Nuclear Operating Company

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

February 18, 2010
U7-C-STP-NRC-100040

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. 52-001
Response to Request for Additional Information

Reference: Letter, Mark McBurnett to Document Control Desk, "Application to Amend the Design Certification Rule for the U.S. Advanced Boiling Water Reactor (ABWR)," dated June 30, 2009, U7-C-STP-NRC-090070 (ML092040048).

This letter provides responses to Request for Additional Information (RAI) Letter Numbers 5, 6, 7, and 8, related to the application to amend the ABWR DCD Part 2, Tier 2, Sections 3.8, 5.2, 15.8 and 19 provided in Attachment 1 to the referenced letter. This submittal completes the responses to these RAI letters with the exception of RAIs 03.08.04-2, 03.08.04-4, 19-11, and 19-13, which will be submitted under separate cover.

The attachment to this letter provides the following RAI question responses:

03.08.04-1	05.02.02-2	15.08-1	19-8
03.08.04-3	05.02.02-3		19-9
03.08.04-5			19-10
			19-12

Changes will be incorporated into the next update of the ABWR DCD Amendment application following review and approval by the NRC Staff.

There are no commitments in this letter.

D050
NRO

If you have any questions, please contact Scott Head 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 2/18/2010

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

fjp

Attachments:

1. Question 03.08.04-1
2. Question 03.08.04-3
3. Question 03.08.04-5
4. Question 05.02.02-2
5. Question 05.02.02-3
6. Question 15.08-1
7. Question 19-8
8. Question 19-9
9. Question 19-10
10. Question 19-12

cc: w/o attachments and enclosure except*
(paper copy)

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RAI 03.08.04-1

QUESTION

Section 1.2.2.16.15, "Alternate Feedwater Injection (AFI) Pump House," of the ABWR DCR amendment application states that, "*The Alternate Feedwater Injection Pump House, which is located remotely from the Reactor Building, ...*" Since the application does not include any additional information in Chapters 3.7 and 3.8, no information is available to ensure that the design and location of this non-Category I structure will not adversely affect any Category I SSC to satisfy the acceptance criteria described in NUREG-0800, Subsection 3.7.2.II.8. Please provide a description and a revised site plan drawing that shows the location of the AFI pump house and its location and orientation to the other buildings and safety-related systems, structures and components, or propose an ITAAC to ensure the seismic interaction criteria are met when the new structure is erected.

RESPONSE:

As noted in the cited portion of the DCD amendment application, the Alternate Feedwater Injection (AFI) Pump House is located remotely from the Reactor Building. It is also required to be located remotely from safety-related SSC's, because it is intended to function in the event that an aircraft impact renders all safety systems unavailable. The AFI Pump House contains no Category I SSC's. The remote location of the AFI Pump House assures that a seismic event that could impact the AFI Pump House will not impact the Reactor Building and Control Building or the safety-related SSC located in those buildings. As noted in the DCD amendment application markup below, a design criterion has been established that the AFI Pump House must be located a minimum of 300 feet from the Reactor Building and Control Building. In addition, the interaction of the non-seismic AFI Pump House with Seismic Category I structures, systems and components will be evaluated in accordance with the existing process currently defined in Part 2, Tier 2, Section 3.7.2.8 of the DCD. Changes from the DCD amendment application previously submitted are highlighted with gray shading.

9.5.14.1 System Description

An alternate feedwater injection (AFI) system, capable of injecting into the Reactor Pressure Vessel (RPV) at operating pressure (≥800 g.p.m. at a pressure approximately at the lift setpoint of the first group of safety/relief valves) and located outside of the Reactor Building (R/B) is available. The system is capable of providing sufficient core cooling in the unlikely event that all normal and emergency core cooling systems are unavailable. It is comparable to the High Pressure Core Flooder (HPCF) system capacity and discharge pressure (at rated pressure). The AFI Pump House which contains this system as well as the water source for AFI are ~~is~~ located a minimum of 300 feet from the Reactor Building and Control Building. The interaction of the non-seismic AFI Pump House with Seismic Category I structures, systems and components will be evaluated in accordance with the existing process currently defined in Part 2, Tier 2, Section 3.7.2.8 of the ABWR DCD.

This will ensure ~~such that a simultaneous loss of the non-seismic AFI Pump House and the Reactor Building~~ that a failure of the non-seismic Pump House will not render any Category I structure inoperable ~~is unlikely~~. A schematic of the AFI system is shown in Figure 9.5-6.

RAI 03.08.04-3

QUESTION

Referring to Figure 9.5-6, "Alternate Feedwater Injection System Schematic," discuss and confirm that the effects of a postulated piping failure of the non-safety related AFI line entering and supported by the steam tunnel wall are adequately accounted for in the structural design basis of the reactor building steam tunnel structures.

RESPONSE:

The AFI line break is bounded by the Main Steam or Feedwater High Energy Line Breaks (HELB). It should also be noted that the AFI system piping is powered off and unpressurized for all normal and design basis accident conditions. The only mechanism for pressurizing the system is through backleakage past the check valves on the AFI line. The AFI system is required to function only in the beyond design basis event when all normal makeup and ECC systems are rendered unavailable as a result of an aircraft impact. The AFI system is initiated manually. Manual initiation of this system requires intentional operator action involving: (a) entering the AFI Pump House, (b) activating the breakers to power the system, (c) turning on the AFI pump, and (d) opening the normally closed motor-operated injection valves. Therefore, it is unlikely that the AFI will be inadvertently actuated. For these reasons, a break in the AFI line is unlikely.

There is no DCD amendment application change required as a result of this RAI.

RAI 03.08.04-5

QUESTION

Section 6.7.2, "System Description," of the ABWR DCR amendment application states, in part, that, "...An additional non-safety related nitrogen gas storage bottle capable of supplying nitrogen to one of the non-ADS safety/relief valves from the AFI Pump House is added to allow system depressurization in the event of loss of nitrogen supply in the Reactor Building." Discuss and confirm that the effects of adding this High Pressure Nitrogen Gas Supply System including piping and supports will not adversely impact the structural design basis, integrity and safety functions of the affected structures supporting the system.

RESPONSE:

Because the additional nitrogen gas supply system as described in the initial DCD amendment application submittal is not required to meet the AIA rule, that system is being removed from the DCD amendment application, and consequently, all of the DCD amendment application markups associated with that change are being deleted. As a result, there will no longer be a DCD amendment application change requiring an additional nitrogen supply line as described in this RAI .

The DCD amendment application markups required as a result of this response are provided in the response to RAI 06.02.04-1.

RAI 05.02.02-2

QUESTION

Re: DCD Figure 5.1-3 (Sheet 4 of 11)
Describe the type of analyses performed to ensure that the non-safety AFI line connected to the CUW tie-in lines to the feedwater system is designed such that it will not inadvertently impact the ability of safety-related RCIC system which injects to the reactor through the Feedwater system to perform its intended functions. Also, summarize the results of these analyses.

RESPONSE:

This Request for Additional Information is a duplicate of RAI 05.02.02-2 requested from the NRC in Letter Number 4 dated December 22, 2009. The response to this RAI has been provided in STP letter to the NRC on January 21, 2010, U7-C-STP-NRC-100026 as Attachment 2.

RAI 05.02.02-3

QUESTION

Re: DCD Figure 5.1-3 (Sheet 4 of 11)
Describe the type of analyses performed to ensure that the non-safety AFI line connected to the CUW tie-in lines to the feedwater system is designed such that it will not inadvertently impact the ability of safety-related RCIC system which injects to the reactor through the Feedwater system to perform its intended functions. Also, summarize the results of these analyses.

RESPONSE:

This Request for Additional Information is a duplicate of RAI 05.02.02-2 requested from the NRC in Letter Number 4 dated December 22, 2009. The response to this RAI has been provided in STP letter to the NRC on January 21, 2010, U7-C-STP-NRC-100026 as Attachment 2.

RAI 15.08-1

QUESTION

DCD 9.5.14.4, Instrumentation Requirements

Even though it is assumed that the reactor is shutdown, it is critical that when the reactor is being operated from a remote location, that the operators verify that the reactor is in shutdown condition. Moreover, for reactor control, one cannot control reactor pressure and reactor pressure vessel level without knowing the reactor power. There may be scenarios where there was only partial scram due to non-insertion of several control rods. RPV water level and RPV pressure indications are provided in the remote location, neutron flux monitoring instrumentation is not provided. Explain the bases for exclusion of the neutron flux monitoring system.

RESPONSE:

The ABWR design for aircraft impact is in full compliance with the guidance of NEI 07-13, "Methodology for Performing Aircraft Assessments for New Plant Designs". In the event of a threatened aircraft impact while the reactor is at power operation, the guidelines in NEI 07-13 allow that the operators will have advance warning to take manual action to shutdown the reactor, including verification of reactor shutdown, prior to impact. NEI 07-13 does require that an assessment be made to determine if physical damage resulting from an aircraft attack could prevent the reactor from being shutdown in cases where an advance warning was not provided. This requirement was specifically added to NEI 07-13 to address concerns regarding crushing of the hydraulic control unit (HCU) piping for BWRs that would prevent flow to the scram discharge volume tank, thus possibly not permitting a full scram. For the ABWR, there are two divisions of HCUs. Both divisions, which are located below grade, are not subject to physical damage from an aircraft impact. As a result, the assumption in NEI 07-13 that the reactor will be shutdown is valid. Therefore, there is no need for neutron flux monitoring in addition to the existing instrumentation already identified to satisfy the aircraft impact rule.

There is no DCD amendment application change required as a result of this RAI.

RAI 19-8

QUESTION

In DCD Section 19S.1, the applicant's introduction states that "The specific assumptions regarding the aircraft impact were based on guidance provided by the NRC and Nuclear Energy Institute (NEI 07-13 Rev. 7)..." The staff inferred from this statement that the assessment was conducted following only certain portions of the NEI 07-13 guidance. The applicant is requested to clarify within the DCD whether NEI 07-13 Rev. 7 was fully followed for the entire assessment or whether there were any exceptions taken. If exceptions were taken, please identify them.

RESPONSE:

The guidelines of NEI 07-13 were fully followed with no exceptions.

As a result of this response, the DCD amendment application will be revised as shown below. Changes are shown with gray shading.

19S.1 Introduction and Background

A design-specific assessment of the effects on the U.S. ABWR of the beyond design basis impact of a large, commercial aircraft has been performed in accordance with 10 CFR 50.150. ~~The specific assumptions regarding the aircraft impact were based on~~ and the guidance provided by the NRC and the Nuclear Energy Institute (NEI 07-13 Rev. 7), including the loading function derived from the aircraft impact characteristics for use in applicants' assessments of aircraft impact effects. These guidelines were fully followed with no exceptions taken.

RAI 19-9

QUESTION

In DCD Section 19S.2, the applicant states that the spent fuel pool is not perforated. However, the applicant made no statements to conclude that there would be no leakage from the spent fuel pool liner to allow drain down below the required minimum water level. The applicant is requested to identify whether, accounting for the amended design, any AIA scenarios result in leakage from the spent fuel pool liner to allow drain down below the required minimum water level. Please provide information to address this issues in DCD Section 19S.

RESPONSE:

There are no AIA scenarios that would result in leakage from the spent fuel pool below the required minimum water level. The pool liner is not perforated and all piping attachments are configured such that they will not allow drain down below the minimum water level.

As a result of this response, the DCD amendment application will be revised. Changes are shown with gray shading.

19S.5 Conclusions of Assessment

This assessment based upon NEI 07-13, concludes that the U.S. ABWR can continue to provide adequate protection of the public health and safety with respect to aircraft impact as defined by the NRC. The aircraft impact would not inhibit the U.S. ABWR's core cooling capability and spent fuel pool integrity based on best estimate calculations. There are no AIA scenarios that would result in leakage from the spent fuel pool below the required minimum water level. The pool liner is not perforated and all piping attachments are configured such that they will not allow drain down below the minimum water level. The assessment resulted in the identification of the key design features described in Section 19.S.4 and functional capabilities, changes to which are evaluated and reported in accordance with 10 CFR 50.150(d).

RAI 19-10

QUESTION

In DCD Section 19S4.2(4), the applicant states that the spent fuel pool design, as described in Tier 2 Section 9.1, is an AIA key design feature. The applicant is requested to describe in the DCD Section 19S how the specific location of the SFP protects it. Also, the applicant is requested to describe in the DCD Section 19S specifically how the design features (e.g. walls, location of piping) of the SFP protect the integrity of the pool and prevent perforation below the required minimum water level.

RESPONSE:

The spent fuel pool (SFP) is located entirely within the reactor building. A detailed analysis of the SFP for aircraft impact showed that the structural design of the SFP that includes the walls, liner and support structures, is adequate to prevent rupture of the liner. All pipes are configured such that they will not allow drain down below the minimum water level. Therefore, structural integrity of the pool is maintained and there is not leakage below the minimum required water level.

A markup of Section 19S.5, which incorporates this response, is included with the response to RAI 19-9.

RAI 19-12

QUESTION

In DCD Section 19S4.3, the applicant states the use of fire doors and watertight doors within the R/B and C/B as key design features to protect core cooling equipment. However, the door description does not specify the pressure capability (e.g., 5 psid). The applicant is requested to provide this description detail within the DCD.

RESPONSE:

The detailed fire door design, including identification of the pressure capability, is provided in revised Section 9A.4 which was included in the DCD amendment application. Section 9A.4 is already referenced in DCD Section 19S4.3. For those instances in the marked up Section 9A.4 in which two options are specified (i.e. two 3-hour fire doors or one 5 psid door), either option was evaluated as being acceptable based on the post-aircraft impact fire analysis. All credited watertight doors have a 5 psid rating.

A DCD amendment application change is being made to Appendix 19S per the markup below to note that all credited watertight doors have a 5 psid rating. These changes include those associated with the response to RAI 19-13 as they impact the same DCD section. The changes are noted with gray shading.

19S.4.3 Fire Barriers and Fire Protection Features

The design and location of 3-hour fire barriers, including floor plugs, fire doors and watertight fire doors that separate the safety divisions within the R/B and C/B are key design features for the protection of core cooling equipment within these buildings from the impact of a large commercial aircraft. The assessment credited the design and location of fire barriers (including doors) as described in Tier 2 Sections 9.5.1 and 9A.4 for the R/B and the C/B to limit the effects of internal fires created by the impact of a large commercial aircraft. All credited watertight doors have a 5 psid rating.