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July 10, 1997

JSPLTR: 97-0131

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555
Attention: Document Control Desk

Subject: Dresden Nuclear Power Station Units 2 and 3
Plant Specific ECCS Evaluation Changes - 10CFR50.46 Report
DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

References:
1) J. S. Perry (ComEd) to USNRC letter dated February 7, 1997: "Dresden Nuclear Power Station Units 2 and 3, Plant Specific ECCS Evaluation Changes 10CFR50.46"

2) J. S. Perry (ComEd) to USNRC letter dated March 21, 1997: "Dresden Nuclear Power Station Units 2 and 3 Evaluation of Methods To Address ECCS Flow and Pressure Measurement Uncertainties"

This letter fulfills the requirement of 10CFR50.46(a)(3) as applied to Dresden Station Units 2 and 3 due to the accumulation of the absolute magnitude of changes in the ECCS evaluation models or their application which result in a calculated Peak Clad Temperatures (PCT) difference of more than 50° F. Both Unit 2 and Unit 3 experienced greater than a 50°F change in the Peak Cladding temperature as a result of application of a new methodology to form new baseline analyses of record for each unit. This letter fulfills the 30 day and annual reporting requirement of 10 CFR 50.46(a)(3) for Dresden Station Units 2 and Unit 3.

Reference 1) provided the NRC with the most recent PCT data for Dresden Station. Attachments 1 and 2 provide PCT information for the limiting Loss of Coolant Accident evaluations for Dresden Station, including all assessments as of June 3, 1997. The assessment notes (Attachment 3) provide a detailed description for each change or error reported.

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In March 1997, Dresden Station committed to perform an evaluation of methods to address Emergency Core Cooling System (ECCS) flow and pressure measurement uncertainties (Reference 2). The PCTs reported for both Unit 2 and Unit 3 include the results of the instrument loop inaccuracies. The ECCS measurement uncertainties were treated as a degradation to the overall ECCS response modeled in the 10 CFR Appendix K LOCA analyses. Inclusion of these ECCS measurement uncertainties in the LOCA analyses fulfills the requirements of the Reference 2 commitment.

Unit 3 loaded Siemens ATRIUM-9B fuel with the Cycle 15 reactor startup following the fourteenth refueling outage (D3R14) and, Siemens ATRIUM-9B fuel will be loaded during the fifteenth refueling outage for Unit 2. (D2R15).

If there are any questions or comments concerning this letter, please refer them to Frank Spangenberg, Regulatory Assurance Manager at (815) 942-2920, extension 3800.

Respectfully,

J. Stephen Perry
Site Vice President
Dresden Station

Attachment 1: Dresden Unit 2 10 CFR 50.46 Report
Attachment 2: Dresden Unit 3 10 CFR 50.46 Report
Attachment 3: Dresden Unit 2 and Unit 3 PCT Assessment Notes

cc: A. Bill Beach, Regional Administrator - RIII
J. F. Stang, Project Manager - NRR
NRC Senior Resident Inspector - Dresden
Office of Nuclear Facility Safety - IDNS

Attachment 1

Dresden Unit 2 10CFR50.46 Report

PLANT NAME:	Dresden Unit 2
ECCS EVALUATION MODEL:	EXEM BWR
REPORT REVISION DATE:	6/12/97
CURRENT OPERATING CYCLE:	15

ANALYSIS OF RECORD

Evaluation Model: Advanced Nuclear Fuels Corporation Methodology for Boiling Water Reactors EXEM BWR Evaluation Model, ANF-91-048(P)(A), dated January, 1993, (Attachment 3 Note 1).

Calculations:

1. "Dresden LOCA-ECCS Analysis MAPLHGR Limits for ATRIUM-9B and 9x9-2 Fuel," EMF-97-031(P), Revision 1, Siemens Power Corporation, dated May 1997.
2. "LOCA Break Spectrum Analysis for Dresden Units 2 and 3," EMF-97-025(P), Siemens Power Corporation, dated May 1997.

Fuel: 9x9-2 and ATRIUM-9B LFA
Limiting Single Failure: LPCI Injection Valve
Limiting Break Size and Location: 1.0 Double-Ended Guillotine (DEG) in a Recirculation Suction Pipe

Reference PCT (see Attachment 3 Note 2) PCT = 2018°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

None (Attachment 3 Note 1)

B. CURRENT LOCA MODEL ASSESSMENTS

None

Total PCT Change from Current Assessments $\sum \Delta PCT =$ 0°F

Cumulative PCT Change from Current Assessments $\sum |\Delta PCT| =$ 0°F

NET PCT **PCT = 2018°F**

Attachment 2

Dresden Unit 3 10CFR 50.46 Report

PLANT NAME:	Dresden Unit 3
ECCS EVALUATION MODEL:	EXEM BWR
REPORT REVISION DATE:	6/12/97
CURRENT OPERATING CYCLE:	15

ANALYSIS OF RECORD

Evaluation Model: Advanced Nuclear Fuels Corporation Methodology for Boiling Water Reactors EXEM BWR Evaluation Model, ANF-91-048(P)(A), dated January, 1993, (Attachment 3 Note 1).

Calculations:

1. "Dresden LOCA-ECCS Analysis MAPLHGR Limits for ATRIUM-9B and 9x9-2 Fuel," EMF-97-031(P), Siemens Power Corporation, dated May 1997.

2. "LOCA Break Spectrum Analysis for Dresden Units 2 and 3," EMF-97-025(P), Siemens Power Corporation, dated May 1997.

Fuel: ATRIUM-9B and 9x9-2
Limiting Single Failure: LPCI Injection Valve
Limiting Break Size and Location: 1.0 Double-Ended Guillotine (DEG) in a Recirculation Suction Pipe

Reference PCT (see Attachment 3 Note 2) PCT = 1920°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

None (Attachment 3 Note 1)

B. CURRENT LOCA MODEL ASSESSMENTS

None

Total PCT Change from Current Assessments $\sum \Delta PCT =$ 0°F

Cumulative PCT Change from Current Assessments $\sum |\Delta PCT| =$ 0°F

NET PCT **PCT = 1920°F**

Attachment 3

Additional Information for Dresden Units 2 and 3 50.46 Report

1. Application of EXEM BWR Methodology [ANF-91-048(P)(A)]

The methodology used to perform the analyses of record for Unit 2 and Unit 3 represent a change in the methodology previously used by Siemens Power Corporation. This change in methodology along with the incorporation of ATRIUM-9B fuel into the Unit 3 core is the basis for the 30 day report for Dresden Station. As a result of the new methodology together with the new baseline analysis for each unit, both Unit 2 and Unit 3 have experienced greater than a 50°F change in Peak Cladding Temperature. The Unit 2 Peak Cladding Temperature has been reduced from 2163°F to 2018°F(145°F change), while the Unit 3 Peak Cladding Temperature has been reduced from 2163°F to 1920°F (243°F change).

The methodology currently used by Siemens Power Corporation (EXEM BWR [ANF-91-048(P)(A)]) requires the use of a conservative, constant ECCS injection temperature. Siemens has determined that an elevated value yields the most conservative PCT results. The value used for the Dresden LOCA analysis was 170 °F. The use of this value conservatively bounds the maximum suppression pool temperatures for the initial period of the LOCA during which the PCT is reached and then mitigated. This temperature was derived from the suppression pool analysis as shown in the UFSAR.

Siemens Power Corporation methodology also utilizes a reflood criteria liquid entrainment flow rate which allows the switch from hot channel steam cooling Appendix K heat transfer coefficient to the Appendix K spray cooling heat transfer coefficient. The Siemens FLEX computer code is used to determine the core and system response during the reflood and refill phases of a LOCA. A sustained non-zero value for relative entrainment has been the criteria that FLEX uses to determine the time of core reflood. In this analysis, Siemens has applied a conservative supplemental reflood criteria of absolute entrained liquid flow rate at the plane of interest sustained for 1 second to determine the time of core reflood. Siemens presented the revised supplemental criteria to the NRC on January 9, 1997 and provided an information letter on January 21, 1997 to document the supplemental criteria.

2. Reporting of Different Peak Cladding Temperatures for Each Unit

Dresden Unit 2 and Unit 3 are being maintained under separate analyses of record (EMF-97-031(P), Revision 1 and EMF-97-031(P) respectively) as a result of a reduced Core Spray runout flow condition that exists at Dresden Unit 2. This flow condition is lower with respect to the LOCA analysis assumption for Dresden Unit 3. The following table lists the leakages and Core Spray runout flows assumed for both Units 2 and 3 in the analysis of record for each unit.

Attachment 3

Additional Information for Dresden Units 2 and 3 50.46 Report (Continued)

Dresden Units 2 & 3 Leakage Currently Calculated and Analyzed for Loss-of-Coolant Accidents

Source	Current Unit 2 Calculated Leakage (GPM)	Current Unit 3 Calculated Leakage (GPM)	Currently Analyzed Leakage Unit 2 (GPM)	Currently Analyzed Leakage Unit 3 (GPM)
RPV penetration assembly Design Leakage (2-Loop)	2 x 190 380 total	2 x 115 230 total	500(1)	500(1)
Upper T-box vent hole Leakage (2-Loop)	2 x 8 16 total	2 x 8 16 total	0(1)	0(1)
Core spray piping weld Cracks End of Cycle Leakage (3) (2-Loop)	2 2 Total	10+11 21 Total	0(1)	0(1)
Core shroud weld cracks	184	184	184	184
Access hole cover	78	0	78	78
Bottom head drain line	295(2)	295(2)	295	295
Core Spray Runout Flow	5300(4)	5650(5)	5300(4)	5650(5)

(1) The 500 gpm of RPV assembly penetration leakage listed in the table is equivalent to 500 gpm of total leakage for the RPV assembly leakage, Upper T-box vent hole leakage, and the CS line postulated crack leakage. Since all of these leakages occur in the CS line between its entry into the vessel and the penetration of the core shroud, the distribution of these leakages is insignificant. Conservatively, none of the Core Spray leakage flow is credited to enter the vessel.

(2) The bottom head drain was recalculated by Siemens Power Corporation and determined to be 295 gpm, which is greater than the value of leakage (286 gpm) assumed in the previous analyses. It should be noted that this increase in bottom head drain leakage was explicitly accounted for in the current analyses EMF-97-031(P), Revision 1 and EMF-97-031 for Units 2 and 3 respectively.

(3) The end-of-cycle crack lengths (including unit specific projected crack growth) were used to calculate the leakages.

(4) Core Spray runout flow tests at Dresden Unit 2 show that at least 5520 gpm of runout flow per loop would be available from the Core Spray system. Based on this information the Core Spray flow was conservatively modeled as being 5300 gpm per loop in the analysis of record for Unit 2 (EMF-97-031(P), Revision 1)

(5) Core Spray runout flow tests at Dresden Unit 3 show that at least 5700 gpm of runout flow per loop would be available from the Core Spray system. Based on this information the Core Spray flow was conservatively modeled as being 5650 gpm per loop in the analysis of record for Unit 3 (EMF-97-031(P))