UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 4, 2011

LICENSEE: STP Nuclear Operating Company

FACILITY: South Texas Project, Units 1 and 2

SUBJECT: SUMMARY OF AUGUST 22, 2011, PRE-LICENSING PUBLIC MEETING WITH STP NUCLEAR OPERATING COMPANY TO DISCUSS THE PROPOSED RISK-INFORMED APPROACH TO THE RESOLUTION OF GSI-191, "ASSESSMENT OF DEBRIS ACCUMULATION ON PWR SUMP PERFORMANCE" (TAC NOS. ME5358 AND ME5359)

On August 22, 2011, a public meeting was held between the U.S. Nuclear Regulatory Commission (NRC), and representatives of STP Nuclear Operating Company (STPNOC, the licensee), at NRC Headquarters, Rockville, MD. The meeting notice and agenda, dated August 2, 2011, is located in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML112130182. The purpose of the meeting was to discuss the proposed risk-informed approach to the resolution of Generic Safety Issue (GSI)-191, "Assessment of Debris Accumulation on PWR [Pressurized-Water Reactor] Sump Performance." South Texas Project (STP) is the lead plant and STPNOC plans to submit a license amendment request (LAR) in mid-2012. The licensee previously provided an overview of its proposed approach during the public meetings held on June 2, July 6, and July 26, 2011[1]. The purpose of this conference call was to provide an overview of the Containment Accident Sequence Stochastic Analysis (CASA) Grande method for calculating the effects of debris generated from a spectrum of postulated accidents on emergency core cooling system pump performance and the topic of jet formation as a result of a break.

The licensee's presentation slides and additional materials provided for the meeting are located at ADAMS Accession No. ML112350857. A list of meeting attendees is provided in the Enclosure to this meeting summary.

Meeting Summary

The licensee provided copies of the following presentations prior to the meeting:

1. Models and Methods Used for CASA Grande

    a. Required Inputs to CASA Grande
    b. Topical Approach and Implementation Plan
    c. Interface with Probabilistic Risk Assessment (PRA)
    d. Example Calculations to Illustrate Physics Models

[1] Summaries of the meetings held on June 2, July 7, and July 26, 2011, are available in ADAMS Accession Nos. ML111640160, ML111950094, and ML112130165, respectively.

2. Loss-of-Coolant Accident (LOCA) Initiating Event Frequencies and Uncertainties Status Report

   a. Current Status
   b. Refinements of Approach for Conditional Rupture Probabilities
   c. Preliminary Results
   d. Independent Review by Ali Mosleh
   e. Issues to Complete

Item 2 above was not included in the agenda published in the *Federal Register*, and, therefore, could not be discussed during the meeting. The NRC staff advised STPNOC that this topic could be scheduled for discussion at a future meeting.

The topic of jet formation announced in the Notice for this meeting was not discussed. STPNOC representatives indicated that they were unable to complete the analysis in time and were not ready for discussion. The topic of jet formation will also be discussed in a future public meeting.

The licensee presented an overview of the Models and Methods used for CASA Grande for subtopics 1.a, 1.b, 1.c, and 1d. The presentation covered the following in more detail:

Required Inputs to CASA Grande and Topical Approach and Implementation Plan

- Debris generation covering containment geometry, pipe break (LOCA) frequencies, zone of influence (ZOI) size/shape for plant materials, debris characteristics for plant materials, qualified coating quantity for LOCA categories, unqualified coating category, latent debris quantity, and miscellaneous debris quantity.

- Chemical product generation (not required at STP) for initial quantification. CASA Grande will have the capability to automatically calculate chemical debris quantities generated based on type of debris, buffer type in the pool, time-dependent temperature in the pool, and the spray duration.

- Debris transport covering blowdown, washdown, pool fill, and recirculation transport fractions for LOCA categories, and fiberglass erosion fractions for non-transporting pieces of debris, including upstream blockage.

- Head loss, covering strainer area/geometry, flow rate, and emergency core cooling system (ECCS)/core spray (CS) pump net positive suction head (NPSH) margin, including time dependency.

- Air intrusion including vortexing and gas desorption, along with corresponding void fractions.

- Debris bypass based on the test data and flow conditions.

Interface to PRA

STPNOC indicated that separate results will be compiled for each standard LOCA size (small, medium, and large). Initially, conditional break size probabilities (i.e. given a break, what is the probability that it is of a given size) will be used so that break frequencies can be addressed separately. Plant operating states and sump failure modes will be modeled in detail so that operator mitigating actions can be identified and modeled.

Example Calculations to Illustrate Physics Model

STPNOC presented an example calculation to illustrate the physical model to be used for the risk-informed approach and reflected the use of the following:

- Break frequencies for the break considered (cold-leg weld break)
- ZOI for Nukon and Microtherm insulation material
- Nukon Debris generation
- Microtherm debris generation
- Coating debris generation
- Latent and miscellaneous debris generation
- Blowdown, washdown, and pool fill transport
- Erosion of large pieces of Nukon
- Time dependent recirculation transport
- Nukon and microtherm debris transport (fine and large)
- Qualified, unqualified, and latent debris transport
- Strainer head-loss calculation and impact of gas desorption on head-loss calculation
- Debris bypass calculation to address the downstream effects

The NRC staff asked several clarification questions during the presentation. The licensee's responses are summarized below:

1. Air intrusion calculation analysis will be performed by the use of pressure/ temperature history with pressurized and non-pressurized containment conditions. Best-estimate model assumptions will be documented in the LAR.

2. The licensee stated initially that break sizes only from 2 inches to double-ended guillotine break (DEGB) will be considered for debris-generation calculations. However, NRC staff expressed concern with this assumption and asked the licensee to provide justification. The licensee agreed to consider all breaks from ½-inch to DEGB.

3. The licensee indicated that for STP chemical effects on debris generation are likely to be negligible and STP may not need to consider the chemical effects. The NRC staff questioned the lack of a methodology to consider chemical effects on debris generation. The licensee agreed to discuss chemical effects testing, bypass, and in-vessel effects in a separate public meeting. The licensee asserted that if chemical effects are demonstrated to be a non-issue for STP, additional information will be provided regarding how chemical effects could be addressed under the risk-informed approach for those plants that may be impacted.

4. The licensee plans to provide more detail on the sampling method to be used to propagate the results and associated uncertainties through the PRA model to ensure that highly unlikely cases (i.e., at the tails of the probabilistic distributions) are appropriately sampled and included in the analysis. The licensee expects to demonstrate that the sampling strategy is sufficiently robust to ensure that the results are valid and adequately estimate the risk associated with all break sizes.

5. The model discussed during the meeting covers only the weld breaks. The licensee clarified that potential non-weld breaks will be addressed in the final evaluation to be completed in 2012.

6. The licensee indicated that, during the recirculation mode, all possible combinations of three ECCS trains with CS system on and off will be analyzed for debris transport.

7. The NRC staff questioned the basis for the assumption that the unqualified coatings will reach the containment pool at 24 hours. The NRC staff believed that there should be some time-dependent distribution curve. The licensee agreed to make the impact of unqualified coating time dependent.

8. The NRC staff expressed concern that the sample calculation does not reflect the impact of the void fraction on the NPSH margin. The licensee agreed to address the impact of head loss due to gas desorption and resulting void fraction on the NPSH margin calculated based on the debris loading on the strainer.

9. The licensee expressed objection to the suggestion that STP will be significantly impacted by debris generation due to the use of Microtherm [thermal insulation material]. Because STP is the lead plant, the license agreed to include the methodology to address the impact of materials with adverse properties for debris generation (e.g. Microtherm) for the benefit of other licensees.

10. The licensee agreed to provide a plan for modifying the STP's PRA model detailing how sump blockage and downstream effects will be addressed for large, medium, and small breaks.

Action Items

The NRC staff agreed to arrange another telephone conference call public meeting to discuss the topic of LOCA Initiating Event Frequencies and Uncertainties. The NRC and STPNOC representatives also agreed to hold the next face-to-face public meeting in October 2011.

No Public Meeting Feedback Forms were received for this meeting.

Please direct any inquiries to me at (301) 415-3016, or balwant.singal@nrc.gov.

Sincerely,

Balwant K. Singal

Balwant K. Singal, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Enclosure:
List of Attendees

cc w/encl: Distribution via Listserv

LIST OF ATTENDEES

FOR MEETING WITH STP NUCLEAR OPERATING COMPANY

REGARDING RISK-INFORMED APPROACH TO RESOLUTION OF GSI-191 ISSUE

SOUTH TEXAS PROJECT, UNITS 1 AND 2

AUGUST 22, 2011

NAME	TITLE	ORGANIZATION
Paul Jamie	Licensing	STPNOC
Steve Blossom	Project Manager	STPNOC
Rick Grantom	Manager, Risk Projects	STPNOC
Ernie Kee	Supervisor, Risk Management	STPNOC
Wes Schulz	Design Engineer	STPNOC
Tim Sande	Principal Engineer	Alion Science and Technology
Craig D. Sellers	Program Manager	Alion Science and Technology
Andre Drake	Principal Engineer	Constellation Energy
John Koelbel*	Fleet PRA Services	Constellation Energy
Brian Brogan*	PRA Engineer	Entergy (Palisades)
Jeff Voskuil*	PRA Engineer	Entergy (Palisades)
Keith Smith*	Project Manager	Entergy (Palisades)
Bill Beckius*	Technical Consultant	Entergy (Palisades)
Jeff Weyhmiller*	Design Engineer	Entergy (Palisades)
Karl Fleming	Consultant	KNF Consulting
Bruce Letellier	-	Los Alamos National Laboratory
Yassin Hassan	Professor	Texas A&M University
Alex Galenko	Research Associate	University of Texas, Austin
Erich Schneider	Assistant Professor	University of Texas, Austin
Ervin Geiger	Reactor System Engineer	NRC
Ralph Architzel	Senior Reactor Engineer	NRC
Balwant K. Singal	Senior Project Manager	NRC
Steve Smith	Reactor Systems Engineer	NRC
Stephen Dinsmore	Senior Reliability and Risk Engineer	NRC
Stewart Bailey	Branch Chief	NRC
Donnie Harrison	Branch Chief	NRC

* Participated via phone

Entergy - Entergy Nuclear Operations
NRC – U.S. Nuclear Regulatory Commission
STPNOC – STP Nuclear Operating Company

Enclosure

Action Items

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Sincerely,

/RA/

Balwant K. Singal, Senior Project Manager
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Docket Nos. 50-498 and 50-499

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ADAMS Accession No. ML112411419

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DATE	9/15/11	9/14/11	9/22/11	9/26/11	10/4/11	10/4/11

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