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

June 21, 2012

Mr. George H. Gellrich, Vice President
Calvert Cliffs Nuclear Power Plant, LLC
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION REGARDING REALISTIC LARGE BREAK LOSS-OF-COOLANT-ACCIDENT ANALYSIS (TAC NOS. ME7672 AND ME7673)

Dear Mr. Gellrich:

By letter dated December 1, 2011, Calvert Cliffs Nuclear Power Plant, LLC submitted an Emergency Core Cooling System evaluation of once- and twice-burned AREVA fuel at Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2. The evaluation addresses the specific thermal conductivity degradation issues identified by the Nuclear Regulatory Commission (NRC) staff.

The NRC staff is reviewing the submittals and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The NRC staff is requesting a response to the RAI within 30 days of receipt.

If you have any questions regarding this issue, please contact me at (301) 415-1016.

Sincerely,

Nadiyah S. Morgan, Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2

REALISTIC LARGE BREAK LOSS-OF-COOLANT-ACCIDENT ANALYSIS

DOCKET NOS. 50-317 AND 50-318

By letter dated December 1, 20111, Calvert Cliffs Nuclear Power Plant, LLC requested approval of the realistic large break loss-of-coolant-accident (LBLOCA) analysis for Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (Calvert Cliffs).

In order to complete the review, the Nuclear Regulatory Commission (NRC) staff requests further information on the following items:

1. Please show the results for the limiting downcomer boiling case for Calvert Cliffs. Please identify the limiting parameters for this case in a data table. See the requested list of data parameters for all of the LBLOCA case runs.

2. Figure 3-19 shows a decreasing downcomer liquid level, while the core levels are increasing after about 325 seconds.

   a. Please explain why the core levels are increasing while the downcomer levels show a dramatic decrease.

   b. The average trends of the core and downcomer liquid levels show a decreasing average inventory over the last 150 seconds. Provide results of this limiting break beyond 300 sec until the levels show a steadily increasing trend.

3. Fig. 3-3 shows only four azimuthal sectors for a four loop plant. NRC staff calculations for a combustion engineering plant showed that use of 8 azimuthal sectors in the downcomer (an azimuthal downcomer volume in between each cell connected to each cold leg) increase peak cladding temperature (PCT) by as much as 400 degrees Fahrenheit (°F). While the four azimuthal sectors may be converged as stated in section 4.5.2.1, the additional azimuthal sectors have been shown to produce more downcomer boiling, since the injected emergency core coolant (ECC) is no longer averaged over the entirety of only four cells, thereby reducing the driving head and increasing PCT. If the refueling water storage tank (RWST) temperature is at a maximum with the increased nodalization, PCT is expected to show an increase relative to the crude downcomer nodalization scheme.

   a. Show the results of the more detailed downcomer on ECC response for Calvert Cliffs.

   b. What RWST/safety injection tank (SIT) temperatures, decay heat multiplier, and planar linear heat generation rate (PLHGR) were used in the 3-loop sensitivity study?

4. Tabulate the statistically sampled conditions, input data, etc. for the following parameters for all of the sampled break sizes. A data file is preferred for transmitting the data.

Case number
PCT (°F)
Case end time
PCT elevation
Hot rod
Assembly burnup
Core power (Mwt)
PLHGR (kw/ft)
Axial skew
Axial shape index
Break type
One sided break size (ft^2)
T_{min} (°F)
Initial stored energy (°F)
Decay heat multiplier
Film boiling heat transfer coefficient (HTC) ($btu/hr/ft^2/°F$)
Dispersed flow film boiling HTC
Condensation interphase HTC
Initial reactor coolant system
Flow rate (Mlbs/hr)
Initial T_{cold} (°F)
Pressurizer pressure (psia)
Pressurizer level (ft)
SIT temp (°F)
SIT pressure (psia)
SIT liquid volume (ft^3)
Start of broken loop SIT injection (seconds)
Start of intact loop SIT injection (seconds)
Broken loop SIT empty time
Intact loop SIT empty time
Start of high pressure safety injection flow
Start of low pressure safety injection flow
Beginning of refill time
End of refill time/start of reflood
Beginning of bypass time
Time of annulus downflow/end of bypass
Reflood rate up to time of PCT
Containment pressure at time of PCT
Containment volume (ft^3)
RWST temp (°F)

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