PMSummerColpEM Resource

From: MONROE, AMY [AMONROE@scana.com]
Sent: Friday, May 21, 2010 8:52 AM
To: Sebrosky, Joseph; Simms, Tanya
Cc: MONROE, AMY
Subject: Draft Wet Bulb Retransmittal
Attachments: SCEG 0902021 Draft.doc

Joe, Tanya
I just got to check my voicemail and understand the draft on wet bulb you did not receive yesterday. Appears I had some email transmittal problems (I was trying to send some out from home last night and had trouble then – must have had a problem during the day also). Please confirm with me at our call at 9 today that you got this.
I can support a call at anytime – if WEC is unavailable I will do my best to answer questions.
Amy

Hearing Identifier: VCSummer_COL_Public
Email Number: 280

Mail Envelope Properties (82591B6285A08F42AA28F8983E63676A07B00DBAE0)

Subject: Draft Wet Bulb Retransmittal
Sent Date: 5/21/2010 8:52:10 AM
Received Date: 5/21/2010 8:52:14 AM
From: MONROE, AMY

Created By: AMONROE@scana.com

Recipients:
"MONROE, AMY" <AMONROE@scana.com>
Tracking Status: None
"Sebrosky, Joseph" <Joseph.Sebrosky@nrc.gov>
Tracking Status: None
"Simms, Tanya" <Tanya.Simms@nrc.gov>
Tracking Status: None

Post Office: EXCHANGE02.CORP.SCANA.COM

Files	**Size**	**Date & Time**
MESSAGE	453	5/21/2010 8:52:14 AM
SCEG 0902021 Draft.doc	47168	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 4578 Revision 0
Virgil C. Summer Nuclear Station, Units 2 and 3
South Carolina Electric and Gas Company
Docket No. 52-027 and 52-028
SRP Section: 09.02.02 - Reactor Auxiliary Cooling Water Systems
Application Section: 9.2.2

QUESTION from Balance of Plant Branch 1 (SBPA)

09.02.02-***

The V.C. Summer COL Application, Part 7, Departure and Exemptions, provides justification to the maximum safety wet bulb (noncoincident) air temperature of 87.3 °F. This corresponding site characteristic value exceeds the AP1000 DCD site parameter by 1.2 °F. Analysis of the maximum safety wet bulb (noncoincident) air temperature at a bounding value of 87.4 °F has been performed by the COL applicant. The detailed justification was performed on the following components/systems.

- Containment pressure design limits
- IRWST temperature control with normal residual heat removal system
- Component cooling water system
- Nuclear Island nonradioactive ventilation system capability

This departure/exemption was evaluated by the staff against the AP1000 DCD submittal, APP-GW-GLE-036, "Impact of a revision to the current Wet Bulb Temperature indentified in Table 5.0-1 (Tier 1) and Tier 2 Table 2-1 (Sheet 1 of 3) of the DCD (Revision 16)" to support Levy and Turkey Point 6 and 7. The staff concludes that the applicant should describe in their applicant in a similar manner the change justification at VC Summer to the extent of the AP1000 justification and evaluation. Specifically, the departure/exemption justification should include;

- The performance of passive containment cooling system
- Passive heat sinks associated with the main control room habitability system
- Normal, decay, and spent fuel pool heat removal
- HVAC design
- Chiller water system design
- Component cooling and service water system design
- Steam and power conversion
- Circulating water system and turbine building closed cooling water system design

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Proposed Response to the request for more detail above:

A departure is required because the VC Summer maximum safety (non-coincident) wet bulb temperature value of 87.3°F exceeds the AP1000 value of 86.1°F which is specified in the DCD. The effects of increasing maximum safety (non-coincident) wet bulb temperature to a maximum of 87.4°F have been established and are documented in 4 WEC calculations used to develop a departure evaluation that supports the increased value of 87.3 °F found at VCSNS. Since the VC Summer site temperature value is bounded by the value in the calculations performed for a higher range from that defined in the DCD, the results of the analyses reported in those calculations bound the expected performance for VC Summer.

Areas potentially affected by the increased VC Summer maximum safety wet bulb temperature include:

- *Safety system design basis – PCS performance at the higher wet bulb temperature*
- *Normal heat removal, decay heat removal, and spent fuel pool heat removal cases (only those relying upon use of the maximum safety wet bulb temperature as a performance basis)*
- *Component cooling and service water temperature limits*

Areas not affected by the change in VC Summer maximum safety wet bulb temperature include:

- *HVAC design, including the main control room passive heat sink performance*
- *Chilled water system design*
- *Steam and power conversion system design*
- *Circulating water system and turbine building closed cooling water system design*

The evaluation summarizes the results of the Westinghouse calculations that have been performed to evaluate if a maximum safety wet bulb air temperature (non-coincident) of 87.4° F would adversely affect any safety related systems, structures, or components (SSCs), their functional capabilities or analysis methods as presented in the DCD.

Specifically, the following results apply for any wet bulb temperature equal to or lower than 87.4°F, which bounds the VC Summer maximum wet bulb temperature of 87.3°F:

- *Containment Pressure Design Limit Evaluation – (see response to RAI Item B provided by Jim Scobel)*
- *IRWST Temperature Control with RNS: The IRWST does not steam with RNS cooling initiated two hours after loss of high*

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pressure heat removal and PRHR actuation, with the safety non-coincident wet bulb at or below 87.4°F.

- *CCS Maximum Temperature <100°F during Power Operation: The CCS temperature remains below 100°F with the safety non-coincident wet bulb temperature at or below 87.4°F.*
- *VBS Capability: With the increased heat loads resulting from the higher maximum safety wet bulb temperature, the low capacity chilled water system maintains the Nuclear Island Non-radioactive System's (VBS) capability to maintain the main control room, and 1E electrical rooms below 75 °F with a single train of VBS and the Chilled Water System (VWS) in service. No change to LC VWS chiller capacity or the VBS capacity is required with the safety non-coincident wet bulb at or below 87.4°F.*
- *Maintaining Spent Fuel Pool temperature: With a maximum wet bulb temperature of 87.4°F or below, the temperature of the spent fuel pool can be maintained at or below 120°F following startup from a normal refueling, assuming maximum spent fuel pool heat load and both SFS trains operating.*

Overall Conclusion

- *The Westinghouse calculations support the values that were evaluated. The results of these calculations determined that an 87.4°F site specific maximum safety wet bulb temperature value does not affect any SSC design function or analysis methods as presented in the DCD. This conclusion therefore applies to VC Summer since its maximum safety wet bulb value of 87.3°F is bounded by the higher temperature used for the evaluation. The calculations utilized to support these conclusions are available for audit at the WEC office in Rockville, Md.*

The VC Summer maximum coincident dry/wet bulb temperatures of 112.4°F/74.5°F are bounded by the AP1000 values of 115°F/86.1°F and therefore the conclusions reported in the DCD for safety-related performance requirements or other commitments affected by the dry/wet bulb temperature combination bound the expected performance for VC Summer.

The VC Summer site maximum normal wet bulb temperature of 78°F is below the AP1000 value of 80.1°F. All safety-related or other performance requirements or commitments affected only by the value of the maximum normal wet bulb temperature for VC Summer will be bounded by the results reported in the DCD.

In addition, specific to Section 5.4.7, "Normal Residual Heat Removal System," in the VC Summer's COL Revision 2 submittal, the applicant incorporated by

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reference DCD Section 5.4.7 with the exception of the following departure in Subsection 5.4.7.1.2.3:

> VCS DEP 2.0-2 The component cooling water system supply temperature to the normal residual heat removal system heat exchangers is based on an ambient design wet bulb temperature of no greater than 87.3°F (100 year return estimate of 2-hour duration). The 87.3°F value is assumed for normal conditions and transients that start at normal conditions.

The staff reviewed the applicable RNS design basis subsections and determined that additional information is required by the applicant in order for the staff to complete the evaluation.

With plant operation at the design limit and the ambient design wet bulb temperature at the proposed 87.3°F, describe if the CCW have sufficient heat removal capacity such that the RNS remains within the design basis as described in DCD Subsection 5.4.7.1 and provide a discussion of the evaluation performed that confirms the following subsections:

A. Subsection 5.4.7.1.2.1 that the normal residual heat removal system reduces the temperature of the reactor coolant system from 350° to 125°F within 96 hours after shutdown and the RNS system maintains the reactor coolant temperature at or below 125°F for the plant shutdown;

B. Subsection 5.4.7.1.2.3 that the RNS system limits the in-containment refueling water storage tank water temperature to less than boiling temperature during extended operation of the passive residual heat removal system and not greater than 120°F during normal operation.

<u>Proposed response to Question A above:</u>

The AP1000 DCD confirms that the normal residual heat removal system can reduce the temperature of the reactor coolant system from 350°F to 125°F within 96 hours after shutdown, and maintains reactor coolant temperature at or below 125°F during plant shutdown, with the ambient wet bulb temperature at or below the maximum normal value of 80.1°F. The VCS RNS maximum normal wet bulb temperature is 78°F and therefore the performance of the VCS RNS for normal plant cooldown and refueling is bounded by that described in the AP1000 DCD. The revised VCS maximum safety (non-coincident) wet bulb temperature of 87.3°F does not apply to the cooldown performance requirement.

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