Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

June 29, 2010
U7-C-STP-NRC-100154

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

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

Attached is the response to an NRC staff question included in Request for Additional Information (RAI) letter number 345 related to Combined License Application (COLA) Part 2, Tier 2, Section 3.4.2. Attachment 1 provides the response to RAI question RAI 03.04.02-6.

In addition, Attachments 2 through 5 provide revised responses to four previously submitted RAI question responses which are impacted by the response in Attachment 1. Attachments 2 through 5 provide the revised responses to the following RAI questions:

03.04.02-2
03.08.01-3
03.08.01-6
14.03.02-9

Where there are COLA markups, they will be made at the first routine COLA update following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions regarding this response, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

D091
NRO

STI 32699799

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

Executed on 6/29/10

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

jep

Attachments:
1. RAI 03.04.02-6
2. RAI 03.04.02-2, Rev 1
3. RAI 03.08.01-3, Rev 1
4. RAI 03.08.01-6, Rev 1
5. RAI 14.03.02-9, Rev 1

cc: w/o attachment except*
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RAI 03.04.02-6

QUESTION:

In its evaluation of RAI 03.04.02-2 (ID 3322 Question 13162), the staff accepts in general the applicant's physical description of watertight door locations and the proposed measures and procedures to accomplish water tightness of any below DBFL openings and penetrations of seismic category I, in- and out-of-scope SSC, as reflected in the proposed revision to COLA FSAR. The staff considers that since watertight doors are seismic category I SSC, each exterior door under DBFL located in any category I structure should be given a unique component ID, a set of specific design parameters, other conditions (e.g., controls measures) and be keyed into the corresponding plans to show each door's location. Such information should be reflected in the ITAAC tables conveying the design requirements, the proposed inspections, tests, analyses and the acceptance criteria including the need for as-built reconciliation which is required for category I SSC. All certified and plant-specific category I SSC should be considered, including the underground diesel tanks and vaults if applicable. Compliance with RG1.102 Flood Protection for Nuclear Power Plants should also be indicated for the underground diesel tank access openings if applicable. The staff needs this information to be able to conclude that the seismic category I doors are designed and installed to withstand the design basis flood during an accident.

RESPONSE:

Each of the exterior watertight doors used for protection against Design Basis Flood (DBF) will be given a unique component ID. The specific design parameters and other conditions will be contained in the purchase specification for the doors, and are included in the COLA markups included with this response. The design commitments, as-built reconciliation requirements, required inspections, tests, analyses and acceptance criteria for penetrations in exterior walls below design basis flood level are included in ITAAC Tables 2.15.10 and 2.15.12. ITAAC Table 2.15.10 also applies to the watertight doors in the Diesel Generator Fuel Oil Storage Vaults. The ITAACs for both the Reactor Building (Table 2.15.10) and the Control Building (2.15.12) state that "Penetrations in the external walls below flood level are provided with flood protection features." The ITAACs for both buildings state that they are protected from external flooding events and require a Flood Analysis Report that includes the results of inspections of the as-built flood protection features.

This RAI response will impact previously submitted responses to the following RAIs and COLA Sections.

- COLA Part 2, Tier 2 Sections 3.4.3.1 and 3.4.3.3
- RAI 03.04.02-2
- RAI 03.08.01-3
- RAI 03.08.01-6
- RAI 14.03.02-9
- RAI 19-30

The markup to the COLA Sections is presented in Enclosure 1 and the revised RAI responses, with the exception of RAI 19-30, are being submitted concurrently with this response. The response to RAI 19-30 is being submitted under separate cover. The COLA markups include the description of loads, load combinations, and acceptance criteria for the watertight doors. Please note that Section 3H.6.7, which is referenced in the revision to Section 3.4.3.3, was submitted with response to RAI 03.07.01-19 Revision 2, as submitted in STPNOC letter U7-C-STP-NRC-100129, dated June 7, 2010.

RAI 03.04.02-6
Enclosure 1
Revisions to COLA Part 2, Tier 2, Sections 3.4.3.1 and 3.4.3.3

The following paragraphs will be added at the end of this section

3.4.3.1 Flood Elevation

Watertight doors or barriers are provided on the Reactor Building and Control Building to protect the buildings from the external design basis flood. These watertight doors or barriers are considered Seismic Category I components. In order to ensure that the watertight doors and barriers can withstand the ABWR Standard Plant loading requirements, the watertight doors and barriers of the Reactor Building and Control Building will be designed for the more severe of the standard plant and site-specific loading. Watertight doors shall be designed to meet the Incorporated Barrier requirements of Regulatory Guide 1.102.

The watertight doors or barriers for the Reactor Building consist of the six exterior doors and the exterior Large Equipment Access indicated in Tier 1 Figures 2.15.10h and 2.15.10j. The watertight doors for the Control Building consist of the access doors between the Control Building and the Service Building shown in Tier 1 Figures 2.15.12d, e, and f, the exterior equipment access door shown in Tier 1 Figure 2.15.12g, and an access door between the Control Building and the Service Building shown in Tier 1 Figure 2.15.12g. Each door will be given a unique component ID in the construction drawings.

The locations for watertight doors in the Reactor Building and Control Building include:

Exterior Watertight Door or Barriers

Structure	Door or Barrier Description	Elevation
Reactor Building	Clean Access Area Corridor Entrance	B1F (4800 mm)
	Diesel Generator A Access	1F (12300 mm)
	Diesel Generator B Access	1F (12300 mm)
	Diesel Generator C Access	1F (12300 mm)
	East Equipment Hatch Access	1F (12300 mm)
	West Equipment Hatch Access	1F (12300 mm)
	Large Equipment Access	1F (12300 mm)
Control Building	HX Area Access at Service Building	B3F (-2150 mm)
	Electrical Area Access at Service Building	B2F (3500 mm)
	Control Building Access at Service Building	B1F (7900 mm)
	Entrance to Reactor Building Controlled Access	1F (12300 mm)
	Equipment Access	1F (12300 mm)

Exterior openings of the Reactor Building and Control Building that could make safety-related SSCs vulnerable to tornado missiles are protected by separate barriers or doors designed to resist tornado missiles.

The watertight doors are seated such that the force of the water helps maintain the watertight seal. The watertight doors are designed to be leak tight. Watertight doors will be individually engineered assemblies designed by the supplier to satisfy the design basis performance requirements for external flooding. Watertight doors will allow only slight seepage during an external flooding event in accordance with criteria for Type 2 closures in U. S. Army Corps of Engineers (COE) EP 1165-2-314, "Flood-Proofing Regulations". This criterion will be met under hydrostatic loading of 12 inches of water above the design basis flood elevation per Table 3.4-1, plus the height of wave run-up and drag effects, as required. Water retaining capability of the doors shall be demonstrated by qualification

tests for the water head levels. These tests will be completed prior to shipment of the doors. For this purpose a test fixture may be used, with gasket material and cross section, its retainers, and the anvil configuration being identical to that of the full size doors. The test fixture shall have the necessary valving, pressure gages, flow meters, and instruments for measuring gasket compression. To validate that the door satisfies a Type 2 closure per (COE) EP 1165-2-314, the leakage shall not exceed 0.10 gallon/hour/linear foot of gasket when subjected to 125% of the specified head pressure.

The watertight doors or barriers that are utilized for protection against external flooding are normally closed and are used for egress, as required.

The watertight doors, frames, and all components are designed to the requirements of AISC N690 and SRP Section 3.8.4. The structural steel used for the watertight doors conforms to either ASTM A36, ASTM A992 or ASTM A500 Grade B. The faceplate conforms to ASTM A606, type 4 and the rubber gasket conforms to ASTM D2000, Grade BC. Fabrication of the doors shall meet the requirements of AISC N690. The welding shall meet the requirements of nondestructive testing, personnel qualifications and acceptance criteria contained in AWS D1.1.

The watertight doors shall be designed for the following loads and load combinations:

$S = D + W$

$S = D + P$

$1.6S = D + P + E'$

$1.6S = D + W_t$ (See definition below)

Where:

S = Normal allowable stresses as defined in AISC N690

D = Dead Loads
E' = Loads generated by SSE, per Sections 3H.1 and 3H.2
P = Pressure Loads, which may be due to hydrostatic pressure, P_h, or differential pressure, P_d.
P_h = Loads due to hydrostatic pressure, determined based on the flood elevation per Table 3.4-1, plus the height of wave run-up and drag effects, as required.
P_d = Loads due to differential pressure
W = Normal Wind Loads, per Sections 3H.1 and 3H.2.
W_t = Tornado Loads, per Sections 3H.1 and 3H.2, including wind velocity pressure W_w, differential pressure W_p, and tornado-generated missiles (if not protected) W_m

The value used for W_t shall be computed to satisfy the following possible combinations:

$W_t = W_w$

$W_t = W_p$

$W_t = W_m$

$W_t = W_w + W_m$

$W_t = W_w + 0.5\ W_p$

$W_t = W_w + 0.5\ W_p + W_m$

The following paragraphs will be added at the end of this section

3.4.3.3 Flood Protection Requirements for Other Structures

Watertight doors or barriers are provided on the site-specific Diesel Generator Fuel Oil Storage Vaults to protect the vaults from the external design basis flood. These watertight doors or barriers are considered site-specific Seismic Category I components. Each door will be given a unique component ID in the construction drawings.

The locations of watertight doors for the Diesel Generator Fuel Oil Storage Vaults include:

Exterior Watertight Door or Barrier Component IDs

Structure	Door Description
Diesel Generator Fuel Oil Storage Vaults	Access to Vault A
	Access to Vault B
	Access to Vault C

The design requirements for Diesel Generator Fuel Oil Storage Vault watertight doors are similar to the requirements described in Section 3.4.3.1, except that only the site-specific loads are considered, as described in Section 3H.6.7.

RAI 03.04.02-2, Rev 1

QUESTION:

The applicant stated that "STP 3 & 4 safety-related SSCs are designed for or protected from this flooding event by watertight doors to prevent the entry of water into the Reactor Buildings and Control Buildings in case of a flood. Exterior doors located below the maximum flood elevation on the 12300 floor of the Reactor Building and Control Building are revised to be watertight doors. The Ultimate Heat Sink storage basin and the RSW pump houses are water-tight below the flood level." Discuss a more quantitative performance based definition of a "watertight door," and applicable codes and standards used for the design. Also list STP 3 and 4 site-specific Seismic Category I structures that include watertight doors and penetrations, and discuss how their water tightness is ensured. Provide detailed ITAAC table for STP 3 & 4 safety-related site-specific SSCs including the Ultimate Heat Sink (UHS) structure.

RESPONSE:

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-090161 dated October 7, 2009. The information provided in the original response for the Reactor and Control Buildings is completely superseded by the response to RAI 03.04.02-6, being submitted concurrently with this response. The information provided for the site-specific structures is retained in this revised response. The revisions are indicated by revision bars in the margin.

There are no exterior access openings or above grade penetrations below the design flood level in the Ultimate Heat Sink (UHS) Basin and the Reactor Service Water (RSW) Pump House. The response to RAI 03.04.02-3 provides an ITAAC for the below grade penetration seals to be provided with flood protection features.

The watertight doors in the Diesel Generator Fuel Oil Storage Vaults are discussed in the response to RAI 03.04.02-6.

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

RAI 03.08.01-3, Rev 1

QUESTION:

In FSAR Appendix 3H, Section 3H.1.4.2, sub-item (3), the applicant stated that the maximum flood level for STP units 3 & 4 site is 442 cm above grade against the corresponding ABWR standard design value of 0.305 m below grade (departure STP DEP T1 5.0-1). In Part 7 of the application, the applicant performed an evaluation of this departure, and stated that STP 3 & 4 safety-related SSCs are designed for or protected from this flooding event by watertight doors to prevent the entry of water into the Reactor Buildings and the Control Buildings in case of a flood. The applicant also stated that the exterior doors located on the 12300 floor of the Reactor Building and Control Building are revised to be watertight doors. Since these doors play a significant role in protecting safety-related SSCs and constitutes a special design feature, the staff requests the applicant to include in the FSAR sufficient design information about these doors including locations, seismic and other design criteria, seismic classification, redundancy features, if any, and if these doors will be used for normal access and egress to and from the Reactor Building and the Control Building.

RESPONSE:

The original response to this RAI was submitted in STPNOC letter U7-C-STP-NRC-090136, dated September 15, 2009. The original response is completely superseded by the response to RAI 03.04.02-6, being submitted concurrently with this response.

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

RAI 03.08.01-6, Rev 1

QUESTION:

Follow-up question to Question 03.08.01-3 (RAI 2962)

The applicant's response to Question 03.08.01-3 identifies the watertight doors that will be required to protect safety-related systems and components against a probable maximum flood (PMF) and states that these doors are designed as Seismic Category I for site-specific loads. The applicant also states that the watertight doors between the Control Building and the Service Building and between the Control Building and the Radwaste Building Access Corridor (1) provide access to and egress from the Control Building, (2) will normally remain open and will be closed only upon the indication of an imminent flood, and (3) are controlled by station procedures. Because these doors play a significant role in protecting safety-related systems, structures, and components (SSC) and constitute a special design feature, the staff requests the applicant to provide additional information about these doors and to update the FSAR as necessary, as stated below, in order for the staff to complete the evaluation:

(1) Include the seismic classification of the watertight doors in other relevant sections of the FSAR (e.g., Table 3.2-1) in order to ensure that these doors, including all components of the doors, will be appropriately treated for design, construction, installation, quality control, and maintenance, or explain why it is not necessary to do so.

(2) Identify the location of the additional watertight door between the Control Building and the Radwaste Building Access Corridor. This is not clear from the response to Question 03.08.04-3. Please identify the location of this door in a drawing.

(3) Clearly state in the FSAR the (a) site-specific loads and load combinations, (b) applicable codes and standards, (c) design and analysis procedures, (d) structural acceptance criteria, (e) materials and quality control, and (f) testing and in-service surveillance programs used to design, construct, install, and maintain these doors and all of the components following the guidance in SRP 3.8.4 (SRP Acceptance Criteria 1 through 7), or explain why it is not necessary to do so.

(4) Explain what mechanism is in place to ensure that the requirement for the normally open watertight doors to be closed upon the indication of an imminent flood will be included in the station procedures. Also confirm whether the adequacy of the station procedures to effectively close these doors when needed has been evaluated.

(5) Describe whether any redundancy features were considered for the watertight doors, particularly those that are normally open.

(6) Clarify what appears to be access doors between the Control Building and the Reactor Building that are not identified as watertight doors to be utilized for protection against external flooding. Since there is a gap between these buildings, explain what design feature is provided to ensure that flood water cannot enter the Reactor Building and the Control Building through these access areas.

RESPONSE:

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100018, dated January 14, 2010. This original response is being revised due to the additional information provided in response to RAI 03.04.02-6, which is being submitted concurrently with this response. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

1) COLA Part 2, Tier 2 Table 3.2-1 will be revised with a footnote added to the Reactor Building and Control Building rows to state that watertight doors which protect the safety-related equipment from an external flood are designated as Seismic Category I.

2) No additional access door is provided between the Control Building and the Radwaste Building Access Corridor.

3) See response to RAI 03.04.02-6

4) As described in STPNOC letter U7-C-STP-NRC-100119, dated May 27, 2010, all exterior watertight doors will remain normally closed.

5) Single failure assumptions are not typically imposed on design basis external event calculations as they are conservative by design. Redundancy was not considered for the external or internal watertight doors used to control the effects of flooding.

6) The access doors between the Reactor Building and Control Building are not required to be watertight since both buildings are separately protected from the design basis flood. The gaps between the buildings will be sealed using the detail shown in Figure 03-08-04-15A attached to the response to RAI 03.08.04-15 (see STPNOC letter U7-C-STP-NRC-090160 dated October 5, 2009).

STP Units 3 & 4 COLA will be revised as follows as a result of this response.

A) In Section 3.2 a footnote will be added to Table 3.2-1 for U10, Reactor Building and U12, Control Building, as follows.

3.2 Classification of Structures, Components, and Systems

The information in this section of the reference ABWR DCD, including all subsections, tables and figures, is incorporated by reference with the following departures and supplement (Hot Machine Shop). Note that the departures used for Table 3.2-1 are numbered with {} brackets.

{7} STD DEP T1 2.4-3 Reactor Core Isolation Cooling System

{6} STD DEP T1 2.14-1 Hydrogen Recombiner Requirements Elimination

{8} STP DEP T1 5.0-1 Site Parameters

Table 3.2-1 Classification Summary

Principal Component[a]	Safety Class[b]	Location[c]	Quality Group Classi-fication[d]	Quality Assur-ance Require-ment[e]	Seismic Category[f]	Notes
U10 Reactor Building {8}	3	C, SC, RZ, M	—	B	I	(ii)
U12 Control Building {8}	3	X	—	B	I	(ii)

Table 3.2-1 Notes and Footnotes

ii. Watertight doors that protect safety-related equipment from the Design Basis Flood are designated as Seismic Category I.

RAI 14.03.02-9, Rev 1

QUESTION:

The diesel storage tanks are seismic category I structures which do not interact with any certified systems but warrant ITAAC per the acceptance criteria in SRP Section 14.3.2. The staff notes that ABWR DCD, Revision 4, Subsection 2.16.2 contains the general ITAAC for the Diesel Generator Fuel Oil Storage Vaults. However, COLA Part 9, Revision 2, Section 3.0 should also include an ITAAC for the as-built reconciliation and flood safety of the tanks. Accordingly, the staff requests that the applicant provide an additional ITAAC for the exterior diesel storage tanks and vaults regarding the reconciliation of the as-built system with their structural design basis and the conditions necessary to ensure flood safety, as applicable. The integrity of the diesel tanks and vaults is needed to ensure that the emergency diesel system will perform in accordance with the specified safety functions, features, and characteristics.

RESPONSE:

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100070, dated March 30, 2010. This original response is being revised due to the additional information provided in response to RAI 03.04.02-6, which is being submitted concurrently with this response. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

The ITAAC for the diesel storage tank is included in the DCD Tier 1, Section 14.3.2. The ITAAC for the oil transfer tunnel is included in DCD Tier 1, Section 2.15.10. The ITAAC for the as-built reconciliation of the site-specific Diesel Generator Fuel Oil Storage Vaults is included in the new proposed Table 3.0-15 of COLA Part 9, Section 3.0.

The COLA will be revised as shown in the attached page.

3.0 Site Specific ITAAC

The STP 3 & 4 site-specific systems that require ITAAC because they have a safety-related, safety-significant, or risk significant function are listed below:

- Breathing Air (BA) System
- Diesel Generator Fuel Oil Storage Vaults

Table 3.0-15 Diesel Generator Fuel Oil Storage Vaults

Design Requirement	Inspections, Tests, Analyses	Acceptance Criteria
1. (a) The Diesel Generator Fuel Oil Storage Vaults are classified as Seismic Category I. These vaults are designed and constructed to accommodate the dynamic and static loading conditions associated with the various loads and load combinations which form the structural design basis. The loads are those associated with: i. Natural phenomena—wind, floods, tornadoes (including tornado missiles), earthquakes, rain and snow. ii. Internal events—floods, pipe breaks and missiles. iii. Normal plant operation—live loads, dead loads and temperature effects. 1. (b) Any access opening in the vaults below the flood level will be protected from external flooding with flood protection features.	1. (a) A structural analysis will be performed to reconcile as-built data with the structural design basis as defined in the Design Requirement. 1. (b) An inspection of the vaults will be performed.	1. (a) A structural analysis report exists which concludes that the as-built Diesel Generator Fuel Oil Storage Vaults are able to withstand the design basis loads as defined in the Design Requirement. 1. (b) The vaults have no unprotected openings that would permit external flooding to penetrate into the vaults.