Entergy

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Joseph A. Clark
Manager, Licensing

RBG-47207

February 7, 2012

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Information
Changes to Technical Specification 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation"
River Bend Station, Unit 1
Docket No. 50-458
License No. NPF-47

REFERENCES:

1. Entergy Letter to NRC dated July 27, 2011, License Amendment Request, Changes to Technical Specification 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation" (RBG-47157)

2. NRC letter to Entergy dated September 1, 2011, Supplemental Information Needed For Acceptance Of Requested Licensing Action Re: Request To Modify Main Steam Tunnel Temperature Function (TAC NO. ME6843)

3. Entergy Letter to NRC dated September 16, 2011; Supplemental Information Changes to Technical Specification 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation" (RBG-47176)

4. NRC Email to Entergy dated January 9, 2012

Dear Sir or Madam:

On July 27, 2011 Entergy Operations, Inc. (Entergy) submitted a request for a amendment to the Technical Specifications (TS) for River Bend Station (RBS), Unit 1. A change is proposed to Technical Specification (TS) 3.3.6.1, "Primary Containment and Drywell Isolation Instrumentation" to revise the allowable value setpoints for the Main Steam Tunnel Temperature functions 1.e, 3.f and 4.h (Reference 1).

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The NRC requested additional information on September 1, 2011 (Reference 2). Entergy's response to this request is provided in Attachment 1 to a letter dated September 16, 2011 (Reference 3).

On January 9, 2012 the NRC requested additional information (Reference 4). Entergy's response to this request is provided in Attachment 1 of this letter.

There are no new commitments in this letter.

If you have any questions or require additional information, please contact me at (225) 381-4177.

Sincerely,

JAC/bmb

Attachments:

1. Response to Request for Information

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
612 E. Lamar Blvd., Suite 400
Arlington, TX 76011-4125

NRC Senior Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

U. S. Nuclear Regulatory Commission
Attn: Mr. Alan B. Wang
MS O-7 D1
Washington, DC 20555-0001

Department of Environmental Quality
Office of Environmental Compliance
Radiological Emergency Planning and Response Section
JiYoung Wiley
P.O. Box 4312
Baton Rouge, LA 70821-4312

Public Utility Commission of Texas
Attn: PUC Filing Clerk
1701 N. Congress Avenue
P. O. Box 13326
Austin, TX 78711-3326

Attachment 1

RBG-47207

Response to Request for Information

The following is in reference to Attachment 1 to letter from Entergy Operations, Inc, dated July 27, 2011.

Refer to Attachment 1 to letter from Entergy Operations, Inc, dated July 27, 2011.

1. Section 4.1, under heading "Steam Tunnel Unit Cooler Simulation" states:

   "The proposed calculation explicitly simulates the unit cooler using the AIRCOOLER component in GOTHIC. The AIRCOOLER model in GOTHIC calculates both sensible and latent heat removal. Inputs for the AIRCOOLER were selected to represent design performance of the unit cooler."

   Please describe "AIRCOOLER component in GOTHIC" and "AIRCOOLER model in GOTHIC." The GOTHIC documents (a) GOTHIC CONTAINMENT ANALYSIS PACKAGE TECHNICAL MANUAL Version 7.2b (QA) dated March 2009, and (b) GOTHIC CONTAINMENT ANALYSIS PACKAGE USER MANUAL Version 7.2b (QA) dated March 2009, do not contain description of the component and model.

   Entergy Response:

   There are two types of heat exchanger models available in GOTHIC. These models are: a water-to-water heat exchanger and a steam/gas mixture-to-water heat exchanger. The steam/gas mixture-to-water heat exchanger is referred to in GOTHIC as the "FAN COOLER" and is described in Section 15.8.2 of the GOTHIC CONTAINMENT ANALYSIS PACKAGE USER MANUAL, and its mathematical model is found in Section 6.4.2 of the GOTHIC CONTAINMENT ANALYSIS PACKAGE TECHNICAL MANUAL. Unit coolers are installed in the steam tunnel (one each in the north and south steam tunnel). These unit coolers are steam/gas-to-water heat exchangers with hot steam/gas in the primary side being cooled and condensed by cold water in the secondary side. The term "AIRCOOLER" in the submittal refers to the GOTHIC "FAN COOLER" model.

2. Describe all the conservative inputs and assumptions used in the current methodology using THREED computer program that have been removed from the proposed methodology which uses the GOTHIC computer program.

   Entergy Response:

   The single conservative assumption in the THREED calculation is the representation of the unit cooler servicing the north steam tunnel. Specifically, the unit cooler is represented by two boundary conditions. The first boundary condition represents the return from the unit cooler with a fixed volumetric flow rate, and return air at 105°F and 32% relative humidity. The second boundary condition represents the unit cooler suction with the same fixed volumetric flow rate as the first boundary condition, but with temperature and humidity increasing with the duration of the leak. This approach has the affect of relatively cool / dry air regardless of the temperature

and humidity in the control volume. In reality, the unit cooler would return air at a warmer temperature and higher humidity consistent with the effectiveness of the unit cooler. Instead of the non-physical representation employed in the THREED calculation, the GOTHIC calculation uses a physical representation of the unit cooler using the "FAN COOLER" component model.

3. Section 3.0, third paragraph states:

".....the analysis that establishes the analytical limit for the main steam tunnel temperature corresponding to a 25 gym leak has been refined to remove unnecessary conservatism and raise the analytical temperature limit."

Please provide justification for the proposed main steam tunnel temperature analytical limit of 194.77 °F indicating that it still remains conservative after removing the unnecessary conservatisms.

Entergy Response:

As described to the response to Question 2 above, the calculation approach in the THREED calculation used a non-physical representation of the unit cooler servicing the north steam tunnel. The GOTHIC calculation uses the "FAN COOLER" heat exchanger model to represent the unit cooler.

Conservatisms are introduced into the GOTHIC calculation by selection of bounding low values from historical values for area temperatures, cooling water temperatures, and outside air temperature. In this application, bounding low values are used as this results in a lower temperature one hour after the start of the leak simulation. The following describe the bounding low parameters:

- The initial area temperatures assumed in the THREED analysis are 130°F vs. 110°F in the GOTHIC analysis. The heat sinks in these cases are initialized at these temperatures.
- Service water to the unit cooler supplying the north steam tunnel was taken at 60°F.
- Chilled water to the unit cooler supplying the south steam tunnel is taken as 50°F.
- Outside air temperature is taken at 30°F

In the case of initial area relative humidity, no plant data exists. Therefore, two runs are performed, one run with the model initialized with as low an initial relative humidity as could be achieved, the other with as high an initial relative humidity as could be achieved. The lower one hour temperature is selected for the analytical limit.

4. The proposed analytical temperature limit of 194.77 °F is calculated in the north side of the main steam tunnel while assuming the steam leak rate equivalent to 25 gpm in the north side. For the same steam leaks in the south side of the tunnel what would be the analytical temperature in the north side of the tunnel? Please verify that the proposed analytical limit of 194.77 °F is the bounding lowest analytical temperature limit for leakage of 25 gpm anywhere in the steam tunnel.

   Entergy Response:

   The Reactor Coolant Pressure Boundary (RCPB) leak detection is described in USAR section 5.2.5 and the Main Steam Tunnel leak detection is discussed in Section 5.2.5.1.3. The leak detection addressed by this submittal is limited to areas of the main steam tunnel containing portions of the RCPB.

   The limits of the RCPB in the Main Steam Tunnel are to the outer Main Steam Isolation Valves (MSIV's). The four outer MSIV's are located in the north steam tunnel area. Figure 1.2-14 in the USAR identifies the location of the MSIV's and the jet impingement wall. The area between the containment and the jet impingement wall identifies the north area of the steam tunnel.

   The temperature instrumentation in the north steam tunnel is not intended to resolve leaks in the south steam tunnel. There is temperature instrumentation in the south steam tunnel which is intended to resolve leaks in the south steam tunnel. The analytical limit for the south steam tunnel instrumentation is 153°F. The south steam tunnel instrumentation is not the subject of this application.

5. Editorial comment: In the GOTHIC files LK1-RH000.GTH, LK1-RH100.GTH, LK2-RH000.GTH, and LK2-GTH100.GTH boundary conditions table, boundary condition 1F, the flow (25 x the forcing function 1T (lb/hr) does not match the required steam leak rate equivalent to 25 gpm. Shouldn't the y-axis label of forcing function IT have units (lb/sec) instead of (lb/hr)?

   Entergy Response:

   This is a text only error; the y-axis label should read "lb/s." Confirmed that the values in the table are in units of "lb/s" and are correct for the application. The text error has no impact on the results.