. This submittal completes the response to RAI letter numbers 147 and 154.

The eleven (11) attachments address the responses to the RAI questions listed below:

RAI 16-2	RAI 16-8
RAI 16-3	RAI 16-9
RAI 16-4	RAI 16-10
RAI 16-5	RAI 16-11
RAI 16-6	RAI 16-12
RAI 16-7	

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 me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

STI 32517742

D091
NRO

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

Executed on 8/10/09

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

gsc

Attachments:

1. RAI 16-2
2. RAI 16-3
3. RAI 16-4
4. RAI 16-5
5. RAI 16-6
6. RAI 16-7
7. RAI 16-8
8. RAI 16-9
9. RAI 16-10
10. RAI 16-11
11. RAI 16-12

cc: w/o attachment except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Division for Regulatory Services
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspections Unit Manager
Texas Department of State Health Services
P.O. Box 149347
Austin, TX 87814-9347

C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

*Steven P. Frantz, Esquire
A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave. NW
Washington D.C. 20004

*George F. Wunder
*Stacy Joseph
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852

(electronic copy)

*George Wunder
*Stacy Joseph
Loren R. Plisco
U. S. Nuclear Regulatory Commission

Steve Winn
Eddy Daniels
Joseph Kiwak
Nuclear Innovation North America

Jon C. Wood, Esquire
Cox Smith Matthews

J. J. Nesrsta
R. K. Temple
Kevin Pollo
L. D. Blaylock
CPS Energy

NRC RAI 16-2

QUESTION:

Provide justification for the values in Plant Technical Specifications (PTS) Limiting Condition for Operation (LCO) 3.4.3 b, c, and d. In the ABWR Generic Technical Specifications (GTS), LCO 3.4.3 b and c limit the RCS operational leakage to 3.785 L/min and 98.4 L/min, respectively. In the PTS, LCO 3.4.3 b and c limit the RCS operational leakage to 19 L/min and 114 L/min, respectively. PTS LCO 3.4.3 d limits the unidentified leakage rate within the previous 4 hours to 8 L/min. Provide justification for these less conservative values.

RESPONSE:

LCO 3.4.3 d

LCO 3.4.3 d, which limits the unidentified leakage rate within the previous 4 hours to 8 L/min, does not exist within the GTS. Therefore, its inclusion in the PTS should not be considered a "less conservative value." It was added to the PTS in an earlier revision to the COLA through STD DEP 7.3-12 because of its inclusion as a bracketed item in NUREG 1434, "Standard Technical Specifications General Electric Plants, BWR/6." The inclusion of this bracketed leakage rate has caused confusion, and has since been determined not to be required in this application as explained below; therefore, it is being removed from the PTS and from STD DEP 7.3-12. This is consistent with ESBWR LCO 3.4.2, which does not include the increase in unidentified leakage rate requirement.

NUREG-1434, LCO 3.4.5 specifies limits of ≤ 5 gpm for unidentified leakage (LCO 3.4.5.b) and ≤ [30] gpm for total leakage (LCO 3.4.5.c). It also specifies a limit for an increase in unidentified leakage; however, LCO 3.4.5.d is shown as bracketed in its entirety. This acknowledges that incorporation of this LCO requirement is a plant specific issue.

GL 88-01 required licensees to confirm their plans to ensure that the Technical Specification related to leakage detection be in conformance with the staff position on leak detection included in the Generic Letter. The staff position required, in part, plant shutdown within any period of 24 hours or less when any leakage detection system indicates an increase in rate of unidentified leakage in excess of 2 gpm or its equivalent. GL 88-01 applies to all BWR piping made of austenitic stainless steel that is susceptible to intergranular stress corrosion cracking (IGSCC).

NUREG 75/067 provides the basis for the rate of increase limits. This limit was found to be necessary for BWRs at that time because their materials of construction were susceptible to intergranular stress corrosion.

The BWR evolution has continued to reduce the likelihood of leaks because of Stress Corrosion Cracking (SCC) of austenitic stainless steels by reducing and limiting the use of austenitic stainless steel, eliminating large penetrations in the lower vessel region and using SCC resistant fabrication processes. According to DCD subsection 3.E.1.1, "The ABWR plant design specifies use of austenitic stainless steel piping made of material (e.g., nuclear grade or low carbon type) that is recognized as resistant to IGSCC. The carbon steel or ferritic steels specified for the reactor pressure boundary are described in subsection 3E.2.2. These steels are assured to have adequate toughness to preclude a fracture at operating temperatures." Additional discussion regarding design materials is provided in subsections 3E.2.3 and 5.2.3.2.3. Stainless steel piping continuously active during normal reactor operation is limited to the Reactor Water Cleanup System. Large penetrations in the lower vessel region have been avoided by the elimination of the external recirculation system and most vessel connections are above the core. Additional measures taken in the ABWR to reduce challenges to the 5 gpm unidentified leakage limit are use of SCC resistant materials for bottom head penetrations, CRD housings and in-core housings.

Therefore, based on consistency with the BWR-6 and ESBWR TS, and because the ABWR piping made of austenitic stainless steel is not susceptible to intergranular stress corrosion cracking, the bracketed NUREG-1434 LCO 3.4.5.d (added PTS LCO 3.4.3.d) is not needed. Additionally, as identified in the response to STPNOC RAI 05.02.05-2, an alarm is provided to identify a rapid increase in unidentified leakage rate to warn the operators in a timely fashion prior to exceeding the Technical Specification limit of 19 L/min (5 gpm) for unidentified leakage.

LCO 3.4.3.b

The non-bracketed 5 gpm limit for unidentified RCS operational leakage in NUREG-1434, LCO 3.4.5.b, and in PTS LCO 3.4.3.b (19 L/min) is based on the behavior of pipe cracks. It has been shown that, for leakage even greater than 5 gpm, the probability is small that the associated imperfection or crack would grow rapidly. Additionally, 5 gpm is a small fraction of the calculated flow from a critical crack in the primary system piping. Additionally, pipe cracks are addressed in DCD Table 1.11-1. As shown above and in DCD subsection 5.2.3.4.1, the ABWR design complies with NUREG-0313, Rev. 2 and Generic Letter (GL) 88-01 through the selection of materials and processes that avoid sensitization or susceptibility to IGSCC. According to DCD subsection 5.2.3.4.1, the RCS piping is designed to avoid sensitization and susceptibility to IGSCC through the use of reduced carbon content material and process controls. During fabrication, solution heat treatment is utilized. During welding, heat input is controlled. Austenitic stainless steels that have become sensitized or susceptible to cracking because of IGSCC are not used in the ABWR design. Therefore, because NUREG 1434 specifies 5 gpm unidentified leakage without brackets, and because of the pipe crack behavior argument presented above, the increase proposed in STD DEP 7.3-12 from 3.785 L/min to 19 L/min for unidentified leakage is justified. This is consistent with ESBWR LCO 3.4.2 and with NUREG-1434, LCO 3.4.5, which limits unidentified RCS operational leakage to 5 gpm.

LCO 3.4.3.c

The bracketed [30] gpm limit for total RCS operational leakage in NUREG-1434, LCO 3.4.5.c, and in PTS LCO 3.4.3.c is based on a reasonable minimum detectable amount. The ABWR DCD specified value of 95 L/min was proposed to be increased in STD DEP 7.3-12 to 114 L/min (30 gpm) to be consistent with NUREG-1434 and ESBWR limits.

Based on the above considerations, the proposed TS values and required actions are considered to be proper and adequate to assure plant safety.

COLA Part 2, Chapter 16, LCO 3.4.3 and associated Bases; Part 4, LCO 3.4.3 and associated Bases; and Part 7, subsection 2.2.2, STD DEP 7.3-12 will be revised as shown below in a future revision to the COLA.

COLA Part 7, Section 2.2

STD DEP 7.3-12, Leak Detection and Isolation System Sump Monitoring

Description

Subsection 7.3.1.1.2(m) of the reference ABWR DCD provides alarm setpoints (nominal values) to support Technical Specification limits for Reactor Coolant System Leakage. The leakage rate values are also discussed in Subsections 5.2.5.4.1, 5.2.5.5.1, 5.2.5.5.2 and 5.2.5.9. The original limits were based on a leak-before-break option (not used on STP 3 & 4) that facilitated the use of a lower unidentified leakage limit. In lieu of providing a plant-specific Leak Before Break analysis, RCS operational leakage rate limits are changed as follows:

- Total leakage averaged over the previous 24-hour period is changed from 95 L/min to 114 L/min
- Unidentified leakage is changed from 3.785 L/min to 19 L/min
- ~~Unidentified leakage increase of 8 L/min within the previous 4-hour period in Mode 1 is added.~~

Technical Specification LCOs 3.4.3.b and 3.4.3.c and their associated Bases are changed to show the revised leakage limits ~~and the addition of an "increase in unidentified leakage" parameter~~.

COLA Part 2, Tier 2 Subsection 16.3.4.3

LCO 3.4.3 *RCS operational LEAKAGE shall be limited to:*

a. No pressure boundary LEAKAGE;

b. ≤ ~~3.785~~ 19 L/min unidentified LEAKAGE;

c. ≤ ~~98.4~~ 114 L/min total LEAKAGE averaged over the previous 24 hour period; and

~~d. ≤ 8 L/min increase in unidentified LEAKAGE within previous 4 hour period in MODE 1.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Unidentified LEAKAGE not within limit. OR Total LEAKAGE not within limit.	A.1 Reduce LEAKAGE to within limits.	4 hours
~~B. Unidentified LEAKAGE increase not within limit.~~	~~B.1 Reduce LEAKAGE to within limits.~~ ~~OR~~ ~~B.2 Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.~~	~~4 hours~~
~~C.~~ ~~B.~~ B. Required Action and associated Completion Time of Condition A ~~or B~~ not met. OR Pressure boundary LEAKAGE exists.	~~C.1~~ ~~B.1~~ B.1 Be in MODE 3. AND ~~C.2~~ ~~B.2~~ B.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	Verify RCS unidentified~~, and~~ and total LEAKAGE ~~and unidentified LEAKAGE increase~~ are within limits.	8 hours

COLA Part 2, Tier 2 Subsection 16B.3.4.3

APPLICABLE SAFETY ANALYSES

The allowable RCS operational LEAKAGE limits are based on the predicted and observed leakage in operating plants. The normally expected background LEAKAGE due to equipment design and the detection capability of the instrumentation for determining system LEAKAGE were also considered. The evidence from experiments suggests, for LEAKAGE even greater than the specified unidentified LEAKAGE limits, the probability is small that the imperfection or crack associated with such LEAKAGE would grow rapidly.

STD DEP 7.3-12
STD DEP 16.3-11

The unidentified LEAKAGE flow limit allows time for corrective action before the RCPB could be significantly compromised. The ~~3.785~~19 L/min limit is a small fraction of the calculated flow from a critical crack in the primary system piping (Ref. 6). Crack behavior from experimental programs (Refs. 4 and 5) shows leak rates of ~~tons of thousands liters per second~~ hundreds of liters per minute *will precede crack instability.*

No applicable safety analysis assumes the total LEAKAGE limit. The total LEAKAGE limit considers RCS inventory makeup capability and drywell floor sump capacity.

~~The low limit on increase in unidentified LEAKAGE assumes a failure mechanism of intergranular stress corrosion cracking (IGSCC) that produces cracks. This flow increase limit is capable of providing an early warning of such deterioration.~~

RCS operational LEAKAGE satisfies Criterion 2 of the NRC Policy Statement.

LCO

RCS operational LEAKAGE shall be limited to:

~~STD DEP 7.3-12~~

~~d.~~ ~~Unidentified LEAKAGE Increase~~

~~An unidentified LEAKAGE increase of > 8 L/min within the previous 4 hour period indicates a potential flaw in the RCPB and must be quickly evaluated to determine the source and extent of the LEAKAGE. The increase is measured relative to the steady state value; temporary changes in LEAKAGE rate as a result of transient conditions (e.g., startup) are not considered. As such, the 8 L/min increase limit is only applicable in MODE 1 when operating pressures and temperatures are established. Violation of this LCO could result in continued degradation of the RCPB.~~

ACTIONS

~~B.1 and B.2~~

STD DEP 7.3-12

An unidentified LEAKAGE increase of > 8 L/min within a 4 hour period is an indication of a potential flaw in the RCPB and must be quickly evaluated. Although the increase does not necessarily violate the absolute unidentified LEAKAGE limit, certain susceptible components must be determined not to be the source of the LEAKAGE increase within the required Completion Time. For an unidentified LEAKAGE increase greater than required limits, an alternative to reducing LEAKAGE increase to within limits (i.e., reducing the LEAKAGE rate such that the current rate is less than the "8 L/min increase in the previous 4 hours" limit; either by isolating the source or other possible methods) is to evaluate service sensitive type 304 and type 316 austenitic stainless steel piping that is subject to high stress or that contains relatively stagnant or intermittent flow fluids and determine it is not the source of the increased LEAKAGE. This type piping is very susceptible to IGSCC.

The 4 hour Completion Time is reasonable to properly reduce the LEAKAGE increase or verify the source before the reactor must be shut down without unduly jeopardizing plant safety.

*B.1 and B.2*C.1 and C.2 B.1 and B.2

If any the *Required Action and associated Completion Time of Condition A* or B *is not met or if pressure boundary LEAKAGE exists, 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 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.*

COLA Part 4 Subsection 3.4.3

LCO 3.4.3 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. ≤ 19 L/min unidentified LEAKAGE;

c. ≤ 114 L/min total LEAKAGE averaged over the previous 24 hour period; and

~~d. ≤ 8 L/min increase in unidentified LEAKAGE within previous 4 hour period in MODE 1.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Unidentified LEAKAGE not within limit. OR Total LEAKAGE not within limit.	A.1 Reduce LEAKAGE to within limits.	4 hours
~~B. Unidentified LEAKAGE increase not within limit.~~	~~B.1 Reduce LEAKAGE to within limits.~~ ~~OR~~ ~~B.2 Verify source of unidentified LEAKAGE increase is not service sensitive type 304 or type 316 austenitic stainless steel.~~	~~4 hours~~
~~C.~~ B. Required Action and associated Completion Time of Condition A ~~or B~~ not met. OR Pressure boundary LEAKAGE exists.	~~C.1~~ B.1 Be in MODE 3. AND ~~C.2~~ B.2 Be in MODE 4.	12 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.3.1	Verify RCS unidentified~~,~~ and total LEAKAGE ~~and unidentified LEAKAGE increase~~ are within limits.	8 hours

COLA Part 4 Subsection B.3.4.3

APPLICABLE SAFETY ANALYSES

The allowable RCS operational LEAKAGE limits are based on the predicted and observed leakage in operating plants. The normally expected background LEAKAGE due to equipment design and the detection capability of the instrumentation for determining system LEAKAGE were also considered. The evidence from experiments suggests, for LEAKAGE even greater than the specified unidentified LEAKAGE limits, the probability is small that the imperfection or crack associated with such LEAKAGE would grow rapidly.

The unidentified LEAKAGE flow limit allows time for corrective action before the RCPB could be significantly compromised. The 19 L/min limit is a small fraction of the calculated flow from a critical crack in the primary system piping (Ref. 6). Crack behavior from experimental programs (Refs. 4 and 5) shows leak rates of hundreds of liters per minute will precede crack instability.

No applicable safety analysis assumes the total LEAKAGE limit. The total LEAKAGE limit considers RCS inventory makeup capability and drywell floor sump capacity.

~~The low limit on increase in unidentified LEAKAGE assumes a failure mechanism of intergranular stress corrosion cracking (IGSCC) that produces cracks. This flow increase limit is capable of providing an early warning of such deterioration.~~

RCS operational LEAKAGE satisfies Criterion 2 of the NRC Policy Statement.

LCO

RCS operational LEAKAGE shall be limited to:

~~d.~~ ~~Unidentified LEAKAGE Increase~~

~~An unidentified LEAKAGE increase of > 8 L/min within the previous 4 hour period indicates a potential flaw in the RCPB and must be quickly evaluated to determine the source and extent of the LEAKAGE. The increase is measured relative to the steady state value; temporary changes in LEAKAGE rate as a result of transient conditions (e.g., startup) are not considered. As such, the 8 L/min increase limit is only applicable in MODE 1 when operating pressures and temperatures are established. Violation of this LCO could result in continued degradation of the RCPB.~~

ACTIONS

~~B.1 and B.2~~

An unidentified LEAKAGE increase of > 8 L/min within a 4 hour period is an indication of a potential flaw in the RCPB and must be quickly evaluated. Although the increase does not necessarily violate the absolute unidentified LEAKAGE limit, certain susceptible components must be determined not to be the source of the LEAKAGE increase within the required Completion Time. For an unidentified LEAKAGE increase greater than required limits, an alternative to reducing LEAKAGE increase to within limits (i.e., reducing the LEAKAGE rate such that the current rate is less than the "8 L/min increase in the previous 4 hours" limit; either by isolating the source or other possible methods) is to evaluate service sensitive type 304 and type 316 austenitic stainless steel piping that is subject to high stress or that contains relatively stagnant or intermittent flow fluids and determine it is not the source of the increased LEAKAGE. This type piping is very susceptible to IGSCC.

The 4 hour Completion Time is reasonable to properly reduce the LEAKAGE increase or verify the source before the reactor must be shut down without unduly jeopardizing plant safety.

C.1 and C.2 B.1 and B.2

If any the Required Action and associated Completion Time of Condition A or B is not met or if pressure boundary LEAKAGE exists, 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 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.

RAI 16-3

QUESTIONS:

Correct the following editorials contained in Section 3.1 of the Technical Specifications:

1. Page B3.1.1-5 is misnumbered as B3.1.7-5.

2. On the above mentioned page, which should be page 3.1.1-5, replace "ot" with "to" in line 10 of the last paragraph.

3. On page B3.1.3-6, in lines 1 and 2 of paragraph entitled "E.1", replace "Condition A, C, D or E" with "Condition A, C or D" to ensure that the bases are in agreement with the statement of Condition E of PTS 3.1.3 on page 3.1.3-3.

4. On page B3.1.3-6, in line 4 of the paragraph entitled "D.1 and D.2", there is an open parenthesis before the word "which", with no corresponding closed parenthesis anywhere in the paragraph.

5. On page B3.1.6-1, in the first line of the last paragraph, replace "Reference 1 and 2" with "References 1 and 2".

6. On page B3.1.6-3, in the third line of the third paragraph, there is no space between the words "mode" and "switch". Replace "modeswitch" with "mode switch".

7. On page B3.1.7-4, in the last line of the first paragraph, the word "ACTIONS" has been inserted in error. Replace "low probability of ACTIONS an ATWS event." with "low probability of an ATWS event."

RESPONSE:

1. Part 4 Bases page B3.1.1-5, currently numbered B3.1.7-5, will be renumbered B3.1.1-5

2. Part 4 Bases page B3.1.1-5, in line 10 of the last paragraph "ot" will be replaced with "to".

3. Part 4 Bases page B3.1.3-6, in lines 1 and 2 of the paragraph entitled "E.1" "Condition A, C, D or E" will be replaced with "Condition A, C or D."

4. Part 4 Bases page B3.1.3-6, in line 4 of the paragraph entitled "D.1 and D.2, a closed parenthesis will be added following (BPWS).

5. Part 4 Bases page B3.1.6-1, in the first line of the last paragraph, "Reference 1 and 2" will be replaced with "References 1 and 2."

6. Part 4 Bases page B3.1.6-3, in the third line of the third paragraph, a space will be added between the words "mode" and "switch."

7. Part 4 Bases page B3.1.7-4, in the last line of the first paragraph, the word "ACTIONS" will be removed.

Markups of the affected Part 4 pages are attached. These changes will be made in a future revision to the COLA. Additionally, a standard departure addressing these as well as other editorial changes will be developed and provided in a future revision to the COLA.

BASES

SURVEILLANCE REQUIREMENTS (continued)	SR 3.1.1.1 (continued)
	determined, or during local criticals, where the highest worth control rod pair is determined by testing. Local critical tests require the withdrawal of out of sequence control rods. This testing is performed in accordance with LCO 3.10.7, "Control Rod Testing – Operating" or LCO 3.10.8, "SDM Test – Refueling" where additional requirements are required to be met.
	The Frequency of 4 hours after reaching criticality is allowed to provide a reasonable amount of time to perform the required calculations and appropriate verification.
	During MODE 5, adequate SDM is also required to ensure the reactor does not reach criticality during control rod withdrawals. An evaluation of each in vessel fuel movement during fuel loading (including shuffling fuel within the core) is required to ensure adequate SDM is maintained during refueling. This evaluation ensures the intermediate loading patterns are bounded by the safety analyses for the final core loading pattern. For example, bounding analyses that demonstrate adequate SDM for the most reactive configurations during the refueling may be performed to demonstrate acceptability of the entire fuel movement sequence. These bounding analyses include additional margins to the SDM limit ~~ot~~ to account for the associated uncertainties. Spiral offload or reload sequences inherently satisfy the SR, 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 SDM.
REFERENCES	1. 10 CFR 50, Appendix A, GDC 26.
	2. DCD Tier 2, Section 15.4.1.
	3. DCD Tier 2, Section 4.3.2.
	4. NDE-24011-P-A-9, "GE Standard Application for Reactor Fuel," Section 3.2.4.1, Sept. 1988.

BASES

ACTIONS (continued)

C.1 and C.2 (continued)

loss of position indication, assuming no rod movement, would not result in control rod(s) inoperability until failure of SR 3.1.3.1. SR 3.3.5.1.7 provides additional requirements when the control rods are bypassed to ensure compliance with the RWE analysis.

The allowed Completion Times are reasonable, considering the small number of allowed inoperable control rods, and provide time to insert and disarm the control rods in an orderly manner and without challenging plant systems.

D.1 and D.2

Out of sequence control rods may increase the potential reactivity worth of a control rod, or gang of control rods, during a RWE and therefore, the distribution of inoperable control rods must be controlled. At ≤ 10% RTP, the generic ganged withdrawal sequence restrictions (GWSR) (which is equivalent to previous banked position withdrawal sequence ~~(BPWS)~~ ← (BPWS)) analysis (Ref. 6) requires inserted control rods not in compliance with GWSR to be separated by at least two OPERABLE control rods in all directions, including the diagonal. Therefore, if two or more inoperable control rods are not in compliance with GWSR and not separated by at least two OPERABLE control rods, action must be taken to restore compliance with GWSR or restore the control rods to OPERABLE status. A Note has been added to the Condition to clarify that the Condition is not applicable when > 10% RTP since the GWSR is not required to be followed under these conditions, as described in the Bases for LCO 3.1.6.

E.1

If any Required Action and associated Completion Time of Condition ~~A, C, D, or E~~ [A, C or D] are not met or nine or more inoperable control rods exist, 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 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) of the control rods. The number of control rods permitted to be inoperable when operating above 10% RTP 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 undertaken. The allowed Completion Time of 12 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems.

B 3.1 REACTIVITY CONTROL SYSTEMS

B 3.1.6 Rod Pattern Control

BASES

BACKGROUND

Control rod patterns during startup conditions are controlled by the operator and the rod worth minimizer (RWM) (LCO 3.3.5.1, "Control Rod Block Instrumentation"), so that only specified control rod sequences and relative positions are allowed over the operating range of all control rods inserted to 10% RTP. The sequences effectively limit the potential amount of reactivity addition that could occur during a control rod withdrawal, specifically the rod withdrawal error (RWE) event.

APPLICABLE SAFETY ANALYSES

The analytical methods and assumptions used in evaluating the RWE are summarized in References 1 and 2. RWE analyses assume that the reactor operator follows prescribed withdrawal sequences. These sequences define the potential initial conditions for the RWE analysis. The RWM (LCO 3.3.5.1) provides backup to operator control of the withdrawal sequences to ensure that the initial conditions of the RWE analysis are not violated.

Prevention or mitigation of positive reactivity insertion events is necessary to limit the energy deposition in the fuel, thereby preventing significant fuel damage, which could result in undue release of radioactivity (Reference 4). Since the failure consequences for UO_2 have been shown to be insignificant below fuel energy depositions of 1256 J/g, the fuel damage limit of 1172 J/g provides a margin of safety from significant core damage, which would result in release of radioactivity (Reference 3). Generic analysis of the GWSR (equivalent to the BPWS, see Reference 5) has demonstrated that the 1172 J/g fuel damage limit will not be violated during a postulated reactivity transient while following the GWSR mode of operation.

Control rod patterns analyzed in ~~Reference~~ References 1 and 2, follow the GWSR which is the same as the banked position withdrawal sequence (BPWS) described in Reference 5. The GWSR is applicable from the condition of all control rods fully inserted to 10% RTP. For the GWSR, 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. The banked positions are defined to minimize the maximum incremental control rod worths without being overly restrictive during normal plant operation. The generic BPWS analysis (Reference 5) also evaluated the effect of fully inserted, inoperable control rods not in compliance with the sequence, to allow a limited number (i.e., eight) and distribution of fully inserted, inoperable control rods.

BASES

ACTIONS (continued)

A.1 and A.2 (continued)

with LCO 3.1.3; LCO 3.1.4, "Control Rod Scram Times"; and LCO 3.1.5, "Control Rod Scram Accumulators." The allowed Completion Time of 8 hours is reasonable, considering the restrictions on the number of allowed out of sequence control rods and the low probability of a RWE occurring during the time the control rods are out of sequence.

B.1 and B.2

If nine or more OPERABLE control rods are out of sequence, the control rod pattern significantly deviates from the prescribed sequence. Control rod withdrawal should be suspended immediately to prevent the potential for further deviation from the prescribed sequence. Control rod insertion to correct control rods withdrawn beyond their allowed position is allowed since, in general, insertion of control rods has less impact on control rod worth than withdrawals have. Required Action B.1 is modified by a Note that allows the affected control rods to be bypassed in RAPI in accordance with SR 3.3.5.1.7 to allow insertion only.

With nine or more OPERABLE control rods not in compliance with GWSR, the reactor mode switch must be placed in the shutdown position within 1 hour. With the reactor ~~modeswitch~~ mode switch in shutdown, the reactor is shut down, and therefore does not meet the applicability requirements of this LCO. The allowed Completion Time of 1 hour is reasonable to allow insertion of control rods to restore compliance, and is appropriate relative to the low probability of a RWE occurring with the control rods out of sequence.

SURVEILLANCE REQUIREMENTS

SR 3.1.6.1

The control rod pattern is verified to be in compliance with the GWSR at a 24 hour Frequency, ensuring the assumptions of the RWE analyses are met. The 24 hour Frequency of this Surveillance was developed considering that the primary check of the control rod pattern compliance with the GWSR is performed by the RWM (LCO 3.3.5.1). The RWM provides control rod blocks to enforce the required control rod sequence and is required to be OPERABLE when operating at ≤ 10% RTP.

BASES

ACTIONS (continued)

C.1

If both SLC subsystems are inoperable, at least one subsystem must be restored to OPERABLE status within 8 hours. The allowed Completion Time of 8 hours is considered acceptable, given the low probability of ~~ACTIONS~~ an ATWS event.

D.1

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

SURVEILLANCE REQUIREMENTS

SR 3.1.7.1 and SR 3.1.7.2

SR 3.1.7.1 and SR 3.1.7.2 are 24 hour Surveillances, verifying certain characteristics of the SLC System (e.g., the volume and temperature of the borated solution in the storage tank), thereby ensuring the SLC System OPERABILITY without disturbing normal plant operation. These Surveillances ensure that the proper borated solution and temperature are maintained. Maintaining a minimum specified borated solution temperature is important in ensuring that the boron remains in solution and does not precipitate out in the storage tank. The 24 hour Frequency of these SRs is based on operating experience that has shown there are relatively slow variations in the measured parameters of volume and temperature.

SR 3.1.7.3

This Surveillance requires an examination of the sodium pentaborate solution by using chemical analysis to ensure the proper concentration of boron exists in the storage tank. SR 3.1.7.3 must be performed anytime boron or water is added to the storage tank solution to establish that the boron solution concentration is within the specified limits. This Surveillance must be performed anytime the temperature is restored to within the limits of Figure 3.1.7-1, to ensure no significant boron precipitation occurred. The 31 day Frequency of this Surveillance is appropriate because of the relatively slow variation of boron concentration between surveillances.

RAI 16-4

QUESTION

Provide justification for increasing the time period specified for the CTG to start and achieve steady state voltage and frequency from within 2 minutes to less than 10 minutes, in Section 3.5.1 Actions B 1.1 and C 1.1.1.

Required Action B.1.1 verifies that the CTG is functional and is implemented when the RCIC is inoperable OR the RCIC and any one other ECCS subsystem are inoperable. This required action is consistent with the GTS 3.5.1 Required Action B.1.1 except for the specified time period within which the CTG must be verified to start and achieve steady state voltage and frequency. No justification is provided in this Bases for the increase in time period for the CTG to start and achieve steady state voltage and frequency.

Required Action C.1.1.1 verifies that the CTG is functional and is implemented when the RCIC and any two other ECCS subsystems are inoperable provided at least one HPCF subsystem is OPERABLE. This required action is consistent with GTS 3.5.1 Required Action C.1.1.1 except for the time period within which the CTG must be verified to start and achieve steady state voltage and frequency. The bases for PTS 3.5.1 Required Action C.1.1.1 do not provide a justification for the increase in time period for the CTG to start and achieve steady state voltage and frequency.

This change is identified in STP 3&4 DCD as STD DEP 8.3-1. Section 9.5.11 Combustion Turbine/Generator (CTG) of the STP 3&4 FSAR describes the CTG as automatically starting, coming up to speed, reaching nominal voltage and frequency, and accepting load within 10 minutes of receipt of its start signal, and that the reconfiguration necessary to shed plant investment protection (PIP) loads for emergency shutdown loads can be accomplished from the main control room within 10 minutes of the onset of the start of a station blackout. It further states that this meets the requirements of Regulatory Guide 1.155 such that a station blackout coping analysis is not required. While this change description does meet the requirements for Regulatory Guide 1.155 so that a station blackout coping analysis is not required, this is not a justification for the change in PTS 3.5.1 Required Action B.1.1 and C.1.1.1. Regulatory Guide 1.155 is NRC staff guidance to licensees of existing plants (1988) to respond to a postulated accident scenario. A demonstration of the ability of a plant to connect its alternate AC power source to the safety buses when the plant is in a degraded state (inoperable equipment) is not discussed in Reg. Guide 1.155 and is not applicable to the technical specifications.

RESPONSE

The CTGs are non-safety related and are not assumed in the accident analysis. They are considered in the plant specific PRA solely from the perspective of Station Blackout. The automatic start feature of the CTG is not "important" in the context of the PRA, and safety-grade loads are added manually. Were it not for the purpose of extending Completion Times of other components in the Technical Specifications, the CTGs would not be included in the Technical Specifications because they do not meet any of the criteria in 10 CFR 50.36 for inclusion.

The CTGs, however, have been factored into the Technical Specifications as alternate (albeit unqualified) electrical sources in order to extend the Completion Times for various combinations of inoperable offsite circuits and EDGs, and for various combinations of inoperable ESF equipment.

A CTG start time of 2 minutes was specified in the DCD, not based on accident analysis or any other time critical requirement, but on the time it was assumed that a 9 MWe CTG could realistically start and be ready to load. The CTGs specified for STP 3 & 4 are at least 20 MWe. A survey of combustion gas turbine generator manufacturers found that the typical start times for 20 MWe and larger units are greater than 2 minutes, largely due to the required purging of potentially explosive gases from within the air ducts and machinery. For these large CTGs, 10 minutes is considered a safe duration between the time the CTG is started and the time it is ready to accept loads.

As discussed below, the impacts of an increase from a 2 to a 10 minute start time is more than offset by the benefit of the greater CTG capacity, especially since it meets station blackout criteria and does not affect any safety analysis assumptions. Based on this evaluation, STD DEP 8.3-1 was proposed to change the CTG start/load time from 2 to 10 minutes.

The consequences of changing the start time for the CTGs from 2 to 10 minutes for the ACTIONS in LCOs 3.5.1, 3.8.1, 3.8.4, 3.8.9 and 3.8.11 are considered insignificant from a safety standpoint. The additional 8 minutes is a small percentage of the time the equipment specified in each of the affected ACTIONS is allowed to remain inoperable prior to even verifying that the CTG is functional (Completion Time for verifying CTG functionality) and for aligning it to the appropriate buses.

Consideration of the TS LCOs 3.5.1, 3.8.1, 3.8.4, 3.8.9, and 3.8.11 Completion Times shows that for the most restrictive Completion Time for verifying the CTG starts and is ready for loading in MODES 1, 2 or 3 (LCOs 3.5.1, 3.8.1, 3.8.4 and 3.8.9) is 12 hours with the exception that it must be aligned in two hours if two required DGs are inoperable. An 8-minute difference in starting time is a small fraction of these Completion Times. The most restrictive Completion Time, 1 hour, is associated with LCO 3.8.11 which applies only in MODE 4 and in MODE 5 with water level in the refueling cavity less than 7 meters above the reactor pressure vessel flange, which is a safer condition from an accident standpoint because a DBA is remote under these conditions. In each case, the difference of 8 additional minutes for equipment to remain inoperable while the CTG starts and becomes available for loading will not significantly increase the consequences of any analyzed accidents. Compensating for the extended start and loading time is the additional power available from the larger CTG.

Because there is not a significant safety difference between a 2 minute start time and a 10 minute start time, and because the CTGs utilize a start time of 10 minutes for their primary mission of Station Blackout, the Technical Specification related start times were changed to 10 minutes in

STD DEP 8.3-1. Changing the start time to 10 minutes serves to avoid confusion over start time requirements for various purposes and provides a single start time for the CTGs in the licensing basis. It is also consistent with the Station Blackout criteria of no operator action required for the first 10 minutes.

A demonstration of the ability of a plant to connect its alternate AC power source to the safety buses when the plant is in a degraded state will be performed during preoperational testing as identified in the Preoperational Test Specification steps below:

a) Proper automatic startup and operation of the Combustion Turbine Generator upon simulated loss of Plant Investment Protection (PIP) buses voltage and attainment of the required frequency and voltage within the specified time limits.

b) Proper response and operation for design basis accident loading sequence. This test should be conducted with the power supply unit of load required in test position prior to the test item (c) below.

c) Proper response and operation for design basis accident loading sequence to design basis load requirements, and verification that voltage and frequency are maintained within specified limits.

d) Proper operation of the Combustion Turbine Generator during load shedding, load sequencing, and load rejection, including a test of the loss of the largest single load and of the complete loss of load, verifying that voltage and frequency are maintained within design limits and that overspeed limits are not exceeded.

e) Full-load carrying capability of the Combustion Turbine Generator for a period of not less than 1 hour at a load equivalent to the continuous rating of the Combustion Turbine Generator, including verification that the combustion cooling systems function within design limits, and the Combustion Turbine Generator HVAC System maintains the Combustion Turbine Generator room within design limits.

The following paragraph will be added to the Technical Specification Bases LCO sections for each of the affected LCOs (3.5.1, 3.8.1, 3.8.4, 3.8.9 and 3.8.11) in COLA Revision 4 as a result of this RAI response:

"The CTG, when used as a temporary substitute for the (loss of RCIC or for a second offsite source or for inoperable DGs – as the case may be), must be capable of starting, accelerating to required speed and voltage, and of being manually configured to provide power to the ESF bus. This sequence must be accomplished in less than 10 minutes. The CTG must also be capable of accepting required loads and maintaining rated frequency and voltage when connected to the ESF bus. The Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for startup of the CTG, and the low probability of a DBA occurring during this period."

RAI 16-5

QUESTION:

Correct the logical connectors in PTS 3.5.1 Action C. In Action C, the first "AND" and the "OR" connectors are incorrectly aligned, changing the meaning of the required actions. Revise the logical connectors in Action C to match the GTS.

RESPONSE:

The logical connectors in PTS 3.5.1 Action C Part 4 Technical Specifications will be corrected to conform to the instructions in Technical Specification subsection 1.2, Logical Connectors.

A markup of the affected Part 4 page is attached. This change will be made in COLA Revision 4 as a result of this RAI response.

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. (continued)	B.3	Restore ECCS subsystem(s) to OPERABLE status.	14 days
C. RCIC and any other two ECCS subsystems inoperable provided at least one HPCF subsystem is OPERABLE.	C.1.1.1	Verify the CTG is functional by verifying the CTG starts and achieves steady state voltage and frequency in less than 10 minutes.	72 hours
	AND→		
	C.1.1.2	Verify the CTG circuit breakers are capable of being aligned to each of the ESF buses.	72 hours AND Once per 8 hours thereafter
	←OR		
	C.1.2	Verify the ACIWA mode of RHR(C) subsystem is functional.	72 hours
	AND		
	C.2	Restore one ECCS subsystem to OPERABLE status.	7 days
D. Any three ECCS subsystems inoperable provided RCIC is OPERABLE.	D.1	Restore one ECCS subsystem to OPERABLE status.	3 days
E. Three high pressure ECCS subsystems inoperable.	E.1	Restore one high pressure ECCS subsystem to OPERABLE status.	12 hours

(continued)

RAI 16-6

QUESTION:

Provide the units for SR 3.5.2.2.b. SR 3.5.2.2.b requires the verification of condensate storage tank water level. The PTS and GTS do not provide units for the level value. The Writer's Guide for Plant-Specific Improved Technical Specifications, TSTF-GG-05-01, Section 3.3.4 advises using units that correlate with the units the operator reads from the instrumentation.

RESPONSE:

As identified in the response to RAI 16-1, Item 77, the condensate storage tank level is specified in meters. The brackets are being removed and "5.4m" is being inserted in the next revision to the COLA. In this case, the units can be included within the brackets.

It is recognized however, that the GTS do not specify the units outside of the brackets. Therefore, an editorial markup of the affected Part 4 page is attached. This change will be made in a future revision to the COLA. Additionally, a standard departure addressing this as well as other editorial changes will be developed and provided in a future revision to the COLA.

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Required Action C.2 and associated Completion Time not met.	D.1	Initiate action to restore secondary containment to OPERABLE status.	Immediately
	AND		
	D.2	Initiate action to restore one standby gas treatment subsystem to OPERABLE status.	Immediately
	AND		
	D.3	Initiate action to restore one isolation valve and associated instrumentation to OPERABLE status in each secondary containment penetration flow path not isolated.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify, for each required Low Pressure Core Flooder (LPFL) subsystem, the suppression pool water level is ≥ 7.0 m.	12 hours
SR 3.5.2.2	Verify, for the required High Pressure Core Flooder (HPCF) subsystem, the: a. Suppression pool water level is ≥ 7.0 m, or b. Condensate storage tank water level is ≥ [ ].	12 hours

(continued)

m

RAI 16-7

QUESTION

Provide justification for increasing the time period specified for the CTG to start and achieve steady state voltage and frequency from within 2 minutes to less than 10 minutes, in STD DEP 8.3-1. Also discuss the reasons for the 10 minute criterion on CTG functionality in the bases for the ACTIONS of PTS 3.8.1, and also PTS 3.5.1, 3.8.4, 3.8.9, and 3.8.11, which have the same action requirement for verifying CTG functionality.

Background:
The ABWR DCD section 3.8.1 Technical Specifications state for this CONDITION, the REQUIRED ACTION is, "Verify the CTG is functional by verifying the CTG starts and achieves steady state voltage and frequency in less than 2 minutes."
The analogous STP Technical Specification for this CONDITION and REQUIRED ACTION is, "Verify the CTG is functional by verifying the CTG starts and achieves steady state voltage and frequency in less than 10 minutes."
This change is identified in STP 3&4 STD DEP 8.3-1. Section 9.5.11 Combustion Turbine/Generator (CTG) of the STP 3&4 FSAR describes the CTG as automatically starting, coming up to speed, reaching nominal voltage and frequency, and accepting load within 10 minutes of receipt of its start signal, and that the reconfiguration necessary to shed plant investment protection (PIP) loads for emergency shutdown loads can be accomplished from the main control room within 10 minutes of the onset of the start of a station blackout. It further states that this meets the requirements of Regulatory Guide 1.155 and 10 CFR 50.63 such that a station blackout coping analysis is not required. While this change description does meet the requirements for Regulatory Guide 1.155 and 10 CFR 50.63 so that a station blackout coping analysis is not required, this is not a justification for the change. A demonstration of the ability of a plant to connect its alternate AC power source to the safety buses when the plant is in a degraded state (inoperable equipment) is not discussed in Reg. Guide 1.155 or 10 CFR 50.63 and is not applicable to the technical specifications. STP should commit to performing this verification prior to fuel load and not under adverse conditions

RESPONSE

The CTGs are non-safety related and are not assumed in the accident analysis. They are considered in the plant specific PRA solely from the perspective of Station Blackout. The automatic start feature of the CTG is not "important" in the context of the PRA, and safety-grade loads are added manually. Were it not for the purpose of extending Completion Times of other components in the Technical Specifications, the CTGs would not be included in the Technical Specifications because they do not meet any of the criteria in 10 CFR 50.36 for inclusion.

The CTGs, however, have been factored into the Technical Specifications as alternate (albeit unqualified) electrical sources in order to extend the Completion Times for various combinations of inoperable offsite circuits and EDGs, and for various combinations of inoperable ESF equipment.

A CTG start time of 2 minutes was specified in the DCD, not based on accident analysis or any other time critical requirement, but on the time it was assumed that a 9 MWe CTG could realistically start and be ready to load. The CTGs specified for STP 3 & 4 are at least 20 MWe. A survey of combustion gas turbine generator manufacturers found that the typical start times for 20 MWe and larger units are greater than 2 minutes, largely due to the required purging of potentially explosive gases from within the air ducts and machinery. For these large CTGs, 10 minutes is considered a safe duration between the time the CTG is started and the time it is ready to accept loads.

As discussed below, the impacts of an increase from a 2 to a 10 minute start time is more than offset by the benefit of the greater CTG capacity, especially since it meets station blackout criteria and does not affect any safety analysis assumptions. Based on this evaluation, STD DEP 8.3-1 was proposed to change the CTG start/load time from 2 to 10 minutes.

The consequences of changing the start time for the CTGs from 2 to 10 minutes for the ACTIONS in LCOs 3.5.1, 3.8.1, 3.8.4, 3.8.9 and 3.8.11 are considered insignificant from a safety standpoint. The additional 8 minutes is a small percentage of the time the equipment specified in each of the affected ACTIONS is allowed to remain inoperable prior to even verifying that the CTG is functional (Completion Time for verifying CTG functionality) and for aligning it to the appropriate buses.

Consideration of the TS LCOs 3.5.1, 3.8.1, 3.8.4, 3.8.9, and 3.8.11 Completion Times shows that for the most restrictive Completion Time for verifying the CTG starts and is ready for loading in MODES 1, 2 or 3 (LCOs 3.5.1, 3.8.1, 3.8.4 and 3.8.9) is 12 hours with the exception that it must be aligned in two hours if two required DGs are inoperable. An 8-minute difference in starting time is a small fraction of these Completion Times. The most restrictive Completion Time, 1 hour, is associated with LCO 3.8.11 which applies only in MODE 4 and in MODE 5 with water level in the refueling cavity less than 7 meters above the reactor pressure vessel flange, which is a safer condition from an accident standpoint because a DBA is remote under these conditions. In each case, the difference of 8 additional minutes for equipment to remain inoperable while the CTG starts and becomes available for loading will not significantly increase the consequences of any analyzed accidents. Compensating for the extended start and loading time is the additional power available from the larger CTG.

Because there is not a significant safety difference between a 2 minute start time and a 10 minute start time, and because the CTGs utilize a start time of 10 minutes for their primary mission of Station Blackout, the Technical Specification related start times were changed to 10 minutes in STD DEP 8.3-1. Changing the start time to 10 minutes serves to avoid confusion over start time requirements for various purposes and provides a single start time for the CTGs in the licensing basis. It is also consistent with the Station Blackout criteria of no operator action required for the first 10 minutes.

A demonstration of the ability of a plant to connect its alternate AC power source to the safety buses when the plant is in a degraded state will be performed during preoperational testing as identified in the Preoperational Test Specification steps below:

f) Proper automatic startup and operation of the Combustion Turbine Generator upon simulated loss of Plant Investment Protection (PIP) buses voltage and attainment of the required frequency and voltage within the specified time limits.

g) Proper response and operation for design basis accident loading sequence. This test should be conducted with the power supply unit of load required in test position prior to the test item (c) below.

h) Proper response and operation for design basis accident loading sequence to design basis load requirements, and verification that voltage and frequency are maintained within specified limits.

i) Proper operation of the Combustion Turbine Generator during load shedding, load sequencing, and load rejection, including a test of the loss of the largest single load and of the complete loss of load, verifying that voltage and frequency are maintained within design limits and that overspeed limits are not exceeded.

j) Full-load carrying capability of the Combustion Turbine Generator for a period of not less than 1 hour at a load equivalent to the continuous rating of the Combustion Turbine Generator, including verification that the combustion cooling systems function within design limits, and the Combustion Turbine Generator HVAC System maintains the Combustion Turbine Generator room within design limits.

The following paragraph will be added to the Technical Specification Bases LCO sections for each of the affected LCOs (3.5.1, 3.8.1, 3.8.4, 3.8.9 and 3.8.11) in COLA Revision 4 as a result of this RAI response:

"The CTG, when used as a temporary substitute for the (loss of RCIC or for a second offsite source or for inoperable DGs – as the case may be), must be capable of starting, accelerating to required speed and voltage, and of being manually configured to provide power to the ESF bus. This sequence must be accomplished in less than 10 minutes. The CTG must also be capable of accepting required loads and maintaining rated frequency and voltage when connected to the ESF bus. The Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for startup of the CTG, and the low probability of a DBA occurring during this period."

RAI 16-8

QUESTION:

Provide a standard departure report for the addition of SR 3.7.1.4. Proposed changes to the technical specifications require NRC approval. SR 3.7.1.4, Operate each cooling tower cell fan for greater than or equal to 15 minutes once per 31 days, is not a part of the GTS and requires justification for inclusion in the PTS. Provide the justification for SR 3.7.1.4.

This question also applies to PTS SR 3.7.2.4 and SR 3.7.3.4.

RESPONSE:

Standard Departure (STD DEP) 16.3-16 is being revised as committed to in the response to RAI 16-1 to include a paragraph addressing the addition of SRs 3.7.1.4, 3.7.2.4 and 3.7.3.4 to LCOs 3.7.1, 3.7.2 and 3.7.3. The following paragraph is being added to STD DEP 16.3-16:

"The STP 3&4 UHS design incorporates cooling towers with fans and a UHS basin instead of a UHS spray pond. LCOs 3.7.1, 3.7.2, and 3.7.3 are revised to include SRs 3.7.1.4, 3.7.2.4, and 3.7.3.4, respectively, for monthly surveillance testing of the cooling tower cell fans."

This change is being made in Revision 3 to the COLA.

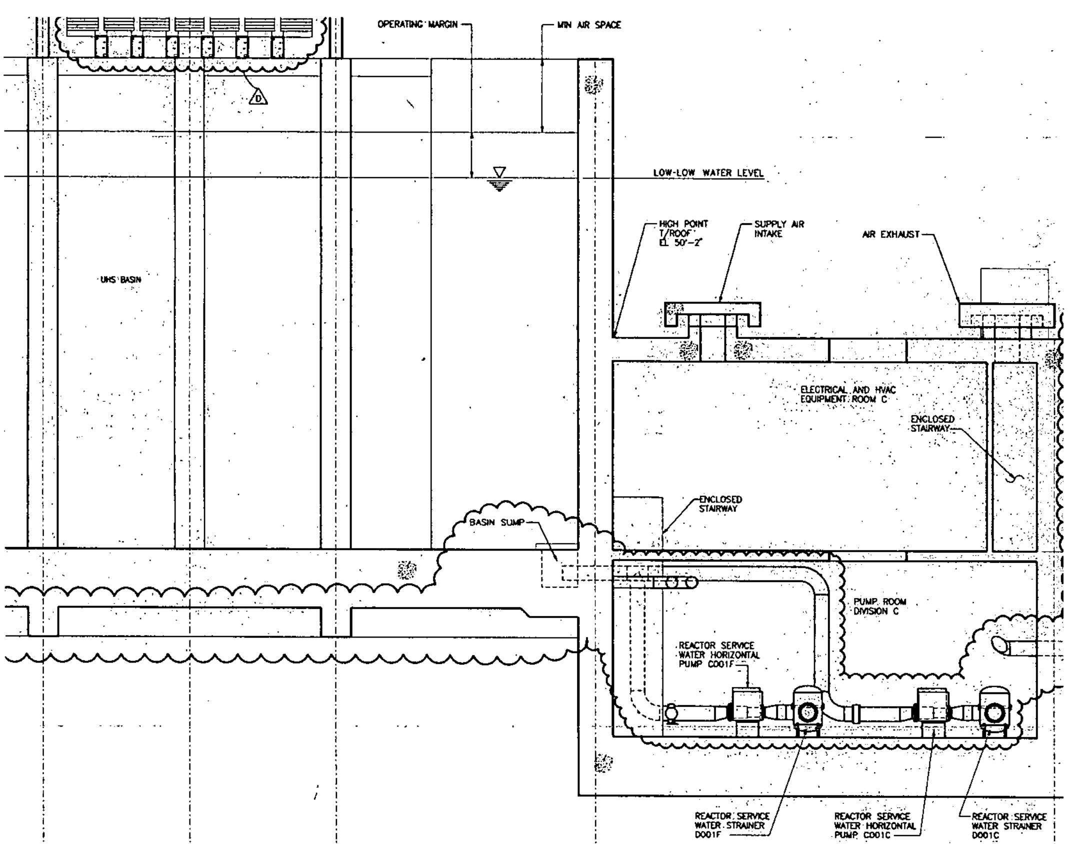
RAI 16-9

QUESTION:

Revise SR 3.7.1.2 to verify the water level in the RSW pump well. Currently, PTS SR 3.7.1.1 and SR 3.7.1.2 require verification of the water level in the UHS basin. PTS SR 3.7.1.2 should correspond to GTS SR 3.7.1.2, requiring verification of the water level in the RSW pump well. Revise PTS SR 3.7.1.2 to require verification of RSW pump well water level.

RESPONSE:

The UHS and RSW system have been reconfigured as shown below. Part of the change includes the use of centrifugal type pumps rather than vertical wet-pit type pumps. As a result, conventional pump wells are not needed and are not designed into the system. Thus, the UHS basin water level must be measured in order to verify adequate water level for NPSH and vortex prevention considerations. Therefore, SRs 3.7.1.2, 3.7.2.2 and 3.7.3.2 were revised to verify water level in the UHS basin rather than in the pumps wells.



As stated in DCD subsection 9.2.15.1, "Portions [of the RSW System] Within Scope of ABWR Standard Plant," all portions of the RSW System which are outside the Control Building are not in the scope of the ABWR Standard Plant. Thus this information is supplemental and not included in STD DEP 16-3-16. However, because Technical Specifications are affected, STD DEP 16.3-16 will be revised in Revision 4 to include the following paragraph:

> The UHS and RSW system have been redesigned to include the use of centrifugal type pumps located below the bottom of the UHS basin rather than vertical wet-pit type pumps located in pump wells. Thus, the UHS basin water level must be measured in order to verify adequate water level for NPSH and vortex prevention considerations. Therefore, SRs 3.7.1.2, 3.7.2.2 and 3.7.3.2 were revised to verify water level in the UHS basin rather than in the RSW pumps wells.

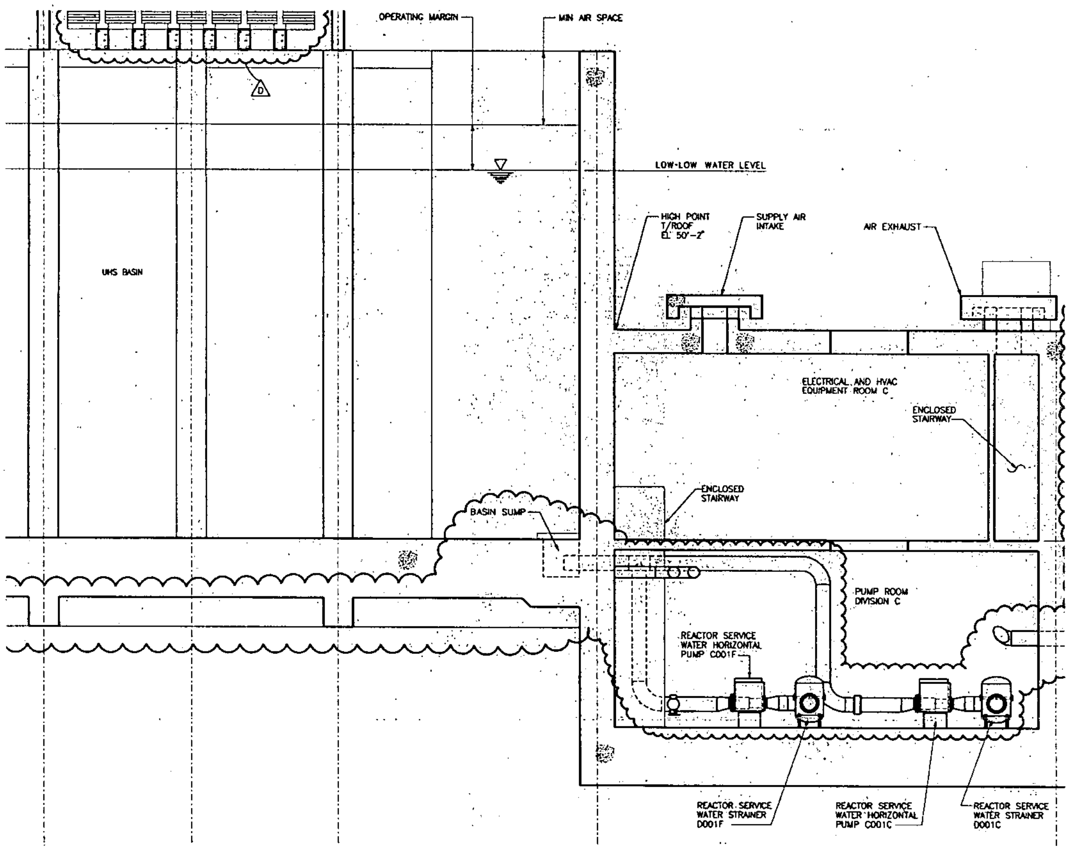
RAI 16-10

QUESTION:

The applicant is requested to justify, in a STD DEP, replacing GTS SR 3.7.2.2, to verify the water level in the RSW pump well, with PTS SR 3.7.2.2, to verify the water level in the UHS basin.

RESPONSE:

The UHS and RSW system have been reconfigured as shown below. Part of the change includes the use of centrifugal type pumps rather than vertical wet-pit type pumps. As a result, conventional pump wells are not needed and are not designed into the system. Thus, the UHS basin water level must be measured in order to verify adequate water level for NPSH and vortex prevention considerations. Therefore, SRs 3.7.1.2, 3.7.2.2 and 3.7.3.2 were revised to verify water level in the UHS basin rather than in the pumps wells.



As stated in DCD subsection 9.2.15.1, "Portions [of the RSW System] Within Scope of ABWR Standard Plant," all portions of the RSW System which are outside the Control Building are not in the scope of the ABWR Standard Plant. Thus this information is supplemental and not included in STD DEP 16-3-16. However, because Technical Specifications are affected, STD DEP 16.3-16 will be revised in Revision 4 to include the following paragraph:

> The UHS and RSW system have been redesigned to include the use of centrifugal type pumps located below the bottom of the UHS basin rather than vertical wet-pit type pumps located in pump wells. Thus, the UHS basin water level must be measured in order to verify adequate water level for NPSH and vortex prevention considerations. Therefore, SRs 3.7.1.2, 3.7.2.2 and 3.7.3.2 were revised to verify water level in the UHS basin rather than in the RSW pumps wells.

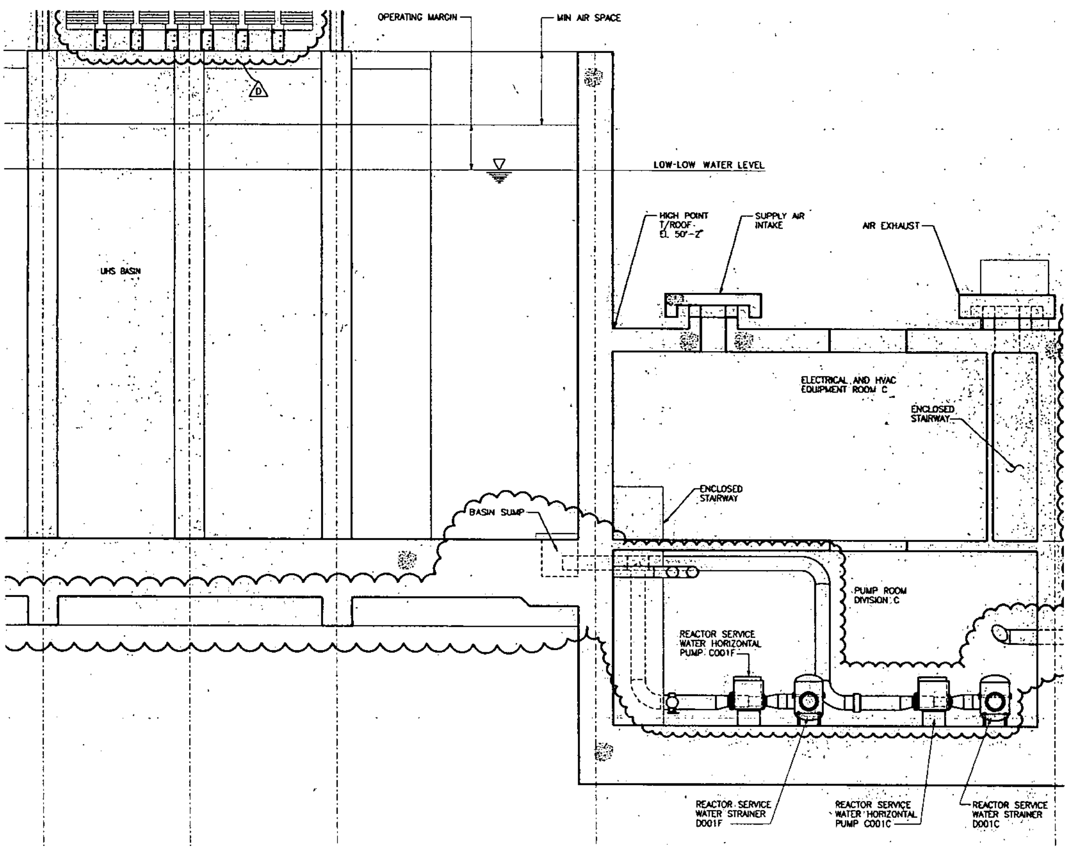
RAI 16-11

QUESTION:

The applicant is requested to justify, in a STD DEP, replacing GTS SR 3.7.3.2, to verify the water level in the RSW pump well, with PTS SR 3.7.3.2, to verify the water level in the UHS basin.

RESPONSE:

The UHS and RSW system have been reconfigured as shown below. Part of the change includes the use of centrifugal type pumps rather than vertical wet-pit type pumps. As a result, conventional pump wells are not needed and are not designed into the system. Thus, the UHS basin water level must be measured in order to verify adequate water level for NPSH and vortex prevention considerations. Therefore, SRs 3.7.1.2, 3.7.2.2 and 3.7.3.2 were revised to verify water level in the UHS basin rather than in the pumps wells.



As stated in DCD subsection 9.2.15.1, "Portions [of the RSW System] Within Scope of ABWR Standard Plant," all portions of the RSW System which are outside the Control Building are not in the scope of the ABWR Standard Plant. Thus this information is supplemental and not included in STD DEP 16-3-16. However, because Technical Specifications are affected, STD DEP 16.3-16 will be revised in Revision 4 to include the following paragraph:

> The UHS and RSW system have been redesigned to include the use of centrifugal type pumps located below the bottom of the UHS basin rather than vertical wet-pit type pumps located in pump wells. Thus, the UHS basin water level must be measured in order to verify adequate water level for NPSH and vortex prevention considerations. Therefore, SRs 3.7.1.2, 3.7.2.2 and 3.7.3.2 were revised to verify water level in the UHS basin rather than in the RSW pumps wells.

RAI 16-12

QUESTION:

The applicant is requested to justify, in a STD DEP, revising GTS 3.7.7 Required Action B.1 by replacing "<" with "<=" in PTS 3.7.7 Required Action B.1. PTS 3.7.7 Action B.1 states that thermal power should be reduced to<= 40% RTP. GTS Required Action B.1 states that thermal power should be reduced to < 40% RTP.

RESPONSE:

As stated in COLA Part 2, Tier 2, Chapter 16.3, "The information in this section (3.7.7, Main Turbine Bypass System) of the reference ABWR DCD, including all subsections, is incorporated by reference with no departures or supplements." Required Action B.1 therefore reads "Reduce THERMAL POWER to < 40% RTP."

An error was made in the conversion to COLA Part 4. PTS 3.7.7 Required Action B.1 will be corrected in COLA Revision 4 to read "Reduce THERMAL POWER to < 40% RTP."