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10CFR50.46

June 8, 2006
2130-06-20347

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: 10 CFR 50.46 Annual Report

References:
1) Letter from Pamela B. Cowan (AmerGen Energy Company, LLC) to U. S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report," dated May 25, 2005

2) GE Letter, "10 CFR 50.46 Notification Letter," 2003-05, Rev. 2, April 27, 2006

The purpose of this letter is to transmit the 10 CFR 50.46 reporting information for Oyster Creek Generating Station (OCGS). The previous 50.46 report for OCGS (Reference 1) provided the cumulative Peak Cladding Temperature (PCT) errors for the most recent fuel designs through May 24, 2005.

Since the Reference 1 annual report was issued, General Electric (GE) has performed a detailed evaluation of a previously reported hydrogen-oxygen recombination phenomenon and has determined that there is sufficient conservatism in the Appendix K analysis which bounds the Upper Bound PCT and Oxidation with hydrogen-oxygen recombination in both PCT limited and oxidation limited exposure ranges (Reference 2). Therefore, the current SAFER/CORCL application methodology for conformance of Appendix K analysis 10 CFR50.46 limits remains applicable. The hydrogen-oxygen recombination phenomenon does not need to be considered in the Appendix K analysis for BWR/2 plants.

Two attachments are included with this letter that provide the current OCGS 10 CFR 50.46 status. Attachment 1, "Peak Cladding Temperature Rack-Up Sheet," provides information regarding the PCT for the limiting Large Break Loss of Coolant Accident (LOCA) Analysis evaluations for OCGS. Attachment 2, "Assessment Notes," contains a detailed description for each change or error reported.

If you have any questions, please contact Tom Loomis at 610-765-5510.

Very truly yours,

David P. Helker
Manager – Licensing

Attachments: 1) Peak Cladding Temperature Rack-Up Sheet
2) Assessment Notes

cc: S. J. Collins, USNRC Administrator, Region I
G. E. Miller, USNRC Project Manager, OCGS
M. S. Ferdas, USNRC Senior Resident Inspector, OCGS
File No. 05033

ATTACHMENT 1

10 CFR 50.46
"Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors"

Report of the Emergency Core Cooling System Evaluation Model Changes and Errors

Assessments as of May 10, 2006

Peak Cladding Temperature Rack-Up Sheet

Oyster Creek Generating Station

PLANT NAME: Oyster Creek
ECCS EVALUATION MODEL: SAFER/CORCL/GESTR-LOCA
REPORT REVISION DATE: 05/10/06
CURRENT OPERATING CYCLE: 20

ANALYSIS OF RECORD

Evaluation Model:

1. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume II, SAFER – Long Term Inventory Model for BWR Loss-Of-Coolant Analysis," October 1984.

2. NEDC-30996P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-jet Pump Plants, Volume I, SAFER – Long Term Inventory Model for BWR Loss-of-Coolant Analysis," October 1987.

3. NEDC-32950P, "Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model," January 2000. (Application Methodology Description)

4. NEDC-30996P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-jet Pump Plants, Volume II, SAFER Application Methodology for Non-jet Pump Plants," October 1987. (Non-jet Pump Plant – SAFER/CORCL)

Calculations:

1. GE-NE-0000-0001-7486-01P, "Oyster Creek Generating Station Loss-of-Coolant Accident Evaluation for GE11," GE Nuclear Energy, dated July 2002.

2. GE-NE-0000-0006-3699-01P-R1, "ECCS-LOCA Evaluation for Oyster Creek with Improved GE9 LHGR Limits," GE Nuclear Energy, dated September 2002.

Fuel: GE9, GE11
Limiting Fuel Type: GE9/GE11 (same)
Limiting Single Failure: ADS Valve
Limiting Break Size and Location: 4.66 ft^2 Double-Ended Guillotine (DEG) in a Recirculation Discharge Pipe

Reference Peak Cladding Temperature (PCT) PCT = 2150°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

New LOCA analyses were performed for both GE9 and GE11 fuel in support of operating cycle 19 (See Note 1)	ΔPCT = 0°F
WEVOL Code Error (See Note 2)	ΔPCT = 0°F
Hydrogen-Oxygen Recombination (See Note 3)	ΔPCT = +25°F
CORCL Boundary Conditions (See Note 4)	ΔPCT = 0°F
NET PCT (GE9)	**2175°F**
NET PCT (GE11)	**2175°F**

B. CURRENT LOCA MODEL ASSESSMENTS

Hydrogen-Oxygen Recombination (See Note 5)	ΔPCT = -25°F
Total PCT Change from Current Assessments	$\sum\Delta$PCT = -25°F
Cumulative PCT Change from Current Assessments	$\sum \lvert\Delta\text{PCT}\rvert$ = 25°F
NET PCT (GE9)	**2150°F**
NET PCT (GE11)	**2150°F**

ATTACHMENT 2

10 CFR 50.46
"Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors"

Report of the Emergency Core Cooling System Evaluation Model Changes and Errors

Assessment Notes

Oyster Creek Generating Station

1. Prior LOCA Assessment

New LOCA analyses were performed for both GE9 and GE11 fuel in support of operating cycle 19. These analyses supersede all prior LOCA assessments. These analyses incorporate all errors and changes known at that time (as of July 2002).

[Reference: GE-NE-0000-0006-3699-01P-R1, "ECCS-LOCA Evaluation for Oyster Creek with Improved GE9 LHGR Limits," GE Nuclear Energy, dated September 2002.]

[Reference: GE-NE-0000-0001-7486-01P, "Oyster Creek Generating Station Loss-of-Coolant Accident Evaluation for GE11," GE Nuclear Energy, dated July 2002.]

From August 2002 until May 2004, GE notified Exelon of two errors applicable to Oyster Creek, identified below (Notes 2 and 3).

The annual 50.46 Report for Oyster Creek erroneously reported no update to the LOCA model assessment for GE9 fuel and correctly reported the new LOCA analysis for the introduction of GE11 fuel. A Peak Clad Temperature of 2183°F was erroneously reported for GE9 fuel (correct value was 2150°F).

[Reference: Letter from Michael P. Gallagher (AmerGen Energy Company, LLC) to U.S. NRC, "10 CFR 50.46 Reporting Requirements," 2130-02-20349, dated December 18, 2002.]

2. Prior LOCA Assessment

General Electric (GE) reported that an error was found in the WEVOL code, which affects the calculated vessel volume in the downcomer region. The free volume in the region of the shroud head is calculated incorrectly, resulting in the calculated value to be underpredicted by 4 – 10 ft^3.

[Reference: GE Letter, "10 CFR 50.46 Notification Letter," 2002-05, August 26, 2002.]

3. Prior LOCA Assessment

GE reported that a new heat source term has been postulated. This heat source involves the recombination of hydrogen and oxygen within the fuel bundle during the core heatup. The additional heat will raise the temperature of the steam heat sink in the bundle, resulting in a potential increase in the peak cladding temperature and local oxidation. This recombination is spontaneous at temperatures above approximately 900°F. The hydrogen is generated by the steam-zirconium reaction during heatup. The oxygen enters the vessel either as a dissolved gas in the ECCS water or through the break when the vessel fully depressurizes and draws the containment non-condensable gases back into the vessel. The current LOCA evaluation models do not include this new heat source. Pending disposition of this phenomenon, a change notification was supplied to provide the impact of hydrogen-oxygen recombination on the cladding temperature and local oxidation.

[Reference: GE Letter, "10 CFR 50.46 Notification Letter," 2003-05, May 13, 2004.]

4. Prior LOCA Assessment

GE reported that the representative exposure point at which the 'long duration' SAFER run is performed to provide the boundary conditions for the CORCL evaluations may not be bounding and can have a non-conservative effect on the CORCL results. 'Short duration' SAFER runs are performed at each analyzed exposure point to provide the fuel bundle initial conditions. Long duration SAFER runs were performed for each analyzed exposure point. The PCT impact for the reported condition was determined to be 0^0F for GE9 and GE11 fuel.

[Reference: GE Letter, "10 CFR 50.46 Notification Letter," 2005-01, April 01, 2005.]

5. Current LOCA Assessment

In item 3 above, GE reported that a new heat source term has been postulated. This heat source involves the recombination of hydrogen and oxygen within the fuel bundle during the core heatup. GE has performed a detailed evaluation of this phenomenon and has determined that there is sufficient conservatism in the Appendix K analysis which bounds the Upper Bound PCT and Oxidation with hydrogen-oxygen recombination in both PCT limited and oxidation limited exposure ranges. Therefore, the current SAFER/CORCL application methodology for conformance of Appendix K analysis 10 CFR50.46 limits remains applicable. The hydrogen-oxygen recombination phenomenon does not need to be considered in the Appendix K analysis for BWR/2 plants.

[Reference: GE Letter, "10 CFR 50.46 Notification Letter," 2003-05, Rev. 2, April 27, 2006.]