



March 21, 1997

JSPLTR #97-0059

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Subject: Dresden Nuclear Power Station Units 2 and 3  
Evaluation of Methods To Address ECCS  
Flow and Pressure Measurement Uncertainties  
NRC Docket Nos. 50-237 and 50-249

- References:
- (1) J. Stephen Perry letter to U.S. NRC, dated November 6, 1996, transmitting Dresden Core Spray System Flow Requirements.
  - (2) NUREG 1482, dated April 1995; "Guidelines for Inservice Testing at Nuclear Power Plants."
  - (3) ASME OMa-1988 Part 6 (OM-6); "Inservice Testing of Pumps in Light-Water Reactor Power Plants."
  - (4) James M. Taylor U.S. NRC letter to James J. O'Connor ComEd, dated December 24, 1996, transmitting Independent Safety Inspection of Dresden Nuclear Power Station (NRC Inspection Report 50-237/96-201, 50-249/96-201).

In Reference (1) Dresden Station committed to perform an evaluation of methods to address Emergency Core Cooling System (ECCS) flow and pressure measurement uncertainties. The purpose of this letter is to provide the results of the evaluation regarding the treatment of measurement uncertainties for ECCS pump flow and pressure. The measurement uncertainties are used in the performance of Technical Specifications operability testing and the ASME Inservice Testing (IST) program. The scope of this assessment addresses the Core Spray (CS), High Pressure Coolant Injection (HPCI), and Low Pressure Coolant Injection (LPCI) pumps for both units.

The Attachment to this letter contains the results of the evaluation.

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	LITCO	1	1

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This letter contains the following new commitments:

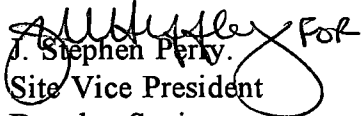
1. Pump discharge flow and pressure instrument loop accuracy calculations will be developed for the CS, HPCI, and LPCI systems to quantify the instrument accuracy.
2. The results of the instrument loop accuracy calculations will be assessed in the Unit 3 Cycle 15 Loss of Coolant Accident (LOCA) Analysis which is applicable to both Unit 2 and Unit 3. Their Peak Cladding Temperature (PCT) impact quantified and approved along with other factors affecting PCT margin. The analysis will be performed using the 10 CFR 50 Appendix K methodology previously approved for use by the NRC.
3. Based on the results of the Unit 3 Cycle 15 LOCA Analysis, updates will be submitted for the UFSAR and the Design Base Documents (DBDs) for the CS, HPCI, and LPCI systems. These changes will ensure consistency in definition of how the site is committed to address ECCS measurement uncertainty in our licensing basis.
4. Revisions will be made to plant instrument maintenance and operations procedures involved with IST/Technical Specifications surveillances for ECCS pump operability, or in calibrating the instruments discussed in action 1 above. These changes will be made to provide administrative controls to ensure that instrument accuracy requirements are maintained in the future and to protect the integrity of the design inputs to the LOCA analysis for measurement uncertainties.
5. The IST program basis and acceptance criteria manual will be revised to document how pump discharge flow and pressure measurement uncertainty is addressed within the site program.

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If there are any questions regarding this issue, please contact Frank Spangenberg,  
Dresden Station Regulatory Assurance Manager, (815) 942-2920, extension 3800.

Sincerely,

  
J. Stephen Perry  
Site Vice President  
Dresden Station

Attachment

cc: A. Bill Beach, Regional Administrator, Region III  
P. L. Hiland, Branch Chief, Division of Reactor Projects, Region III  
J. F. Stang, Project Manager, NRR (Unit 2/3)  
Senior Resident Inspector, Dresden  
Office of Nuclear Facility Safety - IDNS

## ATTACHMENT

### Background

Verification of ECCS pump operability at Dresden is demonstrated by performance of surveillance procedures that meet both the Inservice Testing (IST) Program requirements of ASME Section XI and OMa-1988 Part 6 (OM-6) and the Technical Specifications requirements for Emergency Core Cooling System (ECCS) pump performance. For the IST Program, performance is trended with respect to a reference condition established when the pump was last known to be operating acceptably. If performance degrades beyond the relative limits set by OM-6, the pump is declared inoperable. For Technical Specifications surveillance requirements, the pump flow rate and discharge pressure are verified to meet or exceed values based on the plant design safety analysis. If pump performance falls below the required Technical Specifications limits, it is declared inoperable and corrective actions are initiated.

Historically, Dresden pump operability testing for both IST and Technical Specifications compliance has been based on "As Read" indications of installed plant instrumentation. The instrumentation used to perform these procedures has been maintained within the limits specified in ASME OM-6, which defines instrument range and calibration accuracy requirements. Per the ASME Code, this ensures that the test results are sufficiently accurate to monitor each pump for degrading conditions. This approach is also consistent with the recommendations specified in NUREG 1482 (Reference 2) and ASME OM Committee guidance for instrumentation used in pump performance trending.

In Sections 5.6 and 5.10, NUREG 1482 states that the ASME OM-6 requirements are provided to trend general pump performance over time. It also notes that the limits in the plant design safety analysis should not be ignored when pump acceptance limits are being developed. System performance limits specified in the design safety analysis normally form the basis of ECCS pump Technical Specifications surveillance acceptance limits. Section 5.10 states that the IST Program operability limit selected for a pump should be the most conservative value established between the safety analysis, and the ASME IST criteria. Section 5.10 further implies that if pump operability limits are chosen to ensure compliance with plant specific design basis assumptions, it may be necessary to achieve a higher degree of accuracy for the instrumentation, beyond the ASME OM-6 limits.

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In the second quarter of 1996, Dresden performed a self assessment of the IST Program to verify that the program was being properly implemented in accordance with the ASME Code and other regulatory requirements. NUREG 1482 was also used for supplemental guidance. During the assessment, a potential discrepancy in the Technical Specifications surveillance acceptance criteria was identified since the acceptance criteria had not been adjusted for the accuracy of the instrumentation used as discussed in NUREG 1482, Section 5.10. It was not clear whether the Dresden IST Program was in strict compliance with NUREG 1482. This potential deficiency was noted and entered into the Dresden corrective action program for follow up and resolution. The results of the IST Program assessment were reported to the NRC on August 9, 1996, via Licensee Event Report 96-011/ Docket 50-237.

In September 1996, an NRC Independent Safety Inspection (ISI) began at Dresden. The NRC ISI Team reviewed the Technical Specifications surveillance requirements for the CS, HPCI, and LPCI systems. They identified that there were no retrievable bases for the Technical Specifications surveillance acceptance criteria to ensure that the test conditions suitably reflected accident conditions. In addition, the NRC ISI Team noted that the acceptance criteria did not include an allowance for the accuracy of the instrumentation used. Dresden acknowledged the need to account for this measurement uncertainty, but noted that this had been identified in the IST Program self assessment and was being resolved under the corrective action program. Dresden maintained that further evaluation was required before a decision as to how to account for this measurement uncertainty could be made. As a result, this was identified as Unresolved Item 50-237(249)/96-201-25 in Reference 4.

### Summary of Site Instrument Uncertainty Evaluation

Dresden Station formed an interdisciplinary project team in early December 1996, to evaluate how to address flow and pressure measurement uncertainty associated with ECCS pump operability testing. The project team considered several approaches to address this issue and concluded that one of the following three options should be implemented:

- Option 1** Measurement uncertainty accounted for in the pump surveillance acceptance criteria and system equipment margins. In this Option, station operating procedures would have the acceptance criteria increased to account for the accuracy of the instrumentation used.

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- Option 2** Measurement uncertainty accounted for in the 10 CFR 50.46 LOCA Safety Analysis. In this Option, the ECCS flow input to the 10 CFR 50.46 LOCA/ECCS analysis would be reduced to account for the accuracy of the instrumentation used.
- Option 3** Measurement uncertainty quantified and accounted for as margin in the 10 CFR 50 Appendix K methodology for performing LOCA Analysis. In this Option, a "best estimate" analysis would be performed per 10 CFR 50.46. The results would be compared to the 10 CFR 50 Appendix K analysis results to demonstrate that adequate margin existed to account for the accuracy of the instrumentation used.

After evaluating each of these options, the project team recommended that Option 2, accounting for pump flow and pressure measurement uncertainty in the 10 CFR 50.46 LOCA Safety Analysis, be implemented for the CS, HPCI, and LPCI systems on both units. Dresden Station maintains that it is and has been in compliance with the original licensing basis. The ECCS measurement uncertainty issue will be addressed by adjusting the inputs in the 10 CFR 50.46 LOCA analysis. This will bring Dresden into compliance with the current NRC guidance on the issue as provided in NUREG 1482.

### Implementation Plan and Conclusion

Dresden station will address ECCS pump flow and pressure measurement uncertainty by taking a flow penalty in our 10 CFR 50.46 LOCA analysis and a resulting reduction in the margin to our Peak Cladding Temperature (PCT) limits. This is in compliance with ASME Section XI and OM-6 requirements and the recommendations of NUREG 1482. This change does not require revision to any existing Technical Specifications, or Technical Specification Bases.

The following actions will be taken to implement our plan:

1. Pump discharge flow and pressure instrument loop accuracy calculations will be developed for the CS, HPCI, and LPCI systems to quantify the instrument accuracy. (NTS # 23712397004 and 23712397005)

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2. The results of the instrument loop accuracy calculations will be assessed in the Unit 3 Cycle 15 LOCA Analysis which is applicable to both Unit 2 and Unit 3. Their PCT impact quantified and approved along with other factors affecting PCT margin. The analysis will be performed using the 10 CFR 50 Appendix K methodology previously approved for use by the NRC. (NTS # 23712397006)
3. Based on the results of the Unit 3 Cycle 15 LOCA Analysis, updates will be submitted for the UFSAR and the DBD's for the CS, HPCI, and LPCI systems. These changes will ensure consistency in definition of how the site is committed to address ECCS measurement uncertainty in our licensing basis. (NTS # 23712397007)
4. Revisions will be made to plant instrument maintenance and operations procedures involved with IST/Technical Specifications surveillances for ECCS pump operability, or in calibrating the instruments discussed in action 1 above. These changes will be made to provide administrative controls to ensure that instrument accuracy requirements are maintained in the future and to protect the integrity of the design inputs to the LOCA analysis for measurement uncertainties. (NTS # 23712397009 and 23712397010)
5. Revise the IST program basis and acceptance criteria manual to document how pump discharge flow and pressure measurement uncertainty is addressed within the site program. (NTS # 23712397008)

Actions 1 through 5 will be completed by January 31, 1998 and Dresden will have fully implemented the resolution of this issue. The results of these actions will be further evaluated to determine if any follow on actions are appropriate to restore pump margins or reduce the PCT penalties in the LOCA analysis.