May 27, 2010

MEMORANDUM TO: Mark Tonacci, Chief
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

FROM: Rocky D. Foster, Project Manager **/RA/**
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: SUMMARY OF A PUBLIC MEETING WITH SOUTH TEXAS PROJECT ON THE STATUS OF CHAPTER 19, HELD IN ROCKVILLE, MARYLAND ON APRIL 27, 2010

The U.S. Nuclear Regulatory Commission (NRC) held a public meeting on April 27, 2010, with South Texas Project (STP) to discuss the status of Request for Additional Information (RAI) responses and plans towards resolution of Open Items in Chapter 19, "Probabilistic Risk Assessment and Severe Accident," of the STP Units 3 and 4 Combined License application.

The NRC and STP made brief opening remarks and introductions. NRC staff described its position on Chapter 19 RAI responses and Open Items. The group's discussion of outstanding issues is as follows:

- **Open Item 19-9, STP DEP 1.1-2 Fire Water System Design Departure**

  The staff expressed its concern that using hurricane return frequencies from National Oceanic and Atmosophere Administration (NOAA) or coastal weather related LOOP frequencies during shutdown from NUREG-6890 results in hurricane site risk that could exceed the large release frequency goal. The fire water pump was evaluated in the STP Unit 3 and Unit 4 Shutdown Model Revision 0 and in the shutdown LOOP trees developed for the Advanced Boiling Water Reactor (ABWR) SSAR. STP plans to supplement the RAI 19.01-31 response by submitting an evaluation of the design departure considering site hurricane risk. A summary of this information will be included in the Final Safety Analysis Report (FSAR). STP also plans to develop hurricane procedures and document the compensatory measures outlined in the hurricane procedures in the FSAR.

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- **Open Item 19-8, STD DEP T1 2.14-1 Hydrogen Recombiner Requirements Elimination**

  In the certified ABWR Design Control Document (DCD) Revision 4 referenced in Title 10 Code of Federal Regulations (10 CFR) Part 52, Appendix A, there is a flammability control system (FCS) consisting of two permanently installed, safety-related thermal hydrogen recombiners with associated piping, valves, controls, and instrumentation. The FCS was designed to control a potential buildup of hydrogen and oxygen in the containment from the radiolysis of water after a design-basis LOCA.

  The applicant stated in response to RAI 19-3 that the NRC revised 10 CFR 50.44 to amend its standards for combustible gas control in light-water-cooled power reactors. The amended rule eliminated the requirements for hydrogen recombiners and relaxed the requirements for monitoring hydrogen and oxygen. The hydrogen/oxygen analyzers are maintained but as nonsafety-related. In STP COL Table 19.2-2, the applicant assessed no effect on the Probabilistic Risk Assessment (PRA) because the recombiners are not modeled.

  NRC staff reviewed STD DEP T1 2.14-1. The staff concurred that this change had no impact on the risk from severe accidents initiated during normal operation or on accident management strategies. The staff did, however, have concerns during startup and shutdown operations, when the containment would not be inerted. The staff also had concerns about what the impacts of hydrogen combustion during severe accidents initiated during low power and shutdown would be on the large release frequency (LRF) and conditional containment failure probability (CCFP).

  The staff more clearly understands the applicant's response, which adequately addressed the question related to removing hydrogen recombiners, showing that they could not prevent major hydrogen combustion during any severe accidents that could be initiated during startup and shutdown operations. The staff also realizes that resolution of the Fire Water System design departure would also address the concerns pertaining to LRF and CCFP.

- **Open Item 19-12, Main Cooling Reservoir (MCR) Breach**

  The staff expressed its concern that using generic dam frequencies from published data and STP's estimate of the failure probability for the operators to close one of three doors in thirty minutes may yield large release frequencies which could exceed the large release frequency goal. Breach of the MCR combined with failure to close the normally open watertight control room access door and the two watertight doors in the Reactor Building Access Corridor could result in flooding of the control building and lead to core damage. The staff questioned STP's screening MCR breach frequency which only considers breaches in a specific 1000 foot section of the dam. In addition, the staff is concerned that a defense in depth philosophy is not maintained, as discussed in Regulatory Guide (RG) 1.174, since this condition yields an, "over-reliance on programmatic activities to compensate for weakness in plant design." STP may hire an expert to re-evaluate the MCR breach failure frequencies. STP stated that it would consider whether to address the staff's concerns by committing to keep these normally open watertight doors closed while STP evaluates other options to mitigate flooding.

- **Open Item 19-5, COL License Information Item 19.14 Accident Management**

  In Section 19.9.14, the applicant commits to include operator actions in the operating procedures and the training of these procedures be developed and implemented before fuel loading. (COM 19.9-13).

The human actions identified will be reviewed so that detailed procedures can be developed and the appropriate training will be conducted. These procedures will include the following:

- Directions and guidance for operating the COPS shutoff valves.
- For human actions to be taken that rely on instrumentation possibly operating outside of the qualification range, the licensee will determine the expected performance of the instrumentation and will provide additional guidance to the operator, if needed.
- Accident management strategies will consider the potential for recriticality during the recovery.

NRC staff reviewed this information and stated that the information in the application does not address all of the items needed to establish a sufficient technical basis for developing accident management procedures for STP Units 3 and 4. In particular, the staff stated that the applicant needs to develop strategies for the containment in case, for example, the inadvertent premature operation of the drywell flooder could pour water into the lower drywell before vessel breach. Therefore, the staff believes that the containment flood guideline may have to consider actions to address the consequences of lower drywell flooding, such as ex-vessel steam explosions following premature flooding.

The applicant responded that it intends to follow NEI 91-04 Revision 1, “Severe Accident Closure Guidelines,” which includes a commitment the industry made to the NRC to incorporate severe accident strategies into the overall Accident Management Program. Changes in the EPGs and SAGs (such as the containment flood strategy) will be included as inputs to the plant-specific technical guidelines. The staff stated that this approach is acceptable, provided that the technical basis for ABWR severe accident management is established based on current understanding of severe accident progression in the ABWR.

- **Open Item 19-13, STD DEP 9.5-2 Lower Drywell Flooder Fusible Plug Valve**

  This departure replaces the fusible plug in the ABWR DCD design with a newer, temperature-sensitive fusible plug that melts at a specified temperature and, in turn, triggers the fusible plug valve to fully open. In addition, the applicant provides supplemental information on the lower drywell flooder fusible plug valve description and opening time.

  The staff agreed that this concept would most certainly provide water to cover the debris, but was concerned that the containment liner failure may not be averted for 24 hours after core damage. Accordingly, the staff decided to carry out a confirmatory assessment using the MELCOR 1.8.6 computer code. To facilitate this assessment, the staff issued RAIs requesting the applicant to provide results of the MAAP calculations for the more likely severe accident scenarios for STP Units 3 and 4. The applicant provided the necessary information in a timely fashion. At the meeting the staff stated that the confirmatory assessment is still in progress, but indications are that liner failure would be averted for 24 hours for the more likely severe accident scenarios.

Enclosed with this summary are the agenda for the meeting, list of attendees, and the handout.

Enclosures: As stated

cc w/encl: See next page

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DATE	05/20/2010	05/20/2010	05/26/2010	05/27/2010

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Meeting Agenda
Category 1 Public Meeting With
South Texas Project Nuclear Operating Company
April 27, 2010

1:00 p.m. – 1:10 p.m.	Opening Remarks	NRC
1:10 p.m. – 2:30 p.m.	Chapter 19 RAIs/Responses	NRC
2:30 p.m. – 3:30 p.m.	Chapter 19 Responses	STP
3:30 p.m. – 3:45 p.m.	Break	
3:45 p.m. – 5:00 p.m.	Chapter 19 Discussion/Other Topics	NRC/STP

Enclosure 1

Meeting Agenda
Category 1 Public Meeting With
South Texas Project Nuclear Operating Company
April 27, 2010
Attendees List

Attendees	Organization
George Wunder	NRO
Rocky Foster	NRO
K. C. Prasad	TANE
Coley Chappel	South Texas Project
Glen MacDonald	South Texas Project
Tom Daley	South Texas Project
Ed Bates	South Texas Project
Scott Head	South Texas Project
Bill Stillwell	South Texas Project
Steve Frantz	Morgan Lewis
John Lai	NRO
Don Dube	NRO
Mark Tonacci	NRO
Roy Karimi	ERI
Mohsen Khatib-Rahbar	ERI
Hosung Ahn	NRO
Marie Pohida	NRO
Alfred Krall	Energy Research
Ed Fuller	NRO
Michael Spencer	OGC
Todd Hilsmeier	NRO
Charles Ader	NRO
Mark Lombard	NRO
Michelle Hart	NRO
Lynn Mrowca	NRO
Keith Tetter	NRO
Goutam Bagchi	NRO

Enclosure 2

List of STP COLA SER Chapter 19 Open Items
Meeting Handout – April 27, 2010

- Open Item 19-9, RAI 19.01-31, STP DEP 1.1-2
  Shared Common Fire Protection System

  Staff has questions on the impact of this departure on hurricane risk.

- Open Item 19-8, RAI 19-3, DEP T1 2.14-1
  Impact of Hydrogen Combustion During Shutdown

  Impact on Level 2 (large release frequency) shutdown due to the shared common fire protection system when containment is de-inerted (hydrogen combustion).

  This open item is associated with Open Item 19-9.

- Open Item 19-12, RAI 19-30
  MCR Breach Evaluation

  Staff has concerns with the MCR breach frequency calculation.

- Open Item 19-5, RAI 19-5
  Steam Explosion Potential from Premature Opening of the Drywell Flooder

- Open Item 19-13, RAI 19-1
  MAAP and Fusible Plug

  Staff performing confirmatory assessments.

Enclosure 3

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