Nuclear Operating Company

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

December 28, 2010
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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 Number PROJ0772
Response to Requests for Additional Information

References: 1. Letter from Tekia Govan to Mark McBurnett, "Request for Additional Information Re: South Texas Project Nuclear Operating Company Topical Report (TR) WCAP-17116-P Revision 0, Supplement 5 – Application to the Advanced Boiling Water Reactor," June 7, 2010 (ML101580249)

2. Letter from Tekia Govan to Mark McBurnett, "Request for Additional Information Re: South Texas Project Nuclear Operating Company Topical Report (TR) WCAP-17065-P Revision 0, Westinghouse Subcompartment Analysis Using GOTHIC," December 2, 2010 (ML103360115)

Attached are responses to NRC staff questions included in the referenced letters. The following RAI questions from Reference 1 are addressed:

RAI-36	RAI-41
RAI-38	RAI-45

This letter also includes the response to the following RAI question from Reference 2:

RAI-8

There are no commitments in this letter.

T010
NRO

STI 32796720

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 12/28/2010

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

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Attachments:

1. RAI-36
2. RAI-38
3. RAI-41
4. RAI-45
5. RAI-8

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

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RAI-36

QUESTION

Steam Lines

a. What are the pipe lengths of the steam lines from the RPV to the primary containment wall and from the primary containment wall to the turbine stop/control valves?

b. What is the approximate location of the pressure equalization lines?

RESPONSE

a. The pipe lengths of the steam lines from the Reactor Pressure Vessel (RPV) to the primary containment wall and from the primary containment wall to the turbine stop/control valves are shown in Table 36-1 below. The steam lines have been letter-designated as shown in Figure 36-1. The same designation applies in the turbine building for steam lines and stop valves.

b. The pressure equalization lines are at the following three approximate locations: (1) at the bottom of the main steam line just before the inboard Main Steam Isolation Valve (MSIV), (2) downstream of the outboard MSIV prior to the drain line ascending to the main steam tunnel, and (3) between the equalizer header and the turbine stop/control valves. At the first location, the four main steam line equalizing lines connect to a common equalizing line prior to the inboard motor operated isolation valve (MO F011). The drain line has an outboard motor operated isolation valve (MO F012) in series with MO F011. At the second location, the four outboard drain lines connect to a common equalizing line via a third motor operator (MO F013). The equalizing lines also function to provide a drain line to the main condenser for low point condensate drains during plant operation.

Table 36-1 Main Steam Line Pipe Lengths

Steam Line Designator	Length from RPV to Primary Containment Wall, ft.	Length from Primary Containment Wall to Turbine Stop/Control Valves, ft.
A	59.9	289.8
B	72.9	282.4
C	72.9	320.2
D	59.9	304.7

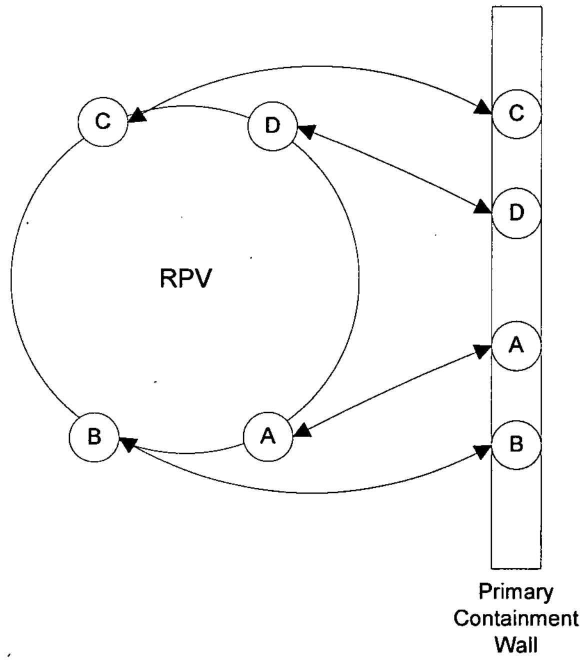

Figure 36-1 Letter Designation of Main Steam Lines

RAI-38

QUESTION:

Control Rods

a. Neutronically, can GE-7 control rods be assumed for ABWR DCD core modeling?

b. Provide control rod blade width and thickness.

c. Provide control rod lattice information.

RESPONSE:

a. Although GE-7 fuel is used in the ABWR DCD, Westinghouse does not have the detailed design information on the GE-7 blades for N-lattice type plants, because it is proprietary to GE. As a result, the preferred approach would be to model the Westinghouse CR99 and CR82M-1 control rod blades. The CR99 will be used for power regulation and the CR82M-1 for shut down blades. Based on this, any confirmatory analysis should not use the GE-7 control rod information but rather the Westinghouse control rod information as described in WCAP-17275-P.

b. WCAP-17275-P provides all of the design information for CR99 and CR82M-1 application to ABWR (N-Lattice) plants. Table 8-1 provides dimensional information such as control rod blade thickness and control rod blade wingspan.

c. WCAP-17275-P provides all control rod lattice information. Section 2.1 provides basic design information, Table 5-1 provides materials information, Tables 6-1 and 6-2 provide mechanical related critical attributes, and Table 8-1 provides dimensional information.

RAI-41

QUESTION:

Steam Bypass System

a. What is the line size?

b. Where are these lines connected on the main steam lines? (downstream of the IVISIVs).

c. What activates the bypass system and are they assumed to be available for LOCA, AOO and ATWS transient sequences?

RESPONSE:

The turbine bypass valves are used for: (1) reactor pressure control during startup when rated pressure is reached and preparation is being made for turbine startup, (2) pressure control following turbine trip, and (3) controlling the rate of cooldown during plant shutdown. All four steam lines connect to a common equalizing steam header, which has four supply lines to the turbine stop and control valves.

a. Four 28 inch steam lines connect to a 38 inch steam header prior to the turbine stop valves. There are two 22 inch supply lines from the 38 inch chest to the turbine bypass valve chest. Each of the three individual bypass valves is connected to an 18 inch steam line to its respective condenser. See DCD Figure 10.3-1.

b. The Turbine Bypass Lines are connected to a header which supplies the Turbine Stop Valves. See DCD Tier 1, Figure 2.10.1.

c. The Turbine Bypass Valves are regulated automatically to control pressure when the reactor is at rated pressure and the turbine is off line. The valves may be manually opened as desired to control reactor cool down rate. The turbine bypass valves are controlled by the Steam Bypass and Pressure Control System, as described in ABWR DCD Tier 1 subsections 2.2.10 and 2.10.13 (Turbine Bypass System (TBS)).

   The TBS does not serve or support any safety function and has no safety design bases as described in ABWR DCD, subsection 10.4.4.3.

   The bypass valves are not required following a LOCA and are not credited in LOCA analysis. The main steam isolation valves (MSIVs) are expected to close following a LOCA either on low RPV water level or steam line break sensing logic. Also, the LOCA analysis assumes loss of off-site power, which removes power from supporting systems needed to maintain condenser vacuum and bypass valve hydraulic oil pressure. Bypass valves operate on any abnormal occurrence that results in turbine trip or load rejection, assuming the MSIVs remain open and off site power is available. A description of the operation of the bypass system to mitigate certain anticipated operational occurrence

(AOO) events, including the consideration of failures within that system, is provided in ABWR DCD Chapter 15, most notably in response to pressure increase events as detailed in Section 15.2. Operation of the steam bypass system to mitigate Anticipated Transient Without Scram (ATWS) events, including the impact of failures within that system, is described in ABWR DCD, Section 15E. It is desirable and directed by emergency operation procedures (EOPs) to utilize the turbine bypass valves (if available) during an ATWS to limit the energy input into the primary containment pressure suppression pool.

Turbine bypass valves require condenser vacuum, hydraulic oil pressure, and control power for operation. Condenser vacuum requires turbine sealing steam, operating circulating water pumps, Steam Jet Air Ejectors, and supporting electrical power. The AC power requirements to support maintaining condenser vacuum and Turbine Bypass Valve hydraulic control capability require off-site power.

RAI-45

QUESTION:

There are RIP and CRD purge flows. Are these flows terminated during transients? Is there also a CRD feed flow?

RESPONSE:

The Control Rod Drive (CRD) system provides purge flow to the Reactor Internal Pumps (RIPs) during normal operation.

Purge flows may be interrupted for a period of time during the following events:

- Loss-of-offsite-power
- CRD pump trip
- CRD pump transfer
- All plant accident conditions
- Maintenance of the purge systems for the Reactor Recirculation System or Reactor Water Cleanup System.

In the event that purge flow is interrupted as a result of a transient, the RIPs are capable of extended operation without purge flow. This extended operation provides sufficient time to permit the operator to trip the pump. This operation without purge flow could result in a slight increase in motor contamination and possible damage to the secondary seal. However, the secondary seal would be replaced during the next scheduled maintenance for the motor, according to normal procedure. This scenario would not cause any more leakage from the RPV than would be normally experienced during the motor maintenance.

The CRD supply pump supplies the CRD system with flow at a rate of 507 L/min during normal operation.

RAI-8

QUESTION:

During an audit of STP's topical report on ABWR subcompartment analysis using GOTHIC the NRC staff identified areas which required clarification. The staff requests that the applicant specify the following information:

1.) Please clarify in the report specifically what approval is being sought; and what, if any, limitations are considered appropriate. Please address, at a minimum, the general scope of the approval with respect to breaks, break locations, correlations and loss coefficients and the role of the currently unapproved mass and energy release code reference in the report.

2.) Please specify what version of the GOTHIC code is being used for this specific application?

3.) Please describe the procurement methodology for GOTHIC.
   a. Is it procured as safety related?
   b. Was it developed under a program meeting 10 CFR 50, Appendix B and 10 CRF Part 21?
   c. Describe the procurement chain for Qualification of NAI as an Appendix B supplier.

RESPONSE:

1. Westinghouse will update the topical report to clearly address the scope and limitations for the approval being sought. In addition, the report will be updated to address the use of the GOBLIN code to generate the required ABWR short-term mass and energy release input for the subcompartment pressurization analyses. This update will be provided by January 15, 2011.

2. Westinghouse is currently using GOTHIC version 7.2a for the ABWR subcompartment analyses.

3. Westinghouse is a member of the EPRI GOTHIC Advisory Group and receives copies of the GOTHIC code from Numerical Applications Incorporated (NAI). NAI is a Westinghouse-qualified software vendor and the GOTHIC code is procured as a safety-related component. The computer software used in engineering applications is governed by procedures and processes established in accordance with the Westinghouse Quality Management System (QMS). Westinghouse software QA procedures control the installation, configuration control, notification, and resolution of errors for software obtained from qualified software vendors. These procedures are in compliance with, and address the requirements of 10 CFR 50 Appendix B and 10 CFR Part 21. In addition, the development and maintenance of the GOTHIC code by NAI is done under the requirements of 10 CFR 50, Appendix B and 10 CFR Part 21, as verified by Westinghouse through periodic quality assurance reviews of qualified software vendors.