PMSTPCOL PEmails

From: Muniz, Adrian
Sent: Wednesday, July 22, 2009 2:28 PM
To: Bhatia, Bhupendra; Pal, Amar
Cc: STPCOL
Subject: FW: Responses to Requests for Additional Information
Attachments: U7-C-STP-NRC-0900071.pdf

Please see attached for your review.

From: Ballinger, Amy [mailto:aballinger@STPEGS.COM]
Sent: Wednesday, July 22, 2009 2:22 PM
To: Muniz, Adrian; Sosa, Belkys; Dyer, Linda; Wunder, George; Eudy, Michael; Plisco, Loren; Anand, Raj; Foster, Rocky; Joseph, Stacy; Govan, Tekia; Tai, Tom
Subject: Responses to Requests for Additional Information

Good Afternoon,

Attached is a courtesy copy of the letter answering the NRC staff Request for Additional Information related to Section 8.2, 8.3, 8.4, and 14.3.

The official paper copy was mailed today according to the letter addressee list.

If you have any questions contact Dick Bense at 361-972-4802.

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July 22, 2009
U7-C-STP-NRC-090071

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Responses to Requests for Additional Information

Attached are responses to NRC staff questions included in following Requests for Additional Information (RAI): letters number 126 and 131, related to FSAR Section 8.2, Offsite Power System; letter number 129, related to FSAR Section 8.3, AC Power Systems (Onsite); letter number 125, related to FSAR Section 8.4, Station Blackout; and letter number 128, related to FSAR Section 14.3, Inspections, Tests, Analyses, and Acceptance Criteria. This letter includes the complete response to RAI letters number 126, 131, 129, 125 and 128.

Attachments 1 through 18 provide responses to the following RAI questions:

08.02-18	08.03.01-1	08.03.01-5	08.03.01-9	08.04-1	14.03-1
08.02-19	08.03.01-2	08.03.01-6	08.03.01-10	08.04-2	14.03.06-5
	08.03.01-3	08.03.01-7	08.03.01-11		
	08.03.01-4	08.03.01-8	08.03.01-12		

When a change to the COLA is indicated, the change 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 regarding these responses, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

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

Executed on 7/22/09

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

rhb

Attachments:

1. Question 08.02-18
2. Question 08.02-19
3. Question 08.03.01-1
4. Question 08.03.01-2
5. Question 08.03.01-3
6. Question 08.03.01-4
7. Question 08.03.01-5
8. Question 08.03.01-6
9. Question 08.03.01-7
10. Question 08.03.01-8
11. Question 08.03.01-9
12. Question 08.03.01-10
13. Question 08.03.01-11
14. Question 08.03.01-12
15. Question 08.04-1
16. Question 08.04-2
17. Question 14.03-1
18. Question 14.03.06-5

cc: w/o attachments and enclosure except*
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RAI 08.02-18

QUESTION:

With regard to your response to RAI 02.03.02-7, it is not clear to the staff what is meant by the design of the transformer considers the effect of salt deposition of the nature discussed. Operating experience have shown that insulator failures will likely occur due to salt deposits. IEEE Standard C57.19.100-1995 discusses counter measures that can be implemented to insure that the salt deposits do not degrade the bushings. Discuss counter measures that will be taken to prevent insulator and bushing failures on offsite power system equipment due to salt deposits.

Response:

To prevent insulator and bushing failure on offsite power system equipment due to salt deposition, bushings and insulators for offsite power equipment will be designed for heavy contamination areas. STP will, in accordance with IEEE C57.19.100-1995, use bushings designed for heavy contamination with a minimum creep distance of 44 mm/kV. In addition STP will be providing a permanent coating on ceramic bushings and ceramic insulators for offsite power equipment up to the switchyard.

COLA Tier 2 Section 8.2.1.2 will be revised to include the following description:

> According to IEEE C57.19.100 the STP Units 3 & 4 site is a medium to heavy contamination environment due to its proximity to the coast and additional salt deposition from the Ultimate Heat Sinks. To prevent insulator and bushing failure on offsite power system equipment due to contamination from salt deposition, the bushings and insulators for offsite power equipment up to the switchyard will have a minimum creep distance of 44 mm/kV and a permanent coating.

RAI 08.02-19

QUESTION:

DCD COL License Information Section 8.2.4.2 requires plant operating procedures to address the condition of a RAT or UAT out of service. STP 3 & 4 FSAR Section 8.2.4.2 indicates that the PTS limit plant operation whenever one UAT or both RATs are inoperable. The staff has noted that STP 3&4 uses two RATs rather than one RAT, as included in ABWR DCD Section 8.2. Explain if the plant operating procedure will include any restriction on plant operation when one RAT is out of service.

Response:

FSAR Tier 2 Section 8.2.4.2 indicates that Technical Specification limit plant operation whenever one UAT or both RATs are inoperable. Appropriate plant operating procedures will restrict plant operation when both RATs are out of service. While the plant procedures discussed in FSAR Tier 2 Section 8.2.4.5 which provide limits to assure that RAT loading does not exceed the transformer's ONAF rating will address the loss of one RAT, plant operation will not be limited when only one RAT is out of service.

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

RAI 08.03.01-1

QUESTION:

FSAR subsection 8.3.1.1.1 describes the need for tripping the condensate pumps when a feedwater line break inside the drywell is detected and the use of dual trip coils to ensure that tripping will occur. The applicant stated that the breaker control power and trip circuits will not fully meet the RG 1.75 separation requirements. Discuss the separation guidance criteria of RG 1.75 that are not being met and why this is acceptable. Additionally, discuss the results of the reliability assessment performed in accordance with GDC 21.

Response:

FSAR subsection 8.3.1.1.1 identifies that breaker control power and trip circuits for the safety related condensate pump breakers will not fully meet the guidance provided in RG 1.75. The basis for this statement is that IEEE 384 requirements for physical separation at the dual trip coil circuit breaker and auxiliary switch assembly are not fully met.

RG 1.75 allows "an analysis of nonsafety-related circuits to demonstrate that the safety-related circuits are not degraded below an acceptable level" when minimum separation cannot be met. Separation between nonsafety-related and safety-related components and separation between safety related components of different divisions is justified in FSAR subsection 8.3.1.1.1, which lists the compensatory measures that "provide reasonable assurance for tripping of condensate pumps during a feedwater line break in the drywell:"

- The control power and SSLC circuits are provided with isolation devices.
- The control power cables are installed in dedicated raceways. Adequate separation exists between control circuit raceways and other non-safety raceways.
- The design of the raceway supports is performed considering seismic loads throughout their routing.
- The safety-related breakers are located in a separate electrical room.
- The design of the safety-related breaker supports is performed considering seismic loads.
- The probability of trip and control power circuit failure is very low. Even in case of failure of non-safety power cable, the breaker trip circuit is expected to perform the safety function of tripping the condensate pump feeder breakers due to redundancy of trip coils, trip signals and control power supply.
- The design does not impact or degrade any other safety-related equipment or function.
- A reliability assessment for this design has been performed.

The reliability assessment described above determined that the probability that all three operating condensate pumps will trip in response to a feedwater line break signal is 0.99910027. The probability that two or more operating condensate pumps will trip in response to a feedwater line break signal is.0.99999973. The condensate pump circuit breaker is equipment actuated by the protection system. The circuit breaker is not considered part of the protection system as defined by GDC 20 and GDC 21.

As clarified in the response to RAI 08.03.01-2, an acceptable containment response following a feedwater line break inside containment is achieved without taking credit for the automated condensate pump trip. This determination eliminates concerns about the potential failure of a safety-related condensate pump breaker.

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

RAI 08.03.01-2

QUESTION:

FSAR subsection 8.3.1.1.1 indicates the use of two circuit breakers in series, one safety-related and one non-safety-related, to assure the tripping of the condensate pumps in the event of a feedwater line break inside containment. The subsection also indicates the use of dual trip coils powered by redundant Class 1E sources for each breaker to assure the tripping of the circuit breakers. Since a non-safety-related component cannot be relied upon to perform a safety-related function, indicate why two safety-related breakers are not being used to assure conformance with the single failure criterion.

Response:

The Condensate Pump Trip function is not part of the certified ABWR certified design. This feature was added by standard departure (STD DEP) T1 2.4-2, Feedwater Line Break Mitigation, in conjunct standard departure (STD DEP) 6.2-2, "Containment Analysis," "to provide added assurance of acceptable results" following a feedwater line break inside containment. STD DEP T1 2.4-2 and STD DEP 6.2-2 and are described in COLA Part 7.

As described in STP's response to RAI 06.02.01.01.C-1 (Letter U7-C-STP-NRC-090074, dated July 15, 2009), the containment response portion of the STP 3 & 4 accident analysis has been re-performed using the GOTHIC computer program in place of the GESSAR computer program. This re-analysis confirmed that an acceptable containment response to a feedwater line break inside containment is achieved without taking credit for the automated condensate pump trip. As a result, STD DEP 6.2-2, "Containment Analysis," will be revised to clarify that "this automated condensate pump trip is not credited in the containment analysis."

STD DEP T1 2.4-2 is not being modified and the FWLB mitigation function, including the condensate pump trip, will be maintained as a safety-related feature of the STP design. This is consistent with its original intent, "to provide added assurance of acceptable results" following a feedwater line break inside containment. However, 10 CFR 50, Appendix A, GDC 35, requirements for single failure tolerance for containment capabilities are not applicable to the condensate pump trip feature because this feature is not credited in the containment analysis.

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

RAI 08.03.01-3

QUESTION:

FSAR subsection 8.3.1.1.4.1 describes the use of four 120 VAC "Class 1E instrument power systems", rather than the three identified in the corresponding DCD section. Discuss how the STP logic philosophy differs from the DCD philosophy and discuss the utilization difference between the 120 VAC Class 1E power of this subsection and the 120 VAC vital power in Figure 8.3-3 of the ABWR DCD. Additionally, discuss the impact of a loss of voltage to the instruments supplied by the "Class 1E instrument power systems" for a period of 10 minutes during a station blackout event.

Response:

ABWR DCD, Tier 1, Section 2.12.15, Instrument and Control Power Supply Design Description, describes the Class 1E Instrument and Control Power Supply as consisting of three divisions (Division I, II, and III) of 'interruptible' power supplies with their respective distribution panels. Each Class 1E power supply provides interruptible, regulated AC power to Class 1E circuits which do not require continuity of power during a loss of preferred power.

Standard departure (STD DEP) T1 2.12-2, which is described in COLA, Part 7, adds a fourth division to Class 1E Instrument and Control Power Supply System. As a result of this departure, Class 1E Instrument and Control Power is separated into Divisions I, II, and III, and IV with distribution panels and local control panels fed from their respective divisional sources, except Division IV is fed from the Division II source.

As described in STD DEP T1 2.12-2, adding a fourth Class 1E Instrument and Control power supply (i.e., a fourth regulating transformer and associated distribution panels) increases reliability and availability even though two of the four power supplies are supported by the Division II source. Use of a separate regulating transformer and associated distribution panels for each instrument division improves both reliability and diagnostics. Most instrumentation power problems can be addressed on-line and will be "non-critical" faults since no functionality will be lost.

There is no difference between the ABWR and the DCD in the philosophy and utilization 120 VAC Class 1E power. In both the ABWR DCD and the STP design, each Class 1E power supply provides interruptible, regulated AC power to Class 1E circuits which do not require continuity of power during a loss of preferred power. STD DEP T1 2.12-2 adds additional redundancy and flexibility.

For the "Class 1E instrument power systems," there is no impact as a result of a loss of voltage for a period of 10 minutes during a station blackout event because the loads are limited to Class 1E circuits which do not require continuity of power during a loss of preferred power.

For the "Class 1E Vital instrument power systems," the impact of a loss of voltage for a period of 10 minutes during a station blackout event is discussed in FSAR 8.3.1.1.7, "Load Shedding and

Sequencing on Class 1E Buses." Specifically, Item (9), Station Blackout (SBO) considerations, explains that Class 1E AC power is generated through inverters from the station batteries and is not lost during a station blackout event.

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

RAI 08.03.01-4

<u>QUESTION:</u>

In NUREG 0800, Standard Review Plan Section 8.3.1, subsection 4.J., "SRP Acceptance Criteria," it is stated: "Acceptance criteria for the interface between the onsite ac power system and the offsite power system to satisfy the requirements of GDC 17 in evolutionary light water reactor design applications are documented in SECY-91-078, which states that the design should include at least one offsite circuit to each redundant safety division supplied directly from one of the offsite power sources with no intervening non-safety buses in such a manner that the offsite source can power the safety buses upon the failure of any non-safety bus." These guidance criteria are reflected in the DCD design where one winding of the reserve auxiliary transformer (RAT) is connected directly to a source breaker of each of the three safety-related buses. The offsite power circuit, as described in FSAR section 8.3.1 and figure 8.3-1, is connected to the safety buses through an intermediate bus that also supplies non-safety loads. Discuss how the STP design meets the SRP and SECY-91-078 guidance and how is it consistent with the DCD design.

<u>Response:</u>

As stated in SECY-91-078, "no regulatory requirements or guidance address the connection of safety bus offsite power sources through nonsafety buses." That stated, SECY-91-078 includes the following as basis for the guidance suggested in the question:

> "Such an arrangement increases the difficulty in properly regulating voltage at the safety buses, subjects the safety loads to transients caused by the non-safety loads, and adds additional failure points between the offsite power sources and safety loads."

As indicated in FSAR figure 8.3-1, "During Normal Plant operation, all of the Non-Class 1E buses and two of the Class 1E buses are supplied with power from the Main Turbine Generator through the Unit Auxiliary Transformers. The remaining Class 1E bus is supplied from RAT B. This division is immediately available, without a bus transfer if the NPP is lost to the other two divisions."

With this design, in the normal alignment discussed above, there will be one Class 1E bus aligned to a RAT without intervening non-safety related load connected to the 4.16 kV winding of either RAT. Therefore the SECY-91-078 concerns relative to voltage regulation and transients caused by non-safety related loads would not be applicable.

Therefore, the only remaining concern relative to the intervening non-safety related bus would be the potential failure point between the offsite power source and the Class 1E buses. It should be noted that the ABWR design defines the interface between the offsite power source and the Class 1E bus as the incoming circuit breaker at the Class 1E bus. Based on this definition, there are no intervening non-safety related buses between the offsite power source and the Class 1E buses. There is one intervening non-Class 1E bus (CTG 3) between RAT B and the Class 1E bus. While this connection may introduce a potential failure point, the design presented in FSAR

Figure 8.3-1 improves diversity and flexibility by providing an additional source of power to the safety related buses for normal, outage, accident, and severe accident conditions.

In the certified design, each Class 1E bus could get power from a single UAT, the single RAT, one EDG, or the CTG. In the design presented in FSAR Figure 8.3-1, each Class 1E bus can get power from a single UAT, either of two RATs, one EDG, or the CTG.

Due to the improved diversity and flexibility realized in this design, no change to meet the guidance of SECY-91-078 is warranted.

While no COLA revision is required as a direct result of this question, in order to reduce the number of non-Class 1E buses which intervene between the UATs and RAT A and the Class 1E buses, the following changes to FSAR Chapters 7 and 8 text will be made. Each of the changes is shown below. The text that is changed from Revision 02 is highlighted with gray shading (Please note unshaded strikethrough text was previously changed by COLA Revision 02).

8.2.1.1 Scope

(12) The non-segregated phase buses from the unit auxiliary transformers (UATs) to the input terminals of the non-safety-related medium voltage (~~6.9~~13.8 kV) switchgear, ~~the non-safety-related medium voltage switchgear (A4, B4, C4) and the power cables form the non-safety related medium voltage switchgear to the safety related switchgear~~ the power cables from the UATs to the input terminals of the plant investment protection (PIP) medium voltage (4.16 kV) switchgear and ~~stub buses, and power cables between the stub buses and the~~ safety related switchgear.

(13) The non-segregated phase bus and power cables from the reserve auxiliary transformers to the input terminals of the non-safety-related and safety-related medium voltage (~~6.9 kV~~13.8 kV and 4.16 kV) switchgear ~~and stub buses, and power cables between the stub buses and the safety-related switchgear~~.

7.4.1.4.4 Remote Shutdown Capability Controls and Instrumentation–Equipment, Panels, and Displays

(7) Electrical Power Distribution System (EPDS)~~Medium Voltage Power Distribution System (MVD)~~

(a) The following functions have transfer and control switches located on the Division I remote shutdown panel:

(i) ~~6.9 kV feeder breaker: Unit auxiliary transformer A to M/C E~~ Safety Bus A3 Breaker from UAT A ~~Stub Bus A4~~

(ii) ~~6.9 kV feeder breaker: Reserve auxiliary transformer A to M/C E~~ Safety Bus A3 Breaker from RAT A ~~Stub Bus A5~~

(b) The following functions have transfer and control switches located on the Division II remote shutdown panel:

(i) ~~6.9 kV feeder breaker: Unit auxiliary transformer B to M/C F~~ Safety Bus B3 Breaker from UAT B ~~Stub Bus B4~~

(ii) ~~6.9 kV feeder breaker: Reserve auxiliary transformer A to M/C F~~ Safety Bus B3 Breaker from RAT A ~~Stub Bus B5~~

FSAR Figure 8.3-1, Sheet 1, Figure 8.2-1 Sheet 1, and Figure 7.4-2 will also change as a result of the stub bus removal.

RAI 08.03.01-5

QUESTION:

In FSAR subsection 8.3.1.0.1 regarding the plant investment protection (PIP) buses, it is stated that on loss of normal or alternate preferred power, an automatic transfer of pre-selected buses occurs via dead bus transfer to the combustion turbine generator (CTG) which automatically starts on loss of power. Alternate power to the PIP buses is provided through 4.16 KV bus CTG3 and this same bus is normally supplied by RAT B. Describe the interlock that would prevent paralleling the CTG source with the RAT B source.

Response:

At bus 4.16 kV CTG 3, circuit breaker position interlocks normally prevent paralleling the CTG source with the RAT B source. In order to facilitate orderly restoration of power sources during the SBO, paralleling of the CTG and RAT B sources may be performed.

Electrical interlocks will consist of contact logic and relay supervision of manual synchronizations consistent with IEEE 141 and 242. As such, bus transfers from the CTG source to the RAT B source will be supervised to verify the two ac circuits are within the desired limits of frequency and voltage phase angle to permit them to operate momentarily in parallel. This would allow RAT B to be capable of being restored as an offsite power supply to the Class 1E buses without de-energizing the Class 1E bus.

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

RAI 08.03.01-6

QUESTION:

FSAR subsection 8.3.1.1.1 describes the medium voltage Class 1E power distribution system. Explain why various bus ratings identified in the corresponding section of the ABWR DCD have been deleted.

Response:

Various ratings were removed from subsection 8.3.1.1.1 since the Class 1E medium voltage system changed to a 4.16 kV system from the values stated in the DCD. The bus continuous current rating of 2000A is identified in Figure 8.3-1 Sheet 1. The Class 1E power distribution system equipment has not yet been procured; therefore actual equipment ratings cannot be specified in the FSAR or figures. Based on the initial system sizing calculations, the Class 1E medium voltage bus and circuit breaker ratings have been selected as 4.76 kV, continuous current rating per Figure 8.3-1, interrupting current rating of 61 kA and momentary current rating of 164 kA.

DCD Tier 1, Inspections, Tests, Analyses and Acceptance, Criteria 2.12.9a, will verify ratings.

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

RAI 08.03.01-7

QUESTION:

FSAR subsection 8.3.1.1.8.2 (item 12) states that the maximum loads, expected to occur for each division, do not exceed 95% of the continuous power output rating of the diesel generator. Based on Table 8.3-1 for Diesel Generator B (Division II), the identified connected load exceeds the kW continuous rating of the diesel generator. Also, the operating loads exceed 92% of the generator continuous rating with an additional 677 kW in standby and short time loads. Confirm that the total diesel loading, including standby and short time loads, does not exceed the stated 95% of the continuous rating of the diesel generator in accordance with the guidance of RG 1.9.

Response:

STP has confirmed that the total 'continuous' loading for the each emergency diesel generator (EDG) does not exceed the 95% of the continuous rating of the diesel generator as required by FSAR 8.3.1.1.8.2 (item 12). This determination is based on an EDG continuous rating of 7200 kW as specified in STD DEP 8.3-1, Plant Medium Voltage Electrical System Design, and EDG continuous loading based on FSAR Table 8.3-1, "D/G Load Table – LOCA + LOPP." However, STP did not include either the standby or the short time loads from FSAR Table 8.3-1 in the calculation of EDG continuous loading based on the direction provided in Notes (1), (2) and (5) in ABWR DCD Table 8.3-3, "Notes for Tables 8.3-1 and 8.3-2."

ABWR DCD Table 8.3-3, "Notes for Tables 8.3-1 and 8.3-2," provides the following guidance for the calculation of EDG continuous output:

(1) – : shows that the load is not connected to the switchgear of this division.
X : shows that the load is not counted for D/G continuous output calculation by the reasons shown on other notes.

(2) "Motor operated valves" are operated only 30–60 seconds. Therefore they are not counted for the DG continuous output calculation.

(5) Redundant units, one unit of a division operates and one unit is in standby in case the operating unit shuts down. Total connected load is shown on the table, but operating loads are half these amounts.

Based on the application of Notes (1), (2) and (5) in ABWR DCD Table 8.3-3, the continuous load on an EDG is equal to the total connected loads from FSAR Table 8.3-1 (7306 kW for EDG B) minus the standby loads (311 kW for EDG B) and minus the short time loads (366 kW for EDG B). Therefore, the continuous load on EDG B is 6629 kW. Based on an EDG continuous rating of 7200 kW, the total 'continuous' diesel loading for the limiting emergency diesel generator (EDG B) does not exceed the 95% of the continuous rating of the diesel generator as required by FSAR 8.3.1.1.8.2 (item 12). Specifically, the total 'continuous' diesel loading for EDG B is 92.07% (6629 kW/ 7200 kW) of the continuous rating of the EDG.

ABWR DCD 8.3.1.1.8.2 enumerates the specific guidance in NRC Regulatory Guide (RG) 1.9 and IEEE-387 that must be met. ABWR DCD 8.3.1.1.8.2 (12) includes the requirement that "The maximum loads expected to occur for each division (according to nameplate ratings) do not exceed 90% of the continuous power output rating of the diesel generator." (FSAR 8.3.1.1.8.2, specifically STP DEP 8.3-3, changes this limit to 95% of the continuous power output rating based on guidance provided in RG 1.9, Regulatory Position C.1.1.3.) STP excluded the "short term loads" from the calculation of "the maximum loads expected to occur" because the continuous loads are being compared to the EDG continuous rating, which is consistent with the direction in ABWR DCD Table 8.3-3, Notes (1) and (2) that these loads are "not counted for the DG continuous output calculation."

STP will make the following changes to FSAR Table 8.3-1 to correct typographical errors discovered during this evaluation:

ABWR DCD Table 8.3-3, Notes for Tables 8.3-1 and 8.3-2 (Continued)

Sys No	Load Description	Rating (kW)	A (Div I)	B (Div II)	C (Div III)	Note*
Total Connected Loads			5271	~~7305~~ 7306	~~7042~~ 7043	
Total Standby Loads and Short Time Loads			538	677	677	
Total Operating Loads			4733	~~6628~~ 6629	~~6365~~ 6366	

RAI 08.03.01-8

QUESTION:

As shown in various ABWR DCD 8.3 Figures, uninterruptible power supplies include rectifiers and inverters. Discuss the procedures that will be developed to address the periodic testing of these components.

Also, discuss the administrative controls that will be put in place to assure the proper control of Class 1E fuses used throughout the plant. Class 1E fuses are used throughout the plant, as required by 10 CFR 50, Appendix B, Criterion III, Design Control.

Response:

As described in DCD 2.12.14, Vital AC Power System, "each Class 1E power supply provides uninterruptible, regulated AC power to Class 1E circuits which require continuity of power during a loss of preferred power (LOPP). Each Class 1E Vital AC Power Supply is a constant voltage constant frequency (CVCF) inverter power supply unit." Each Class 1E CVCF Inverter Power Supply is capable of being fed by a Class 1E Battery System.

Testing of the uninterruptible Class 1E power supplies is addressed in FSAR subsection 8.3.4.28, "Periodic Testing of CVCF Power Supplies and EPAs," which states "Procedure(s) for the periodic testing of CVCF power supplies (including alarms) and associated Electrical Protection Assemblies (EPAs) which provide power to the Reactor Protection System will be developed prior to fuel load. These procedures will be developed consistent with the plant operating procedure development plan in Section 13.5. (COM 8.3-17)"

As described in FSAR subsection 13.5.3.3.1, administrative procedures will be developed based on the experiences of other STP operating plants and will be consistent with STP guidelines. The Fuse Control Program for STP Units 1 & 2 will be used as a guideline for development of the Unit 3 & 4 Fuse Control Program.

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

RAI 08.03.01-9

<u>QUESTION:</u>

In FSAR subsection 8.3.4.4 it is stated that, “procedures include periodic testing and calibration of the protective devices (except for fuses which will be inspected) to demonstrate their functional capability for the safety-related circuits that pass through the containment electrical penetrations assemblies." GDC 50 requires that penetrations be designed to assure containment integrity. Containment integrity can be compromised by short circuits affecting non-safety related circuits within the containment during a design basis accident. Confirm whether the above procedures will also include periodic testing and calibration of protective devices associated with the non-safety related circuits that pass through the containment electrical penetration assemblies. If not, provide justification for the omission and assess potential safety consequences.

<u>Response:</u>

The protective devices requiring special consideration as defined by IEEE 741, Section 5.4 (Class 1E and non-Class 1E) will be included in the FSAR 8.3.4.4 identified procedure(s) for periodic testing and calibration of the protective devices.

COLA change is required and proposed changes are as follows:
(Please note unshaded strikethrough text was previously changed in COLA Revision 2).

8.3.4.4 Protective Devices for Electrical Penetration Assemblies

The following site-specific supplement addresses COL License Information Item 8.10. Procedure(s) will be developed before fuel load that demonstrates the functional capability of the electrical penetration assembly protective devices to perform their required safety functions. These procedures include periodic testing and calibration of the protective devices (except for fuses which will be inspected) to demonstrate their functional capability for the ~~safety-related~~ circuits that pass through the containment electrical penetrations assemblies and require special consideration as defined by IEEE-741. A sample of each different type of over current device is selected for periodic testing during refueling outages. The testing includes verification of thermal and instantaneous trip characteristics of molded case circuit breakers; verification of long time, short time, and instantaneous trips of medium voltage air circuit breakers; and verification of long time, short time, and instantaneous trips of low voltage air circuit breakers. The procedures will be developed before fuel load consistent with the plant operating procedure development plan ~~which was provided to the NRC in ABWR Licensing Topical Report (LTR) NEDO-33297, dated January 2007, titled “Advance Boiling Water Reactor (ABWR) Procedures Development Plan.”~~ in Section 13.5. (COM 8.3-2)

RAI 08.03.01-10

QUESTION:

In FSAR subsection 8.3.4.30, Periodic Testing of Electrical Systems and Equipment, the applicant indicates that procedure will be developed for the periodic testing of electrical equipment in accordance with surveillance and test requirements of IEEE 308. Class 1E electrical equipment also includes isolation devices, as discussed in IEEE 384, endorsed by RG 1.75. Confirm that all electrical isolation devices used for achieving electrical independence will undergo periodic testing, in accordance with 10 CFR 50, Appendix B, Criterion XI, Test Control.

Response:

This response addresses the question in three parts:

RG 1.75 Rev. 3

Regulatory Position (1) does call for a supplement to IEEE 384 Section 7 to include periodic testing of circuit breakers (visual inspection of fuses and fuse holders) during every refueling to demonstrate that the overall coordination scheme under multiple faults of non-safety-related loads remains within the limits specified in the design criteria for the nuclear power plant.

IEEE 384

For Power Circuits, IEEE 384, Section 7.1.2.1(1) states, in part, that for circuit breakers tripped by fault currents that periodic testing shall demonstrate that the overall coordination scheme remains within the limits specified.

For Instrumentation and Control Circuits, IEEE 384, Section 7.2.1 states that the capability of a device to perform its isolation function shall be demonstrated by qualification tests. The standard does not include a requirement to periodically test isolation devices for instrumentation and control circuits. The qualification test will be satisfied by the Class 1E equipment procurement process.

10 CFR 50, Appendix B, Criteria XI

The criterion requires that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.

As stated in FSAR subsection 8.3.4.30, procedure(s) for the periodic testing of all Class 1E electrical systems and equipment in accordance with surveillance and test requirements of Section 7 of IEEE 308 will be developed. As discussed in IEEE 384 Class 1E to non-Class 1E isolation devices are safety related, as such they would be covered by 8.3.4.30.

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

RAI 08.03.01-11

QUESTION:

In FSAR subsection 9.5.13.8 (item 3), the applicant refers to subsection 8.3.4.2 for a discussion of diesel generator no-load or low-load operation. However, the referenced subsection does not address no-load or low-load operation. Clarify the statement and provide either an appropriate reference or discuss the issue in either subsection.

Response:

Diesel generator no-load and light load operation is discussed in FSAR subsection 9.5.13.8 (item 1) which states that procedures will be provided that require loading of the engine up to minimum of 40% of full load (or lower per manufacturer's recommendation) for 1 hour following up to 8 hours of continuous no-load or light-load operation. In addition, diesel generator no-load operation is discussed in DCD subsection 8.3.1.1.8.2 (item 10).

Since the issue is discussed in FSAR subsection 9.5.13.8 (item 1) and there is no discussion of the issue in FSAR subsection 8.3.4.2, FSAR 9.5.13.9 (item 3) will be removed as shown below:

~~(3) See Subsection 8.3.4.2 for a discussion of diesel generator no-load or low-load operation.~~

RAI 08.03.01-12

QUESTION:

STP DEP T1 2.15-2 RBSRDG HVAC revises DCD Tier 1 Subsection 2.15.5 DG engine room maximum temperature limit during DG operation from 50°C to 60°C. Discuss the effect of temperature increase from 50°C to 60°C on (1) DG performance (DG rating, effects on electronic components associated DG control system, etc.), (2) Cable ampacity, (3) mild environment equipment qualification, and (4) operation of other equipment in the room if any.

Response:

1. The equipment to be installed in the DG room is being specified and procured to be suitable for the DG room environmental conditions. DG equipment which may not be suitable for the DG room environmental conditions is being specified and procured to be located outside the DG room.

2. The cables to be routed in the DG room shall have suitable ampacity for the area consistent with the ampacity guidelines with temperature correction factors applied for a 60°C ambient temperature. This will be confirmed by DCD Tier 1, Inspections, Tests, Analyses and Acceptance Criteria 2.12.1.14, which is the acceptance criteria for EPD system cable sizing.

3. The safety-related equipment to be installed in the DG room is being specified and procured to be suitable for the DG room environmental conditions consistent with the guidance of DCD Tier 2 Section 3.11.2, Qualification Tests and Analyses.

4 The safety-related equipment to be installed in the DG room is being specified and procured to be suitable for the DG room environmental conditions.

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

RAI 08.04-1

QUESTION:

10CFR 50.63 states that no coping analysis is required if AAC (Alternate AC) source is demonstrated to be available within 10 minutes of the onset of a station blackout (SBO). Discuss the following:

1. Discuss the time required to identify the existence of an SBO (when the SBO clock starts?)
2. How long it will take to energize all required loads?
3. How long it will take to energize the emergency bus when the AAC source is connected to a nonsafety bus?

Response:

1. As discussed in Appendix I to NUMARC 87-00, the SBO "clock" starts after the immediate steps in the EOP's have been taken to verify the SCRAM, primary system parameters, etc, and after the attempt to restore offsite power and start the diesel generators from the control room per the EOP's. The detailed procedures for these activities will be developed as discussed in FSAR, Section 13.5. As these procedures are not yet developed, a precise timeline cannot be established.

2. The initial required loads (for example the RCIC system) are energized automatically and are not dependent on AC sources. As discussed in DCD Table 1C-1, the CTG will start and automatically connect to a non-safety bus. The re-alignment of the CTG to feed the pre-aligned Class 1E bus will require tripping of the feed to the non-safety bus and manual closure of two circuit breakers from the control room. Manual actions will be required after connection of the CTG to the Class 1E system. The detailed procedures for these activities will be developed as discussed in FSAR, Section 13.5. As these procedures are not yet developed, a precise timeline cannot be established.

3. Appendix I to NUMARC 87-00 stated that if you can start and be ready to load the AAC source within the next ten minutes after verification of the SBO, the 10-minute criterion is met. Since in this event, the CTG would be running based on a loss of voltage signal from the PIP buses, the only additional actions remaining would be the alignment of the CTG to feed the Class 1E bus. The detailed procedures for these activities will be developed as discussed in FSAR, Section 13.5. As these procedures are not yet developed, a precise timeline cannot be established. However, due to the simplicity of the operation and the automatic start of the CTG, this operation can easily be performed to meet the NUMARC 87-00 time requirement.

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

RAI 08.04-2

QUESTION:

In subsection 9.5.13.20 of the FSAR, the applicant identified the operating procedures to address a station blackout event (SBO). According to NUMARC 87-00, endorsed by Regulatory Guide 1.155 and referenced by SRP 8.4, the SBO response procedures include (1) Station Blackout Response Guidelines, (2) AC Power Restoration, and (3) Severe Weather Guidelines. Confirm that the operating procedures will address these three topics. Additionally, confirm that training will be provided to the plant personnel on these procedures that will be developed to address the station blackout event.

Response:

As discussed in FSAR section 9.5.13.20, "Operating Procedures for Station Blackout", The station blackout procedure(s) will provide the direction to:

(1) Operate the Alternate AC-CTG during an SBO event;
(2) Restore other plant offsite (preferred) and onsite emergency power sources as soon as possible;
(3) Recover plant HVAC Systems as soon as possible to limit heat increase;
(4) Provide additional core, containment, and vital equipment makeup and cooling services, as necessary; and,
(5) Establish orderly plant safe shutdown conditions

The station blackout procedure(s) will be developed consistent with the plant operating procedure development plan in Section 13.5."

The above list confirms procedure consideration of Items 1 and 2 of the question.

With respect to Item 3, in the June 16, 1989 letter from T.E. Murley, USNRC to W. H. Rasin, Nuclear Management and Resources Council (Included in Appendix K to NUMARC 87-00), it is stated that not all plants are required to have procedures which require shutdown two hours prior to hurricane (i.e., Severe Weather Guidelines) to address Station Blackout. Since the ABWR has an Alternate AC supply available within 10 minutes of the Station Blackout, there is no specific requirement for Severe Weather Guidelines to be included as a Station Blackout response procedure.

Plant training is addressed by FSAR, Section 13.2, which incorporates by reference NEI-06-03, "Template for an Industry Training Program Description." As such, confirmation exists within previously submitted documents.

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

RAI 14.03-1

QUESTION:

Acceptance Criteria of Item 11, in Table 2.12.1, "Electric Power Distribution System," Acceptance criteria of item 8 in Table 2.12.2, "Direct Current Power Supply," Acceptance criteria of item 10 in Table 2.12.14, "Vital AC Power Supply," and acceptance criteria of item 9 in Table 2.12.15, "Instrument and Control Power Supply," of Part 9 of the STP COLA address the system interrupting devices coordination and state that " Analysis of as-built----- and concludes that to the maximum extent possible, the analyzed circuit interrupter closest to the fault will open before other devices." Please modify the acceptance criteria to include a justification of acceptability of those instances when coordination can not be achieved.

Response:

It is noted that the question refers to Table 2.12.2, "Direct Current Power Supply," which should have been identified as Table 2.12.12.

Changes to the COLA, Revision 02, Part 9, Chapter 2, text will be made as shown below. The text that is changed from Revision 02 is highlighted with gray shading.

Table 2.12.1 Acceptance Criteria 11

Analyses for the as-built EPD System exist and conclude that, to the maximum extent possible, the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

Table 2.12.12, Acceptance Criteria 8

Analyses for the as-built Class 1E DC electrical distribution system circuit interrupting devices exist and conclude that, to the maximum extent possible, the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

Table 2.12.14, Acceptance Criteria 10

Analyses for the as-built Class 1E Vital AC Power Supply system circuit interrupting devices (circuit breakers and fuses) coordination exist and conclude that, to the maximum extent possible, the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

Table 2.12.15 Acceptance Criteria 9

Analyses for the as-built Class 1E Instrument and Control Power Supply system circuit interrupting devices (circuit breakers and fuses) coordination exist and conclude that, to the maximum extent possible, the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

A COLA revision is required as a result of this response.

RAI 14.03.06-5

<u>QUESTION:</u>

In Table 3.0-2, Section 3.0 of Part 9 of the STP COLA, Site-Specific ITAAC, the applicant provided ITAAC for the offsite power system. However, no ITAAC is provided for lightning and grounding protection for the offsite power system. SRP Section 14.3.6 recommends that ITAACs for lightning and grounding protection should be developed. Please provide ITAACs for lightning and grounding protection for the offsite power system or provide a discussion on why these are not required.

<u>Response:</u>

COLA Part 9, Section 3.0 Table 3.0-2 will be modified as shown below to add an ITAAC for lightning and grounding protection for the offsite power system.

Table 3.0-2 Offsite Power System

Design Requirement	Inspections, Tests, Analyses	Acceptance Criteria
8. Lightning protection and grounding features are provided for the offsite power system.	8. Inspections of the as-build offsite power system will be performed.	8 Lightning protection and grounding features exist for the offsite power system.